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# The Global Information Technology Report 2008–2009

## Mobility in a Networked World

**Soumitra Dutta,** INSEAD
**Irene Mia,** World Economic Forum
Editors

*The Global Information Technology Report 2008–2009* is a special project within the framework of the Global Competitiveness Network. It is the result of a collaboration between the World Economic Forum and INSEAD.

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The terms *country* and *nation* as used in this report do not in all cases refer to a territorial entity that is a state as understood by international law and practice. The terms cover well-defined, geographically self-contained economic areas that may not be states but for which statistical data are maintained on a separate and independent basis.

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# Preface

**KLAUS SCHWAB**
Executive Chairman, World Economic Forum

Information and communication technologies (ICT) is increasingly moving to the core of national competitiveness strategies around the world, thanks to its revolutionary power as a critical enabler of growth, development, and modernization. Recent economic history has shown that, as developed countries approach the technological frontier, ICT is crucial for them to continue innovating in their processes and products and to maintain their competitive advantage. Equally importantly, ICT has proven instrumental for enabling developing and middle-income economies to leapfrog to higher stages of development and fostering economic and social transformation.

All over the world, ICT has empowered individuals with unprecedented access to information and knowledge, with important consequences in terms of providing education and access to markets, of doing business, and of social interactions, among others. Moreover, by increasing productivity and therefore economic growth in developing countries, ICT can play a formidable role in reducing poverty and improving living conditions and opportunities for the poor.

In these challenging times of global economic crisis, the extraordinary capacity of ICT to drive growth and innovation should not be overlooked, since it can play a critical role not only in facilitating countries' recovery but also in sustaining national competitiveness in the medium to long term. At the World Economic Forum, we are strong believers in the link between economic growth and ICT readiness, a link that should be further emphasized in the face of the current severe economic downturn and calls for budget cuts.

*The Global Information Technology Report* (GITR) series, produced by the Forum in partnership with INSEAD and published annually since 2001, has contributed to raising awareness of the importance of ICT diffusion for overall competitiveness. The broad methodological framework of the Networked Readiness Index (NRI), featured in the *Report* series, identifies the enabling factors that permit countries to fully benefit from ICT advances, stressing the key responsibility of all social actors—individuals, businesses, and governments. The NRI has proven a unique tool for policymakers and all relevant stakeholders, allowing them to follow the progress of their country over time and vis-à-vis relevant comparators, and providing a neutral and authoritative platform for public-private dialogue and for designing national policies and strategies that aim toward enhanced networked readiness and competitiveness.

*The Global Information Technology Report 2008–2009,* the eighth edition in the series, presents the latest findings of the NRI, providing an updated picture of the state of networked readiness in the world. Under the general theme of mobility, the *Report* notably highlights the remarkable role of mobile telephony—possibly the most revolutionary ICT—in economic growth, and once again showcases success stories of countries able to leverage ICT for increased competitiveness.

Continuing our effort to expand the coverage of the *Report,* a record number of 134 economies, accounting for over 98 percent of the world's GDP, has been included this year. Also featured in the *Report* is a comprehensive data section containing detailed profiles for each economy covered and data tables with global rankings for nearly 70 indicators. A number of essays and case studies on mobility and best practices in networked readiness complement the *Report.*

We would like to express our gratitude to the respected academics and industry experts who contributed outstanding chapters to this *Report,* casting light on important aspects of mobility and ICT and highlighting best policies and practices in ICT diffusion and leverage. We especially wish to thank the editors of the *Report,* Soumitra Dutta at INSEAD and Irene Mia at the World Economic Forum, for their leadership and long-lasting dedication to the project. Appreciation also goes to Fiona Paua, who heads the Strategic Insight Teams, and the other members of the Global Competitiveness Network: Jennifer Blanke, Ciara Browne, Agustina Ciocia, Margareta Drzeniek Hanouz, Thierry Geiger, Pearl Samandari, and Eva Trujillo Herrera. Last but not least, we would like to convey our sincere gratitude to our network of 150 Partner Institutes around the world and to all the business executives who participated in our Executive Opinion Survey, without whose valuable input and support the production of this *Report* would not have been possible.

# Foreword

**JOHN CHAMBERS**
Chairman and CEO, Cisco Systems, Inc.

The current global recession has affected business in nearly every industry and geographical region; it is also having a deep and wide impact on societies around the world. Taking decisive action to reprioritize during any slowdown is a key focus for companies and countries, and we are all in the process of taking the necessary measures that will enable us to adjust to today's reality. It is fundamental, however, that we do not allow short-term challenges to distract us from planning for longer-term opportunities to achieve sustainable growth.

I believe that we are faced with a unique opportunity to nurture global economic prosperity, and ubiquitous broadband access is a key part of the solution. By investing in the development and acceleration of a global broadband infrastructure, we can provide Internet access for all of the world's citizens. This means we can create jobs, provide better access to health care and education, connect small business owners to new customers, and in some countries create a middle class that will raise the standard of living and national GDP.

There is plenty of work to do in providing access. For example, while 77 out of every 100 Canadian residents uses the Internet, there are only 16 out of 100 users in Panama, according to 2007 ITU data and analysis. The number of broadband subscribers of the same two countries is in equal contrast; while 28 of every 100 Canadian residents have broadband subscriptions, there is only 1 broadband subscriber per 100 in Panama. Equally important is the opportunity for countries that are considered advanced when compared to other countries from around the world. For example, Korea, Rep., considered the leader in broadband penetration, only has 29 broadband subscribers per 100 residents, according to ITU data.

Achieving ubiquitous broadband access is in the best interest of citizens, businesses, and governments alike. However, we will succeed in this effort only through a collaborative partnership—businesses working alongside health-care providers, educators, governments, and nongovernmental organizations. Only by providing the means for people everywhere to access broadband—from the most remote villages to the densest urban centers—will we have the potential to experience a truly connected global economy.

Broadband provides unprecedented opportunities for people to communicate with others, access information, improve education and health care, enter new markets, expand the reach of businesses, and so much more. Imagine how different the world—and the world economy—would be if we could extend connectivity to all corners of the globe. Broadband literally transforms the way we live, work, play, and learn.

And when we talk about broadband, we are really talking about *mobile* broadband, enabled by a global wireless infrastructure built on an Internet Protocol network platform. Mobility represents the only way for the world to achieve ubiquitous broadband access, allowing the power of the network to scale beyond the limits of traditional hard-wired environments.

Prior to the emergence of the global economic crisis, the world was gaining momentum toward the next phase of the Internet, built on a network platform and fueled by productivity-enhancing collaboration tools and networked applications. Despite the current financial setbacks, we are still collectively poised to reap the benefits of this next phase, enabled by a worldwide mobile broadband network infrastructure.

With this in mind, I believe that the most important step government and business leaders in both developed and developing nations can take to encourage economic growth and global prosperity is to concentrate—collectively, collaboratively—on longer-term opportunities such as universal broadband access.

Let's rise to the challenge, and in doing so, raise the quality of life—and our economic prosperity for generations to come. Now is the time to invest in ubiquitous broadband and empower all of the world's citizens to participate in the human network.

Cisco is pleased to sponsor *The Global Information Technology Report 2008–2009,* including the Networked Readiness Index. We hope that these will provide important insight into how we can use mobility to help address the immense challenges and opportunities ahead.

# Executive Summary

**SOUMITRA DUTTA,** INSEAD
**IRENE MIA,** World Economic Forum

Information and communication technologies (ICT) has proven to be a key enabler of socioeconomic progress and development, enhancing productivity and therefore economic growth, reducing poverty and improving living standards in many ways. ICT is increasingly revolutionizing production processes, access to markets, and information sources together with social interactions. ICT also has an impact on government efficiency, fostering transparency and better communication and services with and to citizens.

Among these new technologies, mobile telephony takes a special place in view of its exceptional diffusion in the last decade or so and its strong social and economic impact. In particular, mobile telephony has proven instrumental in raising prosperity and reducing poverty in developing countries, where it has boomed in recent years—thanks also to a number of facilitating factors, including an infrastructure fairly easy to deploy, a market generally open to new entrants, and the decreasing costs of mobile handsets and communication per minute, among others.

*The Global Information Technology Report* series, launched in 2001 and published annually since, has gone hand in hand with the ICT revolution and evolution for eight years now, contributing to raising public and private awareness of the many benefits associated with fully leveraging ICT in everyday life, in business practices, and in a government's activities and interactions with its citizens. The *Report* has stressed the importance of ICT in national competitiveness and development strategies and has provided a very useful tool for decision makers and civil society alike to monitor national progress as well as examples of best practices and policies to increase networked readiness.

*The Global Information Technology Report 2008–2009* appears at a difficult time for the global economic system, which seems to be plunging deeper and deeper into the serious recession that began with the subprime housing crisis in the United States and then spread to most countries in the world. Against such a daunting economic outlook, it is important to reaffirm the crucial role of ICT for general competitiveness and progress and the importance of continuing to invest in ICT infrastructure and related services, as well as, more broadly, in innovation. We hope that the *Report* and the Networked Readiness Index (NRI) 2008–2009 will further strengthen the case for ICT by highlighting the strong correlation between ICT readiness and economic growth and showcasing success stories of countries that have used ICT to leapfrog stages of development or, more generally, to enhance their competitiveness.

The *Report* is the eighth of a series and is the result of a well-established partnership between the World Economic Forum (the Forum) and INSEAD, aimed at advancing knowledge of networked readiness and of its principal drivers.

The *Report* is composed of four thematic parts. Part 1 features the findings of the Networked Readiness Index for 2008–09, as well as a number of remarkable essays examining different topics related to mobility and ICT. Among these topics are mobile telephony and its impact on economic growth and networked readiness, Internet ubiquity, mobile reality mining, and mobility of talents and research and development (R&D) flows.

Part 2 provides insight into best practices and policies in networked readiness and competitiveness, focusing on specific country case studies. The countries selected this year are Egypt, Korea, Rep. (Korea), and Brazil, for, respectively, best practices as an outsourcing destination, general ICT strategy to promote national competitiveness, and the use of e-government services and ICT to alleviate economic and social problems.

Part 3 includes detailed profiles for each of the 134 economies covered in this year's *Report,* offering a comprehensive snapshot of each economy's current networked readiness landscape and allowing for international and historical comparison on specific variables or components of the NRI. Part 4 features detailed data tables for each of the 68 variables composing the NRI this year, with rankings for the 134 economies covered, and technical notes and sources.

### Part 1: The Networked Readiness Landscape in 2008–09 and Mobility

This part presents the latest findings of the NRI, sketching a comprehensive picture of the networked readiness landscape of the world in 2008–09. A number of deep-dive analyses focusing on different aspects related to mobility, ICT, and innovation are also included, as follows: (1) mobile telephony and its impact on networked readiness; (2) the shift from mobility to ubiquity, thanks to universal Internet connectivity; (3) how to maximize the economic impact of mobile communications;

(4) best practices in regulation that can amplify mobile service benefits in emerging markets; (5) reality mining of mobile communications; (6) global mobility of talent; and (7) mobility of international flows in ICT R&D.

### The Networked Readiness Index

Chapter 1.1, "Gauging the Networked Readiness of Nations: Findings from the Networked Readiness Index 2008–2009," presents the latest NRI findings. The NRI was developed by INSEAD in 2002 as a part of an ongoing joint research project with the Forum, and is the main methodological tool featured in the *Report* to assess countries' preparedness to leverage ICT advances for increased competitiveness and development. It builds on a mixture of hard data collected by well-respected international organizations, such as the International Telecommunication Union (ITU), the United Nations, and the World Bank, and survey data from the Executive Opinion Survey, conducted annually by the Forum in each of the economies covered by the *Report*. The NRI 2008–2009 covers a record number of 134 economies (up from 127 in last year's edition) from both the developed and developing world, accounting for over 98 percent of world GDP. The Networked Readiness Framework, underpinning the NRI and stable since 2002, measures:

- the presence of an ICT-conducive environment, by taking into consideration a number of features of the broad business environment, some regulatory aspects, and the soft and hard infrastructure for ICT;
- the degree of preparation needed to use ICT for the three main national stakeholders—individuals, the business sector, and the government; and
- the actual use of ICT by the above three stakeholders.

The NRI rankings for 2008–09 feature Denmark as the most networked economy in the world for the third consecutive year, the culmination of an upward trend observed since 2003. The other Nordic countries also continue to teach the world best practices on how to leverage ICT for increased competitiveness, with Sweden, Finland, Iceland, and Norway at 2nd, 6th, 7th, and 8th position, respectively. Among the top 20, the United States continues to deliver a convincing performance in networked readiness, climbing one position to an outstanding 3rd place, followed by Singapore (4th) and Switzerland (5th). Five other economies from the Asia and Pacific region place in the top 20 this year: Korea (11th), Hong Kong (12th), Taiwan (13th), Australia (14th), and Japan (17th).

With regard to the largest Asian emerging markets, China leapfrogs 11 positions to 46th, overtaking India (which is down four positions at 54th) and the rest of the BRIC countries for the first time.

The assessment of Latin America and the Caribbean is more mixed in nature, with only six economies in the top half of the rankings, namely Barbados (36th), Chile (39th), Puerto Rico (42nd), Jamaica (53rd), Costa Rica (56th), and Brazil (59th). Chile loses five positions and the leadership in the region for the first time since the inception of this Index. Mexico and Argentina are both losing ground, positioning themselves at 67th and 87th, respectively.

Despite some positive trends, sub-Saharan Africa continues to lag behind the rest of the world by a significant margin, with only two economies (Mauritius and South Africa, at 51st and 52nd place, respectively) in the top half of the NRI, while 18 rank below 100th place.

In Northern Africa, Tunisia (38th) leads the way again, with a large and widening gap. Egypt, Morocco, and Algeria are down at 76th, 86th, and 109th, respectively.

By contrast, the Middle East further improves its networked readiness, with all countries but one appearing in the top half of the NRI rankings, namely Israel (25th), the United Arab Emirates (27th), Qatar (29th), Bahrain (37th), Saudi Arabia (40th), Jordan (44th), Oman (50th), and Kuwait (57th).

Similar to last year, a trend analysis of the eight-year time-series of the NRI is included in the chapter, with the aim of identifying the countries and regions that have proven particularly dynamic in leveraging ICT and have advanced the most in the NRI rankings over the years.

### Mobile telephony and networked readiness

Mobile telephony has emerged as one of the most important and widespread forms of ICT in recent decades, with a significant impact on economic growth and poverty reduction.

In particular, mobile communications penetration has boomed in the developing world, compensating for an often underdeveloped and flawed fixed telephony infrastructure and offering a promising tool to lift more and more people out of poverty and improve market efficiency. This is good news in view of reducing the digital and economic divide existing between high- and low-income countries.

In their paper "Mobile Telephony: A Critical Enabler of Networked Readiness?" Thierry Geiger and Irene Mia (both at the World Economic Forum) explore the connections among mobile telephony, economic growth and development, and countries' networked readiness, as captured by the NRI. The authors' original assumption is that mobile readiness should have a strong impact on overall networked readiness and therefore on sustained economic growth and development. The analysis performed in the chapter shows that this supposition is certainly true, but only to a certain extent.

While the latest data as well as historical data demonstrate that only a handful of countries with low mobile telephony penetration rates achieve above average networked readiness levels, Geiger and Mia noticed that high mobile telephony penetration is not inevitably synonymous with high networked readiness. They also observe that the relation between mobile telephony usage and GDP per capita is clearly positive, but is about three times stronger in low- and lower-middle-income countries. This finding bodes well for poor countries' capacity to reduce poverty levels and improve competitiveness and prosperity, considering the booming mobile phone penetration rates they have registered in recent years.

### From mobility to ubiquitous connectivity

High-speed networks have become part of the basic infrastructure of any country and one of the foundations of the knowledge economy. For many countries they also offer a unique, cost-effective opportunity to enhance their competitiveness and rise above physical or geographical constraints. Beyond mobility of telecommunications, ubiquitous Internet access offers connectivity that follows users seamlessly as they move from place to place and device to device.

In their chapter "From Mobility to Ubiquity: Ensuring the Power and Promise of Internet Connectivity… for Anyone, Anywhere, Anytime," authors Robert Pepper, Enrique J. Rueda-Sabater, Brian C. Boeggeman, and John Garrity (all at Cisco Systems, Inc.) propose: (1) a typology of Internet stages and an ICT Map to place countries' ICT development in perspective and provide a basis for charting a course forward, (2) a framework for assessing and improving connectivity and the use of networks, and (3) a review of the key drivers toward the goal of Internet ubiquity. The stages and ICT Map highlight the importance of balancing infrastructure investments with improvements in the ecosystem (notably ICT policies and market regulation). This is confirmed, the authors say, by evidence that connectivity is not determined solely by income levels—making it possible for lower-income countries to leapfrog in ICT development.

A framework built around six keystones is suggested by the authors to benefit from the opportunity that network connectivity offers. These comprise: a competitive market structure that balances investment incentives and efficient service, policies and regulations that support technology adoption (including convergence around IP), entrepreneurship around applications and content, the use of government ICT budgets to "prime the pump" and
pioneer ICT adoption, skill development, and extensive investment (public and private) in infrastructure. This framework, they argue, can be used to build the foundations from which to progress toward the goal of Internet ubiquity—with all its implications for collaboration and Web 2.0 productivity and inclusiveness. This requires ensuring, in particular, the wide availability of a core network, spectrum availability and other means to allow a diverse system of "capillaries" extending to "the last mile" to emerge, and the proliferation of Internet-enabled devices that meet the needs of users.

### Maximizing the economic impact of mobile communications

Although there is no magic bullet solution for economic development, mobile telecommunications has indeed had a positive disruptive impact on life in many developing economies, especially in rural areas. In their chapter "How to Maximize the Economic Impact of Mobile Communications: The Four Waves," Leonard Waverman (Haskayne School of Business, London Business School, and LECG) and Kalyan Dasgupta (LECG) identify four stages of development of an information society, which they define as the "four waves" of communications technology, namely (1) simple access, (2) universal service, (3) usage, and (4) provision of complementary skills and assets. According to them, only when a country has evolved through all four waves is it able to make the fullest use of technology. The authors observe that the literature and the policy debate have so far essentially concentrated on the first two waves; also there is a lack of data availability for the other two. They believe the development of additional research on the last two waves is of paramount importance for understanding the role of usage and complementary capital in governing gains from ICT in a developing country context. This could provide policymakers with a robust assessment of the policies that will maximize the returns from ICT investment. Indeed, the developing world has seen only a glimpse of the potential economic and social value of investment in mobile telecommunications networks so far. In particular, Waverman and Dasgupta believe that setting the right taxation and the licensing process play crucial roles in ensuring adequate investment and enhancing consumer benefits in the mobile sector, as does defining the appropriate role of government intervention and regulation in the current challenging economic environment. They also remark that 3G or wireless mobile telephony could have a particularly important impact in the developing world since these technologies may represent the most cost-effective way to bring broadband or even Internet access to the masses. Developing countries are likely to enjoy, argue the authors, the benefit of adopting 3G+ technology at a time when devices and applications enhancing the mobile broadband experience are entering a mature developmental phase; therefore one can expect relatively rapid diffusion of 3G technology in the developing world.

### Regulation and its impact on mobile service benefits in emerging markets

Mobile communications play a key role in developing economies, crucially facilitating economic growth and development. At the same time, emerging markets are home to 75 percent of the world's subscribers today and hold an important position in the mobile industry's agenda because of their strong potential going forward. However, succeeding in these markets often requires different and innovative approaches tailored to the specificities of those markets. After discussing the benefits of mobile services in emerging markets, "Unshackled: How Regulation Can Amplify Mobile Service Benefits in Emerging Markets," by Scott Beardsley, Luis Enriquez, Mehmet Güvendi, Miguel Lucas, Oleg Timchenko, Sergio Sandoval, and Ashish Sharma (all at McKinsey & Company, Inc.), highlights a broader set of policy considerations that policymakers and industry players should consider and address together in view of enhancing ubiquity and the benefits of mobile service when regulating the latter in developing economies. Among these considerations are:

1. ensuring sufficient but not excessive competition —in a capital-intensive industry, where large upfront investments are necessary, competition among a few players may have better results than hyper-competition among many;

2. avoiding direct price controls—low prices typically retard industry returns and overall growth in the medium to long term, hampering investment levels and translating into poor customer service;

3. attaching strict rollout and coverage requirements to mobile licenses, in order to prevent new players from investing in rich niche areas and neglecting more low-income and remote areas; and

4. effectively managing spectrum allocation and pricing, given that spectrum management has risen significantly in importance in emerging markets, and spectrum policies will play a major role in delivering telecommunication services to users.

The authors believe these policy issues, if well tackled, can create a fertile environment in which the mobile industry can thrive, generating a high public value for the developing world and its people.

### Reality mining of mobile communications

Humanity has the beginnings of a new nervous system —a digital one derived from mobile telephone networks and already nearly 4 billion people strong. In his chapter "Reality Mining of Mobile Communications: Toward a New Deal on Data," MIT professor Alex Pentland focuses on the consequences in terms of data gathering of the fact we live nowadays in digital networks and leave digital breadcrumbs of our daily activities all the time. He explains that computational models based on these digital "people data," using a process called *reality mining,* allow us to create a startlingly comprehensive picture of our lives and to predict human social behavior with a power that was barely conceivable just a few years ago. Pentland believes that this new "God's eye" view of humanity will present unprecedented opportunities for profitable commerce and effective government but also may endanger our personal freedom. To harness the good and avoid the evil, he calls for a "New Deal" about how personal data can be gathered and used. This deal should be based on ownership as a minimal requirement, complemented by a commitment to adopt policies encouraging the combination of massive amounts of anonymous data to promote the Common Good.

### Global mobility of talent

In today's world, some 200 million people live and work outside their country of origin. OECD countries alone host some 75 million migrants. Broader access to transportation and ICT-enabled new forms of production combined with disparities in income and labor markets are some of the factors behind the growing global market for migrant workers, both short term and less so. In "Global Mobility of Talents: What Will Make People Move, Stay, or Leave in 2015 and Beyond?" Vijayakumar Ivaturi (Wipro), Bruno Lanvin (INSEAD, eLab), and Hrishi Mohan (Wipro) attempt to make some sense of the emerging mobile talent geography, casting light on how the different mobility drivers are likely to combine, compound, or offset each other in the future; what the main directions of labor flows will be; and how the "war for talents" is going to be waged, among other issues.

Taking into account longer-term trends and recent changes in the way companies and individuals operate, the authors explore some avenues that may help define new dimensions of talent mobility, as well as some of the most urgent issues to be addressed by decision makers with respect to the skills required to sustain national competitiveness. In particular, a simple model (the Global Talent Pyramid Model, or GTPM) is presented, according to which the ability of a country to attract talents internationally is determined by three main factors: the attractiveness of the national ecosystem vis-à-vis local and foreign talent, the existence of a critical mass in the "national talent pool" (stock and flow), and the overall efficiency/quality of the economy and society.

The authors believe that mobility, whether virtual or physical, will be a central factor in our collective efforts to establish an equitable, multicultural, open, innovative, and sustainable globalization. They point to

the need to become fully aware of the potential benefits of collective action to encourage and allow such mobility on a global scale, and to the opportunity offered by the current crisis to take such action.

### International flows in R&D in ICT

"R&D and Innovation in the ICT Sector: Toward Globalization and Collaboration," by Graham Vickery and Sacha Wunsch-Vincent (both at the OECD), deals with recent developments in increasingly globalized ICT R&D and innovation. The authors relate how global structures of R&D, science performance, and innovation are undergoing an important change whose main dimensions are the absolute growth of R&D and innovation-related activities; the rise of the BRIC economies in scientific and technological fields; the significant globalization of R&D; the greater performance of R&D in the services sector; and a growing focus on non-technological innovation, enhanced internationalization, and mobility of highly skilled people; and increased internationalized patenting. According to Vickery and Wunsch-Vincent, a number of factors underpin these trends, namely the increasingly knowledge-driven nature of innovation; the quickly changing organization of research that is driven by information technologies, collaboration, and the sharing of knowledge; and changes in markets, the competition environment, and technology.

## Part 2: ICT as a Bridge to Increased Growth and Competitiveness: Selected Case Studies

This part showcases some best practices and policies in networked readiness and competitiveness, relating the experiences of three countries—Egypt, Korea, and Brazil—in becoming a successful outsourcing destination; in adopting a general ICT strategy fostering national competitiveness; and in using world-class e-government practices and ICT (and soccer) to bridge social and economic inequalities.

### Egypt's success story in outsourcing

In the current globalization wave, some developing countries, have emerged as major outsourcing destinations, greatly benefiting from the related opportunities. In their chapter "How Outsourcing Can Help Mobilize Talents Globally: Egypt's Success Story," Nagwa El Shenawy (Ministry of Communications and Information Technology, Egypt) and Bruno Lanvin (INSEAD, eLab) focus on Egypt's successful experience as an emerging outsourcing gateway in the Middle East and relate the carefully built business environment strategy and the sustainable and ongoing technological development and skills upgrading programs that enabled Egypt's transformation in this area. Indeed, an aggressive national plan was set, including specialized ICT-training programs and the creation of business hubs such as the Smart Village and Maadi Investment Park, while investor-tailored incentive packages were introduced.

The authors argue that Egypt has the potential to be one of the top five business process outsourcing destinations within the next 10 years, thanks to competitive advantages such as its low costs, competitive labor pool, stable macroeconomic environment, strategic geographical location, strong government focus, good telecommunications infrastructure, and improving business environment. They highlight, as a main takeaway from Egypt's experience, the importance of investing in relevant human resources, ensuring an overall infrastructure supply with world-class connectivity levels and creating a well-funded investment agency with an adequate regulatory authority working on a public-private partnership basis.

However, Egypt also faces a number of challenges going forward, among which are its intellectual property rights and security risks, the challenge of marketing the country as a late entrant, and labor pool bottlenecks at the middle management and middle level, not to mention global inflationary trends.

### The past, present, and future of IT Korea

Korea has become one of the leading IT nations of the 21st century; it has achieved rapid economic growth owing to the successful development of the IT industry and its applications. The reasons for Korea's amazing economic growth have been analyzed in terms of its proactive acceptance of technology, value-adding development with enhanced performance, and quick transition through industrial structuring. "IT Korea: Past, Present, and Future," by Jae Kyu Lee (Korea Advanced Institute of Science and Technology) and Choonmo Ahn and Kihoon Sung (both at the Electronics and Telecommunications Research Institute, Korea), identifies and reviews four phases in Korean IT industry evolution, explaining how the IT industry is related to the electronics industry and how important it is for technology leadership to attain global IT business leadership. The authors regard as especially crucial the government's proactive role in propagating new standard platforms of telecommunications. Korea has overcome various challenges over time, including financial crises and oil shocks. The Korean IT industry has critically contributed in tackling the above by discovering new answers to demanding pressures. The authors point to the fact that Korea is currently faced with the effect of the financial crisis sweeping the world as well as with a slowdown in the growth of the IT industry. They argue that the role of proactive IT development becomes necessary again as the new growth engine, and describe the New IT Strategy as aiming to overcome today's challenges.

### Brazil: E-government, ICT, and the World Cup to bridge the social divide

ICT-wise, Brazil is a country of many contrasts where one of the most elaborate electronic voting systems in the world and a remarkable online tax return operation coexist with poor broadband penetration and computer illiteracy in many parts of the country, especially among the poor. This reflects entrenched inequalities in the distribution of income, wealth, and access to education and health services, among many other issues. These inequalities not only threaten social cohesion and undermine public safety, they also cut economic competitiveness.

In their chapter "Will the 2014 Soccer World Cup Help Bridge the Social Gap through the Promotion of ICT and E-government in Brazil?" authors Darcilene Magalhães (Minas Gerais State Agency for IT Development, Brazil), Peter Knight (Telemática e Desenvolvimento Ltda., Brazil), and Eduardo Moreira da Costa (The Brazilian Innovation Agency) provide a thoughtful account of the progress made in e-government and ICT diffusion in the last couple of decades in Brazil, as well as the pending challenges that must still be tackled. In particular, two major projects hold the potential to help the government bridge the digital and socioeconomic gap in the country, fostering growth and prosperity for all Brazilians: the *e-Brasil* Project and the 2014-Bis Program. The former, begun in 2004, promotes a broad agenda of public policies aimed at building a more equitable and competitive country through intensive use of ICT and seeks to raise general awareness about the advantages of a coherent e-development strategy. By 2008, the *e-Brasil* Project had created a Web portal promoting the *e-Brasil* vision and published three books, notably featuring a list of policy recommendations and the "10 commandments" program—a concise summary of these recommendations—for *e-Brasil* candidates. An initial assessment of the Project's results is mostly positive, with visible progress at the political level, especially in important states such as São Paulo, Rio de Janeiro, Ceará, and Minas Gerais.

The 2014-Bis Program, which is expected to gain speed this year, intends to create a stronger country brand, showcasing unique Brazilian developments in terms of technology, scope, approach, and social impact, in parallel to the preparation of the World Cup 2014, which will be hosted by Brazil.

## Parts 3 and 4: Country/Economy Profiles and Data Presentation

Parts 3 and 4 present detailed profiles for each of the 134 economies covered this year in the *Report* and data tables for each of the 68 variables composing the NRI, with global rankings. Each part is preceded by a description of how to interpret the data provided. Technical notes and sources, included at the end of Part 4, provide additional details and information on the definitions and sources of the specific hard data variables included in the *Report*.

# The Networked Readiness Index Rankings

## The Networked Readiness Index 2008–2009 rankings

| 2008–2009 rank | Country/Economy | Score |
|---|---|---|
| 1 | Denmark | 5.85 |
| 2 | Sweden | 5.84 |
| 3 | United States | 5.68 |
| 4 | Singapore | 5.67 |
| 5 | Switzerland | 5.58 |
| 6 | Finland | 5.53 |
| 7 | Iceland | 5.50 |
| 8 | Norway | 5.49 |
| 9 | Netherlands | 5.48 |
| 10 | Canada | 5.41 |
| 11 | Korea, Rep. | 5.37 |
| 12 | Hong Kong SAR | 5.30 |
| 13 | Taiwan, China | 5.30 |
| 14 | Australia | 5.29 |
| 15 | United Kingdom | 5.27 |
| 16 | Austria | 5.22 |
| 17 | Japan | 5.19 |
| 18 | Estonia | 5.19 |
| 19 | France | 5.17 |
| 20 | Germany | 5.17 |
| 21 | Luxembourg | 5.10 |
| 22 | New Zealand | 5.04 |
| 23 | Ireland | 5.03 |
| 24 | Belgium | 5.02 |
| 25 | Israel | 4.98 |
| 26 | Malta | 4.79 |
| 27 | United Arab Emirates | 4.76 |
| 28 | Malaysia | 4.76 |
| 29 | Qatar | 4.68 |
| 30 | Portugal | 4.63 |
| 31 | Slovenia | 4.57 |
| 32 | Czech Republic | 4.53 |
| 33 | Cyprus | 4.52 |
| 34 | Spain | 4.50 |
| 35 | Lithuania | 4.40 |
| 36 | Barbados | 4.38 |
| 37 | Bahrain | 4.38 |
| 38 | Tunisia | 4.34 |
| 39 | Chile | 4.32 |
| 40 | Saudi Arabia | 4.28 |
| 41 | Hungary | 4.28 |
| 42 | Puerto Rico | 4.23 |
| 43 | Slovak Republic | 4.19 |
| 44 | Jordan | 4.19 |
| 45 | Italy | 4.16 |
| 46 | China | 4.15 |
| 47 | Thailand | 4.14 |
| 48 | Latvia | 4.10 |
| 49 | Croatia | 4.09 |
| 50 | Oman | 4.08 |
| 51 | Mauritius | 4.07 |
| 52 | South Africa | 4.07 |
| 53 | Jamaica | 4.03 |
| 54 | India | 4.03 |
| 55 | Greece | 4.00 |
| 56 | Costa Rica | 3.99 |
| 57 | Kuwait | 3.98 |
| 58 | Romania | 3.97 |
| 59 | Brazil | 3.94 |
| 60 | Azerbaijan | 3.93 |
| 61 | Turkey | 3.91 |
| 62 | Ukraine | 3.88 |
| 63 | Brunei Darussalam | 3.87 |
| 64 | Colombia | 3.87 |
| 65 | Uruguay | 3.85 |
| 66 | Panama | 3.84 |
| 67 | Mexico | 3.84 |
| 68 | Bulgaria | 3.80 |
| 69 | Poland | 3.80 |
| 70 | Vietnam | 3.79 |
| 71 | Montenegro | 3.79 |
| 72 | Sri Lanka | 3.79 |
| 73 | Kazakhstan | 3.79 |
| 74 | Russian Federation | 3.77 |
| 75 | Dominican Republic | 3.76 |
| 76 | Egypt | 3.76 |
| 77 | Botswana | 3.72 |
| 78 | El Salvador | 3.69 |
| 79 | Macedonia, FYR | 3.67 |
| 80 | Senegal | 3.67 |
| 81 | Trinidad and Tobago | 3.67 |
| 82 | Guatemala | 3.64 |
| 83 | Indonesia | 3.62 |
| 84 | Serbia | 3.62 |
| 85 | Philippines | 3.60 |
| 86 | Morocco | 3.59 |
| 87 | Argentina | 3.58 |
| 88 | Georgia | 3.48 |
| 89 | Peru | 3.47 |
| 90 | Nigeria | 3.45 |
| 91 | Gambia, The | 3.44 |
| 92 | Namibia | 3.44 |
| 93 | Mongolia | 3.43 |
| 94 | Syria | 3.41 |
| 95 | Honduras | 3.41 |
| 96 | Venezuela | 3.39 |
| 97 | Kenya | 3.35 |
| 98 | Pakistan | 3.31 |
| 99 | Moldova | 3.30 |
| 100 | Guyana | 3.29 |
| 101 | Libya | 3.28 |
| 102 | Zambia | 3.26 |
| 103 | Ghana | 3.25 |
| 104 | Tajikistan | 3.25 |
| 105 | Albania | 3.23 |
| 106 | Bosnia and Herzegovina | 3.23 |
| 107 | Mali | 3.18 |
| 108 | Algeria | 3.14 |
| 109 | Mauritania | 3.12 |
| 110 | Malawi | 3.12 |
| 111 | Côte d'Ivoire | 3.12 |
| 112 | Madagascar | 3.09 |
| 113 | Burkina Faso | 3.07 |
| 114 | Armenia | 3.06 |
| 115 | Kyrgyz Republic | 3.04 |
| 116 | Ecuador | 3.03 |
| 117 | Suriname | 3.03 |
| 118 | Lesotho | 3.02 |
| 119 | Tanzania | 3.01 |
| 120 | Uganda | 2.98 |
| 121 | Benin | 2.96 |
| 122 | Paraguay | 2.93 |
| 123 | Cameroon | 2.93 |
| 124 | Mozambique | 2.91 |
| 125 | Nicaragua | 2.90 |
| 126 | Cambodia | 2.89 |
| 127 | Nepal | 2.85 |
| 128 | Bolivia | 2.82 |
| 129 | Ethiopia | 2.80 |
| 130 | Bangladesh | 2.70 |
| 131 | Burundi | 2.63 |
| 132 | Zimbabwe | 2.49 |
| 133 | Timor-Leste | 2.47 |
| 134 | Chad | 2.44 |

*(Cont'd.)*

# Part 1

# The Networked Readiness Landscape in 2008–09 and Mobility

CHAPTER 1.1

# Gauging the Networked Readiness of Nations: Findings from the Networked Readiness Index 2008–2009

**IRENE MIA,** World Economic Forum
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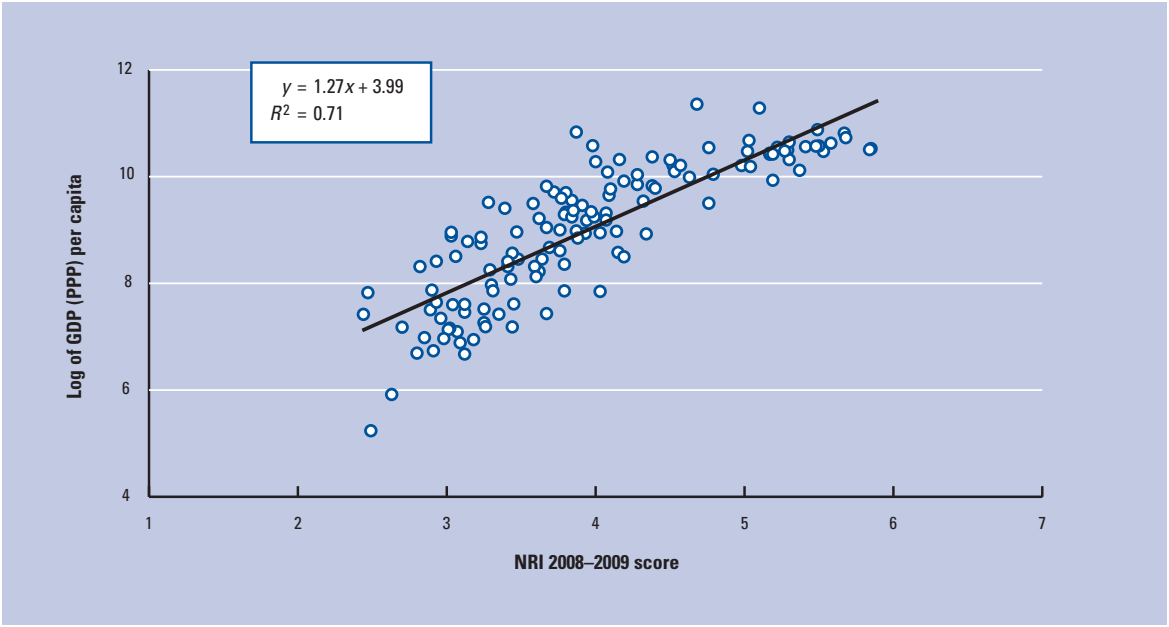
As this eighth edition of *The Global Information Technology Report* (GITR) goes to press in early 2009, economies around the world are reeling from the impact of the global economic crisis. What started out as a subprime housing crisis in the United States has snowballed into a global contagion that is driving a large number of developed economies into recession and significantly retarding the rapid growth rates seen over the last years in emerging markets. Government leaders around the world are rethinking their approaches to the regulation of financial markets and are busy crafting packages to prevent other sectors of their economies from being impacted adversely by the recessionary contagion. The focus worldwide is on stabilizing the global economy and on jumpstarting growth.

The information and communication technologies (ICT) industry is not immune to the crisis. IDC, an IT consultancy, has predicted that global technology spending will grow by 2.9 percent year-on-year in 2009, lower than the previously forecasted 4.9 percent.[1] Leading technology firms are also feeling the crisis. At the time of writing, Intel had slashed its fourth quarter revenue forecast by more than US$1 billion. However, the news is not all bleak for the technology space. While the US economy is expected to shrink in 2009, technology spending in the United States is forecasted to grow by 0.9 percent (as compared with the previously forecasted 4.2 percent). Despite slowdowns in sales in many technology products, the sales of global mobile phones are expected to grow by 6 percent in 2009, according to forecasts by Gartner Inc. (as compared with previous forecasts of 16 percent growth),[2] and the popularity of social networking sites is growing steadily. When the financial crisis hit hard in September 2008, LinkedIn's membership shot up by 25 percent in a single month, to 28 million. As the economic crisis deepened, the site's sign-ups were clocking at the amazing rate of one new member every second.

There are two underlying reasons why the technology sector, while suffering because of the overall economic challenges, is showing such signs of resilience. One is that technology is evolving continuously and, despite economic uncertainty over the coming years, progress in most areas of ICT capabilities continues at a blistering pace. For example, the price of personal computers is falling rapidly and the emergence of a whole new class of laptops, priced as low as US$100 to US$300 is enabling large segments of the population of emerging countries to now get access to affordable computing. Software capabilities are improving steadily, and they account to a large degree for the growth in popularity of social networking platforms and other Web 2.0 services.

The second reason is related to the fact that both public- and private-sector leaders now fully accept the important role of ICT in stimulating growth and enabling the development of economies by significantly

**Figure 1: Networked readiness and GDP per capita, 2007**




Source: World Economic Forum; IMF, 2008.



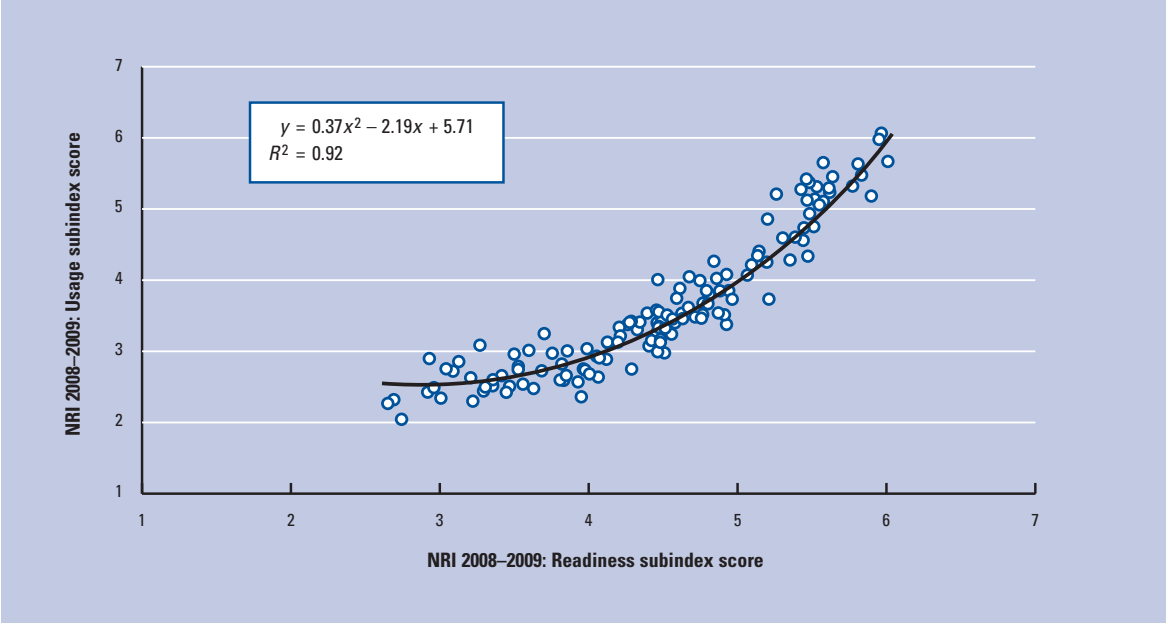
increasing productivity across sectors and industries. Many economies have been able to leverage the extraordinary power of ICT as a driver of change, modernization, and competitiveness (see Figure 1). Previous editions of the GITR have featured detailed case studies on how countries such as Korea, Singapore, Israel, Finland, and Estonia have made important advances in their global competitiveness by positioning ICT at the heart of their national innovation and development strategies. Even in emerging markets in Africa, Latin America, and Asia, access to ICT has boosted information availability, transformed social interactions, and contributed to poverty reduction and improving the life of everyday citizens.

Innovation and technological readiness have featured prominently in the World Economic Forum (the Forum)'s three-decade-long research work as important competitiveness enablers for countries at all levels of development. In particular, the Forum has embarked, in partnership with INSEAD since 2002, in a research project aimed at assessing the impact of innovation—notably ICT—on national growth and development, using, as its main methodology tool, the Networked Readiness Index (NRI). The findings of the NRI have been included in the GITR series, published annually since 2001 and covering this year a record number of 134 economies worldwide, representing over 98 percent of global GDP. The NRI establishes an international framework where the factors enabling economies to leverage ICT for increased competitiveness are clearly identified and against which countries can benchmark their performances over time and with respect to one another.[3] Over the years, the *Report* has become a highly respected platform for private-public dialogue on the best policies and actions to further ICT readiness, contributing to raising general awareness on the key role of innovation and ICT prowess for national competitiveness and sustained growth.

Coming in the midst of global contagion and a world mired in a major slowdown, the *Report* stands as a reminder for leaders in both the public and private sectors not to lose focus on an important enabler of growth and competitiveness—ICT. The next months, or perhaps the next couple of years, are going to be challenging for both developed and developing economies. Many traditional policies and approaches will be questioned and challenged. However, ICT will continue to provide opportunities for innovation and productivity improvements. Economies that will continue to invest wisely in these new opportunities will be the ones not only able to weather the current storm best, but to come out the strongest when the downturn subsides.

The remainder of this chapter presents the findings of the NRI for 2008–09 by region, with a particular focus on the top ranked economies, together with the underlying Networked Readiness Framework and methodology used in this year's edition.

**Figure 2: ICT readiness and usage**




Source: World Economic Forum.



### The Networked Readiness Index 2008–2009: The framework and the methodology

The NRI 2008–2009 rests on the theoretical framework introduced in the 2002–03 edition and developed by INSEAD.[4] The Networked Readiness Framework assesses the extent to which different economies benefit from the latest ICT advances, based on three main principles, as follows:

1. ***Environment as crucial enabler of networked readiness.*** An ICT-conducive environment is a key prerequisite for national stakeholders in a given country to leverage ICT for enhanced growth. In this sense, an effort should be made by the government and any other relevant actors to put in place the appropriate market, regulatory, and ICT environment.

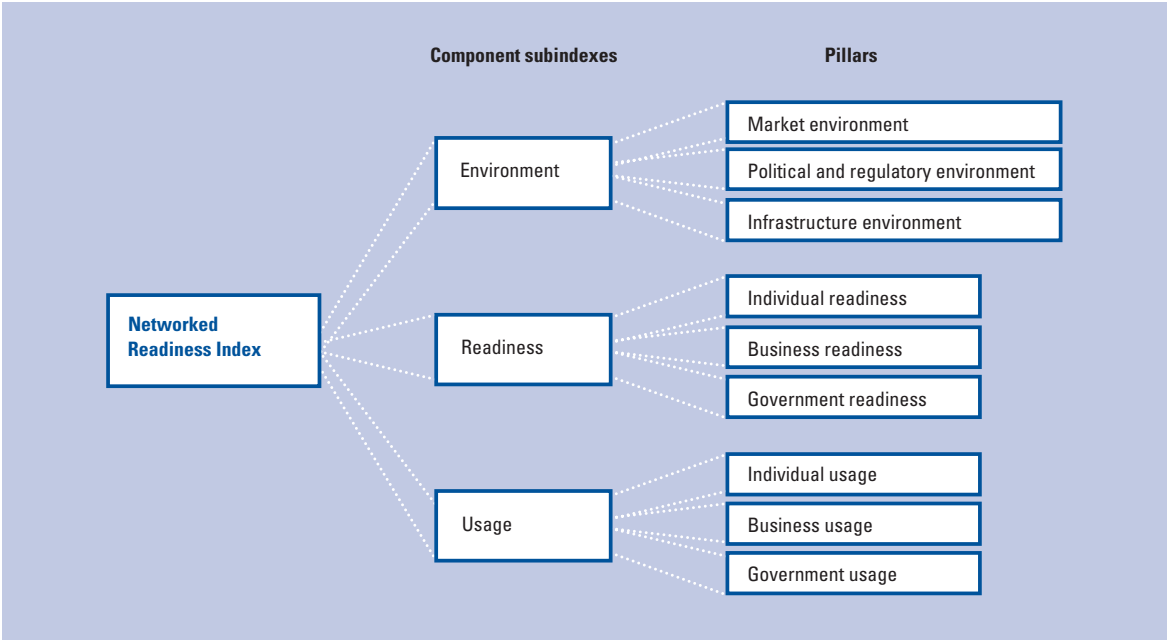
2. ***A multi-stakeholder effort is required.*** Although the government has a natural leadership role to play when it comes to establishing an ICT- and innovation-friendly environment and to putting ICT penetration at the center of the national agenda, a multi-stakeholder effort—involving the government, the business sector and civil society—is required to achieve ICT prowess. The recent development history of countries as diverse as Korea, Israel, Estonia, and Singapore shows that a farsighted government with a clear vision coupled with active engagement of the private sector can be very powerful. In all these countries, an effective multi-stakeholder effort led to leapfrogging stages of development, to a structural transformation of the economy, and to increased growth prospects.

3. ***ICT readiness facilitates ICT usage.*** A society whose stakeholders are better prepared and show a greater interest toward ICT advances will be likely to use it more effectively and extensively. That is, government, business, and individual readiness is reflected in higher ICT use, as confirmed by the strong correlation between the readiness and usage subindexes of the NRI (see Figure 2).

Figure 3 depicts the Networked Readiness Framework, broken down along its three dimensions: environment, readiness, and usage. The environment component is in turn broken down along market, regulatory, and infrastructure lines, while the latter two are broken down along the readiness and usage, respectively, of the three key stakeholder groups—that is, individuals, businesses, and government.

The framework just described converts into the NRI, composed of three subindexes, gauging respectively

**Figure 3: The Networked Readiness Index 2008–2009: The framework**




Source: World Economic Forum.



ICT environment, readiness, and usage, for a total of 9 pillars and 68 variables, as follows:

1. Environment subindex
   - market environment
   - political and regulatory environment
   - infrastructure environment

2. Readiness subindex
   - individual readiness
   - business readiness
   - government readiness

3. Usage subindex
   - individual usage
   - business usage
   - government usage

Although the 68 variables are the same as last year, the number and nature of variables included in the Index have varied to some extent over the years, to take into account the newest developments in the ICT sector and ensure that the NRI was capturing at any time the relevant determinants of networked readiness. However, the Networked Readiness Framework, kept constant since 2002, guarantees the overall comparability of the NRI results over time.

In the calculation of the global NRI score, all three subindexes are given the same weight, while each subindex is a simple average of the composing pillars. This reflects the assumption that all Index components provide a similar contribution to the overall networked readiness of a country. See the Appendix at the end of the chapter for a more detailed description on the composition and computation of the NRI 2008–2009.

A brief description of the different composing elements (at the subindex and pillar level) of the NRI follows.

### Environment subindex

As pointed out above, ICT prowess cannot develop in a vacuum; for social actors to be able to fully exploit ICT potential and nurture their country's overall competitiveness, appropriate market, regulatory, and infrastructure environments must be established. The environment subindex gauges the friendliness of a country's environment for ICT development by taking into consideration a total of 30 variables, grouped into three different pillars relating to the market, regulatory, and hard and soft infrastructure dimensions.

The *market environment pillar* (14 variables) captures the ICT conduciveness of the business environment in a country. Aspects such as the availability of appropriate financing sources (notably venture capital), the extent of business sophistication (as captured by the cluster development and high-tech exports), and innovation potential (measured by the number of utility patents), together with the ease of doing business (including the presence of red tape and fiscal charges), the freedom of exchanging information over the Internet (proxied by

the freedom of the press), and the accessibility of digital content are taken into account.

The *political and regulatory environment pillar* (9 variables) examines the quality of the national legal framework with particular regard to ICT development. In this sense, general elements having to do with the protection afforded to property rights, independence of the judiciary, and efficiency of the law-making process are taken into account, as well as ICT-specific aspects such as the development of ICT laws and the extent to which intellectual property—key to generating innovation—is protected.

The *infrastructure environment pillar* (7 variables) measures the extent to which national infrastructure encourages ICT development and diffusion. *Infrastructure,* in our definition, includes both hard elements—such as the number of telephone lines and secure Internet servers, and electricity production—as well as softer ones related to the quality of the human resources in a given country. With regard to the latter, quantitative measures, such as tertiary enrollment rates and education expenditures, are combined with a qualitative assessment of the scientific research institutions and the availability of scientists and engineers.

### Readiness subindex

The second underpinning of the Networked Readiness Framework relates to the extent to which a country's main stakeholders are interested and prepared to use technology—notably ICT—in their daily activities. Accordingly, the readiness subindex, with a total of 23 variables, measures elements of individual and business readiness, including the existence of appropriate human skills for using ICT and the affordability of ICT, as well as government readiness, reflected notably in the latter's prioritization of ICT in the national agenda.

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

The *business readiness pillar* (10 variables) examines the extent to which companies are disposed and ready to incorporate ICT in their operations and processes, taking into account particularly the quality of on-the-job training, spending on R&D, the collaboration between academia and industry (central to generating applied innovation and to nurturing cluster creation and development), the quantity and quality of suppliers in the economy, and the affordability of ICT for business.

The *government readiness pillar* (4 variables), in turn, attempts to capture government's vision and prioritization of ICT in the national agenda and competitiveness strategy, including the extent to which public procurement of high-tech products is used as a tool to promote efficiency and innovation.

### Usage subindex

The last component of the NRI gauges the actual usage of ICT by a country's main stakeholders, with a particular focus on the impact of ICT in terms of efficiency and productivity gains.

The *individual usage pillar* (5 variables) measures ICT penetration and diffusion at the individual level, through the number of mobile telephone and broadband Internet subscribers, Internet users and personal computers (PCs) and Internet bandwidth.

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

Finally, the *government usage pillar* (5 variables) analyzes the implementation of the vision captured by the government readiness pillar described above. In this sense, government's success in promoting ICT penetration and the development and quality of e-government services are assessed, as well as the government's own ICT usage and the extent to which this has led to productivity and efficiency gains.

As one can see from the description above, the NRI and its composing subindexes, pillars and variables offer an extremely useful and detailed instrument for policy makers, allowing them to identify areas of weakness which need to be addressed in view of improving national networked readiness.

### Computation methodology and data

In line with the methodology used in the previous editions of the *Report* and in the Forum's competitiveness work, the NRI 2008–2009 is composed of a mixture of hard and survey data capturing both quantitative and qualitative determinants of a country's networked readiness. In this regard, as shown in Figure 4, 27 out of the 68 composing variables are hard, quantitative data, collected from international organizations such as the International Telecommunication Union (ITU), the United Nations, and the World Bank. Internationally collected and validated data ensure data comparability across countries.

The remaining 41 variables gauge dimensions that are more qualitative in nature or for which there are no hard data available for a large number of countries but that are nonetheless crucial in capturing national networked readiness. These data come from the Executive Opinion Survey (the Survey), which the Forum administered to over 12,000 business leaders across 134 economies in 2008 (see Box 1 for details about the Survey methodology). Examples include

### Box 1: The Executive Opinion Survey

Two types of data enter the Networked Readiness Index (NRI). Out of the 68 variables composing the NRI, 27 variables, or 40 percent, are *hard data.* Hard data are obtained from international organizations (e.g., the International Telecommunication Union, the World Bank). Such data provide an objective measure of a quantity (e.g., number of PCs, number of procedures required to start a business), complemented, if necessary, by national sources. The remaining indicators come from the Executive Opinion Survey (the Survey) carried out annually by the World Economic Forum.

The aim of the Survey is to capture the qualitative dimension of specific aspects of competitiveness and networked readiness, as well as to provide comparable data on issues for which there are no existing hard data indicators. This highly specialized survey is conducted annually by the World Economic Forum in all 134 countries covered by the *Report* this year. Business leaders are asked to assess specific aspects of the business environment in the country in which they operate. For each question, respondents are asked to give their opinion about the situation in their country of residence, compared with a global norm. To conduct the Survey in each country, the World Economic Forum relies on a network of 150 Partner Institutes. Typically, the Partner Institutes are recognized economics departments of national universities, independent research institutes, or business organizations.

To ensure that the sample is selected consistently around the world, a detailed set of guidelines has been developed by the Forum for the Partner Institutes to target top management business executives, with a particular focus on surveying the most sizeable employers. In addition to relying on Partner Institutes to collect surveys in their respective countries, the Forum's member and partner companies are also invited to participate in the Survey. Sample sizes vary according to the size of the economy. In 2008, a record total of 12,297 responses were included, up from 11,406 in 2007.

Once the data are received, they are subjected to a rigorous quality control process. Following a careful verification of the Survey dataset, individual responses to each question are then aggregated at the country level and combined with results of the previous year following a weighted moving average approach. The weighting scheme is composed of two overlapping elements: on one hand, we ensure that we sufficiently take into account all individual responses by placing more weight on the larger of the two samples of responses; at the same time, we apply a discount factor to the previous year's results, thereby placing more weight on the most recent responses.

The final country scores thus obtained are used in the computation of the NRI and other benchmarking indexes developed by the World Economic Forum. For more information about the Survey's process and methodology, refer to Browne et al. 2008.

dimensions relating to the transparency of the legal framework, the quality of education, together with the government's vision for ICT and the extent to which this is prioritized in the national agenda. For all these dimensions, since no hard data are available, the Survey represents an invaluable source of information and insight.

The inclusion of new countries in the NRI every year is driven by the Survey coverage and the hard data availability. Figure 5 shows the evolution of the NRI and the Survey's coverage from the GITR series' inception. The *Report* features a record number of seven new economies this year, namely Brunei Darussalam, Côte d'Ivoire, Ghana, Malawi, Montenegro, Serbia, and Timor-Leste. The latter three could not have been included in the *Report* until this year, despite having been covered by the Survey for a number of years, for lack of a sufficient number of hard data.

As mentioned earlier, variables included in the NRI may experience some variation from year to year, given the dynamism of the ICT sector and the need to update the NRI accordingly.[5] For this reason, some time-sensitive variables included in past editions that have not been recently updated by relevant international institutions may need to be dropped by the NRI structure and calculation on any given year. The NRI 2008–2009 represents an exception to the above trend, since it includes the same variables used in the 2007–08 computation, updated with the most recent data.

## The NRI 2008–2009 rankings

This section will highlight the main findings of the NRI 2008–2009, with a particular emphasis on the top 10 performing countries as well as selected economies in the following regions: Europe, Latin America and the Caribbean, Asia and the Pacific, Middle East and North Africa (MENA), and sub-Saharan Africa.[6]

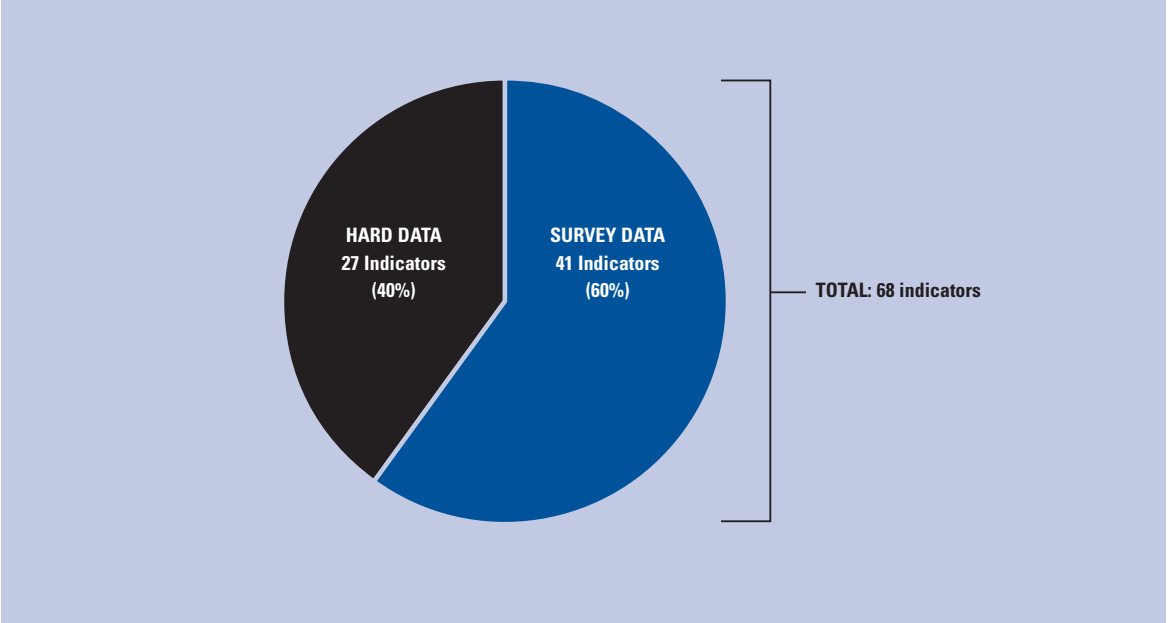
Table 1 displays the NRI rankings and scores for 2008–09 with 2007–08 comparisons, while Tables 2, 3, and 4 show the rankings and scores for the three subindexes and nine pillars composing the NRI. Tables 5 and 6, in turn, provide a more detailed analysis on the most networked economies in the world.

## Top 10

As Table 1 shows, Denmark and Sweden continue to be assessed as the world's most networked economies for the third consecutive year. The two countries' ICT pre-eminence rests on similar bases, notably an early and continuous focus on education and innovation as well as a prominent place given to ICT penetration and diffusion in the national agenda as an enabler of general competitiveness.

The rankings of 2008–09 confirm **Denmark**'s superior capacity to leverage ICT for overall national

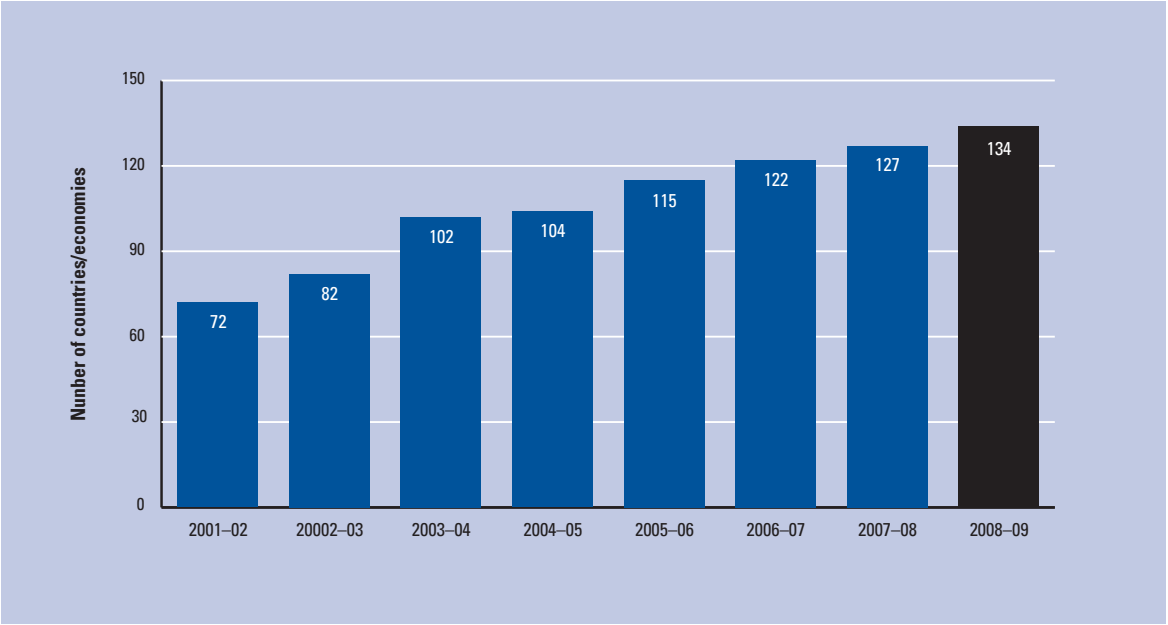
## Figure 4: Hard and Survey data composition of the NRI




Source: World Economic Forum.



## Figure 5: Evolution of the NRI's coverage




Source: World Economic Forum.

## Table 1: The Networked Readiness Index 2008–2009 and 2007–2008

| Country/Economy | NRI 2008–2009 Rank | NRI 2008–2009 Score | NRI 2008–2009 rank among 2007 countries | NRI 2007–2008 Rank | NRI 2007–2008 Score |
|---|---|---|---|---|---|
| Denmark | 1 | 5.85 | 1 | 1 | 5.78 |
| Sweden | 2 | 5.84 | 2 | 2 | 5.72 |
| United States | 3 | 5.68 | 3 | 4 | 5.49 |
| Singapore | 4 | 5.67 | 4 | 5 | 5.49 |
| Switzerland | 5 | 5.58 | 5 | 3 | 5.53 |
| Finland | 6 | 5.53 | 6 | 6 | 5.47 |
| Iceland | 7 | 5.50 | 7 | 8 | 5.44 |
| Norway | 8 | 5.49 | 8 | 10 | 5.38 |
| Netherlands | 9 | 5.48 | 9 | 7 | 5.44 |
| Canada | 10 | 5.41 | 10 | 13 | 5.30 |
| Korea, Rep. | 11 | 5.37 | 11 | 9 | 5.43 |
| Hong Kong SAR | 12 | 5.30 | 12 | 11 | 5.31 |
| Taiwan, China | 13 | 5.30 | 13 | 17 | 5.18 |
| Australia | 14 | 5.29 | 14 | 14 | 5.28 |
| United Kingdom | 15 | 5.27 | 15 | 12 | 5.30 |
| Austria | 16 | 5.22 | 16 | 15 | 5.22 |
| Japan | 17 | 5.19 | 17 | 19 | 5.14 |
| Estonia | 18 | 5.19 | 18 | 20 | 5.12 |
| France | 19 | 5.17 | 19 | 21 | 5.11 |
| Germany | 20 | 5.17 | 20 | 16 | 5.19 |
| Luxembourg | 21 | 5.10 | 21 | 24 | 4.94 |
| New Zealand | 22 | 5.04 | 22 | 22 | 5.02 |
| Ireland | 23 | 5.03 | 23 | 23 | 5.02 |
| Belgium | 24 | 5.02 | 24 | 25 | 4.92 |
| Israel | 25 | 4.98 | 25 | 18 | 5.18 |
| Malta | 26 | 4.79 | 26 | 27 | 4.61 |
| United Arab Emirates | 27 | 4.76 | 27 | 29 | 4.55 |
| Malaysia | 28 | 4.76 | 28 | 26 | 4.82 |
| Qatar | 29 | 4.68 | 29 | 32 | 4.42 |
| Portugal | 30 | 4.63 | 30 | 28 | 4.60 |
| Slovenia | 31 | 4.57 | 31 | 30 | 4.47 |
| Czech Republic | 32 | 4.53 | 32 | 36 | 4.33 |
| Cyprus | 33 | 4.52 | 33 | 41 | 4.23 |
| Spain | 34 | 4.50 | 34 | 31 | 4.47 |
| Lithuania | 35 | 4.40 | 35 | 33 | 4.41 |
| Barbados | 36 | 4.38 | 36 | 38 | 4.26 |
| Bahrain | 37 | 4.38 | 37 | 45 | 4.13 |
| Tunisia | 38 | 4.34 | 38 | 35 | 4.33 |
| Chile | 39 | 4.32 | 39 | 34 | 4.35 |
| Saudi Arabia | 40 | 4.28 | 40 | 48 | 4.07 |
| Hungary | 41 | 4.28 | 41 | 37 | 4.28 |
| Puerto Rico | 42 | 4.23 | 42 | 39 | 4.25 |
| Slovak Republic | 43 | 4.19 | 43 | 43 | 4.17 |
| Jordan | 44 | 4.19 | 44 | 47 | 4.08 |
| Italy | 45 | 4.16 | 45 | 42 | 4.21 |
| China | 46 | 4.15 | 46 | 57 | 3.90 |
| Thailand | 47 | 4.14 | 47 | 40 | 4.25 |
| Latvia | 48 | 4.10 | 48 | 44 | 4.14 |
| Croatia | 49 | 4.09 | 49 | 49 | 4.06 |
| Oman | 50 | 4.08 | 50 | 53 | 3.97 |
| Mauritius | 51 | 4.07 | 51 | 54 | 3.96 |
| South Africa | 52 | 4.07 | 52 | 51 | 4.05 |
| Jamaica | 53 | 4.03 | 53 | 46 | 4.09 |
| India | 54 | 4.03 | 54 | 50 | 4.06 |
| Greece | 55 | 4.00 | 55 | 56 | 3.94 |
| Costa Rica | 56 | 3.99 | 56 | 60 | 3.87 |
| Kuwait | 57 | 3.98 | 57 | 52 | 4.01 |
| Romania | 58 | 3.97 | 58 | 61 | 3.86 |
| Brazil | 59 | 3.94 | 59 | 59 | 3.87 |
| Azerbaijan | 60 | 3.93 | 60 | 67 | 3.72 |
| Turkey | 61 | 3.91 | 61 | 55 | 3.96 |
| Ukraine | 62 | 3.88 | 62 | 70 | 3.69 |
| Brunei Darussalam | 63 | 3.87 | n/a | n/a | n/a |
| Colombia | 64 | 3.87 | 63 | 69 | 3.71 |
| Uruguay | 65 | 3.85 | 64 | 65 | 3.72 |
| Panama | 66 | 3.84 | 65 | 64 | 3.74 |
| Mexico | 67 | 3.84 | 66 | 58 | 3.90 |
| Bulgaria | 68 | 3.80 | 67 | 68 | 3.71 |
| Poland | 69 | 3.80 | 68 | 62 | 3.81 |
| Vietnam | 70 | 3.79 | 69 | 73 | 3.67 |
| Montenegro | 71 | 3.79 | n/a | n/a | n/a |
| Sri Lanka | 72 | 3.79 | 70 | 79 | 3.58 |
| Kazakhstan | 73 | 3.79 | 71 | 71 | 3.68 |
| Russian Federation | 74 | 3.77 | 72 | 72 | 3.68 |
| Dominican Republic | 75 | 3.76 | 73 | 75 | 3.66 |
| Egypt | 76 | 3.76 | 74 | 63 | 3.74 |
| Botswana | 77 | 3.72 | 75 | 78 | 3.59 |
| El Salvador | 78 | 3.69 | 76 | 66 | 3.72 |
| Macedonia, FYR | 79 | 3.67 | 77 | 83 | 3.49 |
| Senegal | 80 | 3.67 | 78 | 85 | 3.46 |
| Trinidad and Tobago | 81 | 3.67 | 79 | 82 | 3.55 |
| Guatemala | 82 | 3.64 | 80 | 80 | 3.58 |
| Indonesia | 83 | 3.62 | 81 | 76 | 3.60 |
| Serbia | 84 | 3.62 | n/a | n/a | n/a |
| Philippines | 85 | 3.60 | 82 | 81 | 3.56 |
| Morocco | 86 | 3.59 | 83 | 74 | 3.67 |
| Argentina | 87 | 3.58 | 84 | 77 | 3.59 |
| Georgia | 88 | 3.48 | 85 | 91 | 3.34 |
| Peru | 89 | 3.47 | 86 | 84 | 3.46 |
| Nigeria | 90 | 3.45 | 87 | 94 | 3.32 |
| Gambia, The | 91 | 3.44 | 88 | 101 | 3.17 |
| Namibia | 92 | 3.44 | 89 | 93 | 3.33 |
| Mongolia | 93 | 3.43 | 90 | 87 | 3.43 |
| Syria | 94 | 3.41 | 91 | 110 | 3.06 |
| Honduras | 95 | 3.41 | 92 | 90 | 3.35 |
| Venezuela | 96 | 3.39 | 93 | 86 | 3.44 |
| Kenya | 97 | 3.35 | 94 | 92 | 3.34 |
| Pakistan | 98 | 3.31 | 95 | 89 | 3.37 |
| Moldova | 99 | 3.30 | 96 | 96 | 3.21 |
| Guyana | 100 | 3.29 | 97 | 102 | 3.16 |
| Libya | 101 | 3.28 | 98 | 105 | 3.10 |
| Zambia | 102 | 3.26 | 99 | 112 | 3.02 |
| Ghana | 103 | 3.25 | n/a | n/a | n/a |
| Tajikistan | 104 | 3.25 | 100 | 98 | 3.18 |
| Albania | 105 | 3.23 | 101 | 108 | 3.06 |
| Bosnia and Herzegovina | 106 | 3.23 | 102 | 95 | 3.22 |
| Mali | 107 | 3.18 | 103 | 99 | 3.17 |
| Algeria | 108 | 3.14 | 104 | 88 | 3.38 |
| Mauritania | 109 | 3.12 | 105 | 97 | 3.21 |
| Malawi | 110 | 3.12 | n/a | n/a | n/a |
| Côte d'Ivoire | 111 | 3.12 | n/a | n/a | n/a |
| Madagascar | 112 | 3.09 | 106 | 104 | 3.12 |
| Burkina Faso | 113 | 3.07 | 107 | 103 | 3.12 |
| Armenia | 114 | 3.06 | 108 | 106 | 3.10 |
| Kyrgyz Republic | 115 | 3.04 | 109 | 114 | 2.99 |
| Ecuador | 116 | 3.03 | 110 | 107 | 3.09 |
| Suriname | 117 | 3.03 | 111 | 117 | 2.91 |
| Lesotho | 118 | 3.02 | 112 | 122 | 2.79 |
| Tanzania | 119 | 3.01 | 113 | 100 | 3.17 |
| Uganda | 120 | 2.98 | 114 | 109 | 3.06 |
| Benin | 121 | 2.96 | 115 | 113 | 3.01 |
| Paraguay | 122 | 2.93 | 116 | 120 | 2.87 |
| Cameroon | 123 | 2.93 | 117 | 118 | 2.89 |
| Mozambique | 124 | 2.91 | 118 | 121 | 2.82 |
| Nicaragua | 125 | 2.90 | 119 | 116 | 2.95 |
| Cambodia | 126 | 2.89 | 120 | 115 | 2.96 |
| Nepal | 127 | 2.85 | 121 | 119 | 2.88 |
| Bolivia | 128 | 2.82 | 122 | 111 | 3.05 |
| Ethiopia | 129 | 2.80 | 123 | 123 | 2.77 |
| Bangladesh | 130 | 2.70 | 124 | 124 | 2.65 |
| Burundi | 131 | 2.63 | 125 | 126 | 2.46 |
| Zimbabwe | 132 | 2.49 | 126 | 125 | 2.50 |
| Timor-Leste | 133 | 2.47 | n/a | n/a | n/a |
| Chad | 134 | 2.44 | 127 | 127 | 2.40 |

*(Cont'd.)*

## Table 2: Environment component subindex

| ENVIRONMENT SUBINDEX | | | Market environment | | Political and regulatory environment | | Infrastructure environment | |
|---|---|---|---|---|---|---|---|---|
| Rank | Country/Economy | Score | Rank | Score | Rank | Score | Rank | Score |
| 1 | Iceland | 5.64 | 11 | 5.10 | 10 | 5.80 | 1 | 6.02 |
| 2 | Sweden | 5.59 | 10 | 5.11 | 5 | 5.92 | 2 | 5.73 |
| 3 | United States | 5.59 | 2 | 5.59 | 19 | 5.45 | 3 | 5.72 |
| 4 | Denmark | 5.51 | 9 | 5.14 | 2 | 6.03 | 6 | 5.35 |
| 5 | Finland | 5.51 | 6 | 5.35 | 3 | 5.97 | 7 | 5.20 |
| 6 | Switzerland | 5.44 | 4 | 5.43 | 7 | 5.85 | 9 | 5.05 |
| 7 | Norway | 5.39 | 19 | 4.90 | 6 | 5.87 | 5 | 5.40 |
| 8 | Canada | 5.39 | 15 | 5.07 | 17 | 5.52 | 4 | 5.57 |
| 9 | Singapore | 5.34 | 3 | 5.58 | 1 | 6.30 | 23 | 4.13 |
| 10 | Australia | 5.22 | 22 | 4.79 | 9 | 5.81 | 8 | 5.06 |
| 11 | Netherlands | 5.20 | 8 | 5.15 | 12 | 5.78 | 14 | 4.68 |
| 12 | United Kingdom | 5.12 | 13 | 5.09 | 20 | 5.45 | 12 | 4.82 |
| 13 | Germany | 5.09 | 20 | 4.88 | 8 | 5.83 | 15 | 4.56 |
| 14 | Ireland | 5.09 | 7 | 5.16 | 15 | 5.53 | 16 | 4.56 |
| 15 | New Zealand | 5.07 | 30 | 4.59 | 14 | 5.58 | 10 | 5.02 |
| 16 | Hong Kong SAR | 5.03 | 1 | 5.61 | 11 | 5.79 | 37 | 3.68 |
| 17 | Korea, Rep. | 5.02 | 14 | 5.08 | 23 | 5.20 | 13 | 4.79 |
| 18 | Austria | 4.99 | 23 | 4.77 | 4 | 5.93 | 21 | 4.28 |
| 19 | Taiwan, China | 4.98 | 5 | 5.43 | 43 | 4.54 | 11 | 4.96 |
| 20 | Japan | 4.97 | 12 | 5.10 | 18 | 5.52 | 20 | 4.29 |
| 21 | France | 4.91 | 25 | 4.72 | 16 | 5.53 | 18 | 4.48 |
| 22 | Luxembourg | 4.82 | 16 | 5.02 | 13 | 5.59 | 29 | 3.84 |
| 23 | Belgium | 4.79 | 28 | 4.69 | 22 | 5.24 | 19 | 4.44 |
| 24 | Israel | 4.75 | 17 | 5.00 | 34 | 4.74 | 17 | 4.51 |
| 25 | Estonia | 4.71 | 21 | 4.85 | 21 | 5.26 | 26 | 4.01 |
| 26 | Malaysia | 4.46 | 18 | 4.92 | 24 | 5.17 | 48 | 3.29 |
| 27 | Malta | 4.46 | 32 | 4.47 | 28 | 4.99 | 28 | 3.91 |
| 28 | Cyprus | 4.42 | 41 | 4.31 | 27 | 4.99 | 27 | 3.95 |
| 29 | Qatar | 4.41 | 26 | 4.72 | 33 | 4.74 | 35 | 3.76 |
| 30 | Portugal | 4.34 | 37 | 4.41 | 30 | 4.85 | 34 | 3.76 |
| 31 | Barbados | 4.34 | 71 | 3.90 | 25 | 5.09 | 25 | 4.02 |
| 32 | United Arab Emirates | 4.29 | 24 | 4.74 | 39 | 4.62 | 40 | 3.52 |
| 33 | Puerto Rico | 4.25 | 31 | 4.49 | 31 | 4.75 | 42 | 3.51 |
| 34 | Slovenia | 4.23 | 43 | 4.19 | 51 | 4.32 | 22 | 4.18 |
| 35 | Spain | 4.20 | 46 | 4.16 | 40 | 4.60 | 31 | 3.83 |
| 36 | Czech Republic | 4.13 | 40 | 4.32 | 52 | 4.30 | 33 | 3.78 |
| 37 | Bahrain | 4.12 | 27 | 4.71 | 49 | 4.37 | 49 | 3.28 |
| 38 | Saudi Arabia | 4.11 | 38 | 4.35 | 42 | 4.55 | 44 | 3.44 |
| 39 | South Africa | 4.11 | 33 | 4.44 | 26 | 5.04 | 69 | 2.83 |
| 40 | Lithuania | 4.10 | 48 | 4.14 | 41 | 4.57 | 39 | 3.58 |
| 41 | Hungary | 4.09 | 44 | 4.17 | 50 | 4.33 | 32 | 3.78 |
| 42 | Chile | 4.08 | 35 | 4.43 | 35 | 4.74 | 57 | 3.07 |
| 43 | Tunisia | 4.08 | 47 | 4.16 | 29 | 4.88 | 51 | 3.20 |
| 44 | Kuwait | 4.02 | 34 | 4.44 | 58 | 4.19 | 45 | 3.44 |
| 45 | Greece | 4.01 | 79 | 3.79 | 61 | 4.13 | 24 | 4.10 |
| 46 | Mauritius | 3.98 | 29 | 4.65 | 38 | 4.62 | 79 | 2.68 |
| 47 | Latvia | 3.98 | 49 | 4.12 | 46 | 4.45 | 47 | 3.36 |
| 48 | Jordan | 3.94 | 51 | 4.12 | 36 | 4.70 | 59 | 3.01 |
| 49 | Thailand | 3.94 | 36 | 4.42 | 48 | 4.43 | 60 | 2.97 |
| 50 | Slovak Republic | 3.91 | 39 | 4.33 | 60 | 4.17 | 50 | 3.23 |
| 51 | Oman | 3.84 | 42 | 4.31 | 44 | 4.52 | 78 | 2.69 |
| 52 | Montenegro | 3.83 | 67 | 3.93 | 89 | 3.72 | 30 | 3.84 |
| 53 | Italy | 3.75 | 75 | 3.85 | 92 | 3.71 | 36 | 3.70 |
| 54 | Croatia | 3.75 | 77 | 3.82 | 67 | 4.04 | 46 | 3.39 |
| 55 | China | 3.74 | 59 | 4.01 | 45 | 4.50 | 74 | 2.71 |
| 56 | Turkey | 3.70 | 66 | 3.97 | 56 | 4.20 | 62 | 2.94 |
| 57 | Panama | 3.70 | 45 | 4.17 | 66 | 4.05 | 68 | 2.87 |
| 58 | Botswana | 3.68 | 70 | 3.91 | 47 | 4.44 | 77 | 2.70 |
| 59 | Namibia | 3.67 | 73 | 3.89 | 32 | 4.74 | 101 | 2.39 |
| 60 | India | 3.67 | 50 | 4.12 | 57 | 4.19 | 76 | 2.70 |
| 61 | Costa Rica | 3.67 | 58 | 4.02 | 80 | 3.85 | 55 | 3.13 |
| 62 | Russian Federation | 3.65 | 96 | 3.58 | 85 | 3.76 | 38 | 3.63 |
| 63 | Kazakhstan | 3.63 | 85 | 3.73 | 70 | 4.02 | 54 | 3.15 |
| 64 | Egypt | 3.63 | 60 | 4.00 | 62 | 4.12 | 70 | 2.78 |
| 65 | Jamaica | 3.63 | 65 | 3.97 | 55 | 4.21 | 75 | 2.71 |
| 66 | Romania | 3.63 | 72 | 3.90 | 68 | 4.04 | 61 | 2.95 |
| 67 | Azerbaijan | 3.62 | 63 | 3.97 | 54 | 4.22 | 81 | 2.66 |
| 68 | Poland | 3.60 | 87 | 3.71 | 100 | 3.59 | 41 | 3.51 |
| 69 | Ukraine | 3.59 | 90 | 3.60 | 95 | 3.67 | 43 | 3.50 |
| 70 | Sri Lanka | 3.55 | 61 | 4.00 | 71 | 4.00 | 83 | 2.66 |
| 71 | Bulgaria | 3.55 | 81 | 3.77 | 93 | 3.69 | 52 | 3.18 |
| 72 | Vietnam | 3.54 | 86 | 3.72 | 53 | 4.23 | 82 | 2.66 |
| 73 | Uruguay | 3.53 | 102 | 3.52 | 59 | 4.18 | 67 | 2.88 |
| 74 | Morocco | 3.53 | 57 | 4.03 | 74 | 3.93 | 88 | 2.62 |
| 75 | Mexico | 3.48 | 74 | 3.88 | 84 | 3.77 | 71 | 2.78 |
| 76 | Macedonia, FYR | 3.44 | 83 | 3.75 | 97 | 3.64 | 63 | 2.92 |
| 77 | Georgia | 3.42 | 53 | 4.07 | 91 | 3.71 | 96 | 2.49 |
| 78 | Colombia | 3.41 | 93 | 3.59 | 79 | 3.87 | 72 | 2.77 |
| 79 | Serbia | 3.40 | 114 | 3.38 | 98 | 3.64 | 53 | 3.17 |
| 80 | Trinidad and Tobago | 3.39 | 69 | 3.91 | 118 | 3.36 | 66 | 2.89 |
| 81 | Indonesia | 3.39 | 55 | 4.05 | 83 | 3.80 | 103 | 2.31 |
| 82 | Gambia, The | 3.38 | 92 | 3.59 | 37 | 4.65 | 129 | 1.90 |
| 83 | Zambia | 3.37 | 76 | 3.84 | 63 | 4.07 | 110 | 2.21 |
| 84 | Philippines | 3.37 | 52 | 4.09 | 87 | 3.74 | 106 | 2.26 |
| 85 | Dominican Republic | 3.36 | 64 | 3.97 | 75 | 3.90 | 108 | 2.22 |
| 86 | Ghana | 3.35 | 82 | 3.75 | 65 | 4.06 | 107 | 2.25 |
| 87 | Brazil | 3.34 | 119 | 3.28 | 82 | 3.81 | 65 | 2.91 |
| 88 | Nigeria | 3.33 | 68 | 3.91 | 64 | 4.06 | 118 | 2.01 |
| 89 | Senegal | 3.32 | 62 | 3.99 | 101 | 3.59 | 100 | 2.40 |
| 90 | Kenya | 3.32 | 91 | 3.60 | 88 | 3.74 | 85 | 2.63 |
| 91 | Brunei Darussalam | 3.32 | 106 | 3.45 | 78 | 3.87 | 84 | 2.65 |
| 92 | El Salvador | 3.31 | 56 | 4.04 | 86 | 3.75 | 112 | 2.15 |
| 93 | Mongolia | 3.31 | 89 | 3.63 | 102 | 3.56 | 73 | 2.74 |
| 94 | Moldova | 3.28 | 118 | 3.29 | 76 | 3.89 | 80 | 2.67 |
| 95 | Malawi | 3.24 | 94 | 3.59 | 73 | 3.93 | 111 | 2.21 |
| 96 | Tajikistan | 3.23 | 125 | 3.10 | 69 | 4.02 | 91 | 2.57 |
| 97 | Honduras | 3.23 | 78 | 3.80 | 94 | 3.67 | 109 | 2.22 |
| 98 | Burkina Faso | 3.22 | 95 | 3.59 | 72 | 3.95 | 114 | 2.12 |
| 99 | Guatemala | 3.21 | 54 | 4.05 | 104 | 3.52 | 117 | 2.05 |
| 100 | Lesotho | 3.20 | 100 | 3.55 | 110 | 3.44 | 89 | 2.60 |
| 101 | Syria | 3.18 | 101 | 3.53 | 103 | 3.53 | 97 | 2.48 |
| 102 | Mali | 3.18 | 103 | 3.51 | 77 | 3.88 | 113 | 2.14 |
| 103 | Guyana | 3.16 | 108 | 3.44 | 112 | 3.42 | 87 | 2.62 |
| 104 | Libya | 3.16 | 129 | 3.02 | 113 | 3.42 | 58 | 3.03 |
| 105 | Kyrgyz Republic | 3.16 | 115 | 3.37 | 106 | 3.50 | 90 | 2.60 |
| 106 | Peru | 3.15 | 88 | 3.69 | 108 | 3.45 | 104 | 2.29 |
| 107 | Argentina | 3.12 | 128 | 3.04 | 120 | 3.21 | 56 | 3.12 |
| 108 | Uganda | 3.11 | 111 | 3.41 | 96 | 3.66 | 105 | 2.27 |
| 109 | Armenia | 3.09 | 120 | 3.27 | 116 | 3.39 | 86 | 2.62 |
| 110 | Benin | 3.07 | 113 | 3.38 | 90 | 3.72 | 115 | 2.12 |
| 111 | Tanzania | 3.07 | 107 | 3.45 | 81 | 3.81 | 123 | 1.96 |
| 112 | Pakistan | 3.07 | 84 | 3.75 | 107 | 3.46 | 121 | 1.99 |
| 113 | Côte d'Ivoire | 3.03 | 104 | 3.46 | 124 | 3.11 | 95 | 2.52 |
| 114 | Nepal | 3.03 | 80 | 3.77 | 115 | 3.41 | 127 | 1.91 |
| 115 | Madagascar | 2.99 | 99 | 3.55 | 111 | 3.43 | 122 | 1.98 |
| 116 | Bosnia and Herzegovina | 2.98 | 122 | 3.18 | 122 | 3.20 | 92 | 2.57 |
| 117 | Albania | 2.98 | 110 | 3.42 | 114 | 3.42 | 116 | 2.09 |
| 118 | Mozambique | 2.95 | 116 | 3.35 | 99 | 3.59 | 128 | 1.91 |
| 119 | Ethiopia | 2.94 | 117 | 3.33 | 105 | 3.51 | 120 | 1.99 |
| 120 | Algeria | 2.93 | 127 | 3.04 | 121 | 3.20 | 93 | 2.56 |
| 121 | Paraguay | 2.93 | 97 | 3.57 | 131 | 2.77 | 98 | 2.43 |
| 122 | Mauritania | 2.91 | 98 | 3.57 | 109 | 3.44 | 133 | 1.71 |
| 123 | Nicaragua | 2.89 | 109 | 3.42 | 119 | 3.24 | 119 | 2.01 |
| 124 | Venezuela | 2.84 | 133 | 2.67 | 127 | 2.94 | 64 | 2.92 |
| 125 | Cambodia | 2.83 | 112 | 3.40 | 117 | 3.38 | 132 | 1.71 |
| 126 | Suriname | 2.77 | 123 | 3.16 | 133 | 2.74 | 99 | 2.43 |
| 127 | Bangladesh | 2.76 | 105 | 3.46 | 130 | 2.86 | 124 | 1.96 |
| 128 | Bolivia | 2.74 | 130 | 2.80 | 129 | 2.87 | 94 | 2.54 |
| 129 | Cameroon | 2.71 | 126 | 3.09 | 123 | 3.19 | 130 | 1.85 |
| 130 | Zimbabwe | 2.69 | 132 | 2.69 | 125 | 3.02 | 102 | 2.36 |
| 131 | Ecuador | 2.67 | 124 | 3.12 | 126 | 2.96 | 126 | 1.94 |
| 132 | Burundi | 2.55 | 131 | 2.77 | 128 | 2.94 | 125 | 1.95 |
| 133 | Timor-Leste | 2.48 | 121 | 3.24 | 134 | 2.47 | 131 | 1.74 |
| 134 | Chad | 2.31 | 134 | 2.54 | 132 | 2.75 | 134 | 1.63 |

*(Cont'd.)*

## Table 3: Readiness component subindex

| READINESS SUBINDEX | | | Individual readiness | | Business readiness | | Government readiness | |
|---|---|---|---|---|---|---|---|---|
| Rank | Country/Economy | Score | Rank | Score | Rank | Score | Rank | Score |
| 1 | Singapore | 6.01 | 2 | 6.50 | 10 | 5.62 | 1 | 5.92 |
| 2 | Denmark | 5.97 | 4 | 6.32 | 6 | 5.72 | 2 | 5.85 |
| 3 | Sweden | 5.95 | 8 | 6.26 | 2 | 5.86 | 3 | 5.72 |
| 4 | Finland | 5.90 | 1 | 6.54 | 5 | 5.78 | 8 | 5.38 |
| 5 | Switzerland | 5.83 | 3 | 6.43 | 1 | 6.00 | 17 | 5.07 |
| 6 | United States | 5.81 | 14 | 6.14 | 3 | 5.83 | 6 | 5.46 |
| 7 | Korea, Rep. | 5.77 | 11 | 6.22 | 16 | 5.40 | 4 | 5.70 |
| 8 | Norway | 5.64 | 17 | 6.09 | 18 | 5.33 | 5 | 5.49 |
| 9 | Iceland | 5.62 | 6 | 6.30 | 20 | 5.27 | 11 | 5.28 |
| 10 | Taiwan, China | 5.61 | 12 | 6.22 | 14 | 5.49 | 14 | 5.14 |
| 11 | Austria | 5.58 | 10 | 6.24 | 12 | 5.55 | 24 | 4.94 |
| 12 | Netherlands | 5.58 | 15 | 6.11 | 8 | 5.63 | 23 | 4.98 |
| 13 | France | 5.55 | 16 | 6.11 | 13 | 5.51 | 19 | 5.03 |
| 14 | Canada | 5.53 | 9 | 6.26 | 19 | 5.31 | 20 | 5.03 |
| 15 | Australia | 5.52 | 13 | 6.18 | 22 | 5.24 | 15 | 5.14 |
| 16 | Belgium | 5.51 | 5 | 6.32 | 7 | 5.67 | 35 | 4.55 |
| 17 | Germany | 5.48 | 25 | 5.97 | 4 | 5.78 | 30 | 4.70 |
| 18 | Estonia | 5.48 | 19 | 6.06 | 32 | 4.94 | 7 | 5.44 |
| 19 | Malaysia | 5.47 | 26 | 5.97 | 21 | 5.25 | 12 | 5.20 |
| 20 | Japan | 5.47 | 31 | 5.90 | 11 | 5.60 | 25 | 4.90 |
| 21 | Hong Kong SAR | 5.46 | 7 | 6.27 | 26 | 5.09 | 21 | 5.02 |
| 22 | Israel | 5.45 | 34 | 5.80 | 15 | 5.42 | 16 | 5.11 |
| 23 | Ireland | 5.44 | 21 | 6.04 | 9 | 5.63 | 31 | 4.66 |
| 24 | United Kingdom | 5.43 | 24 | 6.02 | 17 | 5.38 | 26 | 4.88 |
| 25 | United Arab Emirates | 5.39 | 32 | 5.89 | 33 | 4.94 | 9 | 5.33 |
| 26 | Qatar | 5.35 | 20 | 6.05 | 30 | 5.01 | 22 | 4.99 |
| 27 | Malta | 5.30 | 28 | 5.95 | 47 | 4.64 | 10 | 5.32 |
| 28 | Luxembourg | 5.26 | 27 | 5.95 | 39 | 4.78 | 18 | 5.05 |
| 29 | Tunisia | 5.21 | 29 | 5.94 | 35 | 4.91 | 27 | 4.78 |
| 30 | New Zealand | 5.20 | 22 | 6.04 | 31 | 4.98 | 32 | 4.59 |
| 31 | Czech Republic | 5.20 | 23 | 6.02 | 23 | 5.15 | 43 | 4.42 |
| 32 | Portugal | 5.14 | 48 | 5.55 | 41 | 4.72 | 13 | 5.16 |
| 33 | Slovenia | 5.14 | 30 | 5.94 | 29 | 5.02 | 41 | 4.45 |
| 34 | Spain | 5.09 | 37 | 5.66 | 24 | 5.12 | 37 | 4.50 |
| 35 | Cyprus | 5.07 | 18 | 6.07 | 50 | 4.57 | 34 | 4.56 |
| 36 | China | 4.96 | 38 | 5.66 | 44 | 4.65 | 33 | 4.58 |
| 37 | Barbados | 4.94 | 33 | 5.84 | 56 | 4.50 | 38 | 4.48 |
| 38 | Bahrain | 4.93 | 35 | 5.70 | 62 | 4.32 | 28 | 4.75 |
| 39 | Costa Rica | 4.93 | 44 | 5.57 | 34 | 4.91 | 48 | 4.30 |
| 40 | India | 4.91 | 45 | 5.57 | 27 | 5.05 | 57 | 4.12 |
| 41 | Saudi Arabia | 4.88 | 79 | 5.06 | 28 | 5.04 | 36 | 4.55 |
| 42 | Oman | 4.87 | 49 | 5.54 | 48 | 4.60 | 39 | 4.47 |
| 43 | Chile | 4.86 | 58 | 5.45 | 42 | 4.71 | 42 | 4.42 |
| 44 | Lithuania | 4.84 | 36 | 5.67 | 51 | 4.56 | 49 | 4.29 |
| 45 | Jordan | 4.81 | 53 | 5.52 | 76 | 4.19 | 29 | 4.72 |
| 46 | Thailand | 4.80 | 54 | 5.52 | 43 | 4.67 | 53 | 4.22 |
| 47 | Croatia | 4.80 | 41 | 5.62 | 45 | 4.64 | 56 | 4.13 |
| 48 | Slovak Republic | 4.79 | 39 | 5.65 | 40 | 4.74 | 66 | 3.98 |
| 49 | Puerto Rico | 4.77 | 60 | 5.42 | 25 | 5.12 | 84 | 3.77 |
| 50 | Brunei Darussalam | 4.77 | 40 | 5.64 | 67 | 4.27 | 45 | 4.38 |
| 51 | Mauritius | 4.76 | 50 | 5.53 | 59 | 4.40 | 46 | 4.34 |
| 52 | Hungary | 4.75 | 42 | 5.58 | 46 | 4.64 | 60 | 4.03 |
| 53 | Colombia | 4.71 | 63 | 5.37 | 55 | 4.50 | 50 | 4.28 |
| 54 | Italy | 4.68 | 57 | 5.47 | 38 | 4.78 | 83 | 3.77 |
| 55 | Romania | 4.67 | 46 | 5.55 | 58 | 4.47 | 64 | 3.99 |
| 56 | South Africa | 4.63 | 80 | 5.02 | 36 | 4.88 | 63 | 3.99 |
| 57 | Azerbaijan | 4.63 | 78 | 5.06 | 61 | 4.36 | 40 | 4.46 |
| 58 | Brazil | 4.61 | 81 | 5.02 | 37 | 4.83 | 65 | 3.98 |
| 59 | Latvia | 4.59 | 55 | 5.52 | 60 | 4.38 | 76 | 3.88 |
| 60 | Greece | 4.58 | 56 | 5.49 | 68 | 4.27 | 67 | 3.97 |
| 61 | Uruguay | 4.56 | 65 | 5.35 | 78 | 4.18 | 54 | 4.16 |
| 62 | Poland | 4.56 | 43 | 5.57 | 52 | 4.56 | 103 | 3.54 |
| 63 | Ukraine | 4.53 | 51 | 5.52 | 80 | 4.16 | 74 | 3.90 |
| 64 | Vietnam | 4.51 | 86 | 4.88 | 73 | 4.25 | 44 | 4.42 |
| 65 | Indonesia | 4.51 | 52 | 5.52 | 49 | 4.58 | 111 | 3.43 |
| 66 | Kuwait | 4.49 | 62 | 5.37 | 64 | 4.30 | 80 | 3.80 |
| 67 | Russian Federation | 4.48 | 61 | 5.39 | 69 | 4.26 | 81 | 3.79 |
| 68 | Trinidad and Tobago | 4.48 | 47 | 5.55 | 74 | 4.24 | 94 | 3.65 |
| 69 | Turkey | 4.47 | 64 | 5.35 | 63 | 4.31 | 87 | 3.75 |
| 70 | Panama | 4.47 | 69 | 5.19 | 75 | 4.21 | 61 | 4.01 |
| 71 | Sri Lanka | 4.47 | 76 | 5.09 | 86 | 4.10 | 52 | 4.22 |
| 72 | Jamaica | 4.46 | 71 | 5.14 | 65 | 4.29 | 69 | 3.97 |
| 73 | Serbia | 4.46 | 59 | 5.44 | 77 | 4.18 | 85 | 3.77 |
| 74 | Bulgaria | 4.46 | 66 | 5.34 | 85 | 4.11 | 72 | 3.93 |
| 75 | Kazakhstan | 4.46 | 94 | 4.73 | 54 | 4.51 | 55 | 4.14 |
| 76 | Mexico | 4.46 | 74 | 5.12 | 72 | 4.26 | 62 | 3.99 |
| 77 | Macedonia, FYR | 4.42 | 70 | 5.14 | 81 | 4.16 | 68 | 3.97 |
| 78 | Botswana | 4.41 | 67 | 5.31 | 96 | 3.94 | 70 | 3.97 |
| 79 | Dominican Republic | 4.39 | 87 | 4.87 | 89 | 4.00 | 47 | 4.31 |
| 80 | El Salvador | 4.34 | 82 | 4.99 | 82 | 4.14 | 75 | 3.90 |
| 81 | Argentina | 4.33 | 68 | 5.25 | 57 | 4.48 | 117 | 3.25 |
| 82 | Syria | 4.29 | 75 | 5.11 | 87 | 4.06 | 91 | 3.70 |
| 83 | Guatemala | 4.29 | 89 | 4.81 | 71 | 4.26 | 82 | 3.79 |
| 84 | Senegal | 4.27 | 99 | 4.59 | 66 | 4.28 | 71 | 3.95 |
| 85 | Egypt | 4.26 | 97 | 4.66 | 100 | 3.86 | 51 | 4.27 |
| 86 | Philippines | 4.21 | 83 | 4.98 | 97 | 3.91 | 88 | 3.75 |
| 87 | Montenegro | 4.21 | 88 | 4.81 | 91 | 3.98 | 78 | 3.83 |
| 88 | Venezuela | 4.20 | 72 | 5.13 | 88 | 4.01 | 109 | 3.44 |
| 89 | Morocco | 4.13 | 85 | 4.89 | 92 | 3.96 | 102 | 3.54 |
| 90 | Peru | 4.13 | 95 | 4.68 | 84 | 4.11 | 98 | 3.59 |
| 91 | Georgia | 4.12 | 77 | 5.08 | 115 | 3.45 | 77 | 3.83 |
| 92 | Mongolia | 4.07 | 96 | 4.68 | 112 | 3.46 | 59 | 4.07 |
| 93 | Guyana | 4.06 | 93 | 4.77 | 99 | 3.86 | 100 | 3.56 |
| 94 | Honduras | 4.05 | 98 | 4.66 | 93 | 3.95 | 101 | 3.56 |
| 95 | Libya | 4.01 | 92 | 4.77 | 103 | 3.78 | 108 | 3.46 |
| 96 | Nigeria | 3.99 | 104 | 4.21 | 53 | 4.53 | 120 | 3.22 |
| 97 | Bosnia and Herzegovina | 3.98 | 73 | 5.13 | 108 | 3.58 | 122 | 3.22 |
| 98 | Albania | 3.96 | 91 | 4.79 | 118 | 3.34 | 86 | 3.77 |
| 99 | Suriname | 3.95 | 84 | 4.92 | 70 | 4.26 | 133 | 2.67 |
| 100 | Algeria | 3.93 | 100 | 4.51 | 101 | 3.84 | 110 | 3.44 |
| 101 | Pakistan | 3.86 | 111 | 3.79 | 83 | 4.14 | 95 | 3.64 |
| 102 | Tajikistan | 3.85 | 103 | 4.21 | 107 | 3.60 | 90 | 3.73 |
| 103 | Ecuador | 3.83 | 90 | 4.81 | 105 | 3.72 | 127 | 2.97 |
| 104 | Namibia | 3.82 | 101 | 4.35 | 98 | 3.88 | 121 | 3.22 |
| 105 | Ghana | 3.81 | 110 | 3.82 | 90 | 3.99 | 96 | 3.62 |
| 106 | Kenya | 3.76 | 117 | 3.36 | 79 | 4.16 | 89 | 3.75 |
| 107 | Gambia, The | 3.70 | 122 | 3.05 | 94 | 3.95 | 58 | 4.11 |
| 108 | Zambia | 3.68 | 107 | 3.97 | 102 | 3.79 | 115 | 3.29 |
| 109 | Malawi | 3.63 | 119 | 3.29 | 95 | 3.94 | 93 | 3.65 |
| 110 | Moldova | 3.60 | 106 | 3.98 | 121 | 3.22 | 97 | 3.59 |
| 111 | Armenia | 3.56 | 109 | 3.88 | 111 | 3.52 | 116 | 3.27 |
| 112 | Côte d'Ivoire | 3.53 | 113 | 3.61 | 104 | 3.74 | 118 | 3.23 |
| 113 | Madagascar | 3.53 | 118 | 3.31 | 114 | 3.45 | 79 | 3.82 |
| 114 | Mauritania | 3.50 | 120 | 3.27 | 106 | 3.67 | 99 | 3.56 |
| 115 | Kyrgyz Republic | 3.47 | 105 | 4.17 | 128 | 3.16 | 124 | 3.07 |
| 116 | Paraguay | 3.45 | 102 | 4.23 | 117 | 3.34 | 131 | 2.78 |
| 117 | Cameroon | 3.42 | 115 | 3.48 | 110 | 3.54 | 119 | 3.23 |
| 118 | Tanzania | 3.36 | 121 | 3.14 | 113 | 3.46 | 107 | 3.47 |
| 119 | Lesotho | 3.36 | 114 | 3.55 | 126 | 3.17 | 113 | 3.34 |
| 120 | Nicaragua | 3.31 | 108 | 3.89 | 132 | 2.93 | 123 | 3.10 |
| 121 | Bolivia | 3.29 | 112 | 3.75 | 116 | 3.34 | 130 | 2.79 |
| 122 | Mali | 3.27 | 126 | 2.70 | 123 | 3.20 | 73 | 3.91 |
| 123 | Nepal | 3.22 | 116 | 3.43 | 120 | 3.23 | 126 | 3.01 |
| 124 | Cambodia | 3.21 | 123 | 2.93 | 122 | 3.22 | 106 | 3.47 |
| 125 | Burkina Faso | 3.13 | 133 | 2.34 | 109 | 3.55 | 105 | 3.49 |
| 126 | Benin | 3.09 | 127 | 2.58 | 127 | 3.16 | 104 | 3.53 |
| 127 | Mozambique | 3.04 | 129 | 2.53 | 124 | 3.20 | 112 | 3.39 |
| 128 | Bangladesh | 3.01 | 124 | 2.88 | 129 | 3.09 | 125 | 3.06 |
| 129 | Ethiopia | 2.96 | 128 | 2.57 | 131 | 3.01 | 114 | 3.30 |
| 130 | Uganda | 2.93 | 134 | 1.95 | 125 | 3.19 | 92 | 3.65 |
| 131 | Burundi | 2.92 | 125 | 2.80 | 130 | 3.03 | 129 | 2.92 |
| 132 | Zimbabwe | 2.74 | 130 | 2.49 | 119 | 3.31 | 134 | 2.44 |
| 133 | Chad | 2.69 | 131 | 2.47 | 133 | 2.85 | 132 | 2.75 |
| 134 | Timor-Leste | 2.65 | 132 | 2.36 | 134 | 2.64 | 128 | 2.96 |

*(Cont'd.)*

## Table 4: Usage component subindex

| USAGE SUBINDEX | | | Individual usage | | Business usage | | Government usage | |
|---|---|---|---|---|---|---|---|---|
| Rank | Country/Economy | Score | Rank | Score | Rank | Score | Rank | Score |
| 1 | Denmark | 6.07 | 3 | 5.96 | 2 | 6.15 | 1 | 6.09 |
| 2 | Sweden | 5.98 | 2 | 6.06 | 1 | 6.15 | 6 | 5.72 |
| 3 | Singapore | 5.67 | 7 | 5.21 | 13 | 5.77 | 2 | 6.02 |
| 4 | Netherlands | 5.65 | 1 | 6.39 | 14 | 5.74 | 22 | 4.82 |
| 5 | United States | 5.63 | 10 | 5.05 | 5 | 6.06 | 5 | 5.79 |
| 6 | Switzerland | 5.48 | 6 | 5.29 | 3 | 6.11 | 17 | 5.02 |
| 7 | Norway | 5.45 | 8 | 5.18 | 10 | 5.85 | 12 | 5.33 |
| 8 | Hong Kong SAR | 5.42 | 9 | 5.17 | 20 | 5.46 | 7 | 5.64 |
| 9 | Estonia | 5.37 | 14 | 4.83 | 24 | 5.29 | 3 | 6.00 |
| 10 | Korea, Rep. | 5.32 | 20 | 4.31 | 16 | 5.70 | 4 | 5.95 |
| 11 | Canada | 5.31 | 12 | 4.93 | 12 | 5.77 | 13 | 5.23 |
| 12 | Taiwan, China | 5.30 | 15 | 4.60 | 15 | 5.74 | 8 | 5.55 |
| 13 | United Kingdom | 5.28 | 5 | 5.45 | 17 | 5.65 | 26 | 4.73 |
| 14 | Iceland | 5.24 | 11 | 4.94 | 8 | 5.91 | 21 | 4.86 |
| 15 | Luxembourg | 5.21 | 4 | 5.69 | 23 | 5.29 | 27 | 4.64 |
| 16 | Finland | 5.18 | 16 | 4.59 | 7 | 6.04 | 19 | 4.92 |
| 17 | Australia | 5.14 | 18 | 4.47 | 21 | 5.40 | 9 | 5.55 |
| 18 | Japan | 5.12 | 13 | 4.85 | 4 | 6.09 | 34 | 4.43 |
| 19 | Austria | 5.11 | 21 | 4.26 | 9 | 5.87 | 14 | 5.18 |
| 20 | France | 5.06 | 23 | 4.13 | 18 | 5.65 | 10 | 5.40 |
| 21 | Germany | 4.93 | 17 | 4.51 | 6 | 6.04 | 43 | 4.25 |
| 22 | New Zealand | 4.86 | 22 | 4.25 | 26 | 5.23 | 15 | 5.09 |
| 23 | Belgium | 4.75 | 19 | 4.37 | 19 | 5.55 | 40 | 4.34 |
| 24 | Israel | 4.74 | 28 | 3.67 | 11 | 5.78 | 24 | 4.75 |
| 25 | United Arab Emirates | 4.60 | 31 | 3.57 | 27 | 5.18 | 16 | 5.06 |
| 26 | Malta | 4.59 | 33 | 3.47 | 37 | 4.95 | 11 | 5.37 |
| 27 | Ireland | 4.56 | 24 | 3.95 | 29 | 5.14 | 28 | 4.59 |
| 28 | Portugal | 4.41 | 41 | 3.07 | 28 | 5.17 | 18 | 4.98 |
| 29 | Slovenia | 4.34 | 27 | 3.68 | 35 | 4.98 | 38 | 4.37 |
| 30 | Malaysia | 4.34 | 45 | 2.86 | 25 | 5.26 | 20 | 4.89 |
| 31 | Qatar | 4.28 | 38 | 3.26 | 41 | 4.86 | 25 | 4.73 |
| 32 | Lithuania | 4.27 | 32 | 3.51 | 47 | 4.74 | 30 | 4.55 |
| 33 | Czech Republic | 4.25 | 25 | 3.91 | 22 | 5.32 | 77 | 3.53 |
| 34 | Spain | 4.22 | 30 | 3.57 | 42 | 4.85 | 44 | 4.23 |
| 35 | Bahrain | 4.08 | 44 | 2.90 | 45 | 4.77 | 29 | 4.58 |
| 36 | Cyprus | 4.07 | 37 | 3.28 | 40 | 4.86 | 49 | 4.07 |
| 37 | Italy | 4.05 | 26 | 3.84 | 56 | 4.61 | 68 | 3.69 |
| 38 | Chile | 4.03 | 49 | 2.49 | 31 | 5.06 | 31 | 4.53 |
| 39 | Jamaica | 4.01 | 29 | 3.67 | 63 | 4.49 | 57 | 3.86 |
| 40 | Hungary | 3.99 | 34 | 3.44 | 51 | 4.69 | 58 | 3.86 |
| 41 | Brazil | 3.88 | 62 | 2.12 | 32 | 5.06 | 32 | 4.47 |
| 42 | Barbados | 3.85 | 35 | 3.38 | 60 | 4.54 | 71 | 3.65 |
| 43 | Slovak Republic | 3.85 | 36 | 3.33 | 38 | 4.91 | 94 | 3.31 |
| 44 | Saudi Arabia | 3.85 | 53 | 2.38 | 39 | 4.87 | 42 | 4.30 |
| 45 | Jordan | 3.81 | 73 | 1.93 | 33 | 5.02 | 33 | 4.46 |
| 46 | Latvia | 3.75 | 39 | 3.18 | 62 | 4.49 | 74 | 3.57 |
| 47 | Tunisia | 3.73 | 75 | 1.87 | 36 | 4.97 | 39 | 4.36 |
| 48 | China | 3.73 | 83 | 1.73 | 50 | 4.69 | 23 | 4.77 |
| 49 | Croatia | 3.71 | 42 | 3.01 | 57 | 4.57 | 75 | 3.55 |
| 50 | Puerto Rico | 3.68 | 65 | 2.05 | 34 | 5.02 | 55 | 3.97 |
| 51 | Thailand | 3.67 | 69 | 1.98 | 49 | 4.70 | 41 | 4.32 |
| 52 | Romania | 3.62 | 40 | 3.16 | 78 | 4.28 | 84 | 3.42 |
| 53 | Mexico | 3.58 | 66 | 2.04 | 76 | 4.31 | 36 | 4.39 |
| 54 | Turkey | 3.56 | 61 | 2.13 | 48 | 4.74 | 60 | 3.79 |
| 55 | Oman | 3.54 | 70 | 1.97 | 66 | 4.44 | 45 | 4.21 |
| 56 | Dominican Republic | 3.54 | 85 | 1.70 | 59 | 4.54 | 37 | 4.38 |
| 57 | Azerbaijan | 3.53 | 94 | 1.57 | 55 | 4.61 | 35 | 4.42 |
| 58 | Brunei Darussalam | 3.52 | 54 | 2.38 | 67 | 4.41 | 65 | 3.76 |
| 59 | India | 3.51 | 114 | 1.26 | 30 | 5.09 | 47 | 4.19 |
| 60 | Ukraine | 3.51 | 59 | 2.22 | 71 | 4.35 | 56 | 3.96 |
| 61 | Colombia | 3.48 | 67 | 2.03 | 70 | 4.36 | 50 | 4.06 |
| 62 | Mauritius | 3.47 | 60 | 2.15 | 64 | 4.46 | 59 | 3.79 |
| 63 | South Africa | 3.46 | 78 | 1.83 | 46 | 4.76 | 61 | 3.79 |
| 64 | Uruguay | 3.45 | 55 | 2.36 | 74 | 4.32 | 69 | 3.68 |
| 65 | Kuwait | 3.42 | 51 | 2.41 | 54 | 4.63 | 97 | 3.23 |
| 66 | Guatemala | 3.42 | 86 | 1.69 | 44 | 4.80 | 63 | 3.78 |
| 67 | El Salvador | 3.41 | 76 | 1.87 | 72 | 4.34 | 51 | 4.03 |
| 68 | Senegal | 3.41 | 104 | 1.35 | 52 | 4.67 | 46 | 4.21 |
| 69 | Greece | 3.40 | 48 | 2.51 | 77 | 4.28 | 85 | 3.41 |
| 70 | Bulgaria | 3.40 | 47 | 2.74 | 94 | 3.97 | 80 | 3.50 |
| 71 | Costa Rica | 3.38 | 63 | 2.10 | 79 | 4.26 | 64 | 3.77 |
| 72 | Egypt | 3.38 | 98 | 1.49 | 53 | 4.64 | 53 | 4.00 |
| 73 | Panama | 3.35 | 79 | 1.80 | 58 | 4.57 | 70 | 3.68 |
| 74 | Montenegro | 3.34 | 43 | 2.96 | 97 | 3.94 | 101 | 3.11 |
| 75 | Sri Lanka | 3.34 | 103 | 1.39 | 43 | 4.84 | 62 | 3.78 |
| 76 | Vietnam | 3.33 | 90 | 1.62 | 80 | 4.23 | 48 | 4.12 |
| 77 | Argentina | 3.30 | 52 | 2.38 | 85 | 4.18 | 91 | 3.35 |
| 78 | Kazakhstan | 3.26 | 68 | 2.01 | 92 | 4.05 | 66 | 3.73 |
| 79 | Gambia, The | 3.25 | 101 | 1.42 | 73 | 4.32 | 52 | 4.01 |
| 80 | Poland | 3.24 | 46 | 2.79 | 69 | 4.36 | 127 | 2.57 |
| 81 | Philippines | 3.22 | 91 | 1.61 | 61 | 4.53 | 79 | 3.51 |
| 82 | Russian Federation | 3.17 | 56 | 2.33 | 81 | 4.23 | 111 | 2.95 |
| 83 | Macedonia, FYR | 3.15 | 50 | 2.42 | 109 | 3.69 | 93 | 3.34 |
| 84 | Venezuela | 3.13 | 64 | 2.08 | 98 | 3.92 | 87 | 3.39 |
| 85 | Peru | 3.13 | 72 | 1.95 | 91 | 4.09 | 92 | 3.35 |
| 86 | Trinidad and Tobago | 3.13 | 57 | 2.24 | 89 | 4.10 | 107 | 3.04 |
| 87 | Morocco | 3.12 | 77 | 1.85 | 83 | 4.21 | 95 | 3.30 |
| 88 | Mali | 3.09 | 123 | 1.15 | 88 | 4.12 | 54 | 3.99 |
| 89 | Botswana | 3.08 | 89 | 1.65 | 93 | 3.98 | 72 | 3.60 |
| 90 | Nigeria | 3.04 | 112 | 1.28 | 68 | 4.39 | 83 | 3.45 |
| 91 | Moldova | 3.01 | 80 | 1.80 | 87 | 4.14 | 103 | 3.10 |
| 92 | Pakistan | 3.01 | 93 | 1.59 | 86 | 4.16 | 96 | 3.27 |
| 93 | Serbia | 2.99 | 58 | 2.23 | 113 | 3.57 | 98 | 3.19 |
| 94 | Indonesia | 2.98 | 107 | 1.34 | 65 | 4.44 | 99 | 3.15 |
| 95 | Kenya | 2.97 | 109 | 1.33 | 82 | 4.23 | 88 | 3.37 |
| 96 | Mauritania | 2.96 | 105 | 1.35 | 96 | 3.96 | 73 | 3.58 |
| 97 | Honduras | 2.93 | 111 | 1.28 | 90 | 4.10 | 86 | 3.41 |
| 98 | Mongolia | 2.91 | 97 | 1.52 | 106 | 3.71 | 81 | 3.50 |
| 99 | Uganda | 2.90 | 119 | 1.19 | 95 | 3.97 | 76 | 3.54 |
| 100 | Georgia | 2.89 | 100 | 1.46 | 101 | 3.85 | 90 | 3.36 |
| 101 | Burkina Faso | 2.86 | 127 | 1.08 | 104 | 3.79 | 67 | 3.70 |
| 102 | Namibia | 2.82 | 95 | 1.57 | 84 | 4.19 | 124 | 2.70 |
| 103 | Côte d'Ivoire | 2.79 | 110 | 1.29 | 75 | 4.31 | 121 | 2.76 |
| 104 | Mozambique | 2.75 | 125 | 1.12 | 110 | 3.67 | 82 | 3.47 |
| 105 | Albania | 2.75 | 82 | 1.74 | 120 | 3.46 | 106 | 3.06 |
| 106 | Syria | 2.75 | 96 | 1.54 | 99 | 3.89 | 116 | 2.83 |
| 107 | Madagascar | 2.74 | 126 | 1.08 | 103 | 3.79 | 89 | 3.36 |
| 108 | Bosnia and Herzegovina | 2.74 | 71 | 1.95 | 108 | 3.70 | 129 | 2.56 |
| 109 | Zambia | 2.73 | 116 | 1.21 | 100 | 3.87 | 104 | 3.10 |
| 110 | Benin | 2.72 | 121 | 1.16 | 118 | 3.49 | 78 | 3.51 |
| 111 | Libya | 2.68 | 92 | 1.59 | 115 | 3.51 | 110 | 2.95 |
| 112 | Tajikistan | 2.66 | 132 | 1.04 | 102 | 3.84 | 102 | 3.11 |
| 113 | Cameroon | 2.66 | 117 | 1.20 | 107 | 3.70 | 105 | 3.07 |
| 114 | Guyana | 2.64 | 88 | 1.65 | 121 | 3.46 | 119 | 2.81 |
| 115 | Cambodia | 2.63 | 124 | 1.12 | 112 | 3.61 | 100 | 3.15 |
| 116 | Tanzania | 2.60 | 122 | 1.15 | 105 | 3.72 | 112 | 2.93 |
| 117 | Ghana | 2.60 | 115 | 1.26 | 114 | 3.56 | 108 | 2.97 |
| 118 | Ecuador | 2.59 | 74 | 1.92 | 128 | 3.29 | 128 | 2.56 |
| 119 | Algeria | 2.57 | 81 | 1.74 | 129 | 3.22 | 122 | 2.75 |
| 120 | Armenia | 2.54 | 108 | 1.33 | 111 | 3.63 | 125 | 2.66 |
| 121 | Lesotho | 2.52 | 118 | 1.19 | 117 | 3.49 | 115 | 2.86 |
| 122 | Kyrgyz Republic | 2.51 | 99 | 1.49 | 123 | 3.43 | 126 | 2.61 |
| 123 | Nicaragua | 2.50 | 106 | 1.35 | 122 | 3.44 | 123 | 2.71 |
| 124 | Ethiopia | 2.49 | 134 | 1.01 | 116 | 3.50 | 109 | 2.96 |
| 125 | Malawi | 2.48 | 129 | 1.06 | 119 | 3.46 | 114 | 2.91 |
| 126 | Bolivia | 2.44 | 102 | 1.41 | 132 | 3.09 | 117 | 2.83 |
| 127 | Burundi | 2.43 | 133 | 1.03 | 125 | 3.33 | 113 | 2.92 |
| 128 | Paraguay | 2.42 | 87 | 1.67 | 130 | 3.12 | 132 | 2.49 |
| 129 | Suriname | 2.36 | 84 | 1.71 | 127 | 3.31 | 133 | 2.06 |
| 130 | Bangladesh | 2.34 | 120 | 1.17 | 126 | 3.32 | 130 | 2.53 |
| 131 | Chad | 2.32 | 128 | 1.06 | 131 | 3.11 | 120 | 2.79 |
| 132 | Nepal | 2.30 | 131 | 1.04 | 124 | 3.37 | 131 | 2.49 |
| 133 | Timor-Leste | 2.27 | 130 | 1.05 | 133 | 2.94 | 118 | 2.81 |
| 134 | Zimbabwe | 2.04 | 113 | 1.27 | 134 | 2.87 | 134 | 2.00 |

*(Cont'd.)*

### Table 5: Top performer on each pillar of the Networked Readiness Index 2008–2009

| Country/Economy | Overall GCI | Number of times ranked in top 3 | Market environment | Regulatory environment | Infrastructure environment | Individual readiness | Business readiness | Government readiness | Individual usage | Business usage | Government usage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Denmark | 1 | 5 | — | **2** | — | — | — | **2** | **3** | **2** | **1** |
| Sweden | 2 | 5 | — | — | **2** | — | **2** | **3** | **2** | **1** | — |
| United States | 3 | 3 | **2** | — | **3** | — | **3** | — | — | — | — |
| Singapore | 4 | 5 | **3** | **1** | — | **2** | — | **1** | — | — | **2** |
| Switzerland | 5 | 3 | — | — | — | **3** | **1** | — | — | **3** | — |
| Iceland | 7 | 1 | — | — | **1** | — | — | — | — | — | — |
| Finland | 6 | 2 | — | **3** | — | **1** | — | — | — | — | — |
| Netherlands | 9 | 1 | — | — | — | — | — | — | **1** | — | — |
| Hong Kong SAR | 12 | 1 | **1** | — | — | — | — | — | — | — | — |
| Estonia | 18 | 1 | — | — | — | — | — | — | — | — | **3** |

### Table 6: Evolution of the Networked Readiness Index since 2001–02

| Country | 2008–09 | 2007–08 | 2006–07 | 2005–06 | 2004–05 | 2003–04 | 2002–03 | 2001–02 |
|---|---|---|---|---|---|---|---|---|
| (Number of economies) | 134 | 127 | 122 | 115 | 104 | 102 | 82 | 72 |
| Denmark | 1 | 1 | 1 | 3 | 4 | 5 | 8 | 7 |
| Sweden | 2 | 2 | 2 | 8 | 6 | 4 | 4 | 4 |
| United States | 3 | 4 | 7 | 1 | 5 | 1 | 2 | 1 |
| Singapore | 4 | 5 | 3 | 2 | 1 | 2 | 3 | 8 |
| Switzerland | 5 | 3 | 5 | 9 | 9 | 7 | 13 | 16 |
| Finland | 6 | 6 | 4 | 5 | 3 | 3 | 1 | 3 |
| Iceland | 7 | 8 | 8 | 4 | 2 | 10 | 5 | 2 |
| Norway | 8 | 10 | 10 | 13 | 13 | 8 | 17 | 5 |
| Netherlands | 9 | 7 | 6 | 12 | 16 | 13 | 11 | 6 |
| Canada | 10 | 13 | 11 | 6 | 10 | 6 | 6 | 12 |



competitiveness: the country has ranked consistently in first place since 2006 (continuously improving its score), culminating an upward trend observed since 2003, as shown in Table 6. The country posts an outstanding showing across the board, ranking 4th, 2nd, and 1st in the environment, readiness, and usage components, respectively. This highlights the importance of a supportive environment and of a multi-stakeholder effort to achieve networked readiness prowess. In particular, the government's clear and consistent vision on the importance of ICT diffusion (2nd and 1st, respectively, in government readiness and usage)[7] reflects in an extremely ICT friendly regulatory environment (2nd), with the world's most-developed ICT legislation; it has also helped in achieving among the highest penetration rates worldwide. Denmark continues to display the highest Internet bandwidth (346 mB/s per 10,000 population) and broadband Internet penetration rates (36.3 subscribers per 100 population) in the sample, together with extensive ICT usage by companies in their business transactions (5th). Other notable competitive advantages helping the country to fully leverage technology have to do with more general aspects, such as the well-functioning and developed internal market—which provided the national high-tech industry with a large domestic demand in its early stage—and the excellent educational system (6th) coupled with a close collaboration between academia and industry (7th), and the Danish people's taste and talent for developing, pioneering, and using new technologies and applications.

The other **Nordic countries** continue to feature prominently in the NRI 2008–2009 rankings, with Sweden, Finland, Iceland, and Norway at 2nd, 6th, 7th, and 8th position, respectively. The strong education fundamentals and high levels of technological readiness and innovation shared by these countries represent bases for their overall competitiveness;[8] they will no doubt be of assistance to Iceland in particular in overcoming the present severe economic crisis.

Amidst the current major recession, the **United States** continues to deliver a convincing performance in networked readiness, climbing one position to an outstanding 3rd place. Among the country's most notable competitive strengths are its highly ICT-conducive environment (3rd), displaying an outstandingly efficient market environment (2nd in the world) as well as top-class ICT-related infrastructure (3rd). In particular, the large pool of scientists and engineers (6th) and the best-ranked research institutions in the sample equip the country with the necessary infrastructure for technology

absorption and development. This, coupled with well-developed clusters (2nd), results in an extremely ICT-ready (3rd and 5th, respectively, for business readiness and usage) and innovative business sector, heavily exporting high-tech products (12th, with 21 percent of total exports) to the international market. The country remains one of the world's main innovation powerhouses, as highlighted by its 2nd position for the number of utility patents (263.7 per million population).

On a less positive note, the relatively mediocre rankings registered for the burden of government regulation (50th) and tax rate (68th, 42.3 percent of total profits), among others, point to the presence of red tape and inefficiencies in the country's business environment. The quality of the general regulatory framework, at 19th, is another area of concern, notably with regard to the effectiveness of law making (33rd), the efficiency of the legal framework to settle disputes (28th), the protection of property rights (26th), and the independence of the judiciary (23rd).

**Singapore** leads Asia once again in networked readiness at 4th place, one position up from last year, thanks to important strengths such as the world's most ICT-conducive market and regulatory environment and exceptional levels of government readiness (1st in the sample) and usage (2nd). Singapore's astonishing growth into a vibrant high-tech economy in the space of a few decades has much to do with the government's savvy promotion of ICT readiness as a key element of its competitiveness strategy, coupled with a continued focus on education and innovation and important private-public partnerships.[9]

**Switzerland** is still among the top-ranked economies in the world, but drops two places to 5th. The country's success rests on its extremely ICT-supportive market environment (4th) as well as top-notch educational system, especially for math and science (5th), and research institutions (2nd), resulting in a high degree of innovation (6th for the number of utility patents, at 137.1 per million population) and a very networked civil society. In this respect, Switzerland is quite an unusual case within the most successful countries in the sample: the country's ICT excellence seems to be the result of the interest and usage of the business sector and ordinary citizens rather than of a precise government vision and strategy. The country displays the highest and third-best levels of business and individual readiness, respectively, out of the 134 countries covered, coupled with widespread usage (6th and 3rd for individual and business usage, respectively), while the government lags behind, at a rather disappointing 17th place for both its ICT readiness and usage.

**The Netherlands** is down two positions at 9th, although improving its NRI score slightly. The country continues to post a very robust performance, driven by impressive levels of ICT usage (4th), particularly by individuals (1st). The fairly low marks obtained by the government for its readiness (23rd) and usage (22nd) point to the weak prioritization of ICT in the national agenda and to the need for a more active government role in leveraging ICT for overall growth.

Improving three positions from last year, **Canada** re-enters the top 10, at 10th place, for the first time since 2005–06. The country's networked readiness is particularly boosted by an excellent ICT infrastructure (4th), a conducive market environment (15th), and widespread ICT usage (11th) by all social actors (12th, 12th, and 13th for individual, business, and government usage, respectively).

Tables 5 and 6 provide some additional insight into the most successful economies in leveraging ICT this year, by looking at the top three performers in each of the nine pillars composing the NRI, and at the evolution of the top 10 economies since 2001–02.

Table 5 highlights a number of features:

1. Denmark, Sweden, and Singapore are the countries appearing in the top three positions most frequently (i.e., in five pillars out of nine), followed by Switzerland and the United States, which each appear three times within the top three.

2. Singapore is once again the only country to rank 1st in more than one pillar, topping the political and regulatory environment pillar and the government readiness pillar. Top-ranked Denmark leads only in one pillar (government usage).

3. Finland, Iceland, the Netherlands, Sweden, Switzerland, and the United States each rank 1st in one pillar. Finland and the Netherlands are home of the highest individual readiness and usage, respectively. In particular, the Netherlands displays among the highest penetration rates in the world for PCs (2nd), broadband Internet subscribers (4th), and Internet users (1st). Iceland has the most ICT-friendly infrastructure in the world as assessed by the NRI, with outstanding marks in most of the hard infrastructure components, notably the number of telephone lines (4th), secure Internet servers (1st), and electricity production (2nd). Switzerland and Sweden, in turn, top the league for the readiness and usage, respectively, of their business sectors.

   Switzerland ranks among the best in the world for on-the-job training, industry-academia collaboration, and company spending in R&D, among others, while Swedish businesses appear among the most innovative in the world (4th for capacity of innovation and firm level technology absorption) and are using the Internet extensively in their transactions (2nd). Last, the United States can count on one of the most ICT-conducive market environments in the world, as noted above.

4. Hong Kong (12th overall) and Estonia (18th) are the only two economies outside the top 10 to appear within the top three of one pillar. Hong Kong tops the market environment pillar, thanks to its volume of high-tech exports, which account for 50 percent of total exports (2nd), the low burden of taxation (3rd) and bureaucracy (2nd), the sophistication of its financial market (2nd), and its extensive domestic competition (7th). As for Estonia, it ranks 3rd on government usage. The government gets top marks for the availability of online services (1st worldwide), ICT-driven efficiency (2nd), the presence of ICT in its offices (2nd), and its successes in promoting ICT (5th).

Completing the analysis conducted above, Box 2 relates the main findings of an across-time analysis aimed at identifying the regions and countries that have progressed the most in the eight years since the NRI's inception.

## Box 2: Evolution of the NRI: Focus on the most and least dynamic countries and regions

Table A provides the results of an analysis of country performance based on decile rankings. Like a percentile ranking, a decile ranking attributes ranks *relative* to the number of countries in the sample.[1] This allows us to compare countries' performances across time in the presence of varying sample sizes. In effect, one has to take into account the fact that the country coverage has increased ever since the first edition of the *Report* and, as a result, for a country to be ranked 50th among 75 countries is not the same as being ranked 50th out of 134.

The **Middle East** stands out as the region having benefited the most from ICT advances over the last eight years, registering a 3.5 decile rank improvement, an extra 0.5 from 2007. The regions of the **Commonwealth of Independent States (CIS) and Mongolia** and **Developing Asia** follow, with a 2 and 1.5 decile rank improvement, respectively. The Middle East, in particular, has seen a stellar upsurge in penetration rates in recent years, with a 600 percent increase in the number of Internet users from 2002 to 2007, the largest in the world. Also ICT is increasingly seen by many countries in the region, notably the Gulf countries, as an essential tool (both as a target sector and infrastructure) to promote a structural transformation in the production and export sector toward more value-added goods and to modernize their societies.

For this reason, the **United Arab Emirates** has embarked on a number of multibillion dollar technology-based projects, notably the Dubai Media City, Dubai Internet City, and Knowledge Village, with the aim of creating innovation clusters. **Qatar,** in turn, made ICT the focal point of its economic, political, and social modernization process, creating in 2004 ictQatar as both regulator and ICT champion in the country.[2] Other, less wealthy economies in the region, such as **Jordan** and **Egypt** (respectively progressing 3 and 2 decile ranks during the period under consideration), have proven quite successful in leveraging ICT to improve economic efficiency and service provision, particularly in education. Egypt has also recently turned into an important ICT outsourcing center, thanks to a savvy government strategy in promoting an FDI-friendly environment, as explained in Chapter 2.1 of this *Report*.

In the CIS and Mongolia region, **Ukraine** and **Russia** have proven particularly dynamic over the period, progressing 4 and 3 decile ranks, respectively. Both countries have been fairly successful in leveraging their well-educated workforces and in dramatically improving ICT penetration rates.

In Developing Asia, **China** and **India** have realized impressive upward movements across decile ranks (five and three places, respectively) from 2001. This does not come as a surprise, given that they have established themselves as major players in the international ICT markets in recent times, with India emerging as a prime ICT service exporter and China as the biggest exporter of ICT goods in the world.

In the **Western hemisphere** region, which comprises the Latin American and Caribbean countries, **Jamaica** is the country that has improved the most over the period of inclusion. Ranked in the 8th decile in 2001–02, it climbed the NRI ranking steadily to reach the 4th decile in 2006–07 and has maintained this position ever since.

On a more negative note, **Africa** continues to stagnate in networked readiness, dropping 0.5 in decile rank over the 2001–08 period. Despite the spectacular advances in ICT penetration—notably mobile telephony—realized in the last decade or so, and the great untapped potential of its domestic market, the region is not closing the digital divide with respect to other more networked areas of the world, which are progressing much faster. Nevertheless, 11 countries in the region have progressed in decile ranks since their first inclusion in the NRI, with Mauritius and Nigeria at the forefront (both 3 decile ranks up).

The decile ranking approach presents one caveat: countries that were included after the first edition of the NRI in 2001 are, in majority, from the developing world, in particular Africa. Admittedly, their performance in general has been worse than that of incumbent countries. This means that it is enough for an incumbent country to maintain its rank to automatically progress in the decile ranking. However, examples abound in our analysis of incumbent countries losing ground to incoming countries and, consequently, stagnating or even dropping in terms of decile ranking. Argentina and Tanzania have both lost two decile ranks since 2001–02, Venezuela and Poland have lost one decile rank, Zimbabwe has remained in the 10th decile since the beginning. Two such examples are Italy and Greece. These two EU members have not managed to progress a single

## Table A: Evolution in decile rankings since first inclusion

| Country | Region* | First inclusion Edition | First inclusion Rank | First inclusion Decile | NRI 2008–2009 Rank | NRI 2008–2009 Decile | Decile diff. |
|---|---|---|---|---|---|---|---|
| Albania | CEE | 05–06 | 106 | 10 | 105 | 8 | 2 |
| Algeria | AF | 03–04 | 87 | 9 | 108 | 9 | — |
| Argentina | WH | 01–02 | 32 | 5 | 87 | 7 | –2 |
| Armenia | CIS | 05–06 | 86 | 8 | 114 | 9 | –1 |
| Australia | AE | 01–02 | 14 | 2 | 14 | 2 | — |
| Austria | AE | 01–02 | 9 | 2 | 16 | 2 | — |
| Azerbaijan | CIS | 05–06 | 73 | 7 | 60 | 5 | 2 |
| Bahrain | ME | 04–05 | 33 | 4 | 37 | 3 | 1 |
| Bangladesh | DA | 01–02 | 73 | 10 | 130 | 10 | — |
| Barbados | WH | 06–07 | 40 | 4 | 36 | 3 | 1 |
| Belgium | AE | 01–02 | 18 | 3 | 24 | 2 | 1 |
| Benin | AF | 05–06 | 108 | 10 | 121 | 10 | — |
| Bolivia | WH | 01–02 | 67 | 9 | 128 | 10 | –1 |
| Bosnia and Herzegovina | CEE | 04–05 | 89 | 9 | 106 | 8 | 1 |
| Botswana | AF | 02–03 | 44 | 6 | 77 | 6 | — |
| Brazil | WH | 01–02 | 38 | 6 | 59 | 5 | 1 |
| Bulgaria | CEE | 01–02 | 53 | 8 | 68 | 6 | 2 |
| Burkina Faso | AF | 06–07 | 99 | 9 | 113 | 9 | — |
| Burundi | AF | 06–07 | 121 | 10 | 131 | 10 | — |
| Cambodia | DA | 05–06 | 104 | 10 | 126 | 10 | — |
| Cameroon | AF | 03–04 | 83 | 9 | 123 | 10 | –1 |
| Canada | AE | 01–02 | 12 | 2 | 10 | 1 | 1 |
| Chad | AF | 03–04 | 102 | 10 | 134 | 10 | — |
| Chile | WH | 01–02 | 34 | 5 | 39 | 3 | 2 |
| China | DA | 01–02 | 64 | 9 | 46 | 4 | 5 |
| Colombia | WH | 01–02 | 57 | 8 | 64 | 5 | 3 |
| Costa Rica | WH | 01–02 | 45 | 6 | 56 | 5 | 1 |
| Croatia | CEE | 02–03 | 48 | 6 | 49 | 4 | 2 |
| Cyprus | AE | 04–05 | 37 | 4 | 33 | 3 | 1 |
| Czech Republic | CEE | 01–02 | 28 | 4 | 32 | 3 | 1 |
| Denmark | AE | 01–02 | 7 | 1 | 1 | 1 | — |
| Dominican Republic | WH | 01–02 | 47 | 7 | 75 | 6 | 1 |
| Ecuador | WH | 01–02 | 71 | 10 | 116 | 9 | 1 |
| Egypt | ME | 01–02 | 60 | 8 | 76 | 6 | 2 |
| El Salvador | WH | 01–02 | 55 | 8 | 78 | 6 | 2 |
| Estonia | CEE | 01–02 | 23 | 4 | 18 | 2 | 2 |
| Ethiopia | AF | 03–04 | 101 | 10 | 129 | 10 | — |
| Finland | AE | 01–02 | 3 | 1 | 6 | 1 | — |
| France | AE | 01–02 | 24 | 4 | 19 | 2 | 2 |
| Gambia, The | AF | 03–04 | 82 | 9 | 91 | 7 | 2 |
| Georgia | CIS | 04–05 | 91 | 9 | 88 | 7 | 2 |
| Germany | AE | 01–02 | 17 | 3 | 20 | 2 | 1 |
| Ghana | AF | 03–04 | 74 | 8 | 103 | 8 | — |
| Greece | AE | 01–02 | 31 | 5 | 55 | 5 | — |
| Guatemala | WH | 01–02 | 68 | 10 | 82 | 7 | 3 |
| Guyana | WH | 05–06 | 111 | 10 | 100 | 8 | 2 |
| Honduras | WH | 01–02 | 72 | 10 | 95 | 8 | 2 |
| Hong Kong SAR | AE | 01–02 | 13 | 2 | 12 | 1 | 1 |
| Hungary | CEE | 01–02 | 30 | 4 | 41 | 4 | — |
| Iceland | AE | 01–02 | 2 | 1 | 7 | 1 | — |
| India | DA | 01–02 | 54 | 8 | 54 | 5 | 3 |
| Indonesia | DA | 01–02 | 59 | 8 | 83 | 7 | 1 |
| Ireland | AE | 01–02 | 19 | 3 | 23 | 2 | 1 |
| Israel | AE | 01–02 | 22 | 3 | 25 | 2 | 1 |
| Italy | AE | 01–02 | 25 | 4 | 45 | 4 | — |
| Jamaica | WH | 01–02 | 56 | 8 | 53 | 4 | 4 |
| Japan | AE | 01–02 | 21 | 3 | 17 | 2 | 1 |
| Jordan | ME | 01–02 | 49 | 7 | 44 | 4 | 3 |
| Kazakhstan | CIS | 05–06 | 60 | 6 | 73 | 6 | — |
| Kenya | AF | 03–04 | 84 | 9 | 97 | 8 | 1 |
| Korea, Rep. | AE | 01–02 | 20 | 3 | 11 | 1 | 2 |
| Kuwait | ME | 05–06 | 46 | 4 | 57 | 5 | –1 |
| Kyrgyz Republic | CIS | 05–06 | 103 | 9 | 115 | 9 | — |
| Latvia | CEE | 01–02 | 39 | 6 | 48 | 4 | 2 |
| Lesotho | AF | 06–07 | 116 | 10 | 118 | 9 | 1 |
| Lithuania | CEE | 01–02 | 42 | 6 | 35 | 3 | 3 |
| Luxembourg | AE | 02–03 | 27 | 4 | 21 | 2 | 2 |
| Macedonia, FYR | CEE | 03–04 | 75 | 8 | 79 | 6 | 2 |
| Madagascar | AF | 03–04 | 92 | 10 | 112 | 9 | 1 |
| Malawi | AF | 04–05 | 93 | 9 | 110 | 9 | — |
| Malaysia | DA | 01–02 | 36 | 5 | 28 | 3 | 2 |
| Mali | AF | 03–04 | 96 | 10 | 107 | 8 | 2 |
| Malta | CEE | 03–04 | 27 | 3 | 26 | 2 | 1 |
| Mauritania | AF | 06–07 | 87 | 8 | 109 | 9 | –1 |
| Mauritius | AF | 01–02 | 51 | 7 | 51 | 4 | 3 |
| Mexico | WH | 01–02 | 44 | 6 | 67 | 5 | 1 |
| Moldova | CIS | 05–06 | 94 | 9 | 99 | 8 | 1 |
| Mongolia | CIS | 05–06 | 92 | 8 | 93 | 7 | 1 |
| Morocco | AF | 02–03 | 52 | 7 | 86 | 7 | — |
| Mozambique | AF | 03–04 | 97 | 10 | 124 | 10 | — |
| Namibia | AF | 02–03 | 53 | 7 | 92 | 7 | — |
| Nepal | DA | 06–07 | 108 | 9 | 127 | 10 | –1 |
| Netherlands | AE | 01–02 | 6 | 1 | 9 | 1 | — |
| New Zealand | AE | 01–02 | 11 | 2 | 22 | 2 | — |
| Nicaragua | WH | 01–02 | 69 | 10 | 125 | 10 | — |
| Nigeria | AF | 01–02 | 75 | 10 | 90 | 7 | 3 |
| Norway | AE | 01–02 | 5 | 1 | 8 | 1 | — |
| Pakistan | DA | 03–04 | 76 | 8 | 98 | 8 | — |
| Panama | WH | 01–02 | 48 | 7 | 66 | 5 | 2 |
| Paraguay | WH | 01–02 | 63 | 9 | 122 | 10 | –1 |
| Peru | WH | 01–02 | 52 | 7 | 89 | 7 | — |
| Philippines | DA | 01–02 | 58 | 8 | 85 | 7 | 1 |
| Poland | CEE | 01–02 | 35 | 5 | 69 | 6 | –1 |
| Portugal | AE | 01–02 | 27 | 4 | 30 | 3 | 1 |
| Qatar | ME | 05–06 | 39 | 4 | 29 | 3 | 1 |
| Romania | CEE | 01–02 | 65 | 9 | 58 | 5 | 4 |
| Russian Federation | CIS | 01–02 | 61 | 9 | 74 | 6 | 3 |
| Senegal | AF | 03–04 | 81 | 8 | 80 | 6 | 2 |
| Singapore | AE | 01–02 | 8 | 2 | 4 | 1 | 1 |
| Slovak Republic | CEE | 01–02 | 33 | 5 | 43 | 4 | 1 |
| Slovenia | AE | 01–02 | 29 | 4 | 31 | 3 | 1 |
| South Africa | AF | 01–02 | 40 | 6 | 52 | 4 | 2 |
| Spain | AE | 01–02 | 26 | 4 | 34 | 3 | 1 |
| Sri Lanka | DA | 01–02 | 62 | 9 | 72 | 6 | 3 |
| Suriname | WH | 06–07 | 110 | 10 | 117 | 9 | 1 |
| Sweden | AE | 01–02 | 4 | 1 | 2 | 1 | — |
| Switzerland | AE | 01–02 | 16 | 3 | 5 | 1 | 2 |
| Taiwan, China | AE | 01–02 | 15 | 2 | 13 | 1 | 1 |
| Tajikistan | CIS | 05–06 | 93 | 9 | 104 | 8 | 1 |
| Tanzania | AF | 03–04 | 71 | 7 | 119 | 9 | –2 |
| Thailand | DA | 01–02 | 43 | 6 | 47 | 4 | 2 |
| Trinidad and Tobago | WH | 01–02 | 46 | 7 | 81 | 7 | — |
| Tunisia | AF | 02–03 | 34 | 5 | 38 | 3 | 2 |
| Turkey | CEE | 01–02 | 41 | 6 | 61 | 5 | 1 |
| Uganda | AF | 03–04 | 80 | 8 | 120 | 9 | –1 |
| Ukraine | CIS | 01–02 | 66 | 9 | 62 | 5 | 4 |
| United Arab Emirates | ME | 04–05 | 23 | 3 | 27 | 3 | — |
| United Kingdom | AE | 01–02 | 10 | 2 | 15 | 2 | — |
| United States | AE | 01–02 | 1 | 1 | 3 | 1 | — |
| Uruguay | WH | 01–02 | 37 | 5 | 65 | 5 | — |
| Venezuela | WH | 01–02 | 50 | 7 | 96 | 8 | –1 |
| Vietnam | DA | 01–02 | 74 | 10 | 70 | 6 | 4 |
| Zambia | AF | 03–04 | 85 | 9 | 102 | 8 | 1 |
| Zimbabwe | AF | 01–02 | 70 | 10 | 132 | 10 | — |
| **REGIONS (MEDIANS)** | | | | | | | |
| Advanced Economies | AE | 01–02 | 14.5 | 2 | 15.5 | 2 | – |
| Africa | AF | 01–02 | 60.5 | 8.5 | 109 | 9 | –0.5 |
| Central and Eastern Europe | CEE | 01–02 | 37 | 5.5 | 58 | 5 | 0.5 |
| CIS and Mongolia | CIS | 01–02 | 63.5 | 9 | 90.5 | 7 | 2 |
| Developing Asia | DA | 01–02 | 59 | 8 | 77.5 | 6.5 | 1.5 |
| Middle East | ME | 01–02 | 54.5 | 7.5 | 47 | 4 | 3.5 |
| Western Hemisphere | WH | 01–02 | 51 | 7 | 79.5 | 6.5 | 0.5 |

Note: See text for details. Countries added in, or after, the 2007–2008 edition are not reported but are included in the calculation of the regional medians.
* Regional abbreviations: Advanced Economies (AE); Africa (AF); Central and Eastern Europe (CEE); CIS and Mongolia (CIS); Middle East (ME); Western Hemisphere (WH).

**Box 2: Evolution of the NRI: Focus on the most and least dynamic countries and regions** *(cont'd.)*

decile rank since the first edition of the NRI despite the nearly twofold increase in country coverage. Italy appears in the 4th decile in both editions (it was ranked 25th in 2001–02 and 45th in 2008–09), while Greece appears in the 5th decile (31st in 2001–02 and 55th in 2008–09). This means that these two nations have been overtaken by many incumbent and newly included economies.

**Notes**

1 For each edition of the NRI, the overall ranking was divided into 10 segments—or *deciles*—each with an equal count of ranks. The 1st and 10th deciles comprise the economies that rank the highest and the lowest, respectively. The 1st decile includes ranks 1 to 6 in the 2001–02 edition, and ranks 1 to 13 in 2008–09. Similarly, the 10th decile includes ranks 68 to 75 in 2001–02 and ranks 121 to 134 in 2008–09. Based on this approach, the 50th rank corresponds to the 7th decile in 2001–02 and to the 4th decile in 2008–09. A similar analysis was conducted last year (see Mia and Dutta 2008).

2 See Al-Jaber and Dutta 2008.



## Europe

Europe, as region, continues to occupy a relevant position in the global networked map drawn by the NRI rankings. Twelve out of the top 20 performers are from the region, with Denmark and Sweden showing the way to the rest of the world in networked readiness, followed by Switzerland (5th), Finland (6th), Iceland (7th), Norway (8h), the Netherlands (9th), the United Kingdom (15th), Austria (16th), Estonia (18th), France (19th), and Germany (20th).

The **Nordic countries** are surely the networked readiness champions in the region as well as globally, having consistently ranked in the top 10 for the past eight years, as indicated in Table 6. These countries seem to be fully benefiting from ICT advances, as shown by their extraordinary penetration and diffusion rates and their sophisticated business sectors, successfully exporting high-tech products to international markets. The Nordic recipe for networked success owes much to a transparent and business-friendly legal framework, well-functioning markets, top-notch educational and research systems, and a widespread culture of innovation both in the public and private sectors, among others. Also, Nordic policymakers have early understood the importance of ICT as a competitiveness enabler and have constantly promoted its use and diffusion in their national agendas over time, involving the private sector in a shared vision of ICT excellence.

Turning our attention to the **EU15** economies,[10] the appraisal is more varied. Similarly to the NRI findings in previous editions of the *Report,* there exists a divide among countries such as Denmark, Sweden, Finland, Norway, the Netherlands, the United Kingdom, Austria, France, Germany, **Ireland** (23rd), and **Belgium** (24th), which seem to be leveraging ICT in their economic, political, and social systems, and others such as **Greece** (55th) and, to a lesser extent, **Italy** (45th), which lag behind in networked readiness. While Greece remains stable with respect to 2007 and shows a slight improvement in score (from 3.94 to 4.00), Italy continues the downward trend that began last year, dropping another three places. Important flaws preventing the country to fully leverage ICT are the weak market (75th) and regulatory (92nd) environments and the low priority given to ICT diffusion in the government agenda, as highlighted by the disappointing 83rd place for government readiness.

Among EU newcomers (the **EU accession 12**),[11] **Estonia** (18th) and, to a lesser extent, **Slovenia** (31st), the **Czech Republic** (32nd), **Lithuania** (35th) have successfully used ICT as a lever for the structural transformation and modernization of their economies and societies after the fall of the Berlin Wall. In Estonia, in particular, ICT diffusion eased and facilitated the transition from a planned economy to an extremely competitive market economy in less than 20 years, thanks to a visionary leadership and the government's continuous prioritization of innovation and universal ICT access as a tool for improved growth and competitiveness.[12] Estonia continues this year its march to the top of the rankings, gaining two positions from 2007, showing that small can be beautiful when coupled with the right ICT- and competitiveness-friendly policies and with a vision of a fully networked society.

On the other side of the spectrum, **Bulgaria** (68th) and **Poland** (69th) continue to trail behind. While Bulgaria's rank is essentially unchanged from last year, with a small score improvement (from 3.71 to 3.80), Poland is losing further ground with respect to the most networked among the EU accession 12 countries. Poland has not tackled perennial weaknesses in its networked readiness landscape, such as the poor market and regulatory environment (ranked 87th and 100th, respectively) and the marginal importance given by the government to ICT in its national agenda (103rd and 127th for government readiness and usage, respectively).

**Turkey** drops six places from 2007, positioning itself at 61st, with a fairly homogeneous showing across the different pillars composing the NRI. While the environment appears to be quite ICT friendly (56th), especially in its regulatory dimensions (56th), significant room for improvement remains in the readiness

subindex (69th), in particular with respect to ICT accessibility, the quality of education, and the government's vision and e-leadership in ICT diffusion, among others. In particular, Turkey's government readiness, at 87th, receives the lowest mark across the nine pillars.

**Russia** is fairly stable at 74th, with a minor score improvement (from 3.68 to 3.77) from 2007. The country can count on important competitive advantages for leveraging ICT, such as the quality of educational and research systems together with fairly innovative firms (45th for innovation capacity) that invest significantly in R&D (46th). On the other hand, significant flaws remain to be addressed in the unsatisfactory quality of the market (96th) and regulatory (85th) environments, as well as the scarce ICT focus in the government's agenda and competitiveness strategy, reflected by below par marks for government readiness and usage (81st and 111th, respectively).

### Asia and the Pacific

Behind 4th-ranked Singapore, five other Asia and Pacific region's economies place in the top 20 this year, as follows: Korea (11th), Hong Kong (12th), Taiwan (13th), Australia (14th), and Japan (17th). By contrast, the region is also home to some of the least ICT-ready economies in the world with four countries—**Cambodia** (126th), **Nepal** (127th), **Bangladesh** (130th), and **Timor-Leste** (133rd)—featuring in the bottom 10 of the rankings.

Following a 10-place jump last year, **Korea** is fairly stable at a remarkable 11th position. The Korean government continues to show the way as a major catalyst of ICT diffusion and innovation (4th for both government readiness and usage). The latter have been a cornerstone of the government's development strategy followed in the last couple of decades and have resulted, among others, in high-quality educational and research systems, producing a large number of scientists and engineers (19th) and leading research institutions (14th). This, coupled with a sophisticated business sector, has transformed the country into one of the world's innovation powerhouses, registering 129.7 utility patents per million population in 2007 (7th worldwide) and massively exporting high-tech products to the international markets (28 percent of its total exports, 8th). Chapter 2.2 of this *Report* provides an account of Korea's rise to one of the most important high-tech global players in the space of two decades or so.

**Hong Kong** (12th) is down two places, with an essentially unchanged performance with respect to last year. Major strengths continue to be found in its very business friendly market environment (first worldwide) characterized by low taxes, strong competition, and a well-developed financial sector. Individual readiness (7th) is excellent, thanks to the affordability of ICT and the high quality of the educational system, while the government leads the way when it comes to ICT usage (7th). On a less positive note, the infrastructure environment (37th) constitutes the main area for improvement, notably the availability of scientists and engineers (67th) and tertiary education enrollment (63rd).

Just after Hong Kong, **Taiwan** moves up four positions to 13th rank. Taiwan's impressive networked readiness is reflected in the economy ranking 15th or higher in eight of the nine pillars composing the NRI, confirming the success of the development strategy followed by the government in the last three decades (14th and 8th for government readiness and usage, respectively). In particular, Taiwan benefits from a very ICT-conducive market environment (5th), displaying the highest number of utility patents per million population (266.9), the fifth-largest high-tech exports (44.6 percent) worldwide, and extensive ICT penetration rates across the three main stakeholders.

Very much like Korea, Taiwan is a compelling textbook example of a resource-poor, mainly rural economy transformed into a high-tech powerhouse in the space of a few decades, thanks to a savvy government's strategy and vision based on the importance of education, innovation, and ICT diffusion.[13] On a more negative note, Taiwan gets fairly low marks in the political and regulatory environment category (43rd), mainly due to the perceived inefficiency of the lawmaking bodies (96th), mediocre judicial independence (49th), and widespread red tape as reflected in Taiwan's 119th rank for the number of procedures to start a business.

At 14th, **Australia** delivers a performance in line with the previous three editions, which saw the country rank 15th, 15th, and 14th, respectively. Remarkably, the country ranks no lower than 22nd in any of the nine dimensions of the NRI. The infrastructure environment (8th), the political and legal framework (9th), and the government's zeal at using ICT (9th) constitute Australia's main strengths.

**Japan** is up two notches at 17th, thanks to a small score improvement from 5.14 to 5.19. Japan boasts undeniable prowess at leveraging ICT and innovating, as reflected by the level of business readiness (11th) and usage (4th), individual usage (13th), and the number of per capita utility patents (3rd). However, ICT readiness remains impaired by several regulatory, administrative, and infrastructural shortcomings. Furthermore, the rating of government readiness (25th) and usage (34th) has plummeted, the result of a sharp fall in the measures of prioritization, promotion, and procurement of ICT.

**New Zealand** retains its 22nd rank. The country possesses excellent infrastructure (10th) as well as a very ICT-friendly political and regulatory environment (14th). New Zealand's comparatively low rank of 32nd in government readiness is mainly due to low prioritization and procurement of ICT by the government.

**Malaysia** drops two ranks to what remains a satisfactory 28th place. Its performance deteriorates across the entire NRI: Malaysia ranks the same or lower than

last year in all the nine categories and in 56 of the 68 indicators of the Index, although the government is well assessed for its ICT readiness (12th) and for its ICT usage (20th). Malaysia does better than many advanced economies in several indicators pertaining to business readiness, in particular spending on R&D (18th). Infrastructure (48th) and individual usage (45th), where low IT penetration rates drive performance down, constitute the two categories with the largest room for improvement.

Leapfrogging 11 positions, **China** ranks 46th this year, overtaking India and the rest of the BRIC economies for the first time. Although the improvement is generalized, it is especially remarkable in the readiness component of the NRI, in which China jumps from 54th to 36th position: individual readiness is soaring (38th, up 21 places), while business (44th, up 14 places) and government (33rd, up nine places) readiness display significant progress. There is a sense in the business community that ICT now constitutes much more of a priority for the government (38th, a 36-place surge) and a key aspect of its competitiveness strategy. ICT usage by the government is increasing too, translating into more services and efficiency. Yet, major challenges remain to be addressed. Mobile telephony (94th), PCs (79th), and Internet (78th) are spreading but not as rapidly as in many other countries and remain very low (83rd, down three places, for individual usage), while the market environment (59th) and infrastructure (74th) represent major impediments to further ICT diffusion.

Pursuing its downward slide in the ranking, **Thailand** plunges a further seven positions to 47th. Behind this negative trend is the continuous worsening of the country's performance in all the government-related indicators.

**India** is down four positions this year, at 54th, as a result of a very mixed performance. On one hand, India's business readiness (27th) remains impressive, thanks to high-quality management schools (12th), significant corporate spending on R&D (29th), and a broad base of suppliers. This results in high ICT usage by businesses (30th), with a fairly strong capacity not only to adopt new technologies (26th) but also to innovate (35th). On the other hand, like China, India ranks a low 114th in the individual usage category because of a very spotty ICT penetration. Notably, and despite a twofold increase, there are fewer than three PCs and only seven Internet users for every 100 inhabitants, corresponding to 94th and 99th place, respectively. The quality of the infrastructure environment is poorly rated (76th), despite India's ranking 3rd worldwide for the availability of scientists and engineers and 27th for the quality of its research institutions.

Covered for the first time, **Brunei Darussalam** enters the NRI ranking at 63rd.

At 60th, up seven ranks, **Azerbaijan** reinforces its dominance within the **CIS,** thanks to progress made in several indicators in the environment component and to the government's efforts to prioritize, promote, and use ICT. Within the CIS, the country precedes **Kazakhstan** (73rd, down two) and **Russia** (74th; see the Europe section for further details).

Up three ranks, **Vietnam** (70th) confirms last year's improvement; by contrast, Indonesia and Pakistan, two of the largest Asian economies, display a worrying trend. In just two years, **Indonesia** has lost 21 places and now ranks 83rd. Over the same period, **Pakistan** has dropped 14 ranks and now places 98th, getting dangerously close to the 100 mark.

### Latin America and the Caribbean

The NRI 2008–2009 sketches a rather mixed picture of the Latin American and the Caribbean networked readiness landscape. Although a number of countries are improving their scores and ranks, the region does not seem to be benefiting from ICT to its full potential. Ten countries from the region feature in the top half of the rankings, namely Barbados (36th), Chile (39th), Puerto Rico (42nd), Jamaica (53rd), Costa Rica (56th), Brazil (59th), followed by Colombia, Uruguay, Panama, and Mexico (ranked 64th to 67th, respectively).

Two places up from last year, tiny **Barbados** positions itself at 36th, with a significant score improvement (from 4.26 to 4.38), overcoming Chile as the most networked country in Latin America and the Caribbean for the first time since the NRI's inception. Barbados' networked readiness rests on a rather ICT-conducive environment (31st), especially in its regulatory and infrastructure dimensions (25th in both), and on an outstanding disposition and ICT usage by the individuals (33rd and 35th, respectively, for individual readiness and usage). Among the three stakeholders, individuals play a leading role in leveraging ICT advances. The relative degree of government readiness (38th) has failed so far to translate into high levels of usage, although government usage is one of the items showing the largest improvement from 2007 (rising from 87th to its current rank of 71st).

**Chile,** at 39th, loses five positions as well as its networked readiness prominence in the region. The fact that the country's score is stable (4.32 vs. 4.35 in 2007) underlines the importance of constant progress in ICT diffusion and usage for a country to maintain its competitive edge in the rankings. Chile displays a rather evenly robust performance across all the Index's components, with an especially ICT-conducive market (35th) and regulatory (35th) environments coupled with a strong prioritization of ICT penetration by the government (42nd and 31st for government readiness and usage), as reflected also by the very early adoption—with respect to regional standards—and successful implementation of a comprehensive digital agenda.[14] Among the main outcomes, one can mention the

world-class e-government services (12th), mirrored by extensive business Internet usage (27th). The country's main relative weakness has to do, as in previous years, with the quality of the educational system, especially for math and science (107th) and, to a lesser extent, of research institutions (62nd) and the collaboration between academia and industry (51st). The upgrading of educational and research systems should be a priority in the national competitiveness strategy in the years ahead.

Two other Caribbean economies, **Puerto Rico** (42nd) and **Jamaica** (53rd), continue to post a remarkable showing, even if both seem to be losing some ground with respect to last year (three and seven places, respectively).

On a more positive note, **Costa Rica** (56th) and **Colombia** (64th) are progressing four and five places, respectively, in the ranking, mainly because of a significant improvement in the readiness component from last year: from 48th to 39th and from 64th to 53rd, respectively. In particular, both countries get significantly better marks for individual readiness (Costa Rica moved from 52nd to 44th, and Colombia from 74th to 63rd) and government readiness (from 66th to 48th for Costa Rica, and from 57th to 50th for Colombia).

**Brazil** is unchanged at 59th, with a small score improvement (from 3.87 to 3.94). The country's networked readiness is mainly driven by high levels of usage especially by businesses (32nd) and the government (32nd). Indeed, Brazil is one of the regional and world leaders in e-government services (26th), and the Internet is widely used by businesses in their daily transactions (28th). Chapter 2.3 of this *Report* provides a thoughtful account of successful Brazilian e-government practices and ICT strategy as a tool to reduce the important social and economic divide affecting the country. On a less positive note, Brazil's market (119th) and regulatory (82nd) environments continue to show important flaws in terms of business and ICT friendliness; the soft infrastructure needs to be upgraded, and general education and training standards lag behind. This has negative implications on citizens' readiness to use ICT (81st) and contributes to fairly low levels of individual usage (62nd).

The other regional giant, **Mexico,** is down nine positions from 2007 at 67th and now trails **Uruguay** (65th) and Panama (66th). Mexico shows a deterioration across all nine pillars. The country presents important strengths for leveraging ICT, notably a fairly strong focus on ICT penetration in the government agenda (62nd in government readiness), which translates into high levels of government usage (36th). However, the country suffers from most of the same weaknesses highlighted for Brazil: that is, an overregulated market environment, a poor-quality educational system, and low R&D investment, coupled with rather low ICT readiness and usage by both individuals (74th and 66th, respectively) and the business sector (72nd and 76th, respectively).

Despite a score virtually unchanged (3.58), **Argentina** (87th) is down 10 positions. The country continues to display serious flaws in the market (128th) and regulatory (120th) environments and a perceived lack of ICT prioritization in the government's national agenda (117th and 91st for government readiness and usage, respectively). These challenges will need to be addressed in the coming years for Argentina to fully exploit ICT advances for increased competitiveness.

**Peru** (89th), **Honduras** (95th), and **Venezuela** (96th) follow, while **Ecuador** (116th), **Paraguay** (122nd), **Nicaragua** (125th), and **Bolivia** (128th) continue to stagnate at the bottom of the rankings, lagging behind the rest of the region and most of the world in networked readiness. Overregulated markets, poor educational and research standards, and high ICT-access costs are some of the obstacles preventing these countries from leveraging more ICT in their national competitiveness strategies.

### Sub-Saharan Africa and Middle East and Northern Africa (MENA)

Despite some positive trends, **sub-Saharan Africa** continues to lag behind the rest of the world by a significant margin, as highlighted by the trend analysis discussed above. Among the 26 countries of the region, only two make it into the top half of the NRI, while 18 rank below the 100th mark.

At 51st, three positions up from 2007, **Mauritius** overtakes South Africa as the most ICT-ready economy in the region. Mauritius' networked readiness is boosted by an excellent market environment (29th), characterized by little red tape and low and non-distortive taxes (8th and 12th for the extent and effect of taxation and total tax rate, respectively), among others.

**South Africa** is stable at 52nd. The country's satisfactory performance continues to rest on the ICT and business friendly regulatory (26th) and market environments (33rd). While the business sector appears quite disposed to use ICT (36th) and to be leveraging its latest advances (46th), major weaknesses remain in individual readiness (80th), due to a mediocre assessment of the quality of educational system and high ICT access costs. This partly explains South Africa's low ICT penetration rates and, therefore, its poor showing in the overall individual usage pillar (78th).

Progressing one rank, **Botswana** comes in 77th overall and 3rd in sub-Saharan Africa. The country posts a major improvement in its environment component (moving seven places up to 58th), mainly because of progress made in the infrastructure pillar (from 93rd to 77th). However, the very low levels of usage by individuals (89th) and businesses (93rd), linked to poor

individual and business readiness (67th and 96th, respectively) remain areas of particular concern.

For its second appearance, **Senegal** ranks 80th this year, up five ranks. Sub-Saharan Africa's largest country, **Nigeria** (90th), regains some of the ground lost last year. Despite posting the same score as last year, **Kenya** loses five places to come in at 97th. Still below rank 100, **Zambia** progresses 10 places at 102nd. Entering just below is **Ghana,** at 103rd, clustering together with the other two African newcomers: **Malawi** (110th) and **Côte d'Ivoire** (111th). Among the other countries of the region, only **Lesotho** does not lose further ground, lagging, however, at the bottom of the global rankings (118th, up four).

Despite a small drop, **Tunisia** (38th) continues to lead the way on the continent. And the gap with respect to the rest of **Northern Africa** is large and widening. The country's successful performance reflects the government's strong emphasis on ICT diffusion (27th and 39th for government readiness and usage, respectively) and rests on a business-friendly regulatory environment (29th) and a fairly good preparation of the three main national stakeholders to use ICT (29th for the readiness component).

The picture for the rest of the region is rather negative this year, with all countries losing some ground in networked readiness with the exception of **Libya** (up four positions to 101st). **Egypt** drops 13 ranks to 76th,[15] and **Morocco** loses 12 to 86th. The case of **Algeria** is even more worrying, with the country plummeting from 88th to 108th.

By contrast, the **Middle East** region continues to improve its networked readiness, with all countries but one appearing in the top half of the NRI ranking. At 25th, **Israel** remains the leader in the region, although by a tiny margin. A member of the top 20 from 2001 to 2007 consecutively, the country drops seven places this year, as a result of a poorer assessment in the area of individual readiness (34th) and individual usage (28th). Both the market environment (17th) and the political and regulatory framework (34th) deteriorate significantly. This does not put into question the fundamentals of Israel's prowess in networked readiness and innovation, confirmed by its impressive 5th position in the world for the number of utility patents (154.3 in 2007), coupled with its 24th position for high-tech exports (12.7 percent of total exports). Indeed, Israel's recent development history is another inspiring example of a small, resource-poor country turned into a global high-tech player in less than 30 years, thanks to a government's coherent vision and strategy in this area.[16]

The **United Arab Emirates (UAE)** is up two positions at 27th, almost closing the gap with Israel. As already mentioned in the historical trend analysis above, the government's push for ICT diffusion and usage has been impressive in recent years, as reflected by the country's 9th and 16th position in the government readiness and usage categories, respectively. The country realizes its largest improvement from 2007 in the environment component, going up seven places to 32nd in this dimension. The business environment is assessed as being quite ICT conducive (24th), with an impressive 1st and 2nd place for the extent and effect of taxation and for total tax rate, respectively, and little red tape (5th for the burden of government regulation). The challenge for the country in increasing its innovation potential in the years to come has to do with the quality of its higher educational and research system, which is assessed as being fairly poor and does not seem to provide local businesses with a sufficiently large qualified labor pool (75th for the availability of scientists and engineers).

At 29th, **Qatar** continues its rise to the top of the rankings, with a cumulated seven-place improvement since 2006, the year of its first inclusion. The country makes significant progress in all three NRI components with gains of 14, two, and three positions in environment (29th), readiness (26th), and usage (31st), respectively.

Also on a steep upward trend, **Bahrain** soars eight ranks to 37th for a total gain of 13 ranks since its first NRI appearance in 2006. As for the United Arab Emirates and Qatar, the most significant improvements are observed in the environment component (from 50th to 37th this year).

Thanks to progress made across the board, **Saudi Arabia** (40th) improves by eight positions with respect to its inaugural rank last year. While it places 45th or higher in seven other categories of the NRI, Saudi Arabia's situation presents serious shortcomings in terms of individual readiness (79th), notably the quality of the educational system, especially for math and science (85th). As a result, individual usage still remains limited (53rd). While **Jordan** (44th, up three) and **Oman** (50th, also up three) are on the rise, **Kuwait** (57th) drops five places. Much lower in the rankings, **Syria** realizes an outstanding 16-place jump to 94th rank as the result of a remarkable strengthening of individual and business readiness.

## Conclusions

Networked readiness has proven to be an important element in the development and competitiveness strategy of many countries. The successful development stories highlighted in this chapter show that a consistent focus in the national agenda on educational excellence, innovation, and extensive ICT access is instrumental for both developed countries, to maintain their competitive edge, and developing economies, to leapfrog to higher stages of development and facilitate the structural transformation of their economies and societies.

In the current severe economic downturn, policymakers and civil society should not forget the power of innovation, and ICT in particular, as enabler of economic growth and modernization. Public and private invest-

ment in R&D and in ICT infrastructure should not be sacrificed for the sake of budget cuts, since these are not only key for reinforcing national capacity to recover in the short term, but also to sustaining the innovation and growth potential of an economy in the longer term.

We hope the Networked Readiness Framework, the NRI benchmarking exercise, and the insightful papers included in this *Report* will help to raise awareness on the issue, by showcasing best policies and success stories and to underscore the link between economic growth and networked readiness also in times of global economic crisis.

## Notes

1 See ceBIT Australia 2008a.

2 CeBIT Australia 2008b.

3 With a caveat: the NRI used in the first 2001–2002 edition of the *Report* is not strictly comparable with the one developed by INSEAD in 2002 and used since then as the main methodological framework in the GITR series. For more information on the 2001–02 theoretical framework, see Kirkman et al. 2002.

4 For further details on the Networked Readiness framework and its theoretical conception, see Dutta 2003.

5 Until 2005–06, NRI variables were selected using factor analytical techniques from a larger set of possible variables. Although this was a technically rigorous approach, it reduced the ability to easily explain the underlying logic for including specific variables and to make strict comparisons over time. As a consequence, starting from the 2006–07 edition, expert opinion has played a predominant role in selecting the variables, obviously with the benefit of previous experience in identifying appropriate variables for computing the NRI, thus aligning the NRI's to the Forum's general competitiveness methodology. Also the treatment of missing variables has changed: whereas until 2005–06, those were estimated using analytical techniques such as regression and clustering, beginning in 2006–07 they are indicated with "n/a" and not taken into consideration in the calculation of the specific pillar to which they belong. Moreover, the scale used to compute the NRI and its composing variables has been aligned to the Forum's (increasing) 1–7 scale, changing with respect to the scale used previously for a couple of years (i.e., positive and negative scores around a standardized mean of 0). For more detailed information on the old computation methodology and the changes introduced in 2006–07, see Dutta and Jain 2006 and Mia and Dutta 2007.

6 No specific reference is made to North America as a region in this chapter, since the performances of the United States and Canada are detailed in the top 10 section, while Mexico is included, for analysis purposes, in the Latin America and the Caribbean section.

7 An important element of the government's ICT prioritization was the liberalization of the telecommunications sector in 1996, well ahead of most fellow members of the European Union. This also contributed to the development of a world-class local high-tech industry, whose exports accounted in 2006 for 20 percent of total exports, earning Denmark 24th place in this dimension of the Index.

8 See Sala-i-Martin et al. 2008.

9 For a more detailed analysis of Singapore's ICT success story, see Ng et al. 2008.

10 Included in the EU15 are the countries that joined the European Union before the last two accession rounds in 2004 and 2007, namely Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

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

12 For a more in-depth review of Estonia's ICT development story, see Dutta 2007.

13 See Dahl and Lopez-Claros 2006.

14 For a full account of Chile's ICT strategy, see Alvarez Voullième et al. 2005.

15 In Egypt's case, the dramatic fall in ranking does not correspond to a fall in the absolute performance of the country, but rather to the fact that other countries have progressed more rapidly. Indeed, Egypt even improves its score slightly from 2007 (3.76 compared with 3.74 last year).

16 See Lopez-Claros and Mia 2006 for more details on Israel's success story.

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## Technical Appendix: Composition and computation of the Networked Readiness Index 2008–2009

This appendix presents the structure of the Networked Readiness Index (NRI). The NRI separates environmental factors from ICT readiness and usage, and is composed of three subindexes. Each subindex is divided into three pillars. The 68 variables (or *indicators*) used in the computation of the NRI are then distributed among the nine pillars.[a]

The numbering of the variables matches the numbering of the Data Tables found at the end of the *Report*. The number preceding the period indicates to which pillar the variable belongs (e.g., variable **1.**01 belongs to the first pillar; variable **9.**02 belongs to the ninth pillar).

The hard data indicators used in the NRI are normalized on a 1-to-7 scale in order to align them with the Executive Opinion Survey's results.[b] The Technical Notes and Sources at the end of this *Report* provide detailed information on all the hard data indicators.

### NETWORKED READINESS INDEX

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

### Environment subindex

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

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

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

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

### Readiness subindex

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

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

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

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

### Usage subindex

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

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

*(Cont'd.)*

## Technical Appendix: Composition and computation of the Networked Readiness Index 2008–2009 *(cont'd.)*

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

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

### Notes

a The computation of the NRI is based on successive aggregations of scores, from the variables level (i.e., the lowest level) to the overall NRI score (i.e., the highest level). For example, the score a country achieves in the 3rd pillar, *Infrastructure environment*, accounts for one third of the *Environment subindex*. Similarly, the *Usage subindex* accounts for one third of the overall NRI score.

b The standard formula for converting hard data is the following:

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

The *sample minimum* and *sample maximum* are, respectively, the lowest and highest country scores in the sample of countries covered by the NRI. In some instances, adjustments were made to account for extreme outliers. For those hard data variables for which a higher value indicates a worse outcome (e.g., total tax rate, time to enforce a contract), we rely on a normalization formula that, in addition to converting the series to a 1-to-7 scale, reverses it, so that 1 and 7 still correspond to the worst and best possible outcomes, respectively:

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

CHAPTER 1.2

# Mobile Telephony: A Critical Enabler of Networked Readiness?

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Mobile telephony occupies a special place among the various information and communication technologies (ICT) that have emerged in recent decades, in terms of both its stellar diffusion and its impact on economic growth and poverty reduction.

In particular, mobile communications penetration has boomed in developing countries, helping them to compensate for an often underdeveloped and flawed fixed telephony infrastructure and offering a promising tool to increasingly lift their citizens out of poverty and improve the efficiency of their markets and economies. The total number of mobile telephone subscribers in the developing world is more than twice that of advanced economies.[1] This, as pointed out by Kalil,[2] can be explained by a number of factors, including the relative ease of deploying mobile infrastructure versus landline phones; a more liberal regulation of mobile service provision in most countries, favoring competition; the decreasing cost of mobile handsets; and the possibility of sharing phones and buying pre-paid cards.

The above trend bodes well for reducing the digital and economic divide between developing and developed economies, given the extensive body of literature and the evidence pointing to the economic and social benefits of mobile telephony.

In line with the theme of mobility, this chapter aims to further explore the connection between mobile telephony and economic growth and development, as well as identify the impact, if any, of mobile technologies on countries' networked readiness, as captured by the Networked Readiness Index (NRI) featured in this *Report*. Does mobile penetration, used here as a proxy for "mobile readiness," affect general networked readiness and, if so, does it do so equally for all countries, regardless of their development level?

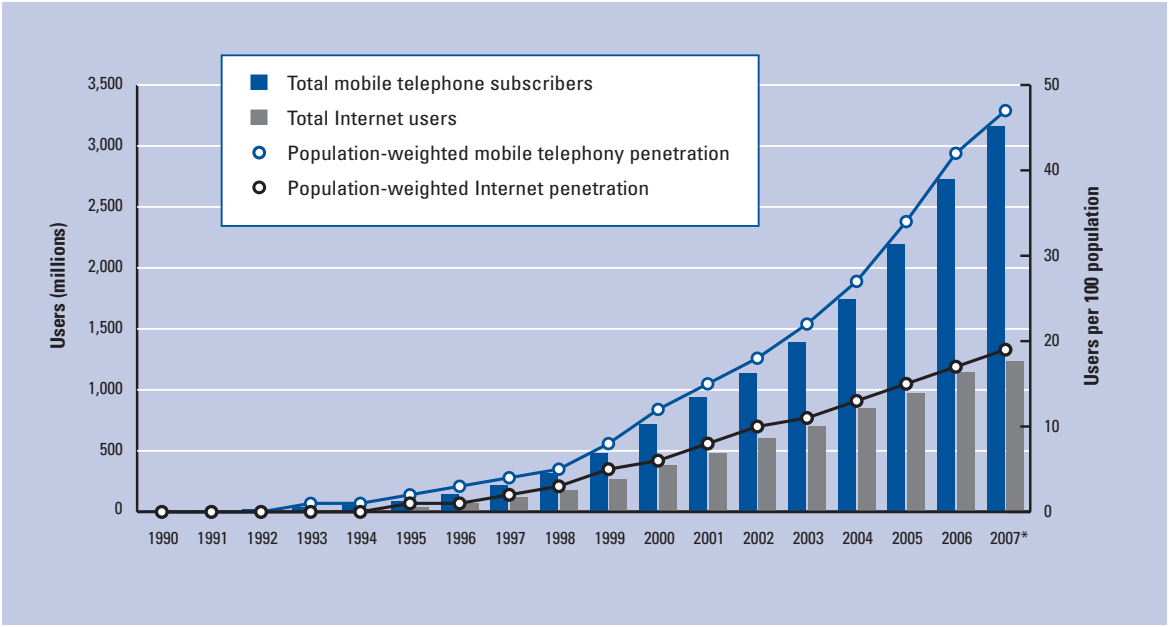
After a brief overview of the evolution of mobile penetration in recent years, the chapter will focus on mobile telephony and its impact on GDP and networked readiness.



## Mobile penetration across the world: A remarkable success story of our day

There is no doubt that mobile telephony has been not only among the most revolutionary technologies of the last couple of decades, but also among the most adopted and rapidly spreading in the developed and developing world. A comparison with Internet diffusion is quite telling. Although often the Internet is mentioned among the fastest-growing technologies worldwide, a glance at Figure 1 shows that Internet penetration has indeed expanded over the last 20 years, but not as fast as mobile telephony. Using ITU data, we estimate that the number of mobile telephone users increased from 11.1 million in 1990 to 3.2 billion in 2007. The number of Internet users went from 2.6 million to 1.2 billion over the same period.

**Figure 1: Mobile telephony penetration and Internet usage, 1990–2007**




Source: Authors' calculations, based on ITU, 2008.
*Preliminary data



Figures 2 to 4 complement Figure 1, providing more detailed information on the growth of mobile telephony penetration across the world and by income group.[3] These figures also illustrate how the growth has been particularly impressive in low-income countries.

Figure 2 describes the evolution in absolute mobile telephony penetration by income group. It shows notably that the group of low-income countries has increased the most: between 1995 and 2006, the number of subscribers grew by an average 90 percent annually, compared with an annual average of 26 percent and 36 percent for OECD and non-OECD high-income countries, respectively. This is a very positive trend, although these data should be taken with some precaution: low-income countries started from a much lower penetration basis than high-income ones and, as shown in Figure 3, the story told by population-weighted average penetration rates is rather less rosy, with a penetration still limited to 18 percent of the population in low-income countries in 2007 versus 107 percent and 114 percent for OECD and non-OECD high-income countries, respectively.[4]

Another way to gauge the growing importance of mobile telephony globally is to analyze the share of mobile subscribers in total telephone subscribers since 1990. As Figure 4 illustrates, not only has this share risen globally from 2.1 percent in 1990 to 77.3 percent in 2007, but, quite predictably, the most marked rise has come from low-income countries, where it has gone from 0 percent in 1990 to 86.3 percent in 2007.

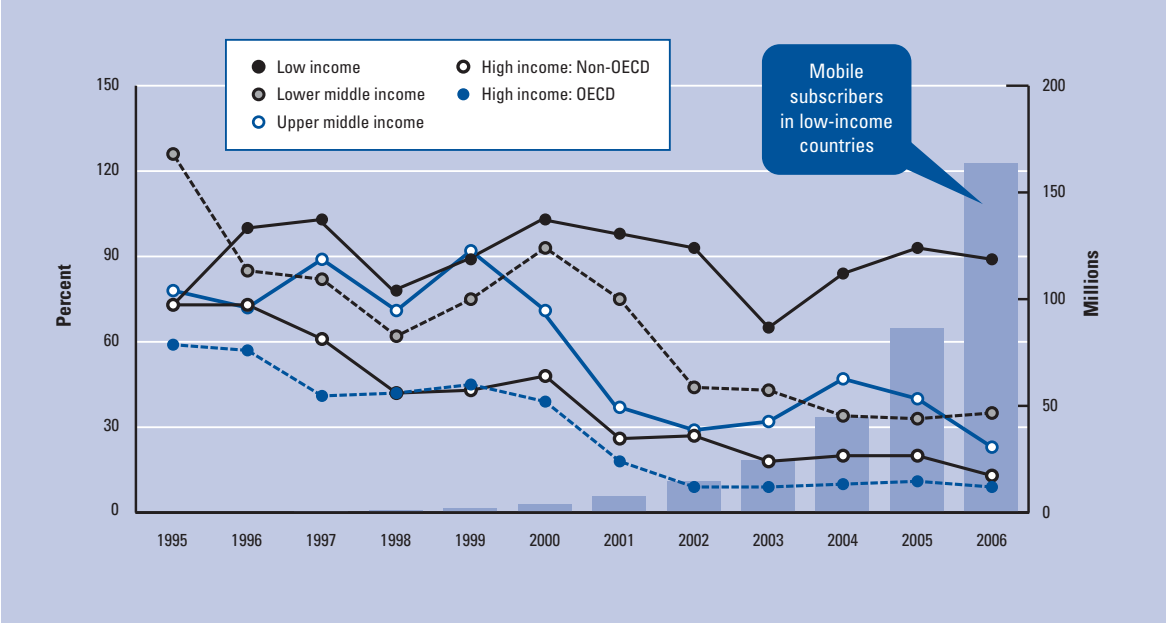
This is partly explained by the fact that mobile technology has allowed many developing countries to leapfrog the lack of fixed infrastructure and thus provide access to telephony services to a much larger portion of their citizens.

Mobile technology's relative simplicity for being deployed and used, together with its versatility and the diminishing costs of both handsets and calls, have been some of the key enablers in its impressive diffusion.

In terms of versatility, even without considering the most advanced—and expensive—mobile applications being constantly developed and adopted in the rich part of the world, there are plenty of examples that illustrate how mobile phones can facilitate business and enable access to markets and to services, not to mention social life. According to the United Nations Conference on Trade and Development (UNCTAD), for example, mobile phones have become the most widely used form of ICT by African businesses to deal with their clients and providers.[5] More generally, m-commerce is becoming an important modality of selling and buying goods in the developing world, which is also facilitated by banking and payment via mobile phones.

Regarding costs, Figure 5 shows the evolution in mobile call costs in basis points (hundredths of percentage points) of GDP per capita since 1995. Despite large fluctuations, partly attributable to data availability issues, telephony costs have been declining not only for developed countries but also for low-income ones. This trend is reinforced and complemented by a dramatic reduction

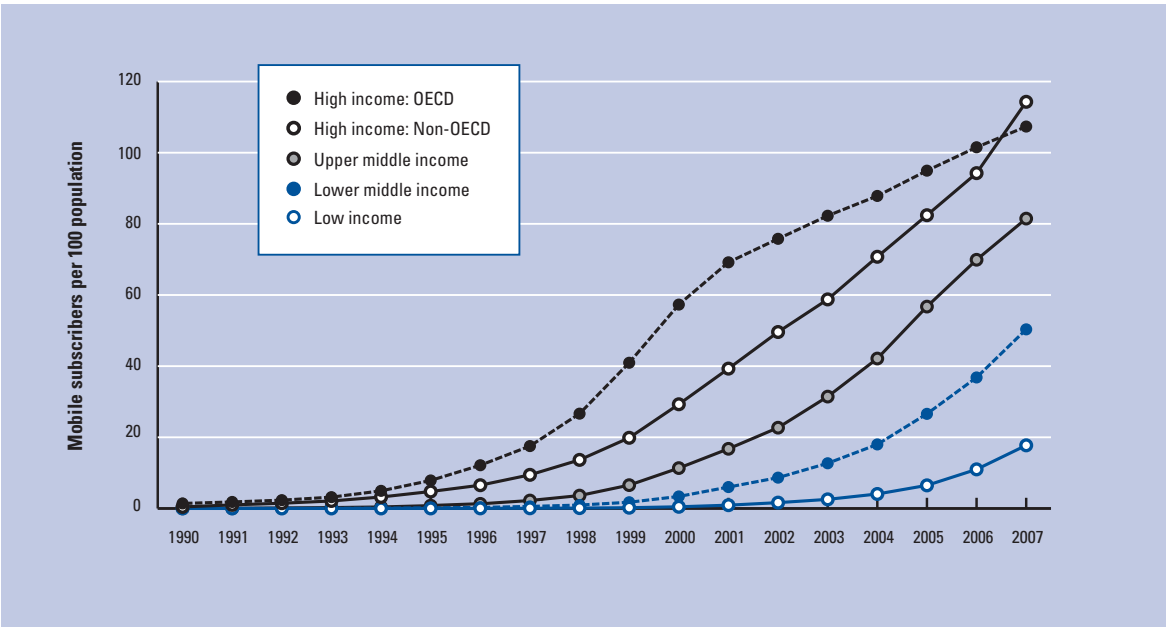
## Figure 2: Growth of mobile telephony penetration rate, 1995–2006




Source: Authors' calculations, based on ITU, 2008.

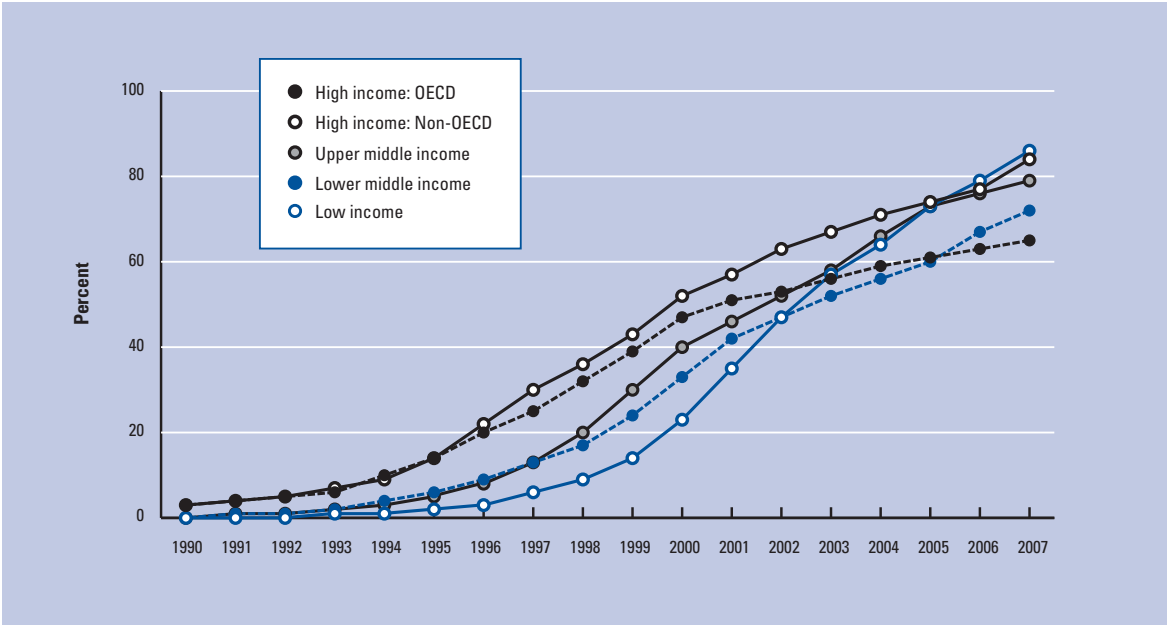


## Figure 3: Population-weighted average mobile penetration rate, 1990–2007




Source: Authors' calculations, based on ITU, 2008.

**Figure 4: Share of mobile subscribers in total telephone subscribers, 1990–2007**




Source: Authors' calculations, based on ITU, 2008.



in the cost of handsets, which have come down to as little as US$15 in some developing countries.

The costs for the poorest segment of the population in developing countries could be further reduced with some relatively simple changes in billing practices. For instance, Barrantes et al. found that access to mobile services would be greatly expanded in Latin America if the mobile phone operators would allow billing practices per second or "mini-recharges" of the pre-paid cards.[6]

### Mobile technology: Impact on GDP growth and countries' networked readiness

There is extensive literature and much evidence about the economic and social benefits associated with mobile telephony. In particular, a number of studies have demonstrated the positive impact of mobile penetration on economic growth and development,[7] which also has an important bearing on poverty reduction and on bridging the digital divide.

This impact on economic growth takes a variety of forms, which can be grouped into a number of subcategories. These include:

- *Improvement of market and business efficiency.* The introduction and usage of mobile telephony can provide economic operators with better access to the goods markets and information they need to manage their business more effectively. This is even more the case for industries and sectors intensive in information.

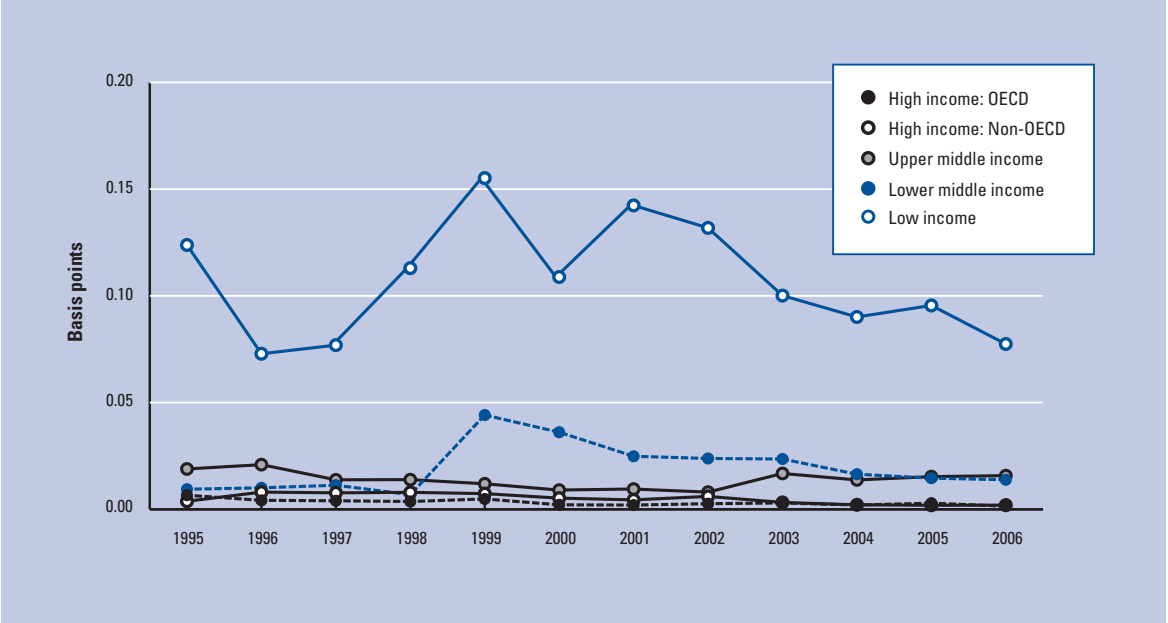
  On a similar note, mobile phones can be used to send personalized job listings to job seekers, thus improving the functioning of labor markets.

- *Larger access to financial services.* Mobile banking and mobile payments represent a cheap alternative for the poor in developing countries to gain access to the formal financial market and consequently to credit, insurance, and money transfers. In particular, mobile telephony facilitates remittances to developing countries, making them easier and cheaper. This has a special relevance for growth, since remittances nowadays represent more than double the amount of foreign aid to the developing world and are therefore among the most important sources of finance in many countries.[8]

- *Job creation.* Investment in mobile network infrastructure and related services directly and indirectly generates employment opportunities.

- *More efficient provision of health-care services.* Mobile phones have proven to be a very helpful complement in the collection of health data, and they are key for better health-care provision and the treatment of patients (for instance, in reminding patients via short message service (SMS) of the medication they need to take).

**Figure 5: Mobile call cost as a share (basis points) of GDP per capita, 1995–2006**




Source: Authors' calculations, based on ITU, 2008.
Note: A *call* is a three-minute call during peak period. Country groups' average costs are weighted by country population.



These illustrations seem to suggest that mobile telephony and its applications have a greater impact in the developing world, where their deployment can yield enormous productivity gains. For advanced economies, which are approaching the technological frontier, such gains will necessarily be smaller. Enhanced productivity, in turn, is a major source of economic growth and, hence, increased prosperity. The relationship between mobile telephony usage and economic prosperity should therefore be stronger for the least-developed countries.

Figure 6 plots mobile telephony penetration, which we use as a proxy of mobile readiness, against the log of GDP per capita (valued at purchasing power parity) to explore whether the above hypothesis is correct.

As can be seen from the figure, the relation between mobile penetration and GDP per capita is a positive one. A simple regression of GDP per capita on penetration rates yields a high $R^2$ of 0.76.[9] Yet as wealth increases, the relation gets looser. It totally breaks down for advanced economies. When considering only the 88 developing countries that belong to the low-income or middle-income groups, the $R^2$ is 0.70. For the 44 high-income countries, the $R^2$ is almost zero (0.03).[10]

These findings appear to corroborate the fact that mobile penetration is particularly relevant for developing countries as an enabler of increased growth, while it becomes less crucial as a country evolves to higher stages of development.

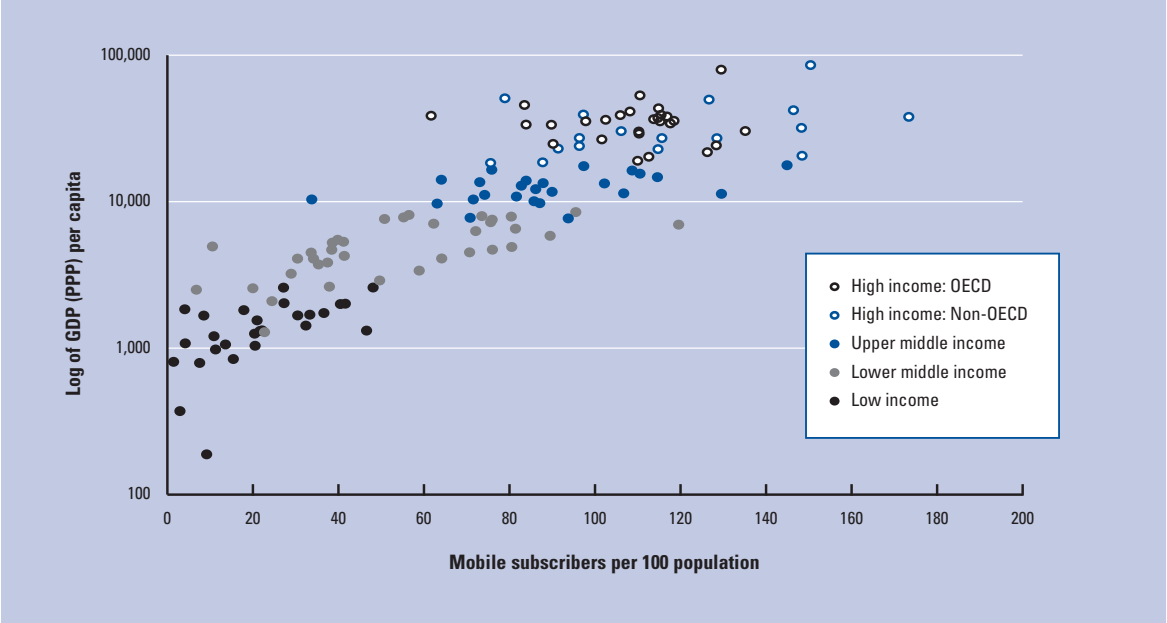
### Mobile telephony and networked readiness

After having explored how mobile telephony contributes to economic growth, the relationship between mobile telephony and networked readiness is examined—that is, countries' capacity to leverage ICT for development. To what extent do the spillovers generated by the usage of mobile telephony translate into enhanced networked readiness as captured by the NRI?

One straightforward way to analyze the relation between mobile telephony diffusion and the NRI is to simply compute the correlation between the 2007 mobile telephony penetration rates for the 134 countries covered in this *Report* and their respective scores on the NRI 2008–2009.[11] This generates an $R^2$ of 0.75, since countries with high mobile penetration rates tend to score well in the NRI, although the high correlation does not necessarily entail a causality link at this stage.

Furthermore, the basic scatter plot presented in Figure 7 reveals the existence of a "glass ceiling" in terms of networked readiness (Y-axis) around the middle score of 4.0. Only countries with penetration rates higher than the median rate of 73.2 mobile subscribers per 100 population seem to break through this ceiling. There are very few exceptions. Out of 134 countries, only five (4 percent) combine an NRI score *above* the middle score and a penetration rate *below* the average rate. Among these, Canada is in a league of its own. The country ranks 10th in the NRI, with just 61.7 mobile subscribers per 100 population, largely below the median rate. The other four countries are located either at

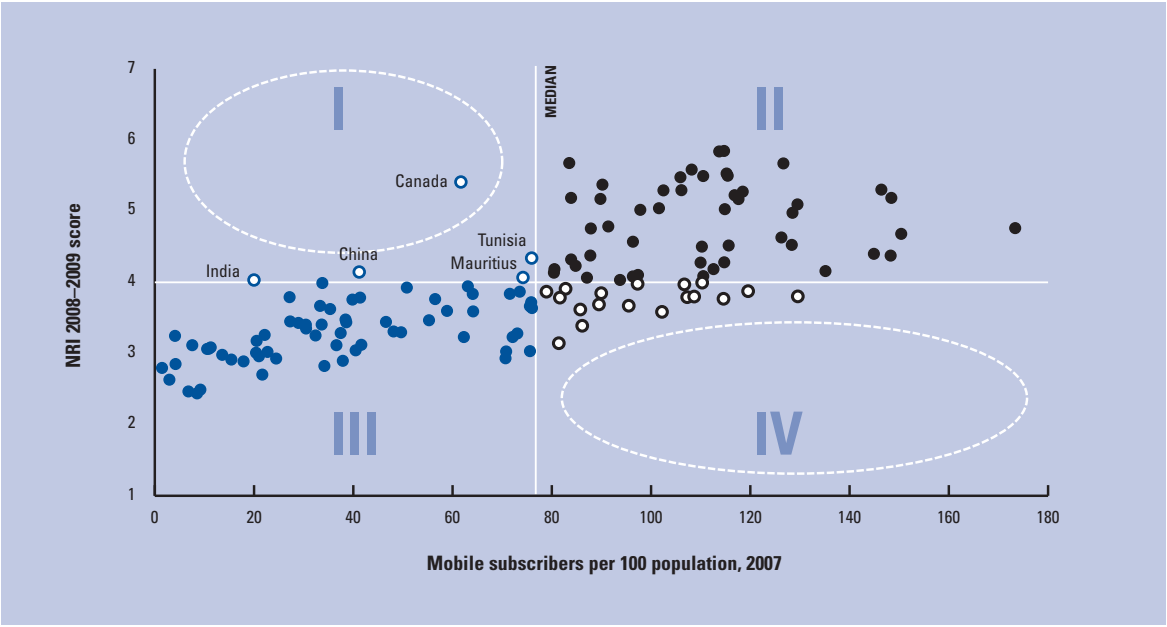
## Figure 6: GDP per capita and mobile penetration rate, 2007




Source: ITU, 2008; IMF, 2008.
Note: Montenegro and Puerto Rico not included due to limited data availability.

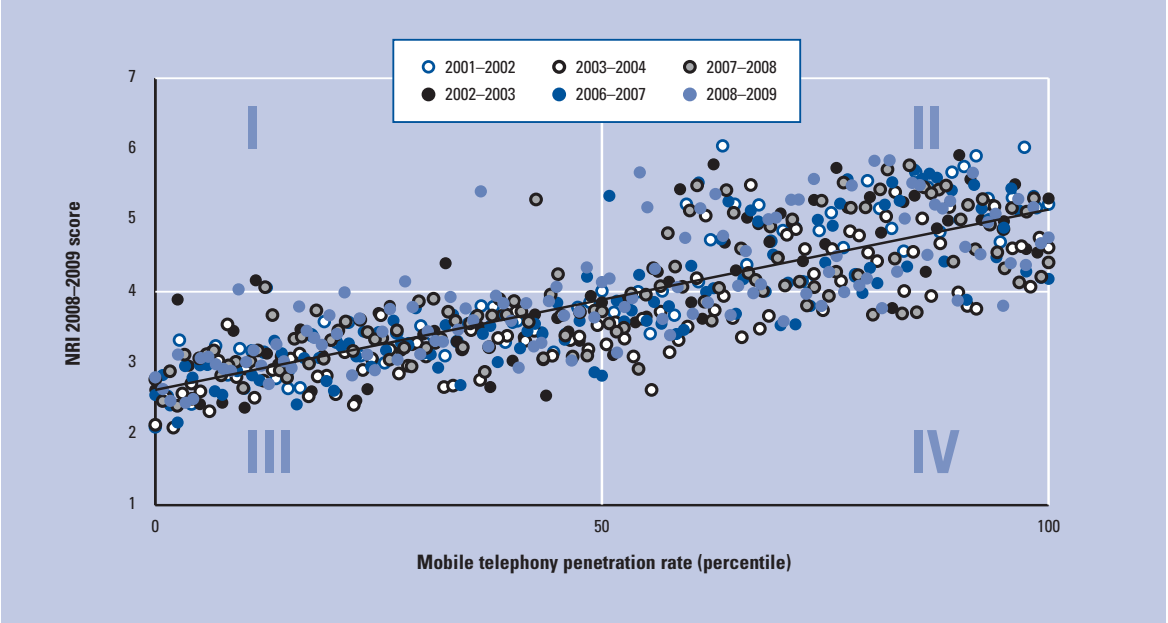


## Figure 7: Mobile penetration and networked readiness, 2007




Source: World Economic Forum; ITU, 2008.

**Figure 8: Mobile telephony and networked readiness over time**




Source: World Economic Forum; ITU, 2008.



the very bottom of panel I, such as India (with an NRI score of 4.02 and 20 subscribers per 100 population) and China (4.15 and 41), or at the very right of the panel, such as Mauritius (4.07 and 74) and Tunisia (4.34 and 76).

We also carried out a similar analysis with historical data. We compared NRI scores from six of the eight editions of the NRI, including the earliest and the latest, and the mobile penetration rates for the corresponding years.[12] This represents 638 pairs of scores and penetration rates. In order to deal with the increase in penetration rates, for each year we convert penetration rates into percentile rankings. For each year a percentile rank of 0, 100, and 50 corresponds to the lowest, highest, and median penetration rate, respectively, within the sample of countries for that year. This way we can overlay on one single chart the results of several editions.

The same transformation is not necessary for the NRI scores. The NRI overall score is an average of *relative* scores.[13] Hard data indicators are normalized so that the best- and worst-performing countries in the sample receive a relative score of 7 and 1, respectively.[14] The absolute scores of the other countries are rescaled linearly so that the distances between them remain proportional. The normalization is redone every year and considers only the value of the current year. This is why NRI scores do not increase from year to year even if the underlying indicators' values do. They always range between 1 and 7.

The results are represented in Figure 8, which looks very similar to Figure 7. North of the 4.0 value on the Y-axis and east to the median rate on the X-axis, the northwest quadrant (Panel I) appears very scarcely populated. As a matter of fact, out of the 638 considered data points, only 20, or 3 percent, belong to that panel. This is a remarkable result considering that, over this eight-year period, mobile telephony diffusion increased, depending on the region, anywhere from 2 to 40 times. All countries, including the least advanced, have seen mobile telephony usage grow dramatically. Yet the ceiling has not disappeared. Only a handful of countries have managed to move from Panel III to Panel I over the past eight years—that is, to overperform in the NRI with a mobile penetration below the median rate. These are China, India, Jamaica, Mauritius, and Thailand. Four other countries—Canada, Italy, Netherlands, and Barbados—continue to overperform in the NRI with respect to their mobile penetration despite falling behind in terms of mobile telephone usage. Finally, Puerto Rico and Tunisia have remained in Panel I since their first inclusion.

Out of the 20 combinations inside Panel I, the biggest outlier is Canada—both in 2007–2008 (43rd percentile for mobile penetration rate and NRI score of 5.29) and in 2008–2009, as discussed above. All the other cases are relatively close to the frontier with the other quadrants.

Although a low mobile penetration rate (i.e., below the median rate) seems to virtually disqualify a country

from reaching the top positions in the NRI rankings, the converse is not true. High mobile telephony diffusion does not *necessarily* lead to a high level of networked readiness. Returning to the NRI 2008–2009 results and 2007 penetration rates (displayed in Figure 7), we see that 18 of the 67 countries with penetration rates *above* the median rate score 4.0 or *lower* in the NRI.[15] The same pattern holds true when one takes into consideration the results from all editions of the *Report* (reference is made to Figure 8). Out of the 307 combinations with a penetration rate above the median (Panels II and IV), 78, or 25 percent, have an NRI score lower than 4.0.

Another interesting observation is that, although clearly positive, the relationship between mobile telephony usage and networked readiness gets looser as usage increases. This can be clearly seen in Figures 7 and 8, and the correlation coefficients provide further evidence. Considering only the points inside Panel III in Figure 7, the correlation between the two series is 0.58. For points inside Panel II, the correlation is only 0.13. Again, this observation continues to apply when considering the historical data. Correlation for the sample of points inside Panel III (311 points) of Figure 8 is 0.60 while it drops to 0.20 for the 229 points inside Panel II.



## Conclusion

Building on the overall theme of this *Report* and previous studies on the impact of mobile telephony on economic growth, this chapter is an attempt to provide some clarity on the relationship and interrelations existing between mobile telephony diffusion and the capacity of countries to use ICT to improve their competitiveness, as measured by the NRI. One would logically expect that mobile readiness has a strong impact on overall networked readiness of countries and therefore on sustained economic growth and development. Our analysis shows that this supposition is true, but only to a certain extent. While the latest data as well as historical data demonstrate that only a handful of countries with low mobile telephony penetration rates achieve above-average networked readiness levels, we found that high mobile telephony penetration is not inevitably synonymous with high networked readiness. Mobile telephony usage, therefore, appears to be a necessary but not sufficient condition of enhanced networked readiness. We also observed that the relation between mobile telephony usage and GDP per capita is clearly positive, but is about three times as strong among low- and lower-middle-income countries. This suggests that the booming mobile phone penetration rates observed in poor countries in recent years can indeed help them reduce poverty and foster economic performance.

## Notes

1 According to ITU data, in 2007 there were some 2.4 billion subscribers in the developing world (low-income, lower-middle-income, and upper-middle-income countries) as opposed to 920 million in high-income countries.

2 See Kalil 2008.

3 In this chapter, we use the World Bank's "World by Income" country classification (as of December 2008). The classification is based on 2006 gross national income (in US dollars) per capita. The four income groups are defined as follows: Low income: $905 and less; lower middle income: $906–$3,595; upper middle income: $3,596–$11,115; high income: $11,116 and more.

4 Population-weighted average penetration rates are calculated using estimates based on 164 countries for which 2007 data were available.

5 UNCTAD 2007.

6 Barrantes et al. 2007.

7 For a review of the literature in question, see De Silva and Zainudeen 2007 and Chapter 1.4 of this *Report*.

8 See Kalil 2008, p. 10.

9 Only the countries covered in this *Report* were considered. Though covered, Puerto Rico and Montenegro were not included because of the unavailability of PPP estimates for these countries. GDP data are from 2007 for all countries. Mobile telephony data are from 2007 for 119 countries, from 2006 for 10 countries, and from 2005 for 3 countries.

10 Admittedly, the number of observations affects the coefficient of determination, yet it cannot alone account for this huge difference.

11 Mobile telephony penetration, measured by the number of mobile telephone subscribers per 100 population, is one of the 68 indicators entering the NRI, but that by itself is not enough to draw any conclusion as to the nature of the relationship. Given the very small implicit weight of each indicator—mobile telephony penetration accounts for 1.2 percent of the overall score—this is unlikely to cause an endogeneity problem that would make the analysis spurious.

12 We included in the analysis the 2001–2002, 2002–2003, 2003–2004, 2006–2007, 2007–2008, and 2008–2009 editions of the NRI. The 2004–2005 and 2005–2006 editions use a different methodology for score computation and the results are not on the traditional 1-to-7 scale. For the 2001–2002 edition, we used penetration rates from 2000; for 2002–2003, we used 2001, and so on.

13 Unlike percentile ranking, which is an ordinal measure (only the *order* of the values of the underlying data matters), the normalization of the hard data yields a cardinal measure (both the order and the value of the underlying data matter).

14 The general normalization formula is:

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

15 Yet only the upper right corner of quadrant IV in Figure 7 is populated, meaning that no country with above-median penetration rates appears in the bottom tier—a score less than 3—of the NRI ranking.

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CHAPTER 1.3

# From Mobility to Ubiquity: Ensuring the Power and Promise of Internet Connectivity… for Anyone, Anywhere, Anytime

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A decade ago, few could have predicted that the start of 2009 would see one-and-a-half billion Internet users around the world. And only the sharpest prognosticator might have foreseen that more than half of the world's population would own a mobile phone and 80 percent would live within range of a cellular network.

If telephones are now nearly ubiquitous, how quickly can we expect the Internet to span the globe? What can be learned from the remarkable mobile phone success story to help countries pave the way for broad, affordable, portable, and transparent ubiquitous Internet service for businesses and citizens? And, most importantly, what policies and models can governments use to help their countries get there?

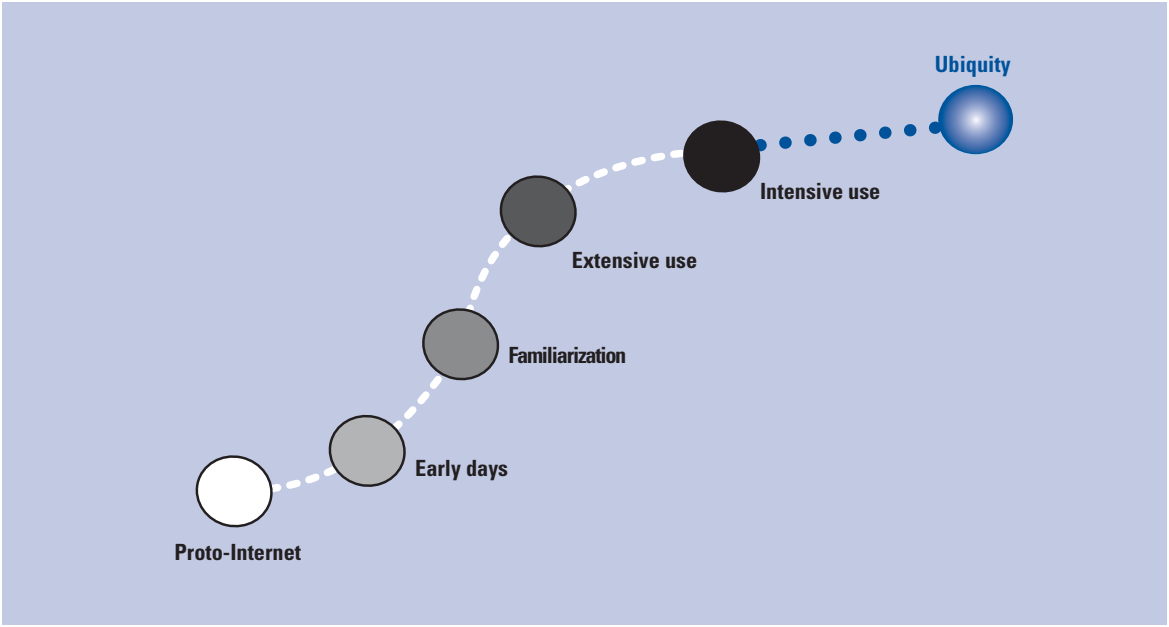
The goal may be simple but it is ambitious: Internet *ubiquity* offers connectivity to people wherever they are, whenever they want to access the network, with the device of their choosing. Ubiquity features safe, reliable, and continuous high-speed connectivity. Above and beyond Internet availability, ubiquity means that the Internet follows users seamlessly rather than users searching for it as they move about during the day from place to place, device to device. It may sound too good to be true, but this advanced state of technological development is not an unreachable utopia. It can be built, but it will require a solid technical, regulatory, and market foundation. The closer countries get to this goal, the more they will reap the benefits, both in terms of economic productivity and personal welfare.

Advanced and emerging countries have reached the Internet through different paths. Personal computers (PCs) were widespread in advanced countries well before broadband became available. In emerging nations, many people have had their first Internet experience in cybercafés, Internet kiosks, or community centers. Increasingly, all countries are seeing a range of devices and an array of fixed and wireless lines for their Internet connectivity—and these are quickly going broadband.

In many countries, however, it is not realistic to expect that everyone will have a connection to the Internet. Indeed, shared-access Internet facilities will remain the only viable approach for quite some time for a large portion of the world's population. But the "stretch" goal of ubiquitous access is worthy if countries wish to tap the potential that the Internet offers in terms of productivity and standards of living.

But how can we build on current progress to move toward ubiquity? When it comes to Internet access, we know that broadband offers much more than telephony ever did—in terms of breadth of information; interactivity across media; economic opportunities; and access to education, health care, and government services. Harnessing the potential that networks and the Internet have to offer is as much about creating the right policy and institutional environment as it is about adopting the right technology and investing in related infrastructure.

**Figure 1: The five stages to Internet ubiquity**






As we end the first decade of the 21st century, it is clear that high-speed networks must be considered an integral part of the basic infrastructure of any country. Indeed, broadband networks are the infrastructure foundation of the knowledge economy. And for many countries these networks offer a unique, cost-effective opportunity to enhance their competitiveness and rise above physical or geographical constraints. We have already seen in advanced economies—and even remarkably more so in emerging economies—how connectivity empowers citizens, improves productivity, generates jobs, enables education, and improves health care. We also believe that we are about to witness broadband networks powering an economic recovery.

In this chapter we propose to do three things. First, we put into perspective the different stages of Internet connectivity for countries and their progress in fostering the broad ICT foundations (or lack thereof) behind that connectivity. We do this by proposing a typology of stages and classifying countries accordingly, and by revisiting and updating the ICT Development Map (ICT Map) presented in *The Global Information Technology Report 2007–2008*.[1]

Second, we look at the key ingredients of successful efforts to advance ICT development and Internet connectivity—what we will call the *keystones of a Net Strategy*. These represent a framework around which it is possible to assess strengths and weaknesses and to identify priorities for action for governments and private actors alike.

Finally, we consider the more specific factors—beyond the solid foundation that the Net Strategy framework proposes—to take countries from broad and accessible connectivity to that end-state goal of Internet ubiquity.

### A definition of the stages and underlying factors of Internet progress

We begin with a model that tracks a country's progress along five stages of Internet connectivity, each one getting progressively closer to the stage that can serve as launching pad for Internet ubiquity. Each stage reflects a different breadth and depth of connectivity. The model revolves around key thresholds, marking the progression that countries have followed and pointing to what they can look forward to, depending on their stage (see Figure 1).

The stages focus specifically on Internet penetration but do not limit themselves to one dimension. Instead we show the progression from occasional or rare Internet access to familiarization with the use of the Internet to widespread connectivity and, finally to more regular, intensive use of Internet-based services. The thresholds are based on 2007 data from ITU consistent with those used in the Networked Readiness Index (NRI) featured in this *Report*—they escalate as we move up the stages: from Internet usage to Internet connections and finally to broadband connectivity.

As we will elaborate below in connection with the ICT Map, it should be noted that progress along the stages does reflect income levels but is not solely determined by them. There are examples of countries that, through strategic improvements in their ICT ecosystem and infrastructure, have managed to move further in connectivity than richer countries.

We classify into these stages a total of 157 countries (see Appendix A for a list of these countries and how it compares with the list of countries included in the NRI 2008–2009)—essentially the whole world, except for countries with very small populations or for which data are not available.

**Proto-Internet.** A country is considered to be in this stage when less than 5 percent of its population has had experience with the Internet. We find 45 countries in this stage, with a total population of about 800 million. These countries are typically low-income, rural economies (only 35 percent of the population on average lives in urban areas), with Internet connectivity largely available only to larger businesses, universities, the government, and small elite groups in the cities. In these countries, less than 1 in 20 people had experienced the Internet by 2007. Examples include populous countries such as Bangladesh and Ethiopia and smaller ones such as Cameroon, Nicaragua, and Tajikistan.

**Early days.** In the next stage, countries have significantly higher Internet usage rates (between 5 percent —or slightly less but growing fast—and 15 percent), but the large majority of the population has yet to experience the Internet directly. We find 32 countries at this stage—including major ones in Asia (India, Indonesia, and Pakistan) and Africa (Egypt, Nigeria, and South Africa), together with smaller countries (such as Albania, Bolivia, Senegal, and Sri Lanka)—with a combined total population of about 2.2 billion people. These are generally countries with significant urban populations (about half of their population lives in cities, on average), and Internet use averages conceal major differences between urban and rural areas. Many people in these countries use the Internet through shared-access connections (cybercafés or community centers), so that the number of Internet users is a multiple of about five times the number of Internet connections in the country.

**Familiarization.** In this stage we include countries with at least 15 percent Internet use, but switch the upper boundary to focus on household connections, with an upper boundary that is equivalent to about one-quarter of all households having their own connections. We find 39 countries in this stage, with an average of 28 percent of the population having used the Internet. These numbers are fueled by high urbanization rates (two-thirds of the people live in urban areas). There are 2.2 billion people who live in countries at this stage, which are wide-ranging in income levels and characteristics—from Brazil and China to Chile, Poland, Thailand, Tunisia, and Turkey. At this stage, virtually all businesses (beyond micro-enterprises) have Internet connections, as do many urban households. Familiarization with the Internet breeds high expectations, and the pent-up demand for online services and greater connectivity is a considerable factor behind Internet momentum (see Box 1 for a summary of a study of Internet use in emerging market cities).

**Extensive use.** The next stage—indicative of extensive Internet connectivity—is largely a transitional stage. Here we find 18 countries—with total population of about 400 million—where at least one-quarter of all households are connected to the Internet (and nearly half of the population, on average, are Internet users), but broadband is not yet prevalent. While earlier stages comprise only emerging economies, the countries at this stage are a mix of emerging (Czech Republic, Malaysia, and Russia, for instance) and advanced ones (Italy, Portugal, and Spain).

**Intensive use.** Finally, in the intensive use stage we find 23 countries—with about 850 million population in total—where half or more of the households (plus all businesses and institutions) have broadband connections. These are advanced economies in which, on average, two-thirds of the population uses the Internet. E-commerce, e-government services, business collaboration, and social networking, among others, are pervasive and have become an integral part of the social fabric and economy. Countries with a strong ICT foundation have reached this stage and derive many benefits from it. The best-practice examples for our Net Strategy come from this group and include countries such as Finland, Korea, Rep. (Korea), and the United States. This stage is the launching pad for ubiquity.

**Ubiquity.** We are still exploring the metrics that we will need in the future to determine if and when countries have moved to the stage of ubiquitous Internet. We do not believe any country has yet come close, but developments in technology, regulation, and business models are paving the way for some countries to make fast progress in this direction. Ubiquity is not about 100 percent connectivity; rather it is about the ability to connect everywhere at anytime by a majority of citizens. This stage of ubiquity un-tethers the user from device or connection and instead envisages a world in which the Internet connection follows the user rather than the user seeking the connection.

The stages identified above help us get a clearer picture of the critical mass thresholds needed to accelerate network connectivity, but they are not meant to provide a diagnostic of a country's ICT development. For that we defer to the ICT Development Map we introduced in *The Global Information Technology Report 2007–2008* to explore the interaction among ICT infrastructure, ecosystem coordinates, and technology adoption.

## Box 1: Cities as spearheads for online service use[1]

Citizens and businesses located in the cities of major emerging economies are not only quite familiar with the Internet but, as they become more exposed to it, they develop high expectations for future access to online services—commercial and governmental alike. While some key factors of ICT adoption are under the primary influence of central governments, other factors come under the purview of municipal or metropolitan governments, and these entities can make a significant difference. Both central and local government broadband strategies are necessary to take advantage of the opportunity that Internet Protocol (IP) networks offer and to extend the advantages of the early stages of Web 2.0.

Because of population density, connectivity spreads faster in cities and, hence, early indications of demand (present and future) for online services can be observed. Cities therefore are excellent proving grounds for online service deployment and can provide central governments with clear indications of what the rest of the country's population might want—and potentially expect—in this area.

Using cities to spearhead ICT development is not just about providing urban dwellers with the benefits of connectivity. It is also an effective approach for creating strong hubs of connectivity and commercial viability and thus extending the reach of networks across the country, laying the groundwork for national ubiquity.

Awareness of the Internet and of its benefits is virtually universal in cities across the world, according to the "Cities Net Opportunities" study by Cisco—based on a survey by Illuminas Global in four cities each in Argentina, Brazil, Mexico, Poland, Russia, and South Africa. The survey found that businesses have seen the Internet improve sales, customer satisfaction, and productivity; while citizens generally believe that Internet access improves people's lives.

In six of these cities (in Brazil, Mexico, and Russia), Cisco was able to conduct a follow-up survey in late 2008.

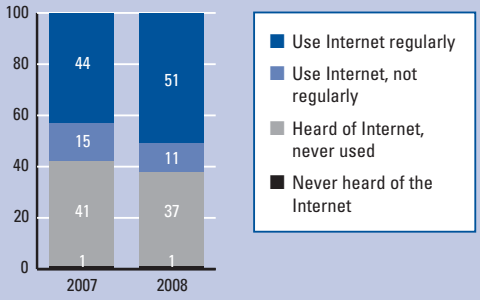
Comparison of the two surveys (Figure A) found very lively dynamics at play: the proportion of regular Internet users (people moving from familiarization to extensive—and even intensive—use of the Internet) in the sample grew from 44 percent to 51 percent within the span of just one year.

The survey also found the following:

1. Citizens' "thirst" for online services regardless of their experience using the Internet:
   - —Those that already use online services expect to continue using and potentially expanding their use, and many consider these online services to be worth paying for.
   - —Those not currently using the Internet and those who do so infrequently expect to use online services in the future nearly to the same degree as regular users.
   - —Citizens show particular interest in (and willingness to pay for) new value-added services such as education or health care.
2. Virtually all businesses already use the Internet, but they see major potential for expanding their use of the Internet for all kinds of e-commerce.
3. There is a clear desire from citizens and businesses for more active involvement by the government to promote Internet access and use. The overwhelming majority of businesses and citizens think government should have a role in making access to the Internet easier (Figure B).

*(Cont'd.)*

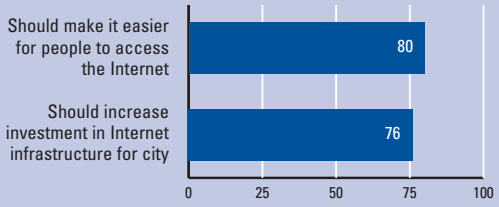
### Figure A: Citizens: Internet use in urban areas (percent)



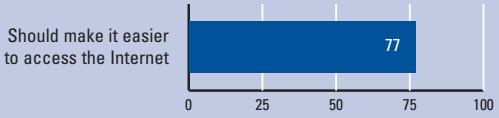

Source: Rueda-Sabater and Lamus, 2008.

### Figure B: Expectations of government's role

**Businesses' expectations (percent)**




**Citizens' expectations (percent)**




Source: Rueda-Sabater and Lamus, 2008.

**Box 1: Cities as spearheads for online service use[1]** *(cont'd.)*

4. Concerning e-government, most businesses—and a large majority of citizens—feel that the government should do more to provide information and services online.

5. As for barriers to greater use of the Internet, citizens and businesses rank skills as the top obstacle. Other major factors are accessibility and cost.

6. People in households with their own connection access the Internet more frequently than those who use shared-access facilities such as a cybercafé. This shows that having a PC at home seems to be a key factor in increasing the frequency and use of the Internet, also considering citizens do not feel that access via mobile phones could satisfy their connectivity needs.

**Note**

1 This box draws on Rueda-Sabater and Lamus 2008.

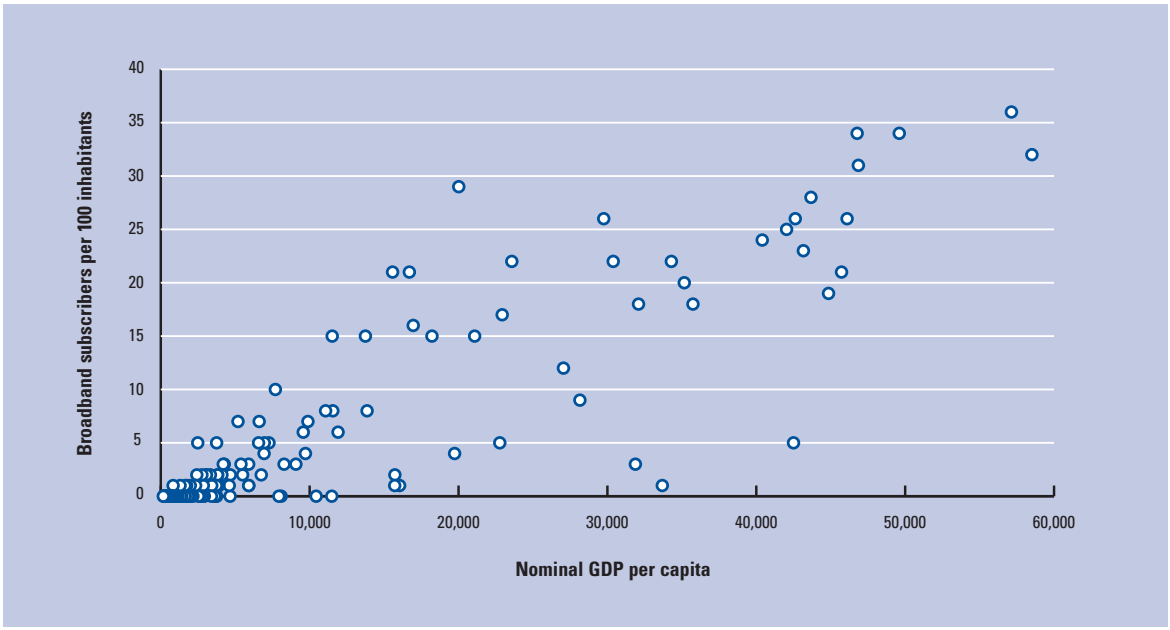
- *ICT ecosystem* refers to institutional factors that underpin entrepreneurial creativity and competitive dynamics for service provision. These factors are hard to measure but include the legal and regulatory framework around ICT deployment and the ease of doing business in general.

- *ICT infrastructure and capacity* refers to assets, such as networks and other infrastructure, as well as the existence of skills to use and manage the hardware effectively.

In last year's *Report,* we used these two dimensions to develop a cartographic model and map countries on the basis of their ICT development—providing a perspective on their current situation and illustrating how to chart a course forward that balances both dimensions. This ICT Development Map relied solely on indicators that were part of the NRI; it did not explicitly consider income levels. Income levels play a role in ICT adoption (see Figure 2), but so do a number of the factors reflected in the ICT Map coordinates. Simple correlation analysis confirms that our ecosystem rating, in particular, is much less influenced by income than is the infrastructure rating (see Appendix A).

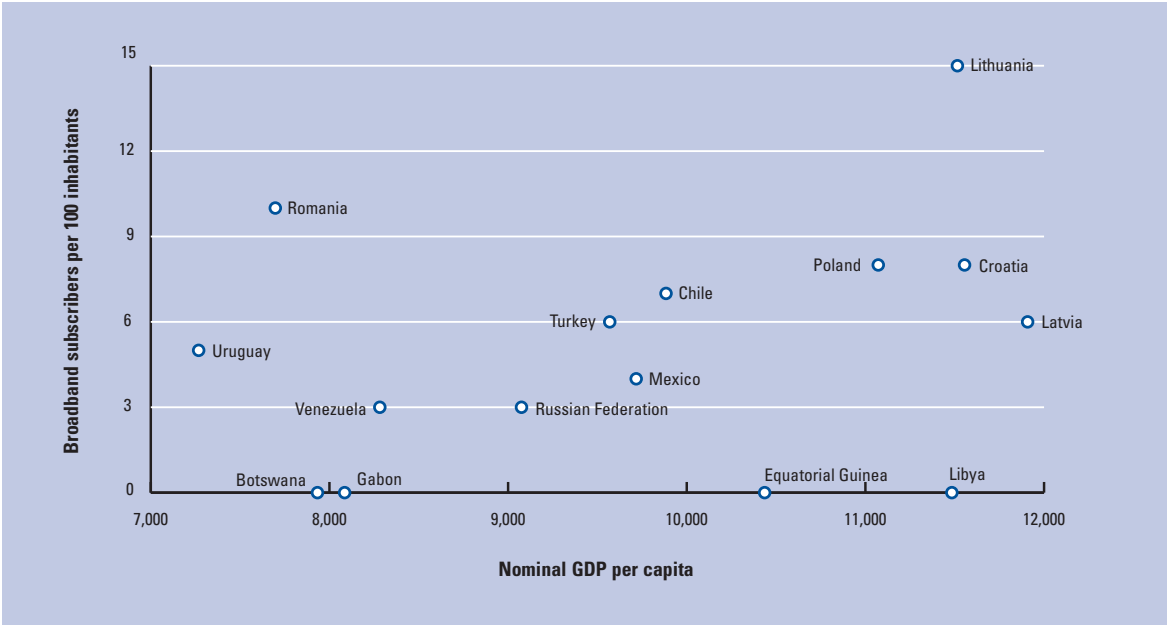


**Figure 2: Broadband penetration and per capita income levels, 2007**




Source: ITU, 2008; IMF, 2008.

**Figure 3: Broadband penetration levels in countries with similar income, 2007**




Source: ITU, 2008; IMF, 2008.



This is a phenomenon that can be observed both in emerging and advanced markets:

- Russia's income level, for instance, is similar to that of Chile, but its broadband penetration is less than half. Similarly with Venezuela and Romania (the former has slightly higher income but the latter has more than twice the broadband penetration). Figure 3—showing a "slice" of the scatter plot—provides further illustration of how non-income factors (differences in ecosystem and infrastructure) can be significant enough to account for major disparities in ICT adoption even after income levels have been factored in (see Appendix A for statistical validation of this significance).

- Among advanced economies, similarly, Austria has a slightly higher income level than Belgium, but the latter had broadband penetration of 26 percent (in 2007) compared to 19 percent for Austria. Ireland and Switzerland also had similar income levels, but broadband penetration (at 32 percent) was almost twice as high in Switzerland than in Ireland.

The indicators behind each ecosystem and infrastructure are combined to produce the two coordinates that allow us to classify each country along the two axes. Figure 4 indicates how the indicators are combined to generate measures for the ecosystem and infrastructure dimensions.

To analyze the implications of positions in the ICT Map, we break each axis into four simple categories. The thresholds for the four categories reflect logical breaks in the distribution of countries along each axis rather than evenly spread groupings. These thresholds are unavoidably arbitrary; they are designed simply as a sorting device that is then validated by the differences in Internet penetration across countries in the different categories.

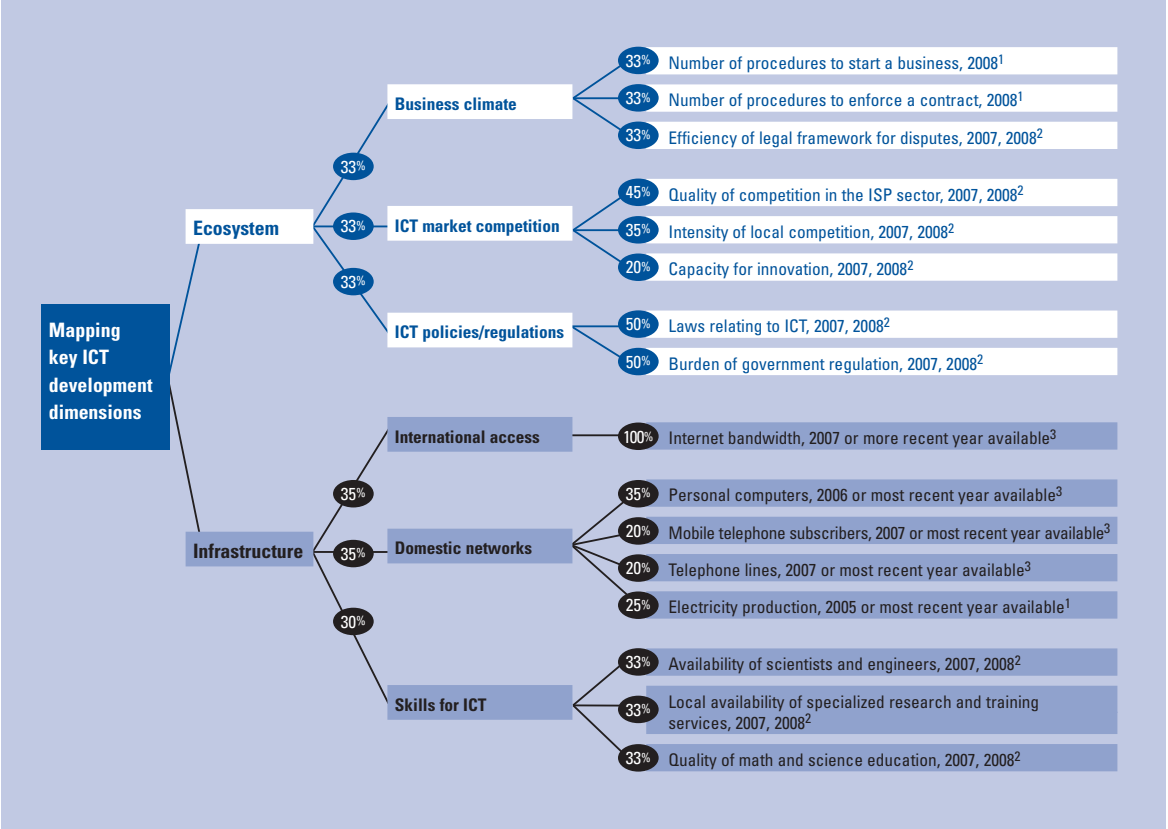
Revisiting the ICT Development Map with information from the NRI 2008–2009, we can look at how the 127 economies for which data are available are spread through the relevant areas of the ICT Map.[3] We find 50 countries still in the "poor" category (including most of the countries included this year for the first time in the NRI), a slight increase (to 33) in the number of countries in good/best practice territory, and 44 countries in between (see Table 1).

The period between 2005 and 2007 was a time of significant expansion of Internet use around the world (possibly a key inflection point in that regard). We offer three views of the dynamics of ICT adoption:

First, we depict ICT Map positions using the data included in the NRI 2007–2008 (black dots) compared with those (blue dots) based on data in the NRI 2008–2009 (Figure 5).

The mapping of one year's changes suggest very little progress on the ecosystem front. This points to a missed opportunity (given that ecosystem improvements are not resource-intensive) and underscores the untapped

## Figure 4: ICT Development Map Framework

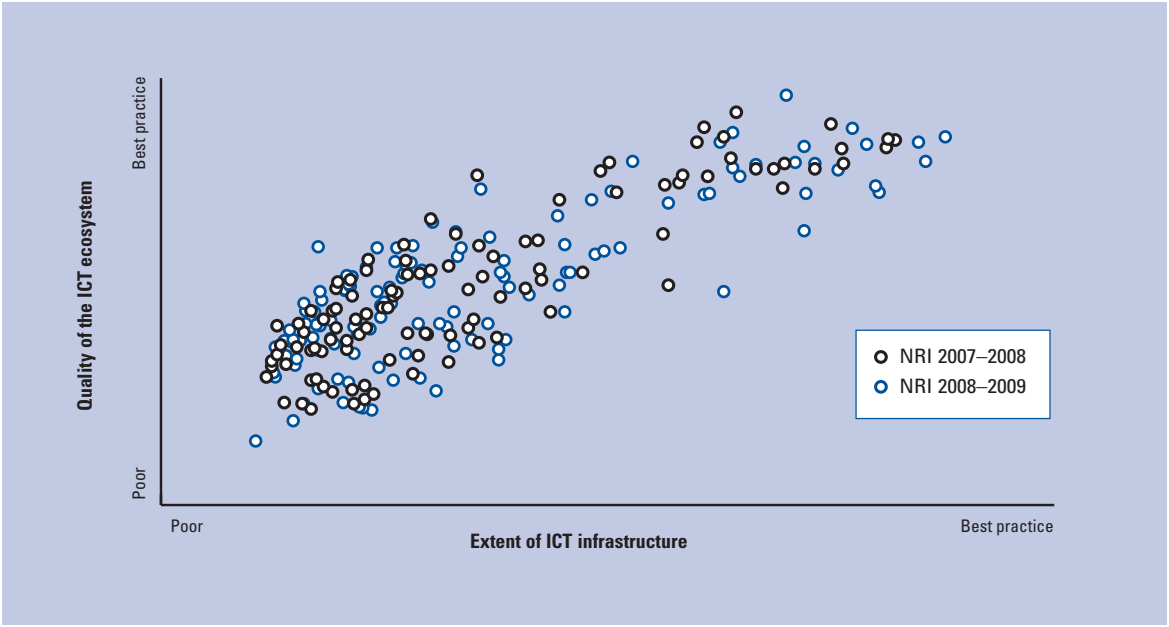



[1] World Bank 2009; [2] 2-year average, World Economic Forum, Executive Opinion Survey, 2007, 2008; [3] ITU 2008.

## Table 1: Distribution of countries in the ICT Map

| Ecosystem \ Infrastructure | Poor | Moderate | Good | Best practice |
|---|---|---|---|---|
| Best practice | | | 3 | 13 |
| Good | 1 | 11 | 13 | 4 |
| Moderate | 20 | 21 | 12 | |
| Poor | 17 | 10 | 2 | |

**Figure 5: Change in ICT Map positions, 2007–2008**




Source: Authors' calculations, based on ICT Map 2008, 2009.



potential for the less wealthy countries to accelerate progress through policy and regulatory reforms.

Second, we analyze the impact that a balanced (diagonal) ICT Map position has on the progress achieved between 2005 and 2007 (see Table 2).

The results confirm the value of the balance between infrastructure and ecosystem—countries along the diagonal (indicative of balance between progress on the ecosystem and infrastructure fronts) saw the greatest increase in broadband line penetration. Countries with poor or even moderate ICT environments face the prospect of lagging further and further behind in their ability to harness the power of networks for competitiveness and social inclusion.

Third, we use the three summary categories (poor, moderate, and good/best practice ICT environments) to review differences in penetration and determine whether the gaps are closing or widening.

The new data from the NRI 2008–2009 validates last year's conclusions. The differences across country categories remain very large; this is particularly the case for broadband (see Figure 6).

Looking back from these penetration rates at the increase in Internet use and broadband penetration over two years shows how major gaps have continued to grow, because countries with weaker ICT environments did not manage to expand their connectivity fast enough to reduce them.

**Table 2: Broadband penetration growth over two years, 2005–07**

| Ecosystem \ Infrastructure | Poor | Moderate | Good | Best practice |
|---|---|---|---|---|
| Best practice | | | 4.7 | 8.8 |
| Good | | 1.2 | 6.6 | 6.7 |
| Moderate | 0.3 | 1.5 | 5.5 | |
| Poor | 0.4 | 1.2 | | |

Source: Authors' calculations, based on ITU, 2008.

- For Internet usage (Figure 7), the absolute gaps kept growing over the 2005–07 period (the proportion of the population that had used the Internet went from an average of 51 percent in 2005 to 60 percent in 2007 in good/best practice countries, compared with 6 percent in 2005 and 10 percent in 2007 for countries in poor environments).

- For broadband connections (Figure 8), the even larger initial gaps kept growing (the proportion of the population that had used broadband Internet went from an average of 15 percent in 2005 to 22 percent in 2007 in good/best practice countries, compared with 1 percent in 2005 and 4 percent in 2007

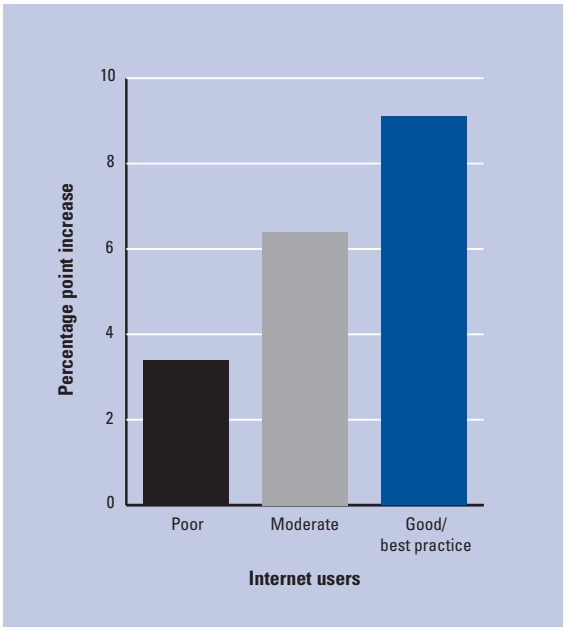
## Figure 6: Internet penetration by summary categories, 2007

| Category | Number of countries | Internet users | Internet subscribers | Broadband subscribers |
|---|---|---|---|---|
| | Average (per 100 inhabitants) | | | |
| Good/best practice | 33 | 60 | 28 | 22 |
| Moderate | 44 | 24 | 8 | 4 |
| Poor | 50 | 10 | 2 | 1 |

Source: Authors' calculations, based on ITU, 2008.

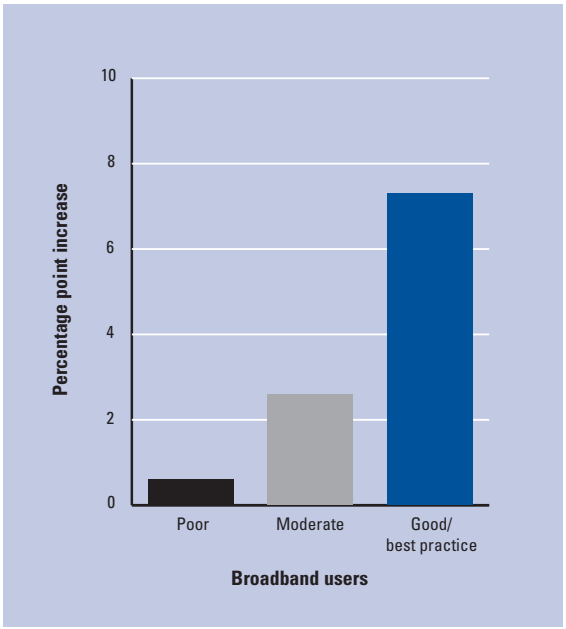


## Figure 7: Increase in Internet penetration, 2005–07




Source: Authors' calculations, based on ITU, 2008.

## Figure 8: Increase in broadband penetration, 2005–07




Source: Authors' calculations, based on ITU, 2008.

for countries in moderate environments—while countries in poor environments remained below 1 percent penetration throughout the 2005–07 period).

The momentum that countries build as they move through the Internet stages appears to be a powerful force. It has proven particularly difficult for countries with poor infrastructure and/or ecosystems to accelerate the rate of Internet penetration compared with that rate in other countries. While the relative growth, of course, is much higher for countries in the "poor" category, actual progress toward the critical mass of users and subscriptions is what represents key thresholds. In that respect, the gap has grown rather than shrunk in the two-year period.

### Using ICT to reach economic and social objectives

As governments, businesses, and community leaders consider possible paths to improved connectivity with the ultimate goal of universal, ubiquitous connectivity, they will find it useful to think in terms of two major objectives: economic growth and social inclusion. The paths to these two goals overlap to some extent, but there are also separate avenues to pursue depending on the relative importance of each goal in a country.

- **Economic growth.** Potential benefits include productivity gains (e.g., through reduced transaction costs; scalability; and fast, reliable information flows) and enhanced innovation (through online collaboration tools and new ways to market goods and services). These are the same ICT productivity gains that have benefited developed economies over the last two decades and are accelerating their impact as they extend from large enterprises to smaller businesses, government, and nonprofit organizations.

- **Social inclusion.** This refers to the potential that improved access to networks offer people and communities across the world to education resources, health service providers, government assistance, and market information. This improved access works together with the networks' potential for empowering individuals to exercise their rights as citizens and become active participants in political processes and social dynamics.

The early stages of the Web 2.0 era of technology-empowered collaboration and knowledge development create unprecedented opportunities for both developed and developing economies. If leveraged correctly, an ambitious network connectivity strategy may very well represent the best hope of economic transformation, particularly at this time of global economic downturn. A strong foundation for ICT development with balanced ecosystem and infrastructure is crucial to reach the intensive Internet use stage, as a launching pad to Internet ubiquity.

### A framework for action

The diagnostic models (ICT Map and Internet stages) that we have designed provide a good basis for providing perspective to a country's starting position and charting a course for progress.

Building on these models, and drawing from the fast-developing best practices of leading countries (including those of government policy and actions), we have identified six key action areas for an effective Net Strategy to improve ICT adoption (broadband in particular). These are consistent with the analytical logic of the ICT Map—with the addition of a more explicit role for government expenditure—and provide the basic structure of our framework for identifying priorities and establishing avenues for action.

These keystones for a Net Strategy represent a foundation in which each of the components needs to be solid and all six reinforce each other's effect. To reach the intensive use stage, countries need to ensure robustness in all six keystones. Areas where remedial action is needed will depend on the stage at which a country finds itself and on the strengths and weaknesses of its ICT environment.

The six keystones can be characterized through a series of questions and by examining lessons from best practice, as follows.

***1. Market/Competition.*** Are the number of players, their technology platforms, and their market shares such that they foster competition (i.e., service innovation and responsiveness to potential demand)?

Simply put, monopolies innovate less and invest less than service providers in a competitive market. Best practice countries have found various ways to promote diversity in platform technologies and service provision, expanding the reach of networks, promoting usage, and ensuring affordability. But there is no blueprint that can be applied to all countries.

Countries ranking high in the NRI tend to have the healthiest competitive environments, where the needs and investment already made by incumbent players were taken into consideration while still providing incentives for newcomers. Competition does not work if regulation becomes confiscatory for incumbents or prohibitive for competitors.

Competition in the service provider market—broadly defined—also plays a vital role in ensuring a broad reach of networks, consumer choice, and efficient response to emerging demand. Needless to say, there is also a delicate balance here, as regulatory frameworks must also be mindful of the impact on incentives for service providers to invest. And diversity among technology platforms is a good indication of the potential for market dynamics that surround connectivity. In any

case, the goal is for markets, not regulators or incumbents, to select service and business models.

***2. Policies and regulations.*** Has the institutional framework evolved from the traditional fixed telephony-based model to one that enables convergence around Internet Protocol (IP) and permits entry and efficient use of tangible and intangible assets?

Regulations, both ICT specific and more generic, can have the unintended effect of discouraging innovation around the development and deployment of applications. Outdated regulation can generate barriers and constrain access to existing assets while inhibiting opportunities for reducing entry costs and technology promotion.

Much of the thinking in the regulatory arena is still hampered by the legacy of the telephone industry and the regulatory environment that has historically surrounded it. In virtually every country around the globe, the traditional telephone industry was organized around five central concepts: the primary service is voice; the minute is the best metric for billing, regulation, and measurement; the location of the user is important; pricing is sensitive to the duration of the call; and pricing is sensitive to the distance between callers. These conditions, along with the heavy capital expenditures needed to deploy a telephone network, led to a heavily regulated marketplace and, hence, to generally monopolistic environments.

None of these conditions apply to broadband use. Distance, duration, and location are moot, making the billing increment of a minute of little value. Voice is but one application in a plethora of applications available to the end user. Incumbent telephone companies are joined by providers from the ICT world, where competition can be fierce, innovation occurs at a rapid pace, and precipitous drops in price are an everyday occurrence.

The only similarity between the telephone and broadband markets is the capital expenditures needed to create the foundational network. Fixed broadband networks still require digging ditches and hanging wires, and these civil-engineering costs can be penciled in at a fairly constant rate. But even this similarity is fading as a result of the advent of high-speed wireless technologies, which promise to drastically reduce capital costs for access networks and expand the range of options available to any location or community.

Countries that have made great strides in broadband connectivity have evolved from a regulatory framework designed for a telecommunications monopoly to recognizing IP convergence and treating networks as critical infrastructure. The old telecommunications regulation was focused on voice and reflected a very different cost structure in the industry. Well-intentioned but myopic regulations based on that model can have perverse effects—favoring monopolies, inhibiting innovation, and keeping prices unnecessarily high. In many countries, Voice over IP (VoIP), for example, is still illegal—hence depriving businesses and citizens of the benefits of a very cost effective technology.

***3. Applications and content.*** Are the business environment and innovation culture such that demand and ICT entrepreneurship drive application development?

IP networks, by their nature, are best utilized when the ICT sector in a country consists of fluid structures —and clusters of innovation on content and applications. Users will obviously value broadband access more if they can go online to access government, education, and health-care services, or access potential jobs and sources of income.

Often the most effective intervention is an indirect one: promoting an environment in which ICT-related entrepreneurship can thrive and meet the demands for content and applications by local businesses and individuals. In addition, governments can promote demand by sponsoring the development of applications that meet the very real needs of the people with regard, for instance, to public services.

A business environment that facilitates business startups, operations, and conflict resolution is crucial for entrepreneurship and can have a disproportionately positive effect on the ICT sector. An active ICT sector is of paramount importance to accelerate technology adoption.

***4. Government budgets.*** Are e-government practices contributing to both operational efficiency and citizen interaction online and is government procurement used to promote national ICT development?

Governments are very large buyers of ICT services and, hence, current government expenditure on ICT can also play a role by aggregating demand, acting as an "anchor tenant," promoting competition and/or "priming the pump" for a wide array of ICT services. Ambitious public online services and advanced use of ICT in government operations generates value and citizen satisfaction.

Strategic use of the government procurement can accelerate the commercial viability of services, promote competition and entrepreneurship in the sector, and create an opportunity for promising ICT business models to take off.

***5. Skills for IT.*** Are the skill levels of ICT users (including those of school teachers) supporting the use of the Internet by businesses and individuals, and are specialist ICT skills developing in line with technology and potential?

Best practice countries have a solid base of ICT technical skills and a good level in broader science and math education. The range of interventions to improve ICT-relevant skills goes from sharply focused training and certification to pipelines of university graduates in engineering and information technology fields. Specialized education and research programs can play a major role over the longer term in contributing to the

ICT sector growth—both in adding value and in promoting efficiency.

Building basic ICT-user skills is, however, another hurdle many countries have to overcome.

An effective strategy must ensure that a lack of first-level ICT user skills are not preventing individuals and businesses from making the most of the opportunities technology has to offer. Programs designed to increase computer skills—and confidence—of older teachers can, for instance, offer a very high, immediate pay-off.

***6. Infrastructure investment.*** Are there ICT infrastructure bottlenecks that affect critically the breadth, depth, and speed of ICT adoption?

Strategic investment (similar to that in trunk roads or interstate highways) may be required to establish a national foundation on which private investments and local initiatives can build. Often, this investment is best addressed through public-private partnerships. A number of different strands of private investment are worth highlighting and the incentives and disincentives affecting them well worth examining.

- Private investment by businesses in networks and service development is critical and has underpinned the development of networks and the growth of connectivity in many countries.

- Core networks should be seen as basic infrastructure. Depending on the starting situation, this may entail greenfield development, expansion, or upgrades. Public and private sectors have complementary roles to play, with government involvement mainly focused on filling gaps.

- In some circumstances, because of low density or difficult geography, government may have to take a more active role in ensuring investment in a broadband core network. For example, governments can make the rights of way they control available to core network operators. Additionally, since generally about two-thirds of the construction cost of core backbone networks is in civil engineering, governments can dramatically reduce the costs by providing empty ducts when they construct roads or maintaining highways and other infrastructure.

- At the other end of connectivity stand ICT devices—which represent an investment of sorts by individual users. There is a strong correlation between PC penetration and broadband use. The sequence in emerging markets is markedly different than that in advanced economies, where universal connectivity could be reached quickly because of the large PC pool already in use. In many emerging countries, device availability can be a critical bottleneck for connectivity.

Countries need to consider wide-ranging formulas for ensuring commercially viable and socially minded access to the Internet. Tariffs and taxes on PCs and constraints on the emergence of other Internet-ready devices can represent hurdles to the spread of connectivity. As appropriate, promotional programs can help facilitate access to devices for disadvantaged segments of the population.

Finally, a powerful though indirect effect, constraints on foreign investment or rigidities in the financial system can have a disproportionately negative effect on the ICT sector, placing a country at a competitive disadvantage.

### Best practice examples

Experience from various parts of the world suggests measures and strategies that governments can take, including through public-private partnerships, to address bottlenecks and promote progress in connectivity. Key lessons from these experiences include:

- *Focus on market failures.* To accelerate adoption (rather than artificially create it) government actions should be designed to address market failures and bridge temporary gaps in demand or supply, as well as to create a dynamic of sustainable investment.

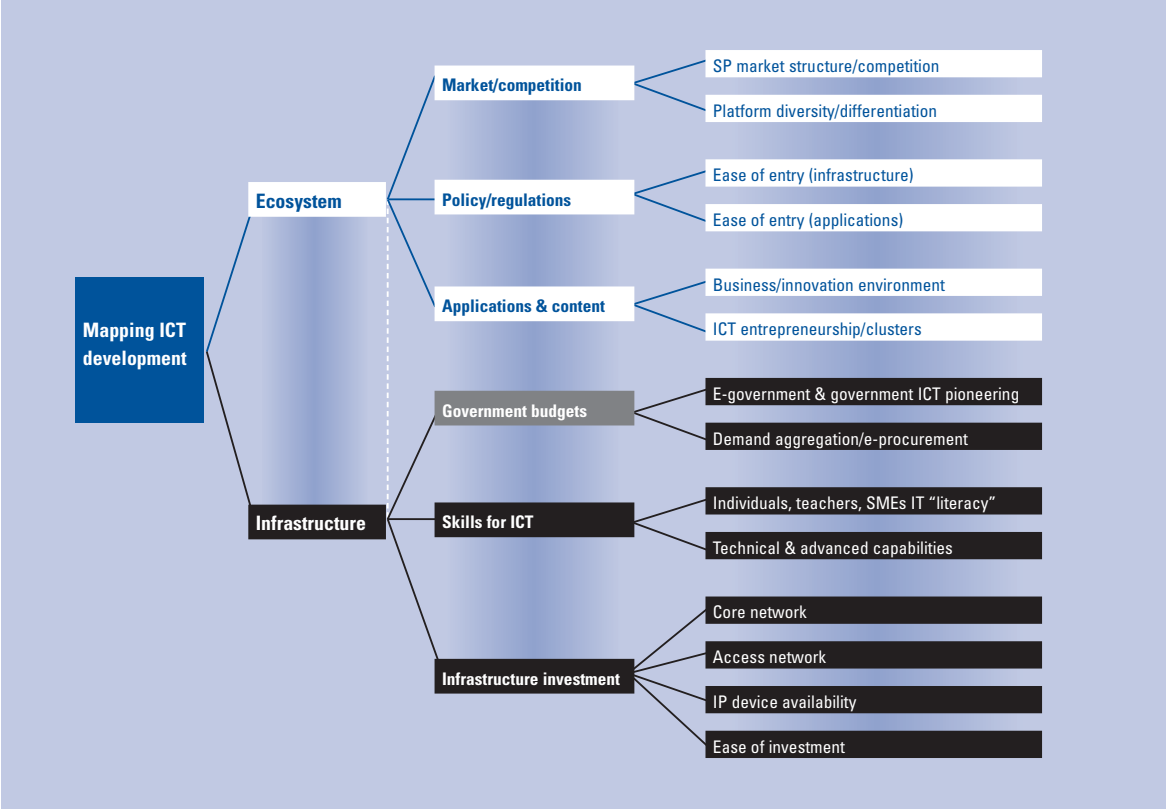
- *Coordinate infrastructure design and implementation.* It is much cheaper to lay cables alongside roads as they are being built than to return later, dig a ditch, and lay cables. Even if roads are being built with no network on the horizon, they can be designed with empty ducts beneath or easily assessable trenches so cable and fiber can be added later at a fraction of the cost. Infrastructure process coordination is an excellent alternative for municipal and regional governments, since there is no need for a federal decree to make coordination happen.

- *Sequencing.* Governments can greatly improve cost effectiveness by considering the importance of effect sequence. For instance, many lower-stage countries would do well to focus on improving their PC-to-citizen ratio as they develop and execute investment programs for broadband expansion.

To envisage the range of possible interventions in the formulation of a Net Strategy, we need now to go into another level of detail beyond our six keystones and consider 14 action areas or levers to which governments —depending on their specific circumstances—can resort (Figure 9).

Going into the details in each of the 14 areas shown on the right side of Figure 9 is beyond the scope of this chapter, but under each of these headings a number of promising practices are taking shape. Matching the assessment of bottlenecks in the 14 intervention areas with a catalog of best practices can quickly

**Figure 9: A Net Strategy Framework**




provide the components of a sound Net Strategy and lead a country to derive the immense benefits that the intensive use stage of the Internet offers.

Examples of promising interventions include the following:

- The national regulator set Greece's broadband market on the path to fair network access and more competition. The two key events in 2006 were the adoption of the European Union (EU) framework for Electronic Communications into Greek law and new regulations on Local Loop Unbundling (LLU). As a result, broadband connections accelerated and Greece no longer occupies the last place in the EU broadband penetration ranking.

- France implemented a bold regulatory framework that has led to a very competitive market. Free Ilyad and Neuf-Cegetel are among the most successful challengers in the world. Both have crafted business plans that focus on fiber deployment and innovative convergent services. In response to this competition, France Telecom has become one of the most innovative incumbents in the world.

- Ireland launched a licensing scheme for local area broadband fixed wireless access services. Under this scheme, licenses are offered in two frequency bands, 10 GHz and 26 GHz. The licenses are awarded on a first-come, first-served basis and issued for up to 2x28 MHz of spectrum for use in a location of the applicant's choice. The licensing initiative is also expected to extend to the 3.5 GHz frequency band at a later stage for service to rural and suburban areas.

- Korean broadband Internet service was classified as a value-added service, not as an infrastructure communications service. Hence it was largely free from strict government regulations and interventions. As a result, the entry barrier into the market was low and pricing competition was free—quite the opposite of the heavily regulated phone market.

- South Africa's regulatory authority announced in November 2008 that it had decided to convert all value-added network service licenses to network infrastructure licenses under the Electronic Communications Act. The move is expected to open South Africa's telecommunications industry to new infrastructure investors able to inject competition and expand services into the market.

## Beyond the intensive use stage: Ubiquity

Ubiquity, everywhere and personal, is predicated on three things: the wide availability of a core network that takes fixed broadband as far as feasible; a diverse system of "capillaries," including wireless broadband that extends the core to "the last mile"; and a variety and abundance of Internet-enabled devices that meet the income, literacy, business, and personal needs of users.

For countries that are at or close to the intensive use stage, there are a number of factors to consider in developing a plan of action toward ubiquity.

**Core network.** Access to ubiquitous wireless networks assumes that broadband core fiber optic networks can reach every part of the country. The core network or backbone can also be thought of as the arteries and veins that handle the heavy flow of traffic, while wireless and other capillary systems provide access beyond the core and create the network's outer reaches. An important role of the government is to ensure that high-speed robust core backbone networks are available across their country to enable the availability of broadband everywhere. In many cases, a clear and predictable regulatory environment will attract private capital to build core broadband networks, if these are not already done; in others, public investment in the basic layer may be required to generate the externalities that core networks offer.

**Spectrum.** Wireless spectrum is, in many countries, an untapped asset. There are many policy enablers available to spread wireless broadband, but none is more effective than making radio spectrum available over large geographic areas. The good news is that the migration from analog to digital television's broadcast is opening up a broad swath of the radio spectrum that is ideal for wireless broadband networks. Virtually all governments control radio spectrum within their borders and therefore can license to broadband providers reclaimed spectrum, at wavelengths that are particularly well suited to deliver the signal over the topography of many emerging countries.

Good spectrum policy can do the same thing for broadband that it did for mobile telephony—leapfrog fixed networks and extend service to large swath of underserved and un-served areas and people.

Finally, spectrum policy to enable the expansion of wireless broadband will lead to new capabilities, such as mobility, that are simply unavailable on fixed networks and open the door for competition to fixed network broadband—driving investment, service innovation, lower prices, and, as a result, greater adoption.

Not all spectrum are created equal: spectrum at lower frequencies travel further with the same amount of energy and do not require line of sight. That is why emphasis on the 700 to 800 megahertz bands—which travel at long distances at lower power—as part of what the ITU calls the *International Mobile Telecommunications Bands,*[4] and on technologies such as WiMAX offers great potential for widespread broadband and ubiquitous Internet.

In order for wireless broadband to become a reality and have the impact that mobile telephony has enjoyed, multiple large swaths of spectrum (of 20 MHz or preferably 30 MHz each) need to be dedicated to wireless broadband. Migrating analog TV spectrum to digital broadband service offers an important "digital dividend." The United States has already acted, with the recent auction of 700 MHz spectrum; other countries are moving in the same direction, with the European Union (EU) planning a 2010–12 rollout. Some countries, such as Chile and India, have never used these 700 MHz band for television and therefore can move even faster to deploy these frequencies for wireless broadband.

Finally, to properly service the "last mile," countries will have to open up spectrum to build ultra-broadband, high-speed, symmetric, robust, intelligent networks. This strategy will promote whole new classes of applications, including high-resolution virtual meetings, such as telepresence systems; more effective and robust remote medical treatment; new forms of entertainment and multiplayer games; and visual and video-based educational opportunities—a particularly important advance for rural and agricultural uses. In countries with many languages and cultural groups, video, visual, and audio communications enabled by wireless broadband can be used to overcome literacy gaps and language barriers to provide education, health care, and government services as well as to expand social interaction.

**Devices.** Ubiquity and personalization also require a range of highly functional devices, including low-cost, robust, and easy-to-use ones. Laptops, of course, are the penultimate take-along Internet device, but for a great percentage of the world's population, laptops are still unaffordable. Mobile phones, in theory, are Internet devices, but aside from texting, they provide very limited connectivity. A wide range of new "smart" phones qualify as true Internet devices, but these are costly and have limitations. Other devices, such as the many variations emerging under the generic term of *netbooks,* offer promise, but accelerating their proliferation will be key.

Although the market is already providing more functional, smart, low-cost devices, public-private partnerships, nongovernmental organizations, and governments can help promote the widespread adoption of these devices to low-income and other disadvantaged populations. Countries ranging from Egypt to Saudi Arabia and Korea are easing or facilitating the adoption of PCs among low-income groups. Many schools in the intensive use stage countries have developed school curricula that rely on PCs and other Internet-enabled devices, and ensuring that these opportunities are open to all is a critical goal.

## Conclusion

A new era has dawned as Internet use crosses critical-mass thresholds across the world and technology expands the range of connectivity options. Broadband networks offer productivity increases for businesses, greater inclusion and opportunity to individuals, and the potential for a competitiveness leap-forward for countries that seize the moment.

Mobile telephony is a great example on how emerging countries have leapfrogged more developed countries, and wireless broadband offers similar potential. No one ever believed that telephone service could reach the level of ubiquity that it has since its inception. Ubiquitous, high-speed Internet connectivity opens the door to the enormous potential of Internet-enabled pervasive communication and multifaceted collaboration.

The world is getting smaller. Telephones and Internet-connected computers started that process, and now ubiquitous broadband will explode the potential for connectivity, bringing us all closer together and changing the nature of our interactions in ways we are just beginning to imagine.

## Notes

1 See Morrison et al. 2008.

2 It is noteworthy that the thresholds between the moderate and good categories are more significant than those between poor and moderate and, particularly, between good and best practice.

3 ITU 2007a.

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## Appendix A: Definitions and Technical Notes

**Broadband definition.** The source for broadband data is the International Telecommunication Union (ITU), which defines broadband as 256 kb/s or higher (http://www.itu.int/ITU-D/ICTEYE/Indicators/WTI_Technotes.pdf). This definition is under scrutiny and likely to be revised in the future—to at least 1 mb/s.

**Countries included in the five stages to ubiquity.** The 157 countries generally overlap with the 134 economies included in the NRI this year, with the following exceptions (driven by data availability or size—we used a floor of 300,000 people for the stages): 6 economies are included in the NRI but not in the stages (Barbados, Burundi, The Gambia, Mongolia, Montenegro, and Puerto Rico) and 29 countries are included in the stages but not in the NRI (Afghanistan, Angola, Belarus, Belize, Bhutan, Cape Verde, Central African Republic, Comoros, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Fiji, Gabon, Guinea, Haiti, Lao People's Democratic Republic, Lebanon, Liberia, Maldives, Myanmar, Niger, Republic of Congo, Rwanda, Solomon Islands, Swaziland, Bahamas, Togo, and Uzbekistan).

**Household penetration ratios.** The subscriber data, again as reported by the ITU, are in terms of subscriptions per 100 inhabitants and, thus, combine quite different magnitudes: the numerator shows total number of lines, accounts, or subscriptions and the denominator shows the total population. This ignores the fact that a significant number of the lines/accounts/subscriptions are used by businesses and that household sizes vary across countries. For the purposes of the stages, we have found it more meaningful to consider businesses and households separately. When referring to household penetration in this chapter, we are relying on a conversion of Internet and broadband subscriber ratios. Our estimates are based on the model:

$$\text{Household Penetration} = \frac{\text{Total Lines} - \text{Total Businesses}}{\text{Total Households}}$$

We get the estimates with two simple steps: (1) using average household sizes to estimate number of households per country that serves as denominator; and (2) deducting from the numerator an estimate of business subscriptions (based on extrapolation of business registration data and on the evidence from the city research, mentioned in the chapter, that all urban businesses above the micro size tend to have connections).

**Explaining variation in broadband penetration—beyond income.** Regression analysis of the GDP per capita 2007 (nominal, from the IMF) for 127 countries (those for which we were able to estimate ecosystem and infrastructure ratings from the NRI components) underscores the role that income plays (including through its effect on infrastructure). As we expand the model specification, the analysis also clearly shows that ecosystem factors are very significant determinants of broadband penetration, adding 12 percentage points in explanatory value; the gap between ecosystem and infrastructure ratings (indicative of distance from the balanced "diagonal") is similarly significant, adding a further 6 percentage points of explanatory value; and, finally, urbanization rates are also a significant explanatory factor (see Table A).

### Table A: Factors in broadband penetration

| | Explanatory (independent) variables (all significant at 97.5% level) | | | | |
|---|---|---|---|---|---|
| Dependent variable | **Income** (per capita GDP, nominal) | **Ecosystem** (authors' rating based on NRI components) | **Balance gap** (difference in ecosystem, infrastructure percentiles) | **Urbanization** (share of urban population in country's total) | $R^2$ (%) |
| **Broadband penetration** (% of population) | X | | | | **65** |
| | X | X | | | **77** |
| | X | X | X | | **83** |
| | X | X | | X | **79** |

CHAPTER 1.4

# How to Maximize the Economic Impact of Mobile Communications: The Four Waves

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Ever since man hunted the mastodon, the ability to communicate over ever-expanding distances has been a key element of human success and advancement. But the modes of communication available and the power of the telecommunication technologies that people utilize have increased dramatically in the last 150 years with the advent of telegraph, telephone service, and now wireless (mobile) networked telecommunication services offering applications such as email and Internet access, and the ability to ignore geographical limitations in the organization of economic and social interaction. Further, progress in telecommunications has been neither linear nor even. The pace of development and innovation has increased in the last 25 years, resulting in an increasingly boundary-less world. Many of these developments have become an integral part of our daily lives—wireless telephony, Internet usage, and email—and yet just 15 years ago, these were "early stage" technologies, at least from a consumer perspective.

The first submarine telephone cable was laid in 1956, just 52 years ago. TAT–1, the joint venture of the UK government and AT&T—a project that was worth £120 million—was one of the three engineering marvels of the 1950s (the other two were Sputnik and the TransCanada Gas Pipeline). TAT–1 had a capacity of 83 simultaneous voice signals. Prior to TAT-1, international calls from New York to London were wireless! (The calls were made via radio waves bounced off the stratosphere.) In 1970, according to the International Telecommunication Union (ITU), there were just 8 telephone lines per 100 inhabitants in France, a number that rose to 30 by 1980, and, with the advent of mobile telephones, 141 lines (fixed and mobile) per 100 inhabitants by 2006 (see Table 1). Today we take relatively affordable and reliable long-distance services and near-universal mobile and fixed telephony for granted in the developed world. Yet these examples demonstrate just how recent the modern telecommunications environment is, even in an affluent country such as France.

In the developing world, the modern telecommunications environment has largely been created by mobile telephony. Malaysia went from having 1 fixed telephone line per 100 inhabitants to 9 fixed lines per 100 inhabitants in 1990, to 92 lines per 100 in 2006, with a mobile penetration rate of 75 per 100. Even more tellingly, Nigeria achieved a teledensity of 25 lines per 100 inhabitants in 2006; 24 of these are mobile telephones. As a result of mobile telephony, teledensity in Nigeria today is at levels similar to that of France in the late 1970s, a remarkable achievement. As Mo Ibrahim, the founder of Celtel, has written, "Fixed lines can never connect Africa: less than 1% [of the population] in Sub Sahara Africa [were connected] 100 years after development of the phone."[1]

Three questions immediately come to mind: first, what has been the impact of the significant increase in teledensity on economic output and welfare; second, if

**Table 1: Evolution of total telecommunications penetration, selected countries**

| Country | Year | Fixed penetration | Mobile penetration | Total telecommunications penetration |
|---|---|---|---|---|
| China | 1970 | n/a | 0 | n/a |
| | 1980 | 0 | 0 | 0 |
| | 1998 | 7 | 2 | 9 |
| | 2006 | 28 | 35 | 63 |
| France | 1970 | 8 | 0 | 8 |
| | 1980 | 30 | 0 | 30 |
| | 1998 | 58 | 19 | 78 |
| | 2006 | 56 | 85 | 141 |
| India | 1970 | 0 | 0 | 0 |
| | 1980 | 0 | 0 | 0 |
| | 1998 | 2 | 0 | 2 |
| | 2006 | 4 | 15 | 18 |
| Malaysia | 1970 | 1 | 0 | 1 |
| | 1980 | 3 | 0 | 3 |
| | 1998 | 20 | 10 | 30 |
| | 2006 | 17 | 75 | 92 |
| Nigeria | 1970 | n/a | 0 | n/a |
| | 1980 | n/a | 0 | n/a |
| | 1998 | 0 | 0 | 0 |
| | 2006 | 1 | 24 | 25 |
| Sweden | 1970 | 45 | 0 | 45 |
| | 1980 | 58 | 0 | 58 |
| | 1998 | 72 | 46 | 119 |
| | 2006 | 61 | 106 | 167 |
| United Kingdom | 1970 | 17 | 0 | 17 |
| | 1980 | 32 | 0 | 32 |
| | 1998 | 55 | 25 | 81 |
| | 2006 | 56 | 117 | 173 |
| United States | 1970 | 34 | 0 | 34 |
| | 1980 | 41 | 0 | 41 |
| | 1998 | 65 | 25 | 90 |
| | 2006 | 56 | 80 | 136 |

Source: ITU, 2008.

telecommunications are so important to the economy, why is Nigeria still vastly poorer than France was in the 1970s; and third, how do we maximize the social gains from telecommunications?

One of the main ways in which modern telecommunication networks affect economic output and welfare is through their effect on how rents are captured and distributed. Picture a remote village in Indonesia today. That village and its inhabitants cannot easily take part in a market economy. Agriculture tends to be subsistence—not because farmers want to tend small lots, but because little information and few market opportunities are present. For example, farmers cannot easily gather information about prices that prevail for their produce at nearby markets. Nor can they easily gather information about the prices of inputs such as fertilizer and feed that they need for their farms. The simple fact of owning a mobile telephone can transform their intelligence-gathering capabilities, and with it the distribution of bargaining power among farmers, middlemen, and sellers is also transformed.

Hence, modern communications in the developing world today—principally wireless communications—lowers transaction costs and redistributes rents by reducing the market power that arises from asymmetric information. This is best seen in Jensen's research, which describes the impact of mobile telephony in changing a situation in which the primary reason that rural producers (fishermen, in this case) earned lower profits and consumers paid higher prices was the distribution of information on demand and supply conditions. Without mobile telephones, fishermen and traders typically knew only the price of fish in a handful of nearby villages or the nearest town. Fuel costs limited the markets at which a fisherman could dock; little storage capacity was available, and ground transportation costs were high. "The inefficiency is clear," Jensen writes. "While at Badagara there are eleven fishermen dumping their catch unsold, there are twenty-seven buyers within fifteen kilometers who are about to leave without purchasing any fish."[2]

Following the introduction of mobile telephony between 1997 and 2001, prices for consumers fell by an average of 4 percent, and fishermen's profits rose by 8 percent. Middlemen who previously earned rents through their control of information and resources related to the dissemination of information lost out. Jensen found that profits rose even for fishermen who did not use mobile telephones. The study by Jensen is a powerful example of the fact that mobile telephones are very much an information technology, and that these information technologies affect economic life in very basic and intuitively understandable ways.

At a macroeconomic level, Waverman et al. found—based on the then-available evidence—that an increase in mobile telephone penetration had a positive and statistically significant impact on the rate of long-term economic growth.[3] Mobile telephones were a vital aspect of social overhead capital to the extent that an increase of 10 lines per 100 inhabitants was associated with an increase of 0.6 percentage points in the long-term rate (20 years) of economic growth.

The Jensen paper and the earlier paper by Waverman et al. both estimate the value of *access* to mobile telephones, since they examine the impact of the increase in the availability of the number of telephones themselves (see Appendix A for a more detailed review of the literature on the subject). However, the effects described in detail by Jensen and implicitly captured in Waverman et al.'s aggregate-level analysis are the effects of not merely having access, but of *usage* of modern telecommunication networks. But these approaches and others do not, in their statistical analysis, examine the contribution to economics and society from modes of use. Thus a next step would be to examine how access and usage contribute to society.[4]

The existing research does, nevertheless, at some level answer the questions surrounding the value to society from modern telecommunication networks. However, one needs also to consider (1) whether factors such as taxation, regulation, social customs, and the like enhance or moderate the value that individual societies derive from investment in modern telecommunication networks, chiefly mobile networks in developing nations; (2) to what extent investment in mobile telecommunication networks requires complementary investment in education, other basic infrastructures, and the like; and (3), to drive productivity growth beyond the huge effects of simple access, how do these complementary investments in assets and skills boost the "bang for the buck" that mobile investment might provide?

Answering these questions will explain both why Nigeria today is poorer than France in the 1970s despite having similar teledensity levels, and also what Nigeria might need to do to boost the impressive strides that the mobile telecommunications sector has made in that country. Literacy rates in France in the 1970s were far higher than they are in Nigeria today, roads were better, and health care was better. Clearly the simple addition of more mobile telephones cannot in itself cure the deep-rooted problems that countries such as Nigeria face. There is no magic bullet solution for economic development, but mobile telecommunications has indeed a "positive disruptive" impact on life in many developing economies, especially in rural areas, where the mere availability of information poses a significant challenge to established ways of doing things. Further, the mobile telecommunications sector provides a significant example of an industry that has survived, thrived, and proliferated even in the seemingly most unpromising environments.

### The four waves of communications

Indeed, one might argue that there are roughly four stages of development of an information society, which one might call the *four waves of communication technologies:*

- simple access,
- universal service,
- usage, and
- provision of complementary skills and assets.

*Simple access:* a telephone in a village, for example, provides huge social and economic benefits. As shown by the example of Jensen above,[5] the ability to make or take a call diminishes the asymmetry of information control. The literature generally illustrates the enormous benefits of access. One line per village might well then have huge social payoffs.

*Universal service* was and is the policy driver for much of North America and Western European telecommunications policy. Because the technology at that time was fixed lines, a connection to every household provided universal service. Policy was devoted to ensuring that each household had access to the telephone system. Mobile telephones change the notion of universal access from one telephone per household to one telephone per person.

*Usage,* as discussed above, is the means through which the productivity and economic benefits of communication networks are manifested. Usage of mobile telephones is affected by the cost of calls (here taxes are important as an obstacle to usage) as well as by institutional arrangements such as the sharing of costs between the calling and receiving party. If (as the econometric research on fixed-line telephony suggests),[6] demand for calls or usage is significantly more elastic than demand for access, then high levels of taxation on mobile telephones might lead to significant "deadweight loss" (loss of welfare) as well as reduce the potential growth and productivity benefits derived from the infrastructure in place.

Insufficient attention has been paid to the impact of institutional arrangements. Penetration appears to be somewhat lower in some "receiving-party-pays" countries (countries where the receiving party is charged for receiving a call on a mobile telephone) than in "calling-party-pays" countries (where the receiving party makes no contribution to the costs of the call). Penetration of mobile telephones also appears to be lower in countries that utilize multiple standards (Global System for Mobile communications, or GSM; Code Division Multiple Access, or CDMA; etc.) relative to countries that utilize just the GSM standard. Crucially, however, the same is certainly not true for data on minutes of use—usage is higher in countries with multiple standards as well as in countries where the receiving party pays part of the costs of a call. Increased competition emanating from the institutions may be the answer; more research is needed.

Finally, *complementary skills and assets* refers to the concept that productivity growth today emanates not just from simple access, universal service, and usage, but also from what one might term the "quality of usage" or "smart usage." Using firm-level data allows one to address some quite targeted hypotheses regarding, for example, the impact of particular technologies, managerial practices, and public policies on firms productivity, output, and efficiency, while being able to control for the other characteristics of firms that also effect productivity, output, and efficiency.

Although we are aware of no specific research on the productivity impact of mobile telephones conducted at the firm level, there is a significant body of literature that looks at the impact of information and communication technologies (ICT) on firms. The findings from this literature are deeply informative: papers by several noted authors, including Brynjolfsson and Hitt,[7] suggest that the payoff to firms from investing in ICT is highest

when firms have the freedom and willingness to reorganize themselves around the ICT that is in place. Other research finds that the impact from investment in ICT may not materialize unless and until there is a significant amount of investment in "complementary capital"—such as worker training, for example.

The findings from this literature are relevant to any future research agenda for studying the economic impact of mobile telephones—which are the most widely diffused form of ICT hardware in most developing nations. One would expect that the impacts of mobile telephony, or ICT more generally, are highest in nations that have a cultural and regulatory climate that welcomes change, and where firms and individuals are most free to reorganize their work habits to make optimal use of technology. While it may seem obvious and intuitive that this is the case, the reality is that the literature on mobile communications and telecommunications generally has not, to date, looked in sufficient detail at factors beyond penetration.

We suggest that only when a country has evolved through all four waves described above is it able to make the fullest use of technology. The literature and policy debate that we have experienced has to date concentrated essentially on the first two waves. In part, this emphasis is an artifact of data availability. To truly study the impact of usage and complementary capital in a manner similar to the research that has been conducted for the impact of ICT in developed economies, one would have to collect detailed firm-level and consumer-level data, which requires a patient and costly research program. However, some initial studies of consumer-level demand patterns are being conducted for countries such as South Africa.[8] Clearly, the development of such research should be of paramount importance, as only when we understand the role of usage and complementary capital in governing gains from ICT in a developing-country context can we provide policymakers with a truly robust assessment of the policies that will enable them to maximize the returns from ICT investment.

We have used these concepts to produce a new method to measure the "connectedness" of countries. This *Connectivity Scorecard* adds to the literature, in a way similar to that of the Networked Readiness Index in this *Report,* by providing novel ways to incorporate infrastructure, access, and usage into measures of communication systems importance.[9]

The remainder of this chapter provides some recent estimates of the welfare loss from high mobile taxation in developing nations. We then conclude by drawing some lessons from the literature that might be used to evaluate arguments regarding the appropriate role of government intervention and regulation in the current challenging economic environment.

Finally, it is worth mentioning that 3G or wireless mobile telephony could have a particularly important impact in the developing world. 3G and other modes of broadband wireless access may represent the most cost-effective way to bring broadband or even Internet access to the masses. Further enabling the introduction of mobile broadband is likely to stimulate inter-platform competition in the broadband market in these countries, with the main different platforms likely to be public switched telephone network (PSTN) for digital subscriber line (DSL) access, fixed wireless (technologies such as WiMax), and wireless (3G and 4G technologies). Developing countries are likely to enjoy the benefit of adopting 3G+ technology at a time when devices and applications relevant to enhancing the mobile broadband experience are entering a mature developmental phase; thus one can expect relatively rapid diffusion of 3G technology in these emerging markets.

## Some policy considerations

Despite the fact that many governments and mobile network operators are in total agreement regarding the growth benefits of mobile telephony, several aspects of government policy in developing countries actually affect the mobile sector in adverse ways. Two areas of policymaking where governments in developing nations (particularly) would be well served by taking a broad view of the mobile telecommunications sector as a potential catalyst for growth, rather than as a ready revenue source, are taxation and licensing. Below, we discuss these policy aspects briefly.

### Consequences of asymmetric taxation on mobile usage

The GSM Association has prepared several papers documenting the incidence of taxation on the mobile sector. In some countries, such as Turkey, taxes represent as much as 44 percent of the cost of owning and operating a mobile telephone. The impact of taxation on usage (e.g., the taxes that some countries levy as a proportion of a subscribers' bill that includes usage and line rental charges) might be particularly significant.

Although there is little detailed econometric research on the issue, it is likely that the price elasticity of demand for "calls" or "minutes" is at least somewhat higher than the price elasticity of demand for "access" (or owning a telephone). Thus, taxes are likely to be a bigger barrier to utilization of mobile telephones than they are to ownership of a mobile telephone.

Hausman provides a relatively simple method for evaluating consumer welfare gains from introducing mobile telecommunications and for assessing the deadweight loss caused by taxation of mobile telecommunications.[10] Hausman's papers suggest that the deadweight loss is likely to be significant when (1) demand is relatively elastic and (2) when an industry has relatively high fixed costs and relatively low marginal costs (i.e., gross margins are high).

Using sensible values for elasticity and gross margins, we recently calculated that the annual deadweight loss

caused by mobile telecommunication taxation on the usage of mobile telephones in Turkey was over US$2 billion, or more than 60 cents for every dollar raised in tax revenues.[11] By contrast, the typical deadweight loss from general taxation is around 20 to 30 cents per dollar of tax raised. That is, Turkey would raise economic welfare and economic growth by shifting taxes from mobile use to other goods and services.

The mobile sector provides an attractive target for exchequers in developing nations—mobile operator revenues are relatively easy to record, and most operators are large companies that happen to be good corporate citizens. Absolutely no economic theory of commodity taxation supports the notion that mobile telephones should bear an especially high tax burden. Mobile telephone usage is not a "sin" that merits a sin tax, it does not have negative externalities meriting a Pigouvian tax designed to reduce usage of mobile telephones (perhaps the opposite can be argued to be desirable), and mobile telephones are not what economists would describe as complements to leisure. Mobile telephones are not a luxury good, and high mobile telephone taxation may particularly discourage usage by less affluent sections of society whose ability-to-pay is relatively low. Thus high mobile telephone taxation is iniquitous and regressive in its nature.

There is another impact of taxation besides the efficiency or static welfare losses described above. Taxation may dampen investment and entry in the mobile telecommunications sector. Given the likely high social rates of return on telecommunications investment, lower investment is likely to translate into lower economic growth. Further, given that the "broadband for the masses" may largely be a mobile-driven story in at least some developing markets, and that entry by mobile or wireless broadband operators into the broadband space has a key role to play in providing sufficient investment and competitive incentives for other players in the broadband sector (fixed PSTN, and fixed wireless), one may have reason to believe that the economic impact of mobile taxation may affect large swathes of the economy in an adverse fashion.

### Licensing and auctions policy

Besides taxation, it may also be tempting for governments to use licensing policy solely as a means to raise revenues or (worse) to orchestrate industry outcomes and favor particular players, technologies, or market outcomes over others. Although we believe that auctions are certainly the theoretically preferred way to allocate valuable spectrum in most circumstances, there are a variety of other considerations that licensing policy ought to take into account:

- Frequent revisions and lack of clarity in the licensing process sow uncertainty and confusion in the minds of industry players. In particular, uncertainties may make it harder to attract international capital to the table; at the margins, international capital may be migrated to other, more attractive and more certain environments. In the current challenging economic environment, capital is no longer plentiful and marginal differences will assume especial importance. Thus the rules of the game have to be made clear and transparent, and they need to be fair rules.

- Although economists would prefer auctions over taxation as a means to raise government revenues (as taxation is more distorting), the valid goal of raising revenues should not become the only goal of the auction, or indeed the *raison d'être* for licensing policy. Recently there have been growing calls for regulators in the United Kingdom and elsewhere in Europe to consider "speed for spectrum" swaps—that is, to give away spectrum in return for commitments by successful licensees to commit to invest in faster broadband access networks.[12] While we continue to think that the market-oriented regulatory approach that has emerged in Europe and North America over the last 20 years remains the best way to promote efficient investment and that within such an approach auctions will remain important, the auction process should take into account not just revenues and competition policy concerns (preventing collusion and market manipulation), but also long-term economic development goals. There may not necessarily be tradeoffs involved between these different goals (indeed, the primary designer of the UK auctions, Professor Klemperer, would insist that there are no tradeoffs involved), but to the extent that there are tradeoffs, licensing policy should take them into account.[13]

- Today, if cash-strapped operators are forced to delay their investment in actual network assets, or, alternatively, if successful licensees have the luxury of limited competition that allows them to wait until the *private benefits* from network rollout are maximized, then there could be a significant loss in consumer welfare.[14] Delaying licensing or spectrum availability to take into account the possibility that handset prices and thus ownership costs for consumers may fall may also not constitute sensible policy. For example, even at today's prices a significant segment of consumers in India and similar developing nations is willing to pay for advanced wireless services (i.e., there is a significant consumer surplus from introducing services today). If services to such consumers are held up by government or regulators for two years, say, then the entire consumer surplus that could have been realized over these two years is lost.

- Unlike Europe, the developing countries have the benefit of introducing 3G technologies at a time when the demand for such technologies, and the applications and devices that enhance the value of 3G networks, are significantly well developed. This is one more reason to believe that it is in national regulators' interest to make it attractive for operators to invest in actual physical network assets sooner rather than later. The long-lived and durable nature of these telecommunications assets is likely to generate significant consumer and business benefits well into the future, and the higher economic growth that results should be factored against the short-term boost to government finances from auctions designed only to maximize revenues.[15] We are not condemning auctions—they are the mechanism of choice; however, their design should not have governmental revenues as their sole objective.

## Conclusion

We do not pretend that mobile telecommunications or ICT is a magic remedy for economic development, or that the financing of government activities in such challenging times as the present credit crisis is at all a simple task. However, we stress the crucial importance of investment in socially valuable infrastructure such as mobile telecommunication networks, and thus the value of policies that enable such investment to be made efficiently and on a timely basis.

The discussion above addressed some simple points:

- the massive and entirely unforeseen success of telecommunications and, in the last decade, of mobile telecommunications in the developing world;
- the positive impact on economic growth and welfare of the initial wave of network rollout in the developing world;
- the still inchoate nature of the research on mobile telecommunications and their impact on economic growth, particularly with respect to the distinctions that we draw between access on the one hand and usage and complementary capital on the other; and
- the role of taxation and the licensing process in ensuring adequate investment and consumer benefits in the mobile sector.

We think that the world, particularly the developing world, has seen only a glimpse of the potential economic and social value from investment in mobile telecommunication networks. However, until there is further research on the key areas of usage and complementary investment, we are still lacking a true understanding of how the benefits from mobile network investment can be maximized. We are also lacking an understanding of which policy and monitoring targets should be chosen—for example, in many countries the penetration rates of mobile telephones are incorrectly measured and overstated because of the incidence of multiple subscriber identity module (SIM) cards among pre-paid customers. On top of this, penetration may not translate into higher usage if market or regulatory factors cause prices to be higher than they might otherwise be. In such circumstances, it may not be adequate to monitor merely penetration rates as a measure of telecommunications development.

Additionally, the early development of 3G mobile networks may have significant potential in the developing world. As was the case with the first wave of 2G mobile network deployment, those who argue that the demand for mobile broadband and what they deem as "high-end" services is limited may be underestimating the thirst for technology in the developing world as well as the demonstrated ingenuity of consumers and businesses in the developing world to put technology to good use. Again, the relative infirmity of fixed-line networks could make 3G mobile broadband (and its successors) the best path forward for making mass-market consumer broadband a reality in many developing nations. It would thus be unfortunate if government policies on taxation and licensing interfered with the timely development of 3G networks.

## Notes

1 Ibraham 2005.

2 Jensen 2007, pp. 882–83.

3 See Waverman et al. 2005.

4 For instance, we are not aware of studies that capture the differential impact of mobile telecommunications or even fixed lines in countries where usage levels are high relative to where usage levels are low. For instance, the United States has a much lower reported mobile penetration rate than Italy, but much higher minutes of use (even when one considers just outgoing minutes). In which country does mobile telephony have a larger economic impact? These sorts of questions in fact assume that it has an even greater importance in developing nations. Similarly, there are few data and little systematic analysis on the impact of usage of mobile data services, although this is a function of the relative newness of such services.

5 Jenson 2007.

6 See Perl 1983 and Taylor 1994.

7 See Brynjolfsson and Hitt 2000.

8 See Gasmi et al. 2008, for example.

9 The *Connectivity Scorecard* is an index that looks at ICT usage and infrastructure, and links it to the prosperity of 25 countries. See Waverman 2009.

10 See Hausman 1997, 2000.

11 Waverman 2008.

12 See, for example, Bailey 2009. One catalyst for the recent proposals for a "public sector" type approach to licensing appears to be the UK government's newfound willingness to reconsider the idea of significant public intervention in developing next-generation broadband.

13 As an example, too low a reserve price might encourage collusion. However, in the current instance of the Indian spectrum auction, too high a reserve price might drive away potential international bidders. Further, there have been complaints that the licensing process already favors established domestic players. In such cases, one must take into account the actual likelihood of collusion as well as the nature of the players that may or not be affected by how the reserve price is set. The fact that capital is very scarce at the moment may also be worth considering in setting auction terms (i.e., look at the ability to pay of different parties). Finally, the fact that parties may not actually have a realistic idea of the real value of their spectrum (as appears to have been the case with some past 3G spectrum auctions) means that they may end up paying "too much" for spectrum. While one might say that this payment is sunk, and will thus not affect their future investment decisions, in practice the cost of capital could be affected by the perception that firms have paid too much for spectrum. Pindyck (2004) provides a good discussion of how one should properly think of "sunk" costs.

14 Here one must take into account the fact that operators are typically unable to capture all the benefit from their investment in socially valuable infrastructure such as telecommunication networks, and that there may be a difference in the privately optimal level and timing of investment and the socially optimal investment schedule.

15 One might argue, again, that the short-term boost to government finances looms large in any net present value type of calculation. Further, the government could re-invest the revenues raised in other sectors and activities. However, against this argument one must consider the finding of DeLong and Summers 1991 that suggests that investment in equipment, machinery, and infrastructure yields especially high returns for society, but also that the returns are highest where the investment is market-conforming (i.e., privately made) rather than market-replacing (government-led).

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## Appendix A: Details of previous studies

**Waverman L., M. Meschi, and M. Fuss. 2005. "The Impact of Telecoms on Economic Growth in Developing Countries, Africa: The Impact of Mobile Phones."** ***Vodafone Policy Paper Series 2,*** **March.**

- Waverman et al. employed two different approaches to estimate the impact of the rollout of mobile telephones on economic growth—the annual production function (APF) approach following the work of Röller and Waverman and the endogenous technical change (ETC) approach similar to the work of Barro.[1]

- Barro provided the more robust and sensible estimates of the impact of mobile telephony on economic growth. Data on 92 countries—high income and low income, from 1980 to 2003—were used and Waverman et al. tested whether the introduction and rollout of mobile telephone networks added to growth.

- The finding was that mobile telephony had a positive and significant impact on economic growth, and this impact was twice as large in developing countries as in developed countries. This result concurs with intuition, since developed economies by and large had fully articulated fixed-line networks in 1996, while developing countries had little telecommunication infrastructure of any kind.[2]

- The growth dividend of increasing mobile telephone penetration in developing countries was estimated to be substantial. All else equal, the Philippines (with a penetration rate of 27 percent in 2003) might enjoy annual average per capita income growth of as much as 1 percent higher than Indonesia (with a penetration rate of 8.7 percent in 2003) owing solely to the greater diffusion of mobile telephones, were this gap in mobile penetration to be sustained for some time. Overall, the Waverman et al. paper found that the long-term average growth rate of a developing country could be boosted by 0.59 percentage points per annum for every 10 mobile telephones per 100 inhabitants added.

- However, the Waverman et al. paper explored the impact of mobile telephones at a time when the development of mobile telephone networks was still very much in progress in the developing world. Further, the paper (in common with the approach utilized by Röller and Waverman) used the mobile penetration rate as an embodiment of the diffusion of the telecommunication capital stock through the wider economy. It would be a potentially fruitful exercise for governments, operators, and professionals alike in the development field to examine whether a longer time-series of data, combined with an attempt to incorporate more explicit measures of usage (i.e., to look at not just diffusion but also utilization of the telecommunication capital stock) would yield results that are similar or provide other relevant insights regarding the growth effect of mobile telecommunications.

**Jensen, R. 2007. "The Digital Provide: Information (Technology), Market Performance, and Welfare in the South Indian Fisheries Sector."** ***Quarterly Journal of Economics*** **122 (3): 879–924.**

- Jensen provided the first microeconomic study that looked at the impact of mobile telecommunications on the distribution of information in a rural, developing-economy setting; further, unlike the numerous case studies that preceded his effort, Jensen uses rigorous economic techniques to quantify the impact of mobile telecommunications on the relative well-being of different actors (fishermen, consumers, and middlemen or agents) in the rural economy.

- Jensen finds that the introduction of mobile telecommunications had a significant impact on the fishing economy in rural Kerala, India. The main effect that he describes is the redistribution of information, which enables significant gains in what economists would term *allocative efficiency.* Simply put, mobile telephones enabled fishermen to determine where there was demand that matched their supply, and at what price they could sell their produce. Mobile telephones greatly reduced the role of human "market-makers" such as middlemen, and reduced the rents available to these middlemen. Interestingly, the introduction of mobile telecommunications resulted in a reduction in the dispersion of prices for the fishermen's produce.

- As discussed previously, Jensen found that fishermen increased their profits by 8 percent, whereas consumers on average paid 4 percent less for their fish (a staple of the diet in Kerala).

- Jensen's findings do not mention the term *GDP* anywhere. But they provide truly robust evidence to support the findings of Waverman et al. In the developing world, mobile telephones have a "market-making" effect—that is, they have the effect of transforming an inefficient, restricted market characterized by huge asymmetries in the distribution

of information into something resembling the efficient well-functioning markets in which one can expect the classical results of welfare and general equilibrium economics to hold. Thus there is a fundamental and transformative impact of mobile telephones on the very nature of the economy under consideration; in the developing world, mobile telephones are truly a disruptive technology, but this disruption is beneficial since it shakes out the inefficiencies and limited opportunities associated with economies in which communication is difficult and information is asymmetric. In the developed world, while mobile telephones may help markets to function better, the effect is fundamentally an incremental or augmentative one, rather than a transformative one.

## Notes

1 See Röller and Waverman 2001 and Barro 1991.

2 The addition of mobile networks had significant value-added in the developed world, reflecting not just the mobility value of the new technology but also the inclusion of disenfranchised consumers through pay-as-you-go plans that were not available for the fixed-line network.

CHAPTER 1.5

# Unshackled: How Regulation Can Amplify Mobile Service Benefits in Emerging Markets

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Over the past 20 years, mobile communications have become an indispensable part of life for billions of users worldwide. About 2.9 billion people currently enjoy mobile service, with an additional 700 thousand signing up each day. As usage has swelled, the mobile phone itself has evolved beyond voice communication alone, allowing consumers to read news, listen to music, search for nearby restaurants, take photos, and make payments. Not surprisingly, the mobile segment of the industry has quickly overshadowed fixed-line communications, accounting for 55 percent of the global industry's US$2 trillion annual revenues in 2008 (Figure 1).

Mobile communications play a central role in emerging markets, acting as a crucial enabler of economic growth and development. Given the inadequate fixed-line phone infrastructure most of these countries endure, mobile service offers millions a unique opportunity to stay in touch easily with their families, friends, and business partners. For example, in Indonesia, only 10 people in 100 have fixed-line phone service, while 52 percent of the population owns a mobile phone. Beyond staying connected, mobile service allows people to access other services they could not use before—such as micro-payments. For instance, Vodafone runs a very successful mobile money transfer operation in Kenya that has attracted over 5 million customers since its launch in March 2007.[1] The company has also partnered with an international payment provider to offer cross-border money transfers in addition to domestic payments.

Emerging markets hold an important position on the mobile industry's agenda as well, because of their strong potential. They contain 75 percent of the world's subscribers today, and—given the difference in growth rates between emerging and mature markets (i.e., 11.8 percent versus 3.3 percent per year, respectively, in 2008)—this number will grow to 79 percent by 2015. These subscriber-heavy markets also hold some of the industry's best players: Ukrainian operator Kyivstar, a part of the Telenor group, generated a 62 percent EBITDA (earnings before interest, taxes, depreciation and amortization) margin in the third quarter of 2008,[2] and Russian mobile operators have traditionally enjoyed margins that approach 50 percent (the global average for the industry is about 45 percent).[3]

But succeeding in these markets requires different and innovative approaches from those needed for developed economies. Emerging markets thrive on unique services such as the micro-payment plans mentioned earlier; "torch phones" that feature multiple LED lights for users who live in areas with little or no regular electricity service; multiple phone books for users who

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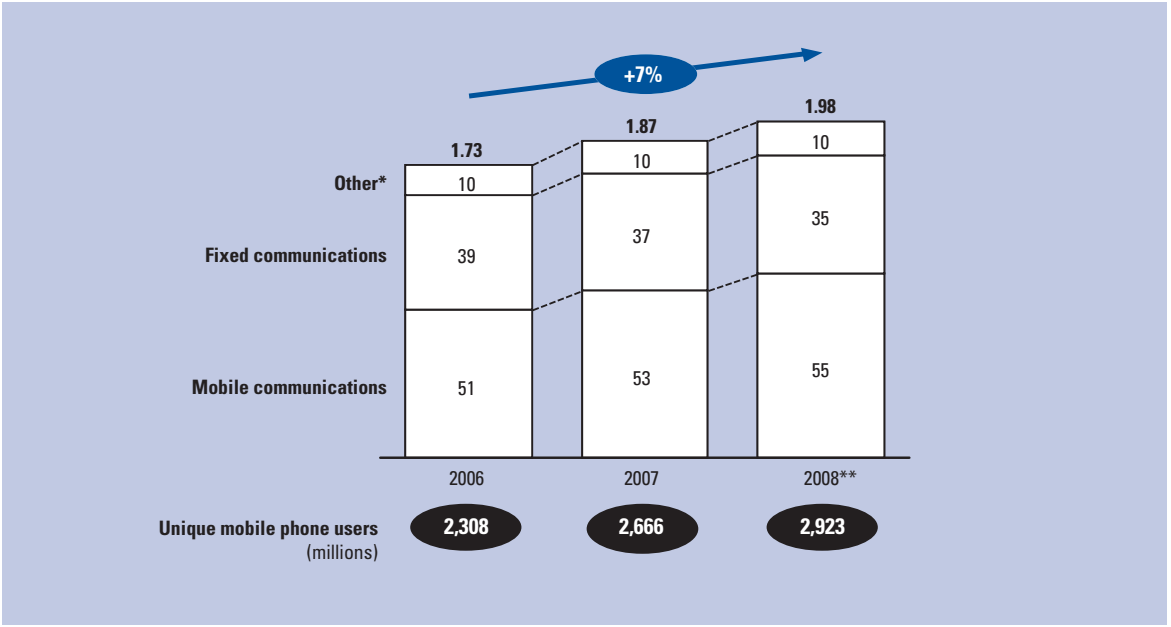
**Figure 1: Mobile telecommunications revenue growth (US dollars, trillions)**




Source: Dataquest Insight, June 2008.
**Other* includes infrastructure, enterprise networking, and communications.
***Estimates.*



share their handsets with family members; or solar device chargers for use in sunny Africa (see Box 1).

The enormous societal and economic benefits mobile service can bring to emerging markets extend well beyond the industry's direct contribution to a country's GDP, although that in itself is not small. To capture the full potential that wireless service offers, governments and industry players must focus on making the widest possible slice of society "mobile." Many markets fail to meet this challenge. Those that do, such as China or the Philippines, typically enjoy mobile penetration rates far greater than those seen in peer countries by focusing on high coverage rates (which coincide with penetration) and low user prices, and they make sure both outcomes are sustainable.

To capture the economic benefits wireless can bring while also ensuring that the poorest members of society can use this service, regulators and operators must work together to lower the cost of ownership, making mobile phones affordable to all. They also need to extend coverage beyond cities to rural areas, where many millions of potential users await. In this chapter, we will attempt to quantify the benefits of mobile services in emerging markets, discuss reasons why some nations fail to achieve these benefits, and suggest several regulatory areas where policymakers and industry players can work together to unlock the value of the mobile industry in emerging markets.

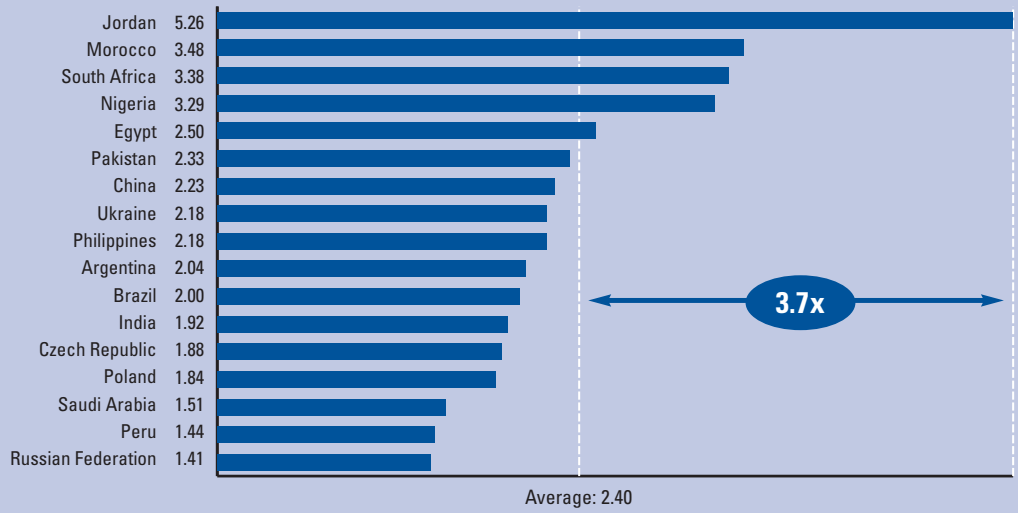
### The many benefits of going mobile

The mobile industry often accounts for 2 percent to 3 percent of an emerging market's GDP, with a range that extends from 1.4 percent in Russia to 5.3 percent in Jordan (Figure 2). However, the indirect contribution of the mobile industry to the economy can range several times higher than this observable GDP effect, because it includes GDP contributions from other companies in the wireless sector, such as handset manufacturers and retailers, content providers, and equipment manufacturers, as well as what we call the "end-user surplus." This surplus includes not only direct productivity gains related to the use of mobile communications, but also indirect consumer benefits such as a peace of mind, security, and access to family.

For example, take the case of a taxi driver who shares his cab with another driver in alternating 12-hour shifts. Buying a mobile phone improves his productivity because he now receives six or seven calls per month from regular passengers, which saves him from spending about four hours a week seeking passengers. He uses his mobile phone to contact other taxi drivers if, for example, he needs to ask directions to unfamiliar destinations. This person also uses his phone to stay in touch with his family and friends, and his employer benefits as well: the company now provides an instant lost-and-found service to passengers.

For this taxi driver, the benefits of going wireless take two forms, which together we call the *end-user surplus.* The first involves greater productivity.[4] McKinsey

**Figure 2: Contribution of mobile telecommunications services to GDP, 2008 (percent)**




Source: Pyramid Research, 2008d.



## Box 1: Successful innovations in mobile telecommunications from emerging markets

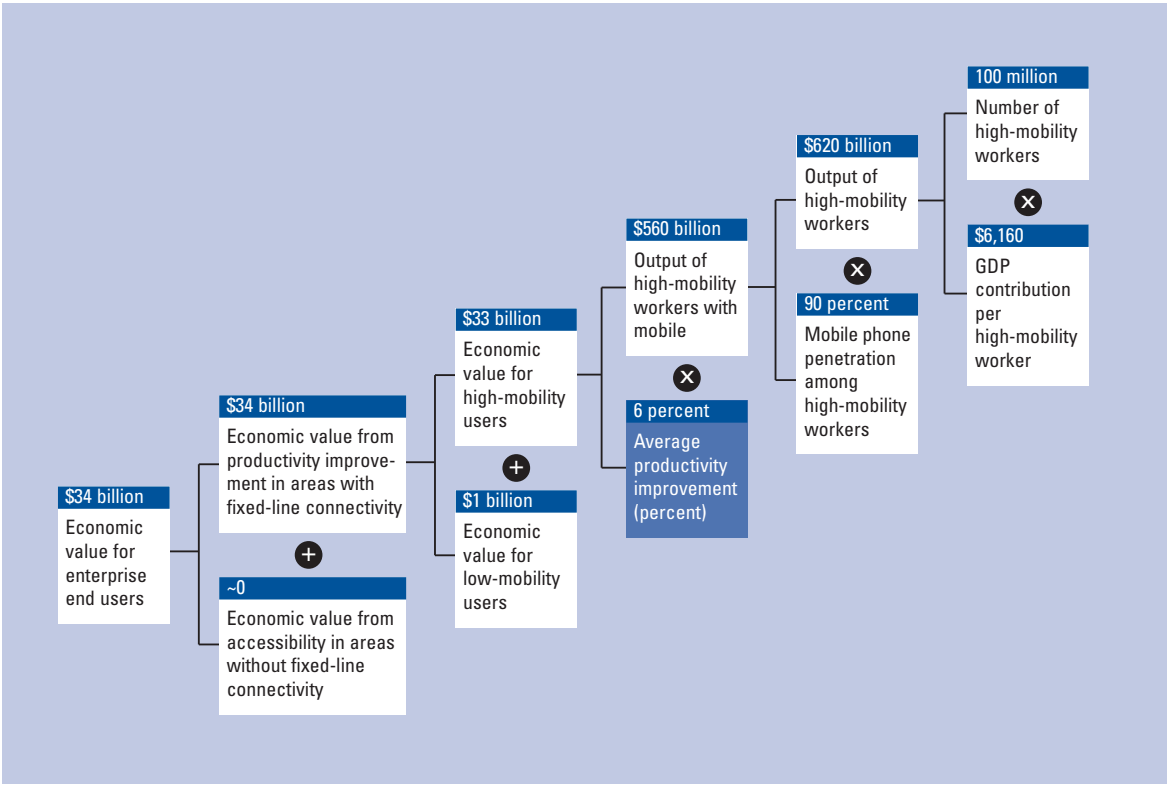
The mobile telecommunications industry has provided many innovations that are used with great success in emerging markets. Some of these are listed here:

- **M-Pesa** is a mobile money service offered by Safaricom in Kenya; it offers savings, domestic money transfers, airtime purchases, and limited bill pay of such services as satellite television or insurance plans.
  - **Users:** About 40 percent of all Safaricom customers signed for M-Pesa service (over 4 million of about 10.2 million total subscribers).
  - **Agents:** There are more than 5,000 M-Pesa agents. Service is also being expanded to enable card-free withdrawals through ATMs.
  - **Area:** The service currently works in Kenya, with pilot programs testing money transfer service between Kenya and the United Kingdom (in cooperation with Western Union).
- **CellBazaar** is a service from Grameenphone in Bangladesh that allows subscribers to buy or sell over their mobile phone (i.e., short message service–based e-auction system, though CellBazaar also offers an online platform)
  - **Users:** CellBazaar has more than 1 million users.
- **Solar panels** are falling in price, allowing low-income subscribers in rural areas with erratic power supply use them to charge their mobile phones.
- The **Village Phone** program launched by Grameen telecom enables poor rural subscribers to own a phone and turn it into a profit-making venture; the subscriber can buy, on credit, a simple mobile phone with very cheap billing rates to provide paid services to the people in the adjoining area.
  - **Users:** There are over 270,000 Village Phone Operators in 50,000 villages.
  - **Area:** Bangladesh, Uganda, Rwanda.
- **Torch phones** are designed for people living with limited access to electricity.
- **Multiple phone books** that open on a single handset were initially intended for rural India, where a single handset is typically shared by two or more families.
- **"Call Me"** service provided by Vodacom in South Africa allows subscribers to send up to five messages per day, free of charge, requesting a call back from the receiver.

Source: M-PESA: http://www.safaricom.co.ke; CellBazaar: http://www.cellbazaar.com; Solar panels: Receiver magazine #20 | Emerging markets, June 2008, http://www.receiver.vodafone.com/20-africas-grassroots; The Village Phone: http://www.grameenfoundation.org; Torch phones: Receiver magazine #20 | Emerging markets, June 2008, http://www.receiver.vodafone.com/20-africas-grassroots; Multiple phone books: http://www.domain-b.com/companies/companies_n/Nokia/20080402_multiple_phone_books.html; Call Me: www.vodacom.com.

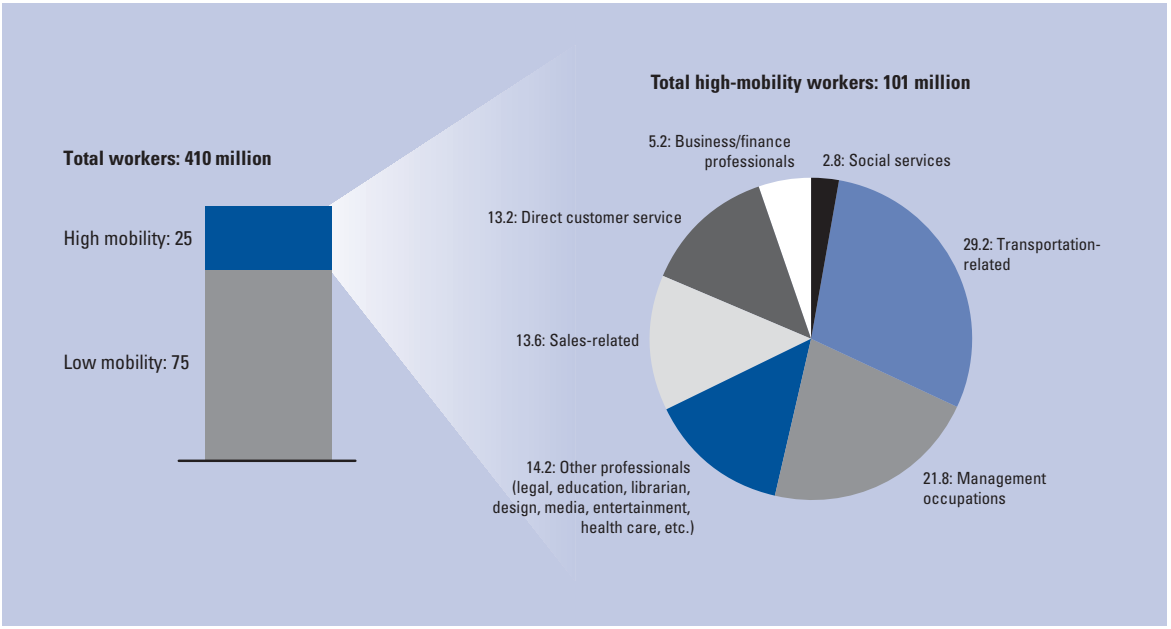
## Figure 3: Economic value of mobile telecommunications industry for enterprise and end users in China, 2005

3a: Economic value and productivity growth



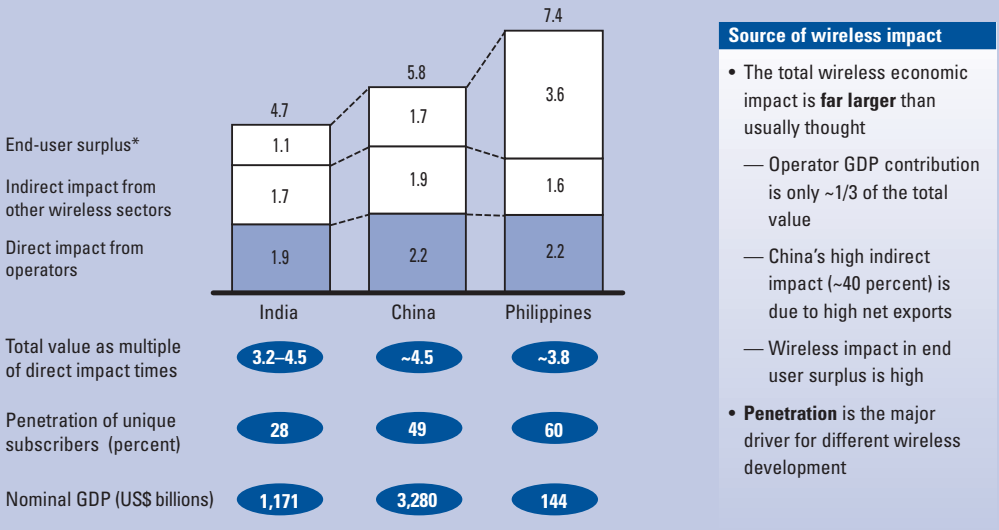

Source: ILO, 2008; China Statistics Bureau, 2005; McKinsey analysis.

3b: Composition of high-mobility workers (percent)




Source: ILO, 2008; China Statistics Bureau, 2005; McKinsey analysis.

**Figure 4: Economic impact of mobile telecommunications industry in India, China, and the Philippines, 2007 (percent of GDP)**




Source: ITU, 2008; EIU, 2008; IHS Global Insight, 2008; Yankee Group Global Forecast 2007; IDC, 2007; McKinsey analysis.
* Rough low-bound estimation using historical ARPU, inflation adjusted.



calculated that the economic value to enterprise end-users in China is around US$34 billion, with a productivity increase of around 6 percent being one of the key levers (Figure 3).

To estimate the second, less tangible benefit—exemplified when workers contact their family and friends with mobile units, we used historical average revenue per user (ARPU) as an indicator of user willingness to pay. This consumer portion of end-user surplus equals ARPU at the time a customer subscribes to wireless services minus today's ARPU, and assumes the user's willingness to pay does not change over time. Thus, a Mumbai mobile subscriber who purchased the service in 2000 for, say, 300 rupees a month but now pays only 250 rupees a month (because of competition and other factors) has gained a surplus of 50 rupees a month.

Admittedly, any estimate of intangible benefits will be a rough calculation, but this one relies on actual data—the amount customers have demonstrated they will pay. In fact, we consider our estimate to be conservative, since many users would pay higher rates if necessary. Moreover, as technology, network coverage, and network quality improve over time, this form of surplus should increase.

These factors massively amplify the economic impact of the mobile industry—in China alone, in 2005 it generated approximately US$100 billion, or nearly 5 percent of the GDP of that country. Of this, only a quarter reflected the direct contribution the mobile industry made to GDP; half came from related industries; and the final 25 percent came in the form of the consumer's surplus. Other countries we examined displayed similar levels of total economic impact—from 3.2 percent in India to 3.8 percent in the Philippines (see Figure 4).

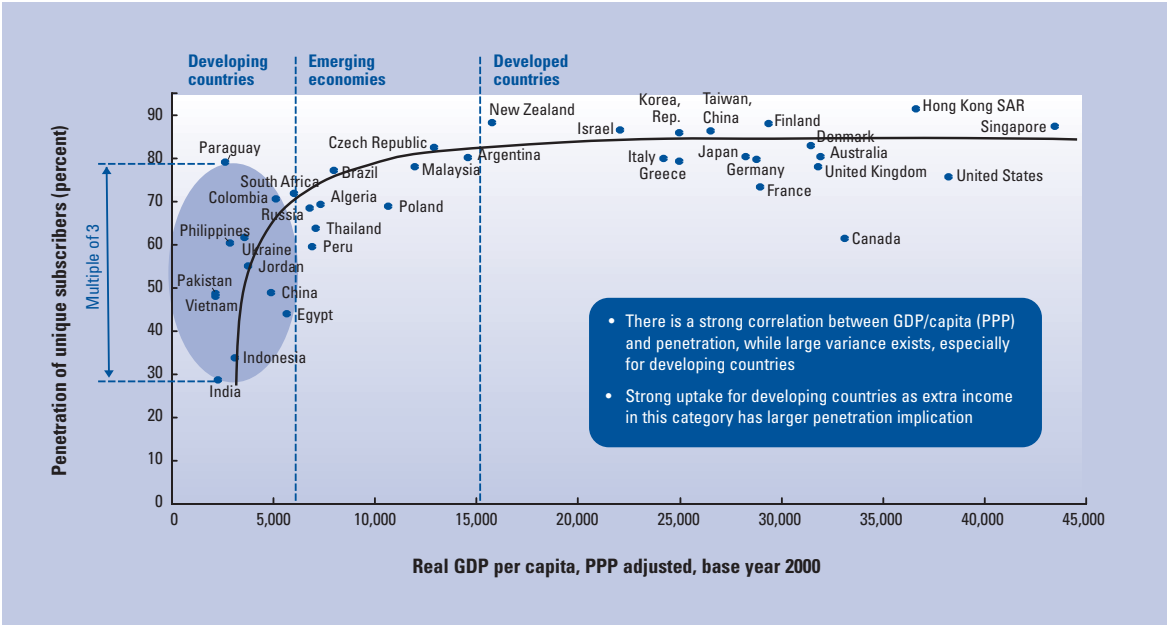
The economic impact of the wireless industry as a percentage of GDP varies from country to country, as Figure 4 also shows. This impact, for example, is higher in the Philippines, a country with high service penetration and a high degree of service innovation, than in other countries such as India, where penetration and quality of service are known to be low. The next section of this chapter describes how the economics of the industry plays a crucial role in explaining these differences.

### Hurdles to high ownership levels and low prices

Achieving the maximum potential societal benefits the mobile industry can offer requires emerging market operators and government regulators to work together to significantly increase penetration rates in these countries.

However, increasing penetration rates is challenging. Figure 5 shows mobile penetration has a strong correlation with economic development. Despite this, even within countries that have achieved similar development levels, penetration rates vary significantly, and this is especially true among the poorest countries. For example, mobile penetration rates in Bangladesh, Pakistan, Peru, and Egypt range from 15 percent to 20 percent, while Jordan, the Philippines, and Colombia enjoy rates in

**Figure 5: Mobile penetration rates vs. income level, selected countries, 2008**




Source: WICS; EIU, 2008.



excess of 60 percent, even though both groups of countries have GDP per capita (PPP) levels of US$3,000 to US$5,000.

Emerging countries that have achieved high mobile penetration rates tend to get a number of things right, such as high coverage levels and low minimum cost of ownership (MCO). Doing this, as Figure 6 illustrates, depends on managing several key factors. Achieving the right network coverage levels requires managing adequately several regulatory levers such as rollout obligations, the ability to share network costs, taxes, spectrum prices, and licensing costs. Additionally it also requires favorable but not excessive returns on capital for investors, which in turn result from factors such as the cost of operations, growth prospects, and competitive intensity.

Similarly, minimizing the total cost of ownership of mobile requires lowering the upfront cost of becoming a mobile subscriber. This is represented by the amount it costs a subscriber to purchase a handset and activate a subscriber identity mobile (SIM) card (amortized over the life of the handset) and bringing down the ongoing cost of remaining an active subscriber, which in turn depends on the ongoing competitive intensity of the industry. Regulation again plays an important role in this last factor, because levers such as licensing, along with retail and wholesale prices, are key determinants of the MCO.

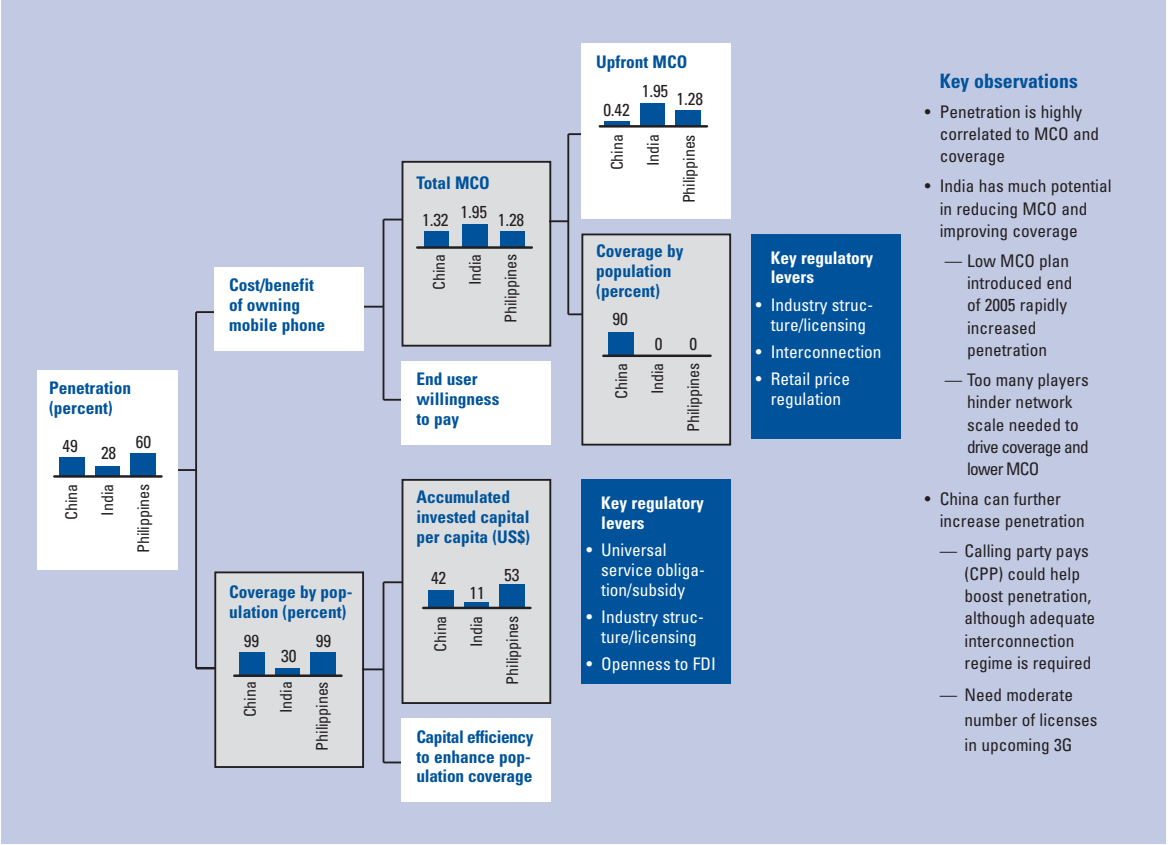
## Coverage

Many observers assume that mobile coverage equates with the number of operators a market holds. In other words, they assume that as the number of mobile operators increases, the percentage of the population covered will also grow, since competition will result in lower prices and more affordable service. However, a number of examples demonstrate that the reverse can be true. Despite the large number of operators (eight) in India, for example, population coverage in that country lags significantly behind Jordan, with four operators; China, with three operators; and the Philippines, with three.

One possible reason for this counter-intuitive finding is that many smaller mobile operators focus on the more profitable urban areas and lack the resources and/or interest to roll service out to rural areas, where the majority of people reside and where the social benefits of mobile connectivity are as high, or potentially higher, than in well-served urban areas. Furthermore, as more operators enter the market and competition intensifies, the utilization levels and profitability of many carriers drop, hindering their ability to invest in the network to expand further.

The examples of India and the Philippines provide a compelling contrast. Both India and the Philippines are geographically diverse and have largely the same income levels (US$2,600 and US$3,400 GDP per capita PPP, respectively). However, the Philippines, with three operators having an average EBITDA margin of about 66 percent, enjoys universal network coverage (roughly 99 percent) and mobile penetration of 60 percent. India,

**Figure 6: Key levers that affect penetration rates, 2007**




Source: GSMA, 2007b; prepaid plans of major operators; McKinsey analysis.
Note: Minimum cost of ownership (MCO) is calculated in dollars per month.

on the other hand, with 37 percent network coverage and 28 percent mobile penetration, is a market where even the best operators rarely exceed EBITDA margins of 40 percent. While city dwellers in India enjoy perhaps the lowest mobile rates in the world (in the range of US$2 cents/minute) because of the fierce competition among the eight major operators, coverage expansion has only recently begun for the vast but underserved rural market.

Regulators in many countries attach rollout obligations to the licensees in an effort to circumvent the tendency of the industry to focus on only a few high-income catchments. For such obligations to work in practice, operators must be well capitalized, with the financial resources needed to undertake required investments. They should also have sufficient reputation at risk to compel them to adhere to the commitments made at the time of entry. In addition, the presence of viable alternative competitive players, which *would* push ahead with similar expansion plans, provide a strong incentive for players to undertake such investments—even at the cost of upfront losses. This in turn highlights the importance of an open but healthy industry structure, with strong, well-capitalized players, as well as relatively liberal foreign direct investment (FDI) regulations to attract the best global capital as well as robust industry operators.

## Minimum cost of ownership

From the customer perspective, the main force behind rapid mobile service uptake involves the MCO, which itself is driven by upfront costs (e.g., handset purchase and activation charges) and ongoing expenses, or the minimum charges required to remain as an active subscriber. For low-end subscribers in particular, the upfront cost—even though a one-time charge—may represent a significant entry barrier.

The cheapest available prepaid plan can provide a good proxy of minimum ongoing expenses, on the assumption that many low-income users cannot afford, or are not eligible for, postpaid subscriptions.

In a rational market, operators would base their lowest subscription plans on their operating expenses (OPEX). Typically, for emerging market operators, the main OPEX items relate to interconnection costs, network operating expenses (e.g., maintenance, rentals, utilities, and personnel), depreciation, sales and marketing, and customer acquisitions, as well as license and spectrum charges.

For at least four of the five major items listed above (interconnection, network, customer acquisition, and license and spectrum charges), the industry structure and various government regulations play crucial if not decisive roles. Comparing a typical Indian operator with one in the Philippines, we find that license and spectrum charges in India amount to a noticeable 11 percent, compared to 3 percent for a proxy operator in the Philippines, marked as it is by the access deficit charge (paid to the fixed-line incumbent operator) as well as revenue share fees, which vary by the viability of the operating area.

On balance, a clear and negative correlation appears to exist between a market's MCO and its mobile penetration level. Pakistan, with a lower MCO of US$1.13 per month, enjoys a significantly higher mobile penetration rate than India, (i.e., 49 percent versus 28 percent, respectively), where MCO is closer to US$1.95 per month.

Getting the MCO elements "right" can have a significant impact on overall penetration, boosting the public value of putting phones in as many hands as possible. Our analysis of an Indian case study revealed a potential increase in subscribers of about 20 million by 2010, driven by a drop in MCO of 25 percent (i.e., from US$8 to US$6 per month).



### Policy and industry implications for emerging markets

To unlock all of the benefits the mobile industry can generate in emerging markets, governments and regulators need to establish a coherent set of regulatory policies that actively increase coverage levels while reducing the minimum cost of ownership. A broader industry compact should accompany this set of policies, allowing providers to participate and collaborate with regulators in order to achieve the ultimate goals of developing the mobile industry and the overall economy of the country.

Any industry stakeholder in an emerging market should consider the following broader set of policy considerations when deciding how to increase the economic and social benefits the mobile industry generates in their respective country:

- **Ensure sufficient but not excessive competition.** In a capital-intensive industry, where large upfront investments are necessary, competition among a few players may have better results (i.e., in terms of coverage, penetration, and service quality) than hyper-competition among many. Clearly, any market needs a minimum number of players to guarantee adequate competition, but opening the market indiscriminately to many competitors may create the wrong incentives and reduce investments in new geographical areas, thereby reducing coverage and focusing competition in high-income areas. Reduced margins and duplicated infrastructure will further hinder efforts to extend coverage and serve low-income customers. Instead, markets need to allow for a sufficient number of players with minimum economic size. India offers a good example of how too many competitors in a single market can lead to suboptimal coverage and low-quality service.

- **Avoid direct price controls.** Low prices typically retard industry returns and overall growth in the medium to long term, hampering investment levels and translating into poor customer service. Regulators should avoid mandating across-the-board lower prices as they attempt to lower the minimum cost of ownership and encourage higher mobile penetration. Such moves can backfire because mandating lower average prices will reduce operator profitability and constrain companies from taking the appropriate steps to increase penetration. Instead, regulators can lower the MCO by designing a system under which the calling party pays, supported by an appropriate interconnection regime that provides incentives to operators who price their services efficiently.

- **Attach strict rollout and coverage requirements to mobile licenses.** Increasing numbers of emerging market regulators mandate network rollout and coverage obligations when they issue new mobile licenses, in order to prevent new players from investing in rich niche areas and neglecting more low-income and remote areas. In fact, almost all of the new licenses issued in emerging markets over the past two years have stipulated some type of rollout and coverage requirement.

  One innovative way in which regulators can facilitate network rollouts and increase coverage focuses on allowing network sharing among operators. This approach, extremely common in developed countries such as Australia, Germany, Sweden, and the United Kingdom can and should play a greater role in emerging markets. India is one of the few developing countries that has been an early adopter of this approach, which reduces capital investment costs and increases network rollout and geographic coverage. As Figure 7 shows, India issued several successful measures to implement network sharing. The first allows providers to spin off their passive network infrastructure in order to offer it to other providers in the market. This new passive network company receives good access to government subsidies in order to continue expanding its network. Furthermore, in April 2008 regulators allowed active network sharing.

  However, given that infrastructure sharing allows operators to reduce their capital costs significantly, this is a lever that ought to be exercised with care and in selected areas, as the recovery of capital

**Figure 7: Infrastructure sharing in India: Benefits in coverage and cost**


Source: ITU *World Telecommunication Indicators,* 2007; GSMA, 2007b.



costs is one of the main levers of price competition in this industry of high fixed costs and minimal variable costs.

- **Effectively manage spectrum allocation and pricing.** Spectrum management has risen significantly in importance in emerging markets, and spectrum policies will play a major role in delivering telecommunication services to users. The number of spectrum licenses granted and the fees attached will have a great impact in the industry. Take India, where mobile operators struggle to obtain additional spectrum allocations in order to carry calls crisply and reliably. Indian operators claim the nation faces a "spectrum crunch"—in November 2007, for example, Sunil Mittal, Chairman of Bharti Airtel, described the country's spectrum situation as one of "extreme anguish" caused by the "pitiful" amounts of spectrum granted to operators. As one journalist noted, "Airtel was supposed to receive an additional spectrum allocation after it passed 1.6 million subscribers. It now has over 3.6 million and it is still waiting."[5] This situation is taking a toll in terms of the number of calls dropped per subscriber and the patchy reception they get.

The role of spectrum management policy becomes even more important when one thinks in terms of economic development implications. As noted above, the number of mobile subscribers exceeds the number of fixed-line users in many emerging countries. Because of the relatively poor development of fixed infrastructure in these markets,

questions arise regarding how broadband service will develop and hence how these countries can benefit from the productivity gains broadband offers. Rural and poor areas accentuate this phenomenon, since providing broadband services there will undoubtedly rely much more on wireless provision rather than on fixed access.

As wireless broadband technology develops and wireless applications and services expand, the main focus of spectrum management in developing countries will turn to accommodating technology and service flexibility. By adopting such flexibility, policymakers will allow operators to choose the most efficient and economically sound technologies needed to provide services to end customers.

To promote flexibility, a number of countries are already moving toward establishing technology- and service-neutral licensing and spectrum management policies. Sri Lanka provides a good example of how a developing country realized the importance of spectrum policy and began an ambitious "refarming" process in order to create a regulatory environment that encourages industry investment and economic growth (see Box 2).[6]

- **Avoid high levels of taxation.** Levying taxes on the mobile telecommunications sector has attracted government attention in emerging markets for two main reasons. First, the mobile sector has achieved strong growth in these nations in the past decade, and second, the operators' efficient billing systems facilitate the collection of government receipts. However, mobile-specific taxes reduce demand for services, lowering penetration levels. Experience in sub-Saharan Africa clearly illustrates this point: a recent study shows that if governments withdrew most industry-specific taxes and instead imposed only value-added taxes (VAT), tax revenues from the mobile industry would actually increase 3 percent by 2012 and average mobile penetration would expand by roughly 8 percent, from 33 percent to 41 percent.[7] This represents a significant loss in terms of economic growth, since an increase in mobile penetration of 10 percent in a typical developing country boosts GDP growth by about 0.6 percentage points.[8]

  Clearly, emerging markets should not impose excessive tax burdens on their mobile industries or they will hinder the penetration of these services and the public value they can create.

This chapter illustrates just a few of the measures emerging in the market that policymakers and stakeholders in the mobile services industry should consider when deciding how to apply regulation to increase the ubiquity of mobile service. Bear in mind that no silver bullet exists to increase coverage or reduce the minimum cost of ownership in the industry. These ideas can, however, create a fertile environment where the industry can flourish, delivering high levels of public value as it provides developing nations and their citizens the full benefits of mobility in the 21st century.

### Box 2: Refarming for success in Sri Lanka

Spectrum management policies in Sri Lanka were virtually nonexistent in the 1990s, when regulators generally bundled spectrum with operating licenses. Up to 1996, regulators allocated spectrum on a first-come/first-served basis in the band sought by operators. Telecommunications providers paid no upfront fee for the allocated spectrum band, but instead faced an annual charge for use of the radio frequency. This policy resulted in a situation where too many different telecommunications companies applied for spectrum at different points in time using a variety of technologies for both wireless local loop (WLL) and mobile applications.

Regulators had not taken into account factors such as equity and efficiency in spectrum allocation, and the technologies used by providers to provide mobile services varied considerably, ranging from Global System for Mobile services (GSM) to Code Division Multiple Access (CDMA). The move toward a more technology- and service-neutral spectrum policy was mainly triggered by a desire to treat all providers equitably, the urging of mobile providers to shift to GSM technology, and the need to use CDMA as a low-cost solution for fixed wireless access in rural areas.

Although the Telecommunication Regulatory Commission of Sri Lanka (TRCSL) was constrained to some extent by existing allocations and defense considerations, it issued more spectrum space. The regulator also recognized the problem of scattering spectrum and attempted to streamline allocations while it cleared capacity in the 1800–1900 megahertz range. It did so by embarking on a thorough industry consultation process that involved difficult negotiations with stakeholders in the industry, which included different compensation schemes for spectrum refarming.

Decisive action by the TRCSL resulted in the fair allocation of spectrum to incumbent and new operators alike, and helped the rapid proliferation of wireless technologies, proving that a forward-looking approach to spectrum management can help to increase the penetration of mobile services and mobility in general in developing countries.

Source: Jain, 2007; Ovum Consulting 2007.

## Notes

1 it*newsafrica* 2009.

2 Telnor 2008, p. 4

3 Telegeography 2008.

4 McKinsey & Company 2006.

5 *The Economist* 2007b.

6 *Refarming* involves the reassignment of spectrum to services that provide greater economic or societal benefits.

7 GSMA 2007a.

8 Vodaphone 2005.

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CHAPTER 1.6

# Reality Mining of Mobile Communications: Toward a New Deal on Data

**ALEX PENTLAND,** Massachusetts Institute of Technology (MIT)

> Within just a few years "people data" will be 90% of the world's collective data.
>
> *—Jeff Nick, CTO of EMC, personal communication*

> We have enough water, enough food, enough money; we have enough of everything except the ability to agree and move forward.
>
> *—Abdul Kalam, former President of India, personal communication*

Around the world, many of us live our lives in digital networks. We wake up in the morning, check our email, make a quick phone call, commute to work, and buy lunch. Many of these transactions leave digital breadcrumbs—tiny records of our daily experiences.[1] *Reality mining,* which pulls together these crumbs using statistical analysis and machine learning methods, offers increasingly extensive information about our lives, both individually and collectively. This technology's potential to transform our understanding of ourselves, our organizations, and our society is the reason that MIT's *Technology Review* recently identified reality mining as one of "10 Emerging Technologies That Will Change the World."[2]



## An emerging—and truly global—nervous system

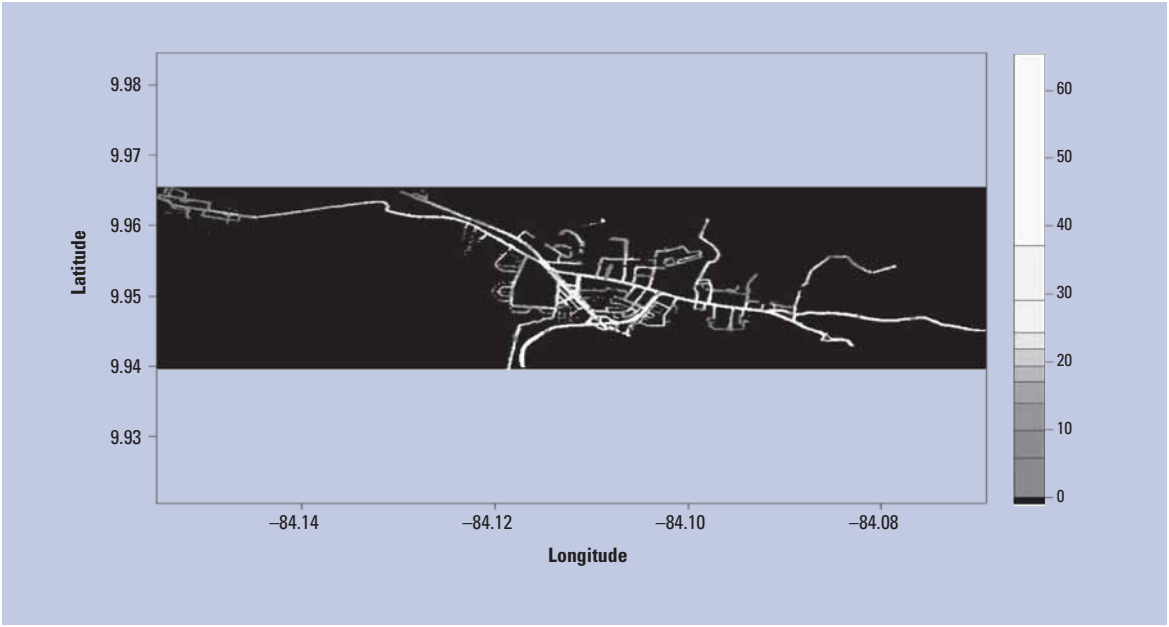
The ability to understand the patterns of human life by analyzing the digital traces that we leave behind will transform poor nations even more than rich nations. Ten years ago, half of humanity had never made a phone call and only 20 percent had regular access to communications. Today almost 4 billion people have a mobile telephone, and because remanufactured mobile phones cost US$10 in the developing world and incoming messages are free, almost every stratum of society is now connected.[3] For the first time, the majority of humanity is linked and has a voice.

The most important changes may come, however, from the fact that these same mobile phones can be used for reality mining. Their reality mining functionality is mostly latent at this point, but already these devices are being used to measure population flows into cities and slums, to map the movement of populations during emergencies, to identify neighborhoods where social services are inadequate (see Figure 4), and to manage automobile traffic congestion (see Figure 1).

The reality mining functionality of mobile phone networks is what governments in countries such as India are using to track terrorists, and they claim that the vast

This article builds on papers co-authored with David Lazer at the J. F. Kennedy School of Government at Harvard University and with my current and former students, as well as on continual interactions and conversations with my colleagues at Sense Networks and at the MIT Media Laboratory.

**Figure 1: Traffic congestion predicted using mobile phone GPS data**




Source: Dong, 2006.



majority of captured terrorists have been identified through mobile phone transactions. The ability of mobile phone networks to identify unusual patterns of movement and communication are also how public health officials and disaster relief teams are scanning for outbreaks of diseases such as severe acute respiratory syndrome (SARS) and emergencies such as tidal waves.

It seems that the human race suddenly has the beginnings of a working nervous system. Like some world-spanning living organism, automobile traffic systems, security sensors, and especially mobile telephone networks are all becoming intelligent, reactive systems with sensors serving as their eyes and ears. Moreover, the evolution of this nervous system will continue at a quickening speed because of the exponential progress in computing and communication technologies as well as basic economics. Networks will become faster, devices will have more sensors, and techniques for modeling human behavior will become more accurate and detailed.

### From individuals to societies

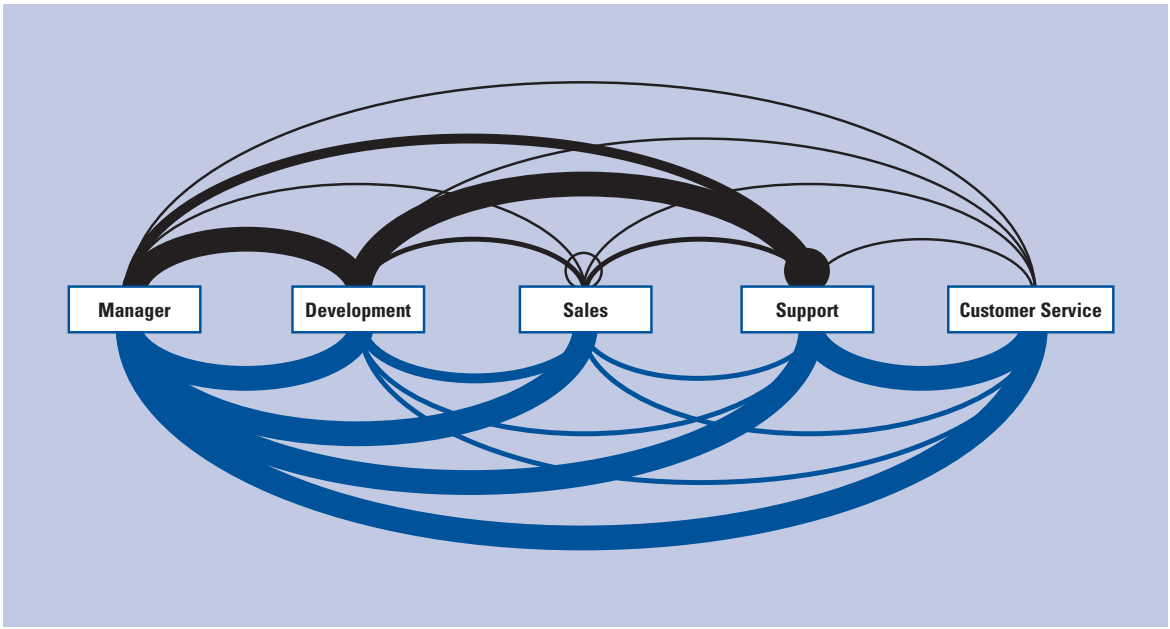
To date, the vast majority of research on the human condition has relied on single-shot, self-report data on relationships: a yearly census, public polls, focus groups, and the like. Reality mining offers a remarkable, second-by-second picture of group interactions over extended periods of time, providing dynamic structural and content information.

Perhaps the simplest example of reality mining is the analysis of automobile traffic congestion by using the global positioning system (GPS) data collected from the mobile telephones carried by the automobile drivers. These data provide minute-by-minute updates on traffic flow, allowing for more accurate predictions of driving time. Congestion patterns can be predicted days in advance, and traffic jams detected hours before they become serious, as illustrated by the "congestion map" of city streets shown in Figure 1.

Similar to using reality mining to understand traffic within a city, we can also use reality mining of mobile phone GPS data, call logs, and email records to better understand the "traffic" within an organization. Analysis of these digital traces allows a detailed picture of face-to-face, voice, and digital communication patterns. These patterns, in turn, allow us a new level of insight into the problems of industry and government, including building customer relationships, resource management, transportation, and public health. Figures 2 and 3 show two recent but very different applications of reality mining of people data.

Figure 2 shows the pattern of face-to-face and email communication within a German bank. The thickness of the top arcs (in black) shows the amount of face-to-face communication, while the thickness of the bottom arcs (in blue) shows the amount of email communication. In our studies of many different types of companies, we have found that the tradeoff between face-to-face and email communication is a critical

**Figure 2: Patterns of communication within departments of a bank**




Source: Pentland, 2008.



predictor of both productivity and job satisfaction. In fact, variations in these patterns can account for more than 30 percent of the differences in productivity between different parts of the same company! Patterns of *change* within these communication networks are also a critical predictor of creative productivity, accounting for up to 40 percent of differences in creative output.[4]

Figure 3 shows a plot of regional communication diversity and the corresponding index of deprivation, a socioeconomic status measurement that is a combination of metrics such as average income levels, access to health care, and education. These data, drawn from town councils across the United Kingdom, show that it is possible to use patterns of communication to identify "information ghettos" that have serious social problems. This capability can allow government services to be far more responsive to citizen needs than is possible by using census or survey data.

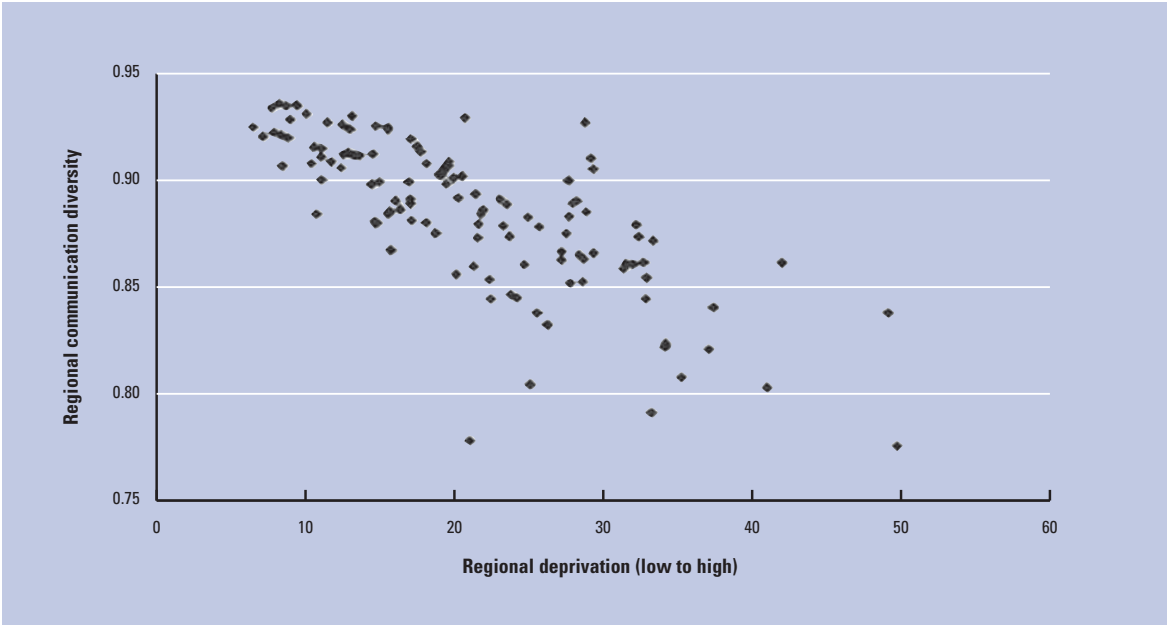
In short, reality mining is beginning to provide the capacity to collect and analyze data about people with a breadth and depth that was previously inconceivable. Current work using reality mining techniques is underway in a variety of applications. For example, reality mining studies of voice, communications, and mobility patterns have already demonstrated the ability to screen for depression, infer quality-of-life metrics, and develop financial indexes for individual neighborhoods.[5]

### Beyond demographics

Advertising, commercial development, and government services all currently rely on demographic data to guide them. Such data can quickly become out of date and, of course, good demographic data simply do not exist in many parts of the world. More importantly, however, we have found that demographics are a relatively poor predictor of behavior, and behavior is what we really need to understand in order to reach the right people.

The fact that mobile phones have GPS means that we can leap beyond demographics directly to measuring behavior. Where do people eat? Work? Hang out? How does word of mouth spread? Analysis of travel patterns using mobile phone GPS data, for instance, allows discovery of the independent subgroups within a city. Figure 4a shows movement patterns with popular "hang outs" coded by the different subgroups that populate these destinations, where the subgroups are defined by both their demographics and, more importantly, by their *behaviors.* Figure 4b shows that the mixing between these different behavior groups is surprisingly small. Knowledge of the "hang outs" of different subgroups and the mixing among groups can provide great improvements in advertising, commercial development, public education, and policy interventions.

**Figure 3: Communication patterns vs. deprivation**




Source: Eagle, 2009.

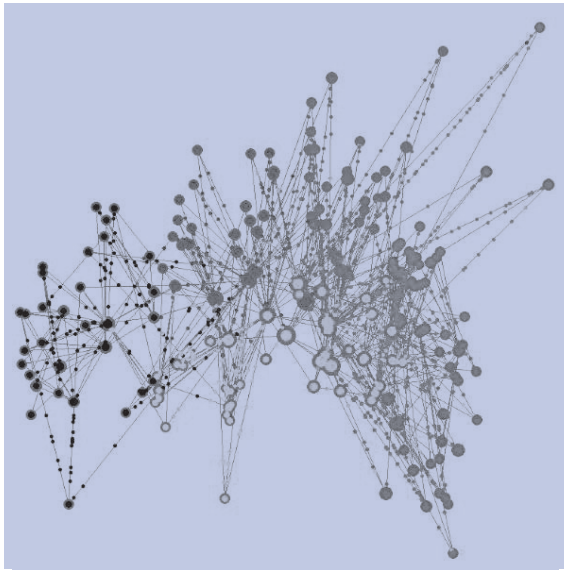


**Figure 4: Reality mining of data from GPS mobile phones**

4a: Patterns of human movement in San Francisco

Source: Sense Networks, 2008.

4b: Limited mixing among people with different behavior patterns



Source: Sense Networks, 2008.

### Usefulness for society

Reality mining of behavior data is just beginning. For instance, the correlation of behavior data with medication data from millions of people could make drug therapies more effective and help medical professionals detect drug interactions more quickly. If behavior data were correlated with medical conditions, the data could illuminate the etiology and preconditions of disease far more powerfully than is possible today and, further, serve as an early warning system for epidemic diseases such as SARS. Comparing the medical data with genomic and protonomic data from different population samples could provide a powerful method for understanding complex gene and environment interactions.

For society, the hope is that we can use this new in-depth understanding of individual behavior to increase the efficiency and responsiveness of industries and governments. For individuals, the attraction is the possibility of a world where everything is arranged for your convenience—your health checkup is magically scheduled just as you begin to get sick, the bus comes just as you get to the bus stop, and there is never a line of waiting people at city hall.

### Data ownership and privacy

Perhaps the greatest challenge posed by this new ability to sense the pulse of humanity is creating a "new deal" around questions of privacy and data ownership. Many of the network data that are available today are freely offered because the entities that control the data have difficulty extracting value from them. As we develop new analytical methods, however, this will change. Moreover, not all people who want access to the data do so for altruistic motives, and it is important to consider how to keep the individuals who generate this information safe. Advances in analysis of network data must be approached in tandem with understanding how to create value for the producers and owners of the data while at the same time protecting the public good. Clearly, our notions of privacy and ownership of data need to evolve in order to adapt to these new challenges.

This raises another important question: how do we design institutions to manage the new types of privacy issues that will emerge with these new reality mining capabilities? Digital traces of people are ubiquitously preserved within our private and public organizations—location patterns, financial transactions, public transportation, phone and Internet communications, and so on. Certainly new types of regulatory institutions are required to deal with this information, but what form should they take?

Companies will have a key role in this new deal for privacy and ownership. One suggestion is that there is an incentive system, one that gives added value to the users. Market mechanisms appear to be a particularly interesting avenue of exploration, since they may allow people to give up their data for monetary or service rewards. Ideally, this would be put into place in order to gain approval from the majority of the population to use data collected from their digital interactions.

Other important considerations revolve around data anonymity. The use of anonymous data should be enforced, and analysis at the group level should be preferred over that at the individual level. Robust models of collaboration and data sharing need to be developed; guarding both the privacy of consumers as well as corporations' legitimate competitive interests are vital here.

What must be avoided is either the retreat into secrecy, so that these data become the exclusive domain of private companies and remain inaccessible to the Common Good, or the development of a "big brother" model, with government using the data but denying the public the ability to investigate or critique its conclusions. Neither scenario will serve the long-term public interest in having a transparent and efficient government.

### The new deal on data

The first step toward open information markets is to give people ownership of their data. The simplest approach to defining what it means to "own your own data" is to go back to Old English Common Law for the three basic tenets of ownership, which are the rights of possession, use, and disposal:

1. You have a right to *possess* your data. Companies should adopt the role of a Swiss bank account for your data. You open an account (anonymously, if possible), and you can remove your data whenever you'd like.

2. You, the data owner, must have full control over the *use* of your data. If you're not happy with the way a company uses your data, you can remove it. All of it. Everything must be opt-in, and not only clearly explained in plain language, but with regular reminders that you have the option to opt out.

3. You have a right to *dispose* or *distribute* your data. If you want to destroy it or remove it and redeploy it elsewhere, it is your call.

Ownership seems to be the minimal guideline for the "new deal on data." There needs to be one more principle, however—which is to adopt policies that encourage the combination of massive amounts of anonymous data to promote the Common Good. Aggregate and anonymous location data can dramatically improve society. Patterns of how people move around can be used for early identification of infectious disease outbreaks, protection of the environment, and public

safety. It can also help us measure the effectiveness of various government programs, and improve the transparency and accountability of government and nonprofit organizations.

## Conclusions

Revolutionary new measurement tools provided by mobile telephones and other digital infrastructures are providing us with a God's eye view of ourselves. For the first time, we can precisely map the behavior of large numbers of people as they go about their daily lives.

These distributed sensor networks have given us a new, powerful way to understand and manage human groups, corporations, and entire societies. As these new abilities become refined by the use of more sophisticated statistical models and sensor capabilities, we could well see the creation of a quantitative, predictive science of human organizations and human society. At the same time, these new tools have the potential to make George Orwell's vision of an all-controlling state into a reality. What we do with this new power may turn out to be either our salvation or our destruction.

## Notes



1 See http://www.bbc.co.uk/britainfromabove/stories/visualisations/index.shtml for amazing videos of the time evolution of automobiles, airplanes, telephone calls, and shipping activity patterns.

2 *Technology Review* 2008.

3 Eagle 2009.

4 Pentland 2008.

5 Pentland 2008.

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CHAPTER 1.7

# Global Mobility of Talents: What Will Make People Move, Stay, or Leave in 2015 and Beyond?

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**BRUNO LANVIN,** INSEAD, eLab
**HRISHI MOHAN,** Wipro

It is estimated that, around the world, some 200 million people currently live and work outside of their country of origin. The OECD countries alone host some 75 million migrants (persons having adopted a residence outside of the country where they were born). Broader access to transportation combined with disparities in income and labor markets have contributed to create a growing global market for migrant workers, who stay outside their country of origin for a limited time. This time is generally linked to the nature and duration of their work contract.

As shown in Figure 1, however, the world of migrations and labor movements is far from even. A number of countries (such as the United States) continue to attract a significant proportion of people seeking residence outside of their countries of origin. Some smaller or less-populated countries, while hosting a comparatively smaller number of foreign-born individuals, face unprecedented situations whereby the proportion of migrants is particularly high compared with their home-born populations (22.4 percent in Canada, 25 percent in Switzerland, and 27.7 percent in Australia). On the labor front, fast-growing countries have attracted a number of migrant workers in sectors such as construction or domestic services. In many cases, such movements have been compounded by significant in-flows of highly skilled foreign workers ("expats") providing services as consultants or managers in local or international businesses, and sometimes in government. A country such as Qatar, for example, has a population of about 1 million, of whom only 20 percent were born in Qatar.

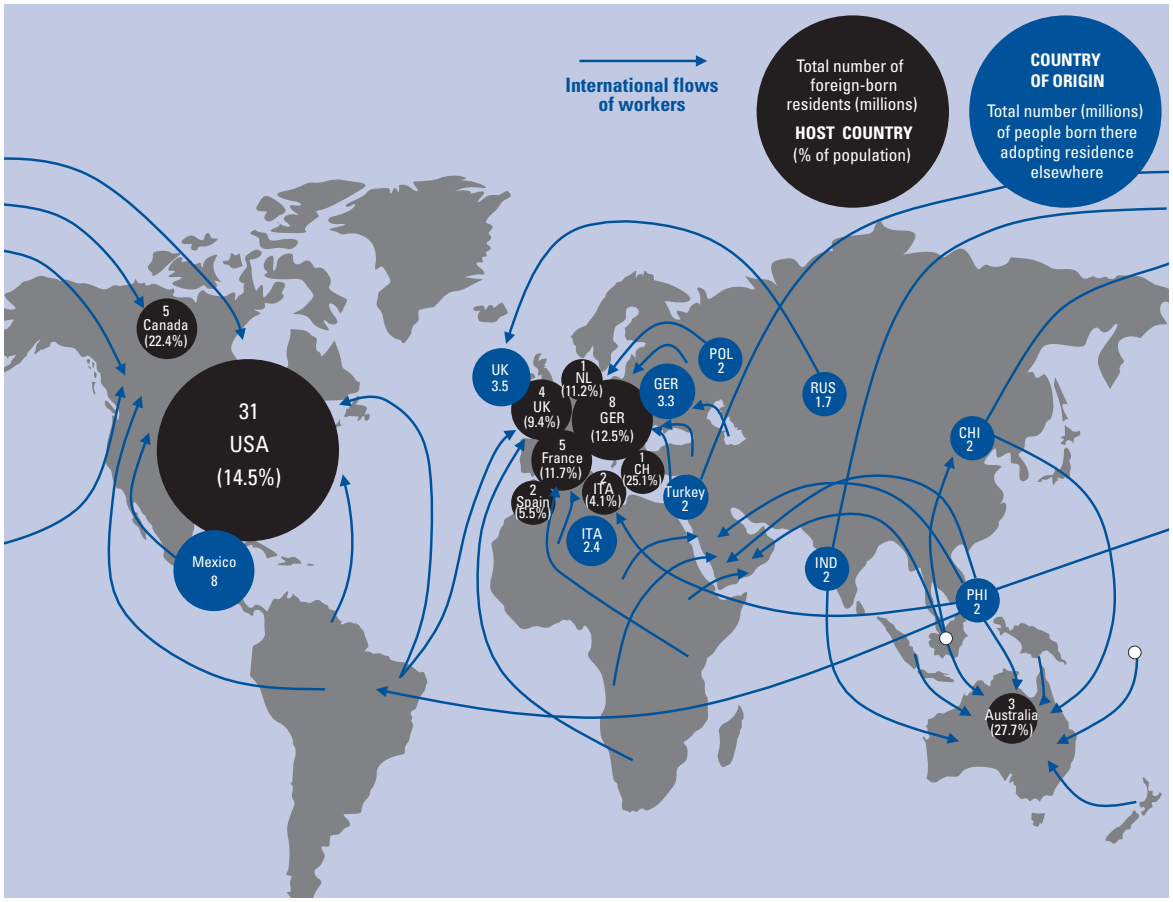
For a growing number of skills and talents, a global labor market has emerged. The international mobility of workers has grown accordingly. However, over the last few decades, accelerated growth in large economies such as those of India and China has radically altered the landscape of resulting labor movements.

Information technology (IT), on the other hand, has allowed new forms of production to take place through the use of telepresence, teleworking, virtual teams, and shared information and knowledge resources. Increasing concerns about the environment and the "carbon footprint" of any business decision have contributed to a growing preference for moving bits and bytes rather than atoms and humans across borders.

How are those different drivers likely to combine, compound, or offset each other in the future? What will be the main directions of labor flows? How is the "war for talents" going to be waged, and who is likely to win it? These are some of the questions that this chapter tries to address.

Through the consideration of longer-term trends and the analysis of recent changes in the way companies and individuals buy, produce, and sell, some avenues will be identified that may help define new dimensions of

**Figure 1: Migration and labor movements in 2007**




Source: Authors, based on OECD and Manpower.
Note: Country names are as follows: POL = Poland; RUS = Russia; CHI = China; PHI = Philippines; IND = India; GER = Germany; CH = Switzerland; NL = Netherlands; ITA = Italy; UK = the United Kingdom; and USA = the United States.

talent mobility. Other avenues will identify some of the most urgent issues to be faced by business and governments regarding the skills that their competitiveness (or survival) may require in the years to come.

### Moving beyond the "brain drain vs. brain gain" controversy

Traditionally, migration flows have been regarded as composed of three major streams: labor migration, refugee migrations (economic or political), and rural-urban migration. More recently, the issue of "environmental refugee" has been added to this panoply, in view of the dramatic situation faced by countries such as the Maldives that are threatened by the rise of sea level.

Mobility has affected production factors in an uneven fashion. Among the production factors to be mobilized and combined, some are tangible (land, raw materials, capital) while others are intangible (technology, ideas, creativity, innovation, entrepreneurship). For several centuries, labor has been considered to be part of the first category: most of the workers who crossed international borders exported their physical strengths or manual abilities rather than their intellectual talents. This can largely explain why available literature is quite abundant on the mobility of tangible factors of production, while analyses of the global circulation of ideas and talents remain relatively scarce.

In this latter domain, much of the debate has focused on trying to determine whether the collective benefits of moving intangible factors of production internationally could justify the undeniable damage caused to the countries (mostly developing countries) that, intentionally or not, let their best-educated and most creative citizens move abroad. The so-called "brain gain vs. brain drain" controversy remained a recurrent theme of development economics until recently.

In the course of the last few decades, several significant changes have altered both the nature and the focus of this debate. One of them has been the success of emigrated elites in their countries of adoption (a case in point being that of the Indian diaspora in the US Silicon Valley), which has generated significant spillover effects in their respective countries of origin.[1] Another

change has been the advent of outsourcing (with its variations from near-shoring to global sourcing), which has allowed some developing countries to compete globally while retaining talents at home.

Such phenomena, however, are still too recent to have generated a full re-balancing of the literature about labor mobility. Data remain scarce and often lack international comparability. The size and direction of international movements of highly skilled individuals are still under-documented and under-measured.

Yet, some trends can be identified on how, where, and why talents cross borders. To try and identify such trends, we will adopt in the rest of this chapter the following working definitions:

1. In order to build an initial measurable proxy for international mobile talents, we will focus on scientific and research and development (R&D) staff, IT professionals, and academics (scholars and students).

2. Our concept of *mobility* focuses on "movements resulting from opportunities, ecosystem strengths, and/or incentives created to encourage such movements." This working definition will enable us to make a methodological distinction between talent mobility (which is multi-directional) and migration (which is uni-directional—that is, with no intent or possibility of returning to one's country of origin).

### What makes talent move across borders: A simple model

The 20th century has seen a progressive re-balancing between the "push factors" of migration (diseases, poverty, and conflicts) and the "pull factors" of labor movements (better wages and better opportunities to acquire new skills or develop a business). Over the last few decades, however, international labor mobility has been greatly facilitated and encouraged by factors such as the following:

- **Significant differences in earning potentials for similar skill sets.** Classic examples are those of Indian software developers (Indian salaries being a fraction of those paid in the United States or Western Europe). This has also applied to professionals trained in Eastern Europe (whose wages are far below those of their western counterparts).

- **Ecosystem attractiveness.** One of the major non-monetary reasons for talents to move outside their country of origin is the presence of an ecosystem that provides an enabling environment for professional growth and self-development. For example, R&D professionals may wish to go abroad in search of better laboratories, a more stimulating research environment, more peer-to-peer interaction, higher funding, or better relationships between universities and business.

- **Interdependence among capital, competence, and talent flows.** Available evidence shows a strong correlation between growth opportunities on one hand and the ability to attract both capital and talent on the other.

- **Increasingly important roles of governments.** When it comes to attracting or retaining talents, governments have a key role to play in designing and implementing proper fiscal and immigration policies; more and more, they tend to do this in accordance with the relative shortage (or relatively high costs) of the skills required by the enterprises of their respective countries. For example, in the United States, a special class of visas (H1) is being granted to IT professionals: a large proportion of the beneficiaries of such visas come from India's IT industry.

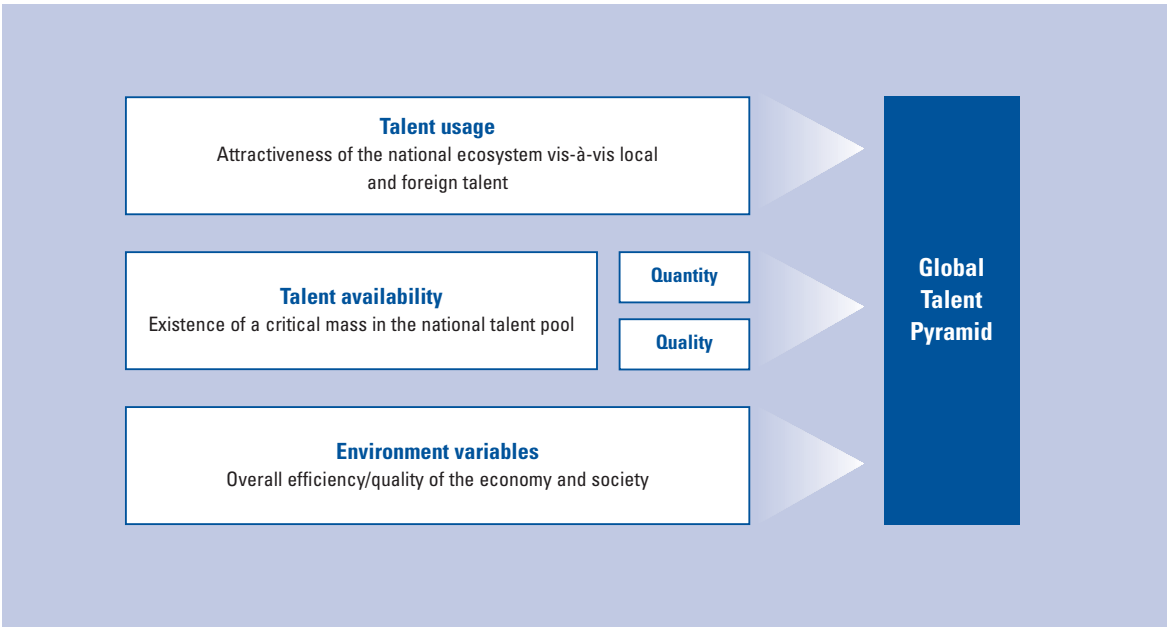
Based on this first list of explanatory factors and building on a selected set of variables mostly included in the Networked Readiness Index (NRI) presented in this *Report,* a simple model—the Global Talent Pyramid Model (GTPM)—has been constructed (Figure 2). In this model, the ability of a country to attract talents internationally is determined by three main factors, namely:

1. attractiveness of the national ecosystem vis-à-vis local and foreign talent,
2. the existence of a critical mass in the "national talent pool" (stock and flow), and
3. overall efficiency/quality of the economy and society.

In order to get a first approximation of those three pillars, a certain number of existing variables has been selected for which sufficient international coverage was already available. Figure 3 summarizes the attribution of such variables to each of the three pillars of GTPM.[2]

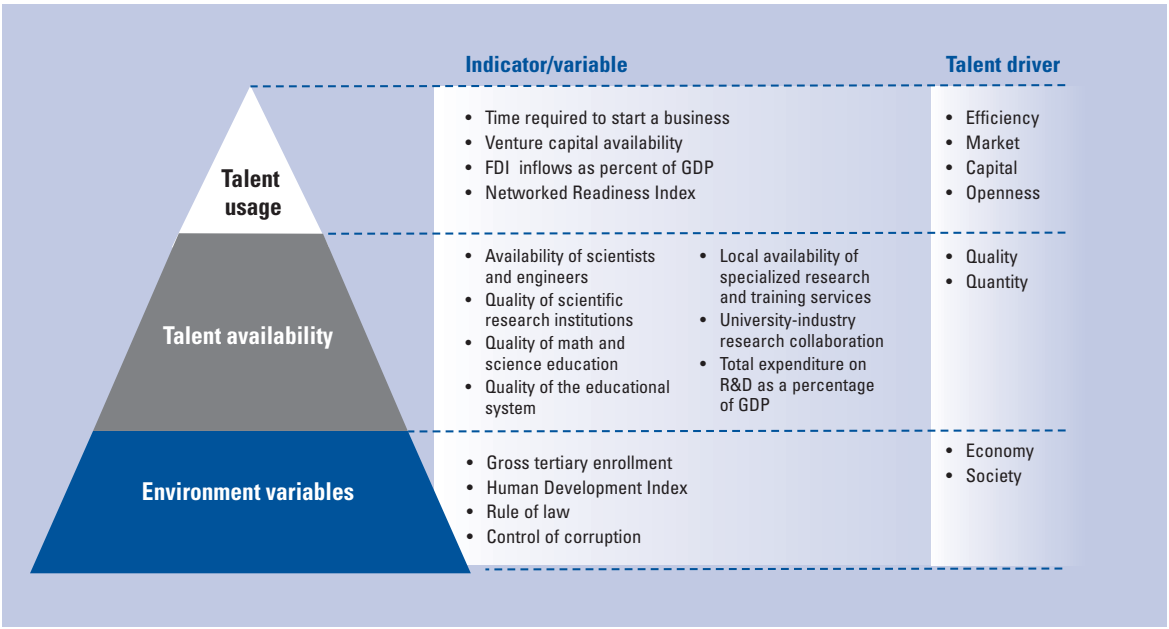
The resulting model suggests that, in building its own talent pyramid, each particular country will benefit from specific advantages and encounter unique challenges. For example, in Europe as a whole or in Japan, the issue of e-skills (i.e., skills for the knowledge society) has started to attract priority attention: a number of companies, and also a growing number of governments, are increasingly worried about Europe's inability to produce the number of programmers, analysts, and

## Figure 2: The Global Talent Pyramid Model (GTPM)



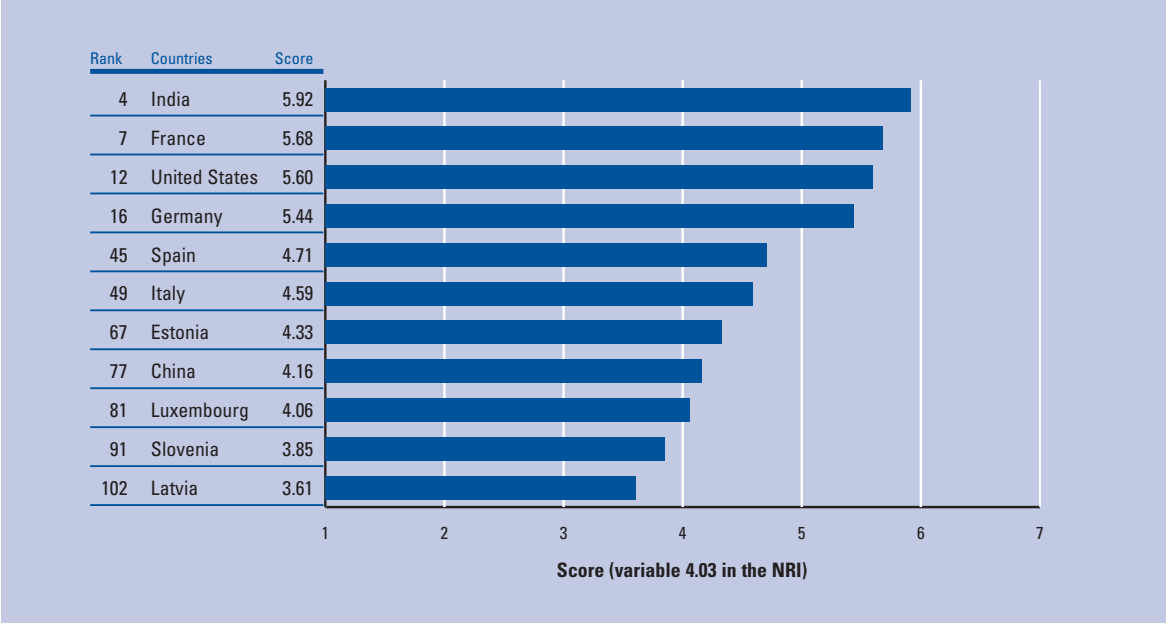



## Figure 3: The Global Talent Pyramid variables




Source: UNCTAD, various years; UNDP, 2007; UNESCO, 2007; UNESCO Institute for Statistics; The World Bank Group, 2008; The World Bank, Governance Indicators; World Economic Forum, Executive Opinion Survey 2007, 2008.

**Figure 4: Availability of scientists and engineers, selected countries**




Source: World Economic Forum, Executive Opinion Survey 2007, 2008.



software architects that its industries will need in coming years.[3]

However, this inability may be the tip of a much larger iceberg. The lack of engineers has recently become a major concern in countries such as Germany and the Czech Republic, as it has already been for some time in Japan. Some of those countries may be looking to places such as India to obtain the talents they need; however, the expected rates of growth of the Indian economy (even once this growth has been discounted by the effects of the current crisis) are such that it is likely that Indian scientists and engineers will have less reason to leave their own countries in the future than they have had in the past. One consequence of the GTPM is, hence, that the talent pool available in a country such as India is likely to increase, while its international mobility will decrease.

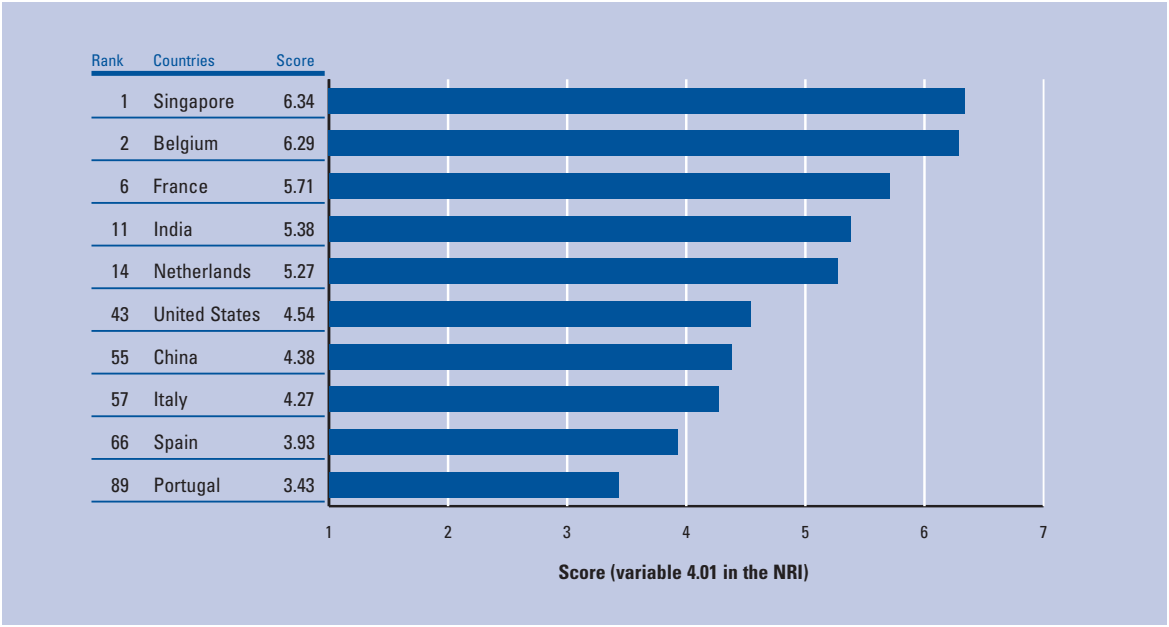
In countries less equipped with the ability to produce enough scientists and engineers (such as China, Spain, Italy, or smaller European economies—see Figure 4), local companies are likely to continue paying a premium to attract necessary talent, and to pressure their respective governments to improve dimensions at the bottom of the Global Talent Pyramid (environment), as well as at the top (e.g., by attracting more presence by foreign companies, or by enhancing outsourcing capabilities through better IT infrastructure). In some countries, especially in Western Europe, stimulating the production of larger numbers of scientists and engineers will require addressing social and cultural factors at the root of the significant decrease in the attractiveness of such careers for younger people witnessed in recent times, especially among female students.

Another factor likely to affect the ability of various countries to produce the talents required by their own development strategies will stem directly from the degree of investment they have made in the past decades in their respective educational systems. Tertiary enrollment in this respect is not the only variable to consider. The quality of education in mathematics and science will also likely have an increasingly important impact on the value that a particular society can provide for itself, as the expansion and improvement of global information networks create more opportunities to share such value.

In this area, countries such as Singapore will continue to benefit from a comparative advantage built relentlessly over the years, while India and China seem to be quickly moving up that same ladder. Relatively low scores should be of particular concern in countries such as Italy, Spain, or Portugal, and to some extent the United States (see Figure 5).

By and large, such partial indicators point to issues shared by many economies around the world. It is clear, for example, that in coming years the availability of talented knowledge workers will not grow as quickly as the global demand for their skills. In such a situation, mobility will be key for narrowing the existing gap between supply and demand. Such mobility will be both physical (e.g., through temporary or permanent migrations) and virtual

**Figure 5: Quality of math and science education, selected countries**




Source: World Economic Forum, Executive Opinion Survey 2007, 2008.



(through a more intense usage of information networks, telepresence facilities, and virtual teams across networks).

In such a context, some fundamental dimensions of the world economy—such as geography or demography—will take on a renewed importance. As an example, the next section will focus on the different situations of two countries with marked differences in those two respects: India and Singapore.

### Age pyramid vs. talent pyramid: The examples of India and Singapore

Applied to India and Singapore, key GTPM variables display sharp differences. For example, Singapore has a strong advantage over India in terms of its business environment: it takes almost 10 times longer to enforce a contract in India than in Singapore; similarly, the time to start a business is less than a week in Singapore, versus a month or so in India. India, however, is ahead of Singapore for its number of scientists and engineers available, and education expenditure (see Table 1).

Such differences in variables take on a different meaning when considered against the longer-term background of demographics. Current data and projections to 2025 point to almost symmetrical situations between the two countries, with a marked aging of Singapore's population, while India's population is only starting to "narrow at the base" and will still display an age pyramid with a majority of the population below 45 years of age (see Figures 6 and 7).

**Table 1: Some key GTPM variables for India and Singapore**

| Variable | NRI variable | India value | Singapore value |
|---|---|---|---|
| Time required to start a business (days)* | 1.10 | 30 | 4 |
| Time to enforce a contract (days)* | 2.09 | 1,420 | 150 |
| Venture capital availability | 1.01 | 3.97 | 4.45 |
| Availability of scientists and engineers | 3.04 | 5.67 | 5.03 |
| Quality of scientific research institutions | 3.05 | 4.84 | 5.63 |
| Quality of math and science education | 4.01 | 5.16 | 6.32 |
| Quality of the educational system | 4.02 | 4.27 | 6.17 |
| Local availability of specialized research and training services | 5.02 | 4.66 | 5.40 |
| University-industry research collaboration | 5.05 | 3.60 | 5.47 |
| Education expenditure as a percentage of GNI* | 3.07 | 3.95 | 2.48 |
| Tertiary education enrollment* | 3.06 | 11.85 | 55.90 |

Source: NRI 2008–2009.
*Hard data.

Combining talent data and demographic information, one can identify some striking challenges and questions regarding talent availability in those two countries:

1. By the year 2025, India's population will be largely concentrated in the age group of 20–50; combined with its current high level of education

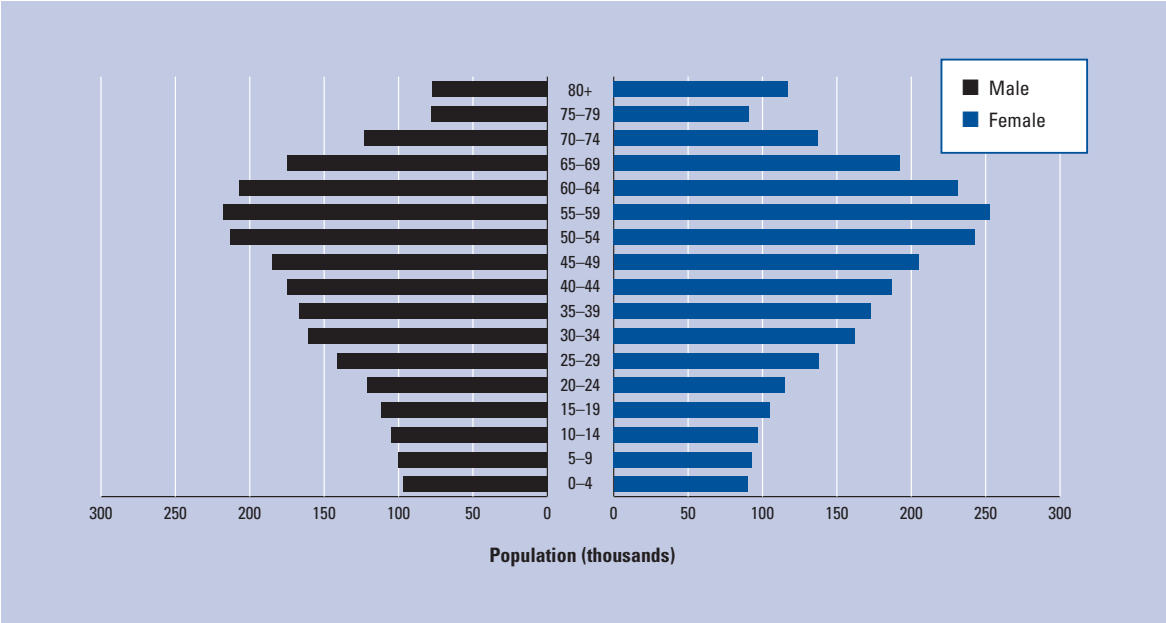
## Figure 6: Singapore's age pyramids

6a: 2008


Source: US Census Bureau, International Database, available at http://www.census.gov/ipc/www/idb/pyramids.html.



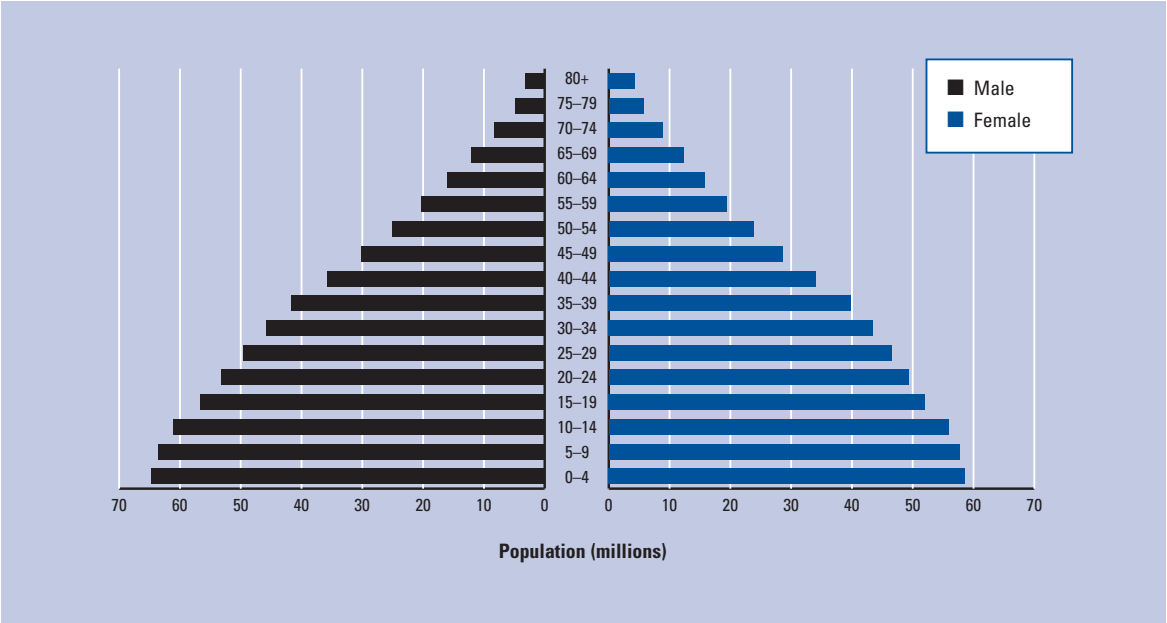
6b: 2025




Source: US Census Bureau, International Database, available at http://www.census.gov/ipc/www/idb/pyramids.html.

## Figure 7: India's age pyramids

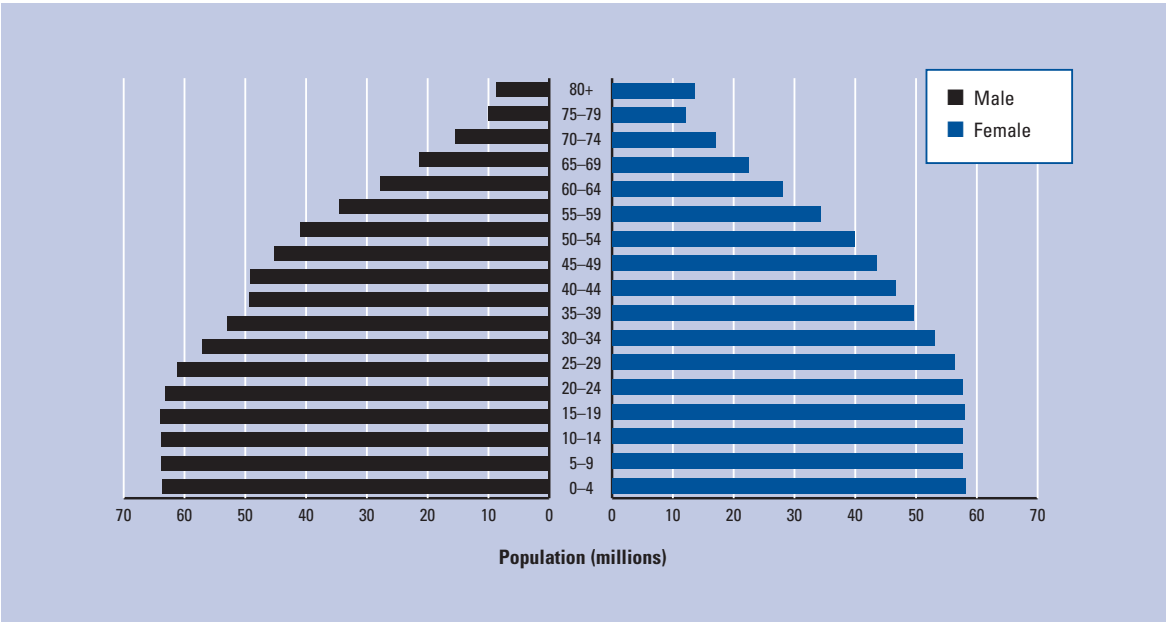
7a: 2008




Source: US Census Bureau, International Database, available at http://www.census.gov/ipc/www/idb/pyramids.html.



7b: 2025




Source: US Census Bureau, International Database, available at http://www.census.gov/ipc/www/idb/pyramids.html.

expenditure, this will translate into a very large talent pool in India. Will India be in a position to leverage the growth and competitiveness potential of such a large talent pool? Assuming that the country maintains its current rate of growth, improvements in the business environment may become a crucial condition to achieve this goal.

2. The same demographic data indicate that India may still enjoy a surplus of talented workers in some areas, such as IT. However, it remains to be seen whether such a surplus will continue to benefit Australia, Canada, the United States, and Western Europe, as is the case today. If the needs of India's economy continue to grow at today's pace, and if other Asian economies (such as Singapore) continue to exhibit a structural deficit in the area of talent, one can envisage that Indian talented workers will move progressively closer to home, and possibly stay home.

3. Current values of some key GTPM variables (such as university-industry research collaboration, time needed to start a business, and the quality of scientific research institutions, for example) seem to indicate that, in the near future, India's talent pool will be more effectively utilized in neighboring Asian countries (and possibly in the Middle East) than in India itself. This should lead to the emergence of a regional India-based nebula (e.g., in IT services) rather than to a set of large Indian companies with headquarters in India.

4. In such regional nebula, advantage will be made of combining areas of national excellence. For example, it is likely that—in exchange for direct access to the large and fast-growing Indian market—Singapore could provide capital and infrastructure from its companies and universities for the development of high-end research activities. In return, talented Indian citizens could provide complex IT services at a competitive cost.

5. Similar cross-border ventures could be developed within Asia and with other regions of the world. In some sectors (aerospace and nuclear industries, for example), India could provide talent to international private ventures, based on volume and high-end R&D.

Such observations point to significant shifts in the ways in which talented workers will flow within Asia in the coming years. Some other studies confirm that similar changes will also affect the global picture (see Box 1).

### Box 1: Global distribution of talent and major shifts ahead

The trends discussed above (e.g., in demography) and policies (e.g., in education) will clearly generate regional opportunities. However, and more importantly, some of the talent-related data available indicate that some of the most striking differences among countries may trigger rapid adjustments, reinforced by the increasing global mobility of talents.

For example, the Global Talent Index (GTI), developed by Heidrick & Struggles with the Economist Intelligence Unit, assesses the talent situation of individual countries by combining seven main variables: demographics, quality of compulsory education systems, quality of universities and business schools, quality of the environment to nurture talent, mobility and relative openness of the labor market, trends in foreign direct investment, and proclivity to attract talent. Based on this approach, the following conclusions emerge:

- While the United States will maintain its position as the world's leading country for nurturing and developing talented workers over the next five years, it will face increasing competition from the United Kingdom, which will rise to second place by 2012.
- Asia-Pacific countries will offer tough competition to the United States and Europe in attracting and nurturing talented workers.
- When it comes to talented workers, BRIC countries appear less homogenous than in other areas. While China and India rank among the top 10 talent hotspots worldwide, Russia is expected to fall from 6th to 11th place by 2012, with Brazil slipping from 18th to 19th.
- Asia is well positioned to move ahead in the talent rankings: apart from India, other countries are expected to continue to feature at the top of such rankings, or to improve by 2012, such as Malaysia (remaining in 12th place), Korea, Rep. (improving from 15th to 13th), or Japan (from 16th to 14th).
- The same study points out that China is set to exploit its natural demographic advantage by significantly improving its compulsory education system and developing a much better environment for producing and nurturing talent. This will enable the country to build on its manufacturing base and attract increasing numbers of foreign-owned businesses.
- Despite the strong performance of the United States overall, its labor market is still likely to become less open and flexible over the next five years amidst fears of terrorism. Under such hypothesis, the United States would rank 9th worldwide on the GTI— only one rank ahead of China.

Source: Heidrick & Struggles/Economist Intelligence Unit, 2007.

### A few conclusions and six priority actions to fight the upcoming talent crunch

From the analysis and examples provided in this chapter, several conclusions emerge:

- Different countries have different talent endowments linked to their demography; educational system; and ability/will to attract, retain, or export talented workers. While many industrialized countries will face serious "talent crunches" in the coming years (particularly in areas such as e-skills and scientific and engineering professions), several large emerging countries (such as India and China) will themselves be increasingly faced with a talent shortage at home, brought about by their fast economic growth. These countries will need to develop appropriate national talent pools. Further exploration (and quantification) of the proposed GTPM should help identify the specific advantages and weaknesses of national economies and draw a "world map of talents." Such an exercise would likely help anticipate main flows and forces in the increasingly fluid world of mobile talents.

- Physical mobility is a double-edged sword in this respect. Associated with migration, it may mean brain drain. Linked with temporary labor movements, it may mean exports, acquisition of foreign knowledge and culture, and establishment of business and personal links across borders, all of which are potentially beneficial for the country of origin.

- IT and the emergence of global networks are radically changing the mobility equation by introducing new ways to combine talents across national borders. In the recent past, outsourcing (especially business process outsourcing) has been one of the main beneficiaries of this phenomenon, as well as all sectors in which virtual teams can be organized for the production, maintenance, marketing, sales, or distribution of complex products and services.

- Virtual mobility has become a key element in the development of exporters of IT services (e.g., India), and in that of importers of foreign expertise (e.g., fast-growing economies in the Gulf area). In both cases, large multinational groups have been among the fastest growing users of the resulting new opportunities arising around cross-cultural and cross-national virtual teams.

- With the advent of new capacities to obtain and share information (either physical, such as ubiquitous broadband, or of a more qualitative nature, such as in the context of Web 2.0/social networks), new business models and new modus operandi are emerging. Many examples are found in the realm of collaborative and open innovation.

- Many of these trends will be reinforced by the readjustments made necessary by the current global economic crisis. Others may be hindered or limited by some of the measures that business and governments will take as a result of the same crisis.

These conclusions point to some serious tensions and difficulties regarding the ways and means by which national economies will compete for globally mobile talent pools in the near future. They also call for some immediate actions. The following list identifies six possible areas for action, under three major headings.

#### Reducing barriers to the mobility of people and information

Considering the slow pace at which demographic constraints (and, to some extent, educational system constraints) can be altered, physical and virtual mobility must be encouraged as a key instrument to ease some of the most serious inadequacies in terms of global supply and demand for talents. Physical mobility should not be hampered by restrictive visa and immigration policies, and virtual mobility should not be limited by unevenness in global connectivity. At the global level, one of the most detrimental effects of a persistent digital divide between rich and poor countries would be to limit the world's ability to benefit from the possible combinations of talents across cultures and geographical borders. In the case of poorer countries, such a divide would contribute to the resilience of the negative effects of physical migrations (brain drain).

**Action 1:** In deciding on visa and immigration issues and policies, governments in industrialized countries should take full account of the cost of limiting the global mobility of talented workers; more open policies are likely to benefit all economies.

**Action 2:** Developing broadband infrastructure worldwide (especially in developing countries and regions such as sub-Saharan Africa) should be considered a priority for the coming decade. This will allow more virtual mobility of talents and benefit developing countries in at least two ways: (1) by better integrating them in global production processes while offering a productive outlet to local talents, and (2) by counterbalancing the negative effects (brain drain) of physical mobility. For advanced and fast-growing economies, bridging the digital divide is key to benefitting from the innovative ideas, designs, and services that still lie underused across the global talent pool.

### Upgrading the protection of workers and intellectual property

In a more fluid world of physical mobility, the current major economic crisis is likely to increase the willingness of low-skilled workers to offer their labor worldwide. This may well lead to a global weakening of their individual and collective bargaining power. Although pressures on wages may be temporary and properly addressed by market forces, other forces may require legal and regulatory safeguards. Specific efforts will need to be deployed—in particular, to avoid the emergence and the spreading of irreversible restrictions to workers' rights and protections. Similarly, if virtual mobility is developing quickly across virtual collaboration networks, intellectual property rights will require specific protection to ensure that innovators worldwide are duly recognized and their efforts properly rewarded. The current approach to intellectual property regimes needs to be upgraded to fully reflect the new realities of our global networked economy.

**Action 3:** Governments need to agree to international standards regarding the rights, working conditions, and living environment of migrant workers. Conventions already in existence (e.g., those in the purview of the International Labour Organization) should be reinforced and reaffirmed in order to avoid further deterioration in times of crisis.

**Action 4:** Intellectual property regimes should be revisited, taking into account the rapid development of collaborative and open innovation networks.

### Education, education, education

As our societies and economies evolve toward more knowledge-centric activities and structures, education is playing an ever more central role as a source of comparative advantage and an engine of social equity and inclusion. The current situation points to some growing gaps between the needs of our "knowledge ambitions" and our ability to generate the skills and talents needed to support it. In industrialized countries, diminished interest for mathematics and science (especially among girls) is a growing concern. On the other hand, the rapid pace of technological change accelerates the process of knowledge obsolescence in an increasing number of areas, creating unprecedented challenges for teachers and educators in the formal educational system.

**Action 5:** Governments, business, and educational institutions (at primary, secondary, and tertiary levels) need to join forces to change the image of scientific and engineering careers among young people; curricula must be developed and harmonized to improve the quality and quantity of e-skilled and science-skilled workers and managers, both in the IT and non-IT sectors.

**Action 6:** Fuller advantage and use need to be made of the opportunities created by IT and networks in the areas of distance learning and life-long education. Governments, business, and educators have a common mission and interest in making fuller use of existing instruments not only as a tool to continuously upgrade workers' skills, but also as a tool to stimulate upward social and career mobility and to fight inequality and exclusion.

Whether it is physical or virtual, mobility will be a key factor in our collective efforts to bring about an equitable, multicultural, open, innovative, and sustainable kind of globalization. To do so, however, we need to (1) become fully aware of the potential benefits of taking collective action to encourage and allow such mobility on a global scale, and (2) consider the current crisis as an opportunity (and an incentive) to take such action, rather than an excuse to procrastinate.

## Notes

1 For example, it has now become common for analysts and observers to describe a world in which Indian and Chinese nationals, after completing higher degree education in California and becoming successful Silicon Valley entrepreneurs, become a bridge between American and Asian markets.

2 For details on the definitions and sources of the variables included in the GTPM, please refer to Appendix A and the Technical Notes and Sources section at the end of this *Report*.

3 The area of e-skills has been one in which the European Commission has been particularly active in the recent past. See, in particular, the outcome of the recent European e-Skills 2008 Conference in Thessaloniki, October 9–10; information available at http://eskills.cedefop.europa.eu/conference2008/. On the same subject, also see Lanvin and Passman 2008.

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## Appendix A: GTPM variable descriptions and sources

### Time required to start a business, 2008

Duration of all procedures required to register a firm.

Source: The World Bank Group, *Doing Business 2009*. Available at http://www.doingbusiness.org/.

### Time to enforce a contract, 2008

Number of days required to resolve a dispute

Source: The World Bank Group, *Doing Business 2009*. Available at http://www.doingbusiness.org/.

### Venture capital availability, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether entrepreneurs with innovative but risky projects can generally find venture capital in their country (1 = not true, 7 = true).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### FDI Inflows as percent of GDP, 2001–05 (average)

Inflows of FDI in the reporting economy comprise capital provided (either directly or through other related enterprises) by a foreign direct investor to an enterprise resident in the economy.

Source: UNCTAD, *World Investment Report*. Available at http://www.unctad.org/Templates/Page.asp?intItemID=1485&lang=1.

### Networked Readiness Index 2008-2009

Source: World Economic Forum, *The Global Information and Technology Report 2008–2009*.

### Availability of scientists and engineers, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether scientists and engineers are available in their country (1 = nonexistent or rare, 7 = widely available).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Quality of scientific research institutions, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether scientific research institutions in their country are (1 = nonexistent, 7 = the best in their fields internationally)

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Quality of math and science education, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether the math and science education available in their country's schools (1 = lag far behind most other countries' schools, 7 = are among the best in the world).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Quality of the educational system, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether the education system in their country (1 = does not meet the needs of a competitive economy, 7 = meets the needs of a competitive economy).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Local availability of specialized research and training services, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether specialized research and training services are (1 = not available, 7 = available from world-class institutions).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### University-industry research collaboration, 2007, 2008

This is based on the average score on a 1–7 scale of a large sample group in a particular country responding to the question of whether, in its R&D activity, business collaboration with local universities in their country is (1 = minimal or nonexistent, 7 = intensive and outgoing).

Source: World Economic Forum, Executive Opinion Survey 2007, 2008.

### Total expenditure for R&D as percent of GDP, 2006

Included are fundamental and applied research and experimental development work leading to new devices, products, and processes.

Source: UNESCO Institute for Statistics. Available at http://www.uis.unesco.org/ev.php?URL_ID=2867&URL_DO=DO_TOPIC&URL_SECTION=201.

### Tertiary education enrollment, 2006 or most recent year available

The reported value corresponds to the total enrollment in tertiary education expressed as a percentage of the population of the five-year age group following on from the secondary school-leaving age. Note that the gross enrollment rate (GER) can exceed 100 percent due to early or late entry and/or grade repetition.

According to UNESCO, tertiary education is composed of two stages. The first stage of tertiary education, ISCED level 5, includes level 5A, composed of largely theoretically based programs intended to provide sufficient qualifications for gaining entry to advanced research programs and professions with high skill requirements; and level 5B, where programs are generally more practical, technical, and/or occupationally specific. The second stage, ISCED level 6, comprises programs devoted to advanced study and original research, leading to the award of an advanced research qualification.

Source: UNESCO, Institute for Statistics (retrieved January 12, 2008); UNESCO, *Education for All Global Monitoring Report 2008—Education for All by 2015: Will We Make It?*

## Appendix A: GTPM variable descriptions and sources *(cont'd.)*

### Education expenditure, 2006 or most recent year available

This variable refers to public current operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipment.

Source: The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008).

### Human Development Index (HDI), 2007

The HDI provides information on the human development aspect of economic growth. The HDI is based on three indicators: longevity, as measured by life expectancy at birth; educational attainment, as measured by a combination of adult literacy rate and the combined gross primary, secondary, and tertiary enrollment ratio; and standard of living, as measured by GDP per capita (purchasing power parity in US dollars).

Source: UNDP *Human Development Report 2007/2008,* Table 1. Available at http://hdr.undp.org/en/reports/global/hdr2007-2008/.

### Rule of law, 2006

This indicator includes several indicators that measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of both violent and nonviolent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts.

Source: The World Bank, Governance Indicators. Available at http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,menuPK:1740542~pagePK:64168427~piPK:64168435~theSitePK:1740530,00.html.

### Control of corruption, 2006

This indicator corresponds to "graft" measures of corruption—notably, corruption measured by the frequency of "additional payments to get things done" and the effects of corruption on the business environment.

Source: The World Bank, Governance Indicators. Available at http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,menuPK:1740542~pagePK:64168427~piPK:64168435~theSitePK:1740530,00.html.

CHAPTER 1.8

# R&D and Innovation in the ICT Sector: Toward Globalization and Collaboration

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This chapter analyzes recent developments in increasingly globalized information and communication technologies (ICT) research and development (R&D) and innovation.[1]

Global structures of R&D, science performance, invention, and innovation are in transition.[2] The main dimensions of change are the absolute growth of R&D and innovation-related activities; the rise of the BRIC economies in scientific and technological fields;[3] significant globalization of R&D; more performance of R&D in the services sector; and a growing focus on non-technological innovation, enhanced internationalization and mobility of highly skilled people, and increased internationalized patenting.

Among the main elements underpinning these developments have been the increasingly knowledge-driven nature of innovation; the quickly changing organization of research, driven by information technologies, collaboration, and the sharing of knowledge; and changes in markets, the competition environment, and technology. Firms are also embracing "open" innovation approaches and actively cooperating with external actors.

The next sections cover this trend toward more international and collaborative ICT R&D.



## Globalized R&D agenda in ICT

While ICT-related research challenges and priorities are evolving, an increasingly globalized ICT R&D agenda is emerging with eight broad priorities (Figure 1).

Some of the research topics listed in Figure 1 have been in the ICT R&D agenda for some time, especially those clustered around the physical foundations of computing, computing systems, and software engineering. Optical and quantum computing, robotics, and artificial intelligence also remain important for addressing long-term challenges. In practice, R&D in a given area has led to the emergence of new topics: for example, the rapidity with which semiconductors are being miniaturized has made nanotechnology research part of core ICT R&D; mounting demand for high-speed broadband is driving research into all-optical networks and optical computing. Progress in biotechnology, nanotechnology, cognitive sciences, and interdisciplinary research fosters synergy and convergence and opens up new research areas.

ICT R&D and innovation also increasingly intend to address pressing socioeconomic challenges, which are now international in scope and reach—for example, climate change, health care, and aging societies (Figure 2).

The authors wish to thank Cristina Serra-Vallejo, statistician at the OECD, and Arthur Mickoleit, consultant to the OECD, who contributed to this chapter.

## Figure 1: ICT R&D priorities (clusters of topics and subtopics)


Source: OECD.

**Figure 2: Examples of ICT R&D as solutions to pressing global socioeconomic challenges**


Source: OECD.



### ICT sector R&D expenditures in the Organisation for Economic Co-operation and Development (OECD)

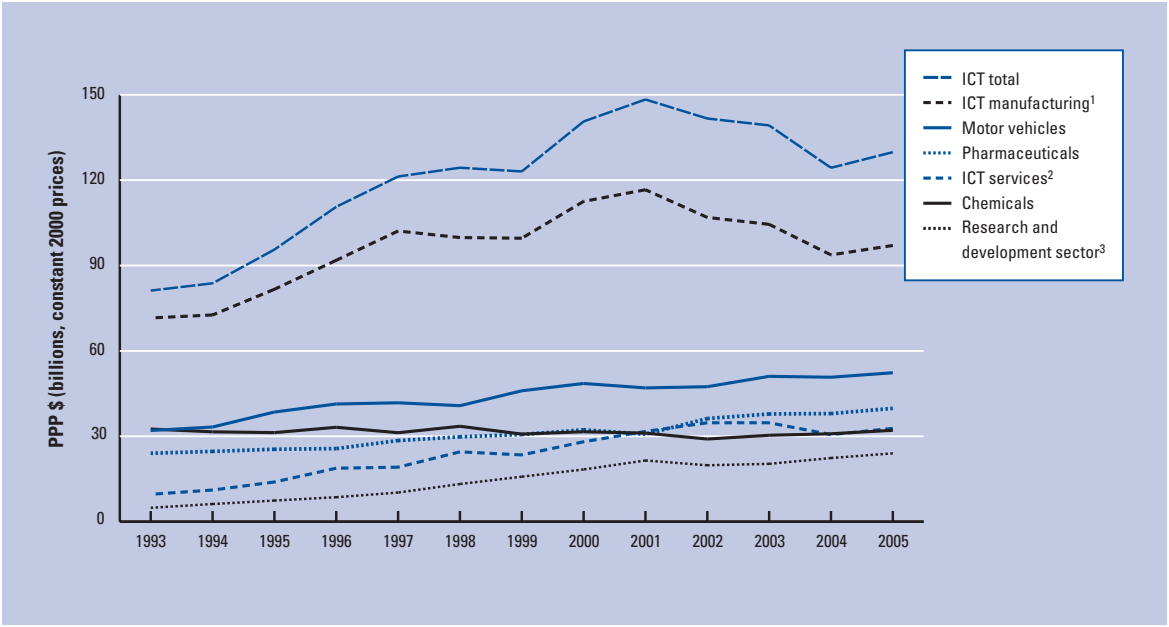
In light of the above challenging research agenda, the ICT sector undertakes large investments in R&D and is very innovative. In terms of R&D expenditures, patents, and venture capital investment, it exceeds other industries by a large margin. ICT is the most important of the five sectors that dominate business-sector R&D (Figure 3). In 2005, the OECD 21 ICT goods and services sector spent about two and a half times as much on R&D (US$130 billion) as the automotive sector and more than triple the pharmaceutical sector.[4]

In 2005, the year of the latest available official data, ICT manufacturing R&D accounted for more than a quarter of total manufacturing business R&D expenditure in most OECD countries. It accounted for more than half in Finland and Korea, Rep. (Korea) (63 percent and 57 percent, respectively), and more than 30 percent in the United States (39 percent), Australia (32 percent in 2002–03), Canada (39 percent in 2005), Japan (36 percent in 2005), and Ireland (34 percent).

The decline in R&D in the ICT goods sector since 2001 (constant terms) has been partly balanced by an increase in ICT services, which have grown very rapidly since the 1990s. These services surpassed the chemical sector in 2001 and almost reached the level of expenditure in the pharmaceutical sector. There has been a very significant growth in the share of services in computer and related activities (largely software and IT services): 21 percent in 2005, up from 9 percent in 1993.

The United States still accounts for 40 percent of all OECD R&D expenditures in ICT manufacturing and services. The European Union (EU) 15 accounts for a little under a quarter of the total, Japan for 22 percent, and Korea for 9 percent, with the larger OECD members making up the bulk of the remainder in 2005.[5]

**Figure 3: Growth of the largest R&D-spending sectors in the OECD 21 area, 1993–2005**




Source: OECD estimates based on ANBERD and RDS databases, June 2008.
1. Office, accounting and computing machinery (ISIC 30); Radio, TV and communication equipment (ISIC 32); Medical, precision and optical instruments (ISIC 33).
2. Telecommunications (ISIC 642) and in some cases ISIC 64; Computer and related services (ISIC 72).
3. Research and development (ISIC 73): Research and experimental development on natural sciences and engineering and on social sciences and humanities.



In ICT manufacturing, Finland, Korea, Japan, Sweden, and the United States have higher than average shares of R&D expenditure in GDP. Finland and Korea have increased their shares since 1997, and estimates for 2006 show a further pick-up for Korea. As a share of GDP, Denmark, Finland, Ireland, and Sweden have the greatest specialization in ICT services R&D (Figure 4).

Expenditure on software R&D has risen most rapidly of all parts of the ICT sector. Data on business R&D in computer and related services for 2006 show that the United States leads by a large margin (US$30.5 billion), roughly 15 times that of Israel (US$2.1 billion), Japan (US$2 billion), the United Kingdom (US$2 billion), and Germany (US$1.9 billion). The same applies to business R&D in software consultancy and supply: the United States (US$17 billion) carries out around 10 times more R&D than Germany (US$1.8 billion), followed by Korea and France (US$0.9 billion each).

Also, the global distribution of R&D is changing, and some non-OECD economies are becoming important ICT R&D spenders. Sectoral spending data are hard to produce in a way that allows direct comparison, however, for these countries at the aggregate level.

### R&D spending of top ICT firms

The R&D spending of the top ICT firms has grown consistently over the last decade and held up well during the years following 2001, reaching US$151 billion in 2006 and expanding in 2007. The question is how ICT firms will react to the current economic downturn, with recession forecasted to last OECD-wide until 2010: that is, they may either significantly reduce their R&D spending or decide to maintain this spending to preserve their competitiveness in the medium to long term.

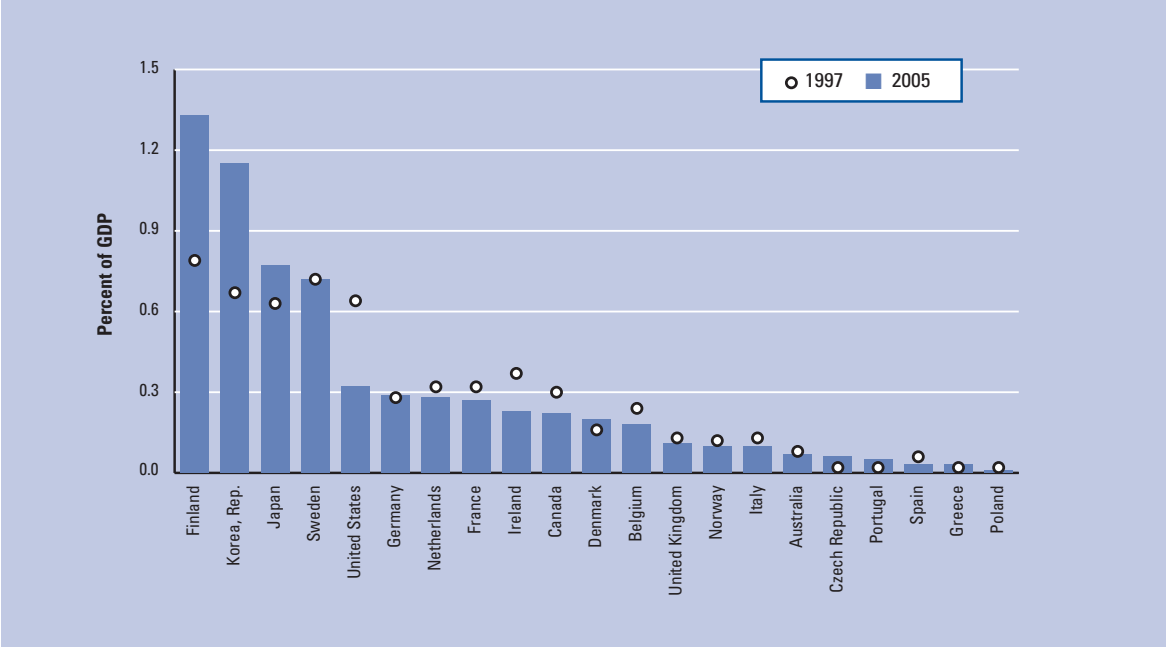
Currently, R&D expenditures of the top ICT firms are significantly higher than those of R&D-intensive firms in the chemicals, pharmaceuticals, or automotive sectors.[6] In 2006, the top 100 ICT R&D-performing firms (ranked by absolute R&D expenditures in 2006) spent an average of 6.7 percent of revenues on R&D. And, as will be explained later, these R&D expenditures are increasingly spread internationally.

The bulk of ICT R&D of the top 250 ICT firms is conducted by US (43 percent) and Japanese (26 percent) firms, followed by firms from Germany (11 percent), Korea (8 percent), and other European countries. Firms from Chinese Taipei,[7] in particular, have overtaken firms from Canada and the United Kingdom in their R&D spending. Despite rapid growth, Chinese ICT firms still have a relatively small share of the R&D expenditures of the top 250 ICT firms.

Korean firms have caught up to firms from other advanced OECD countries. Despite initial high starting levels, German and US firms have also significantly stepped up their R&D spending. Japan had a slight increase and France a slight decrease. Canada has also seen a drop, owing to spending declines by Nortel Networks and Celestica. In terms of growth in R&D spending 2000–06, firms from Chinese Taipei and China are leading, albeit from low levels (Figure 5).

## Figure 4: Business R&D expenditure for ICT goods and services, 1997 and 2005

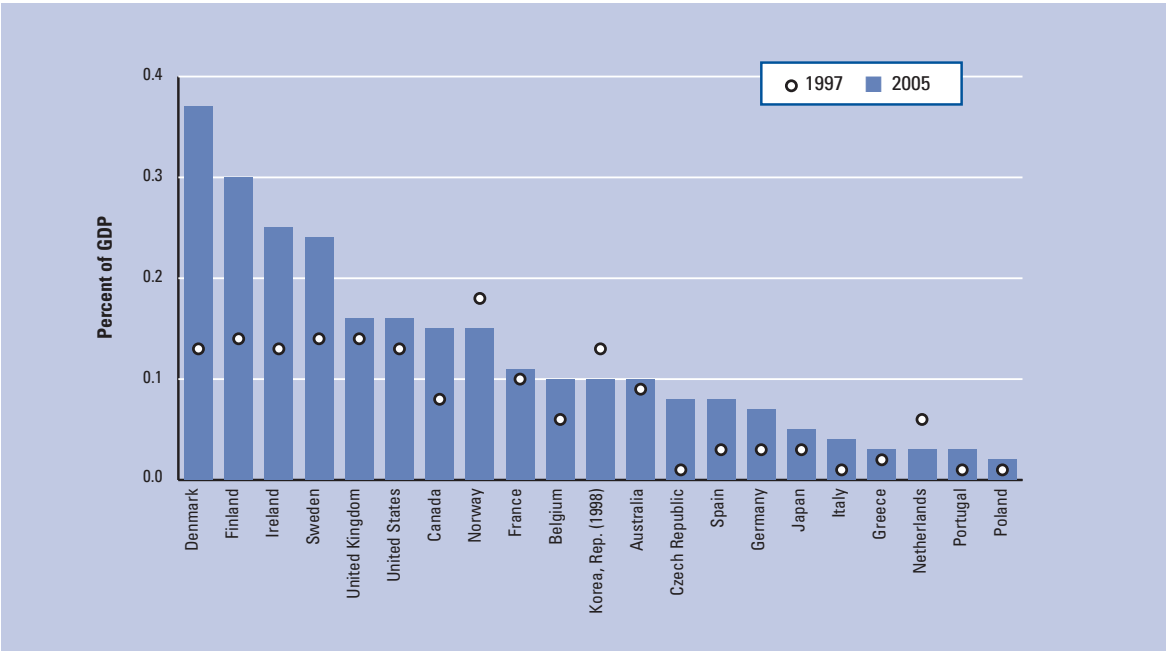
4a: Selected ICT manufacturing industries




Source: OECD estimates based on ANBERD and RDS databases, June 2008. See also OECD, 2007.
Note: When data for class 642 (Telecommunications) are unavailable, division 64 (Post and telecommunications) is used. Class 642 has the major share of division 64 R&D expenditure; for example, in the United States, class 642 accounts for 97–98 percent of the R&D in division 64.

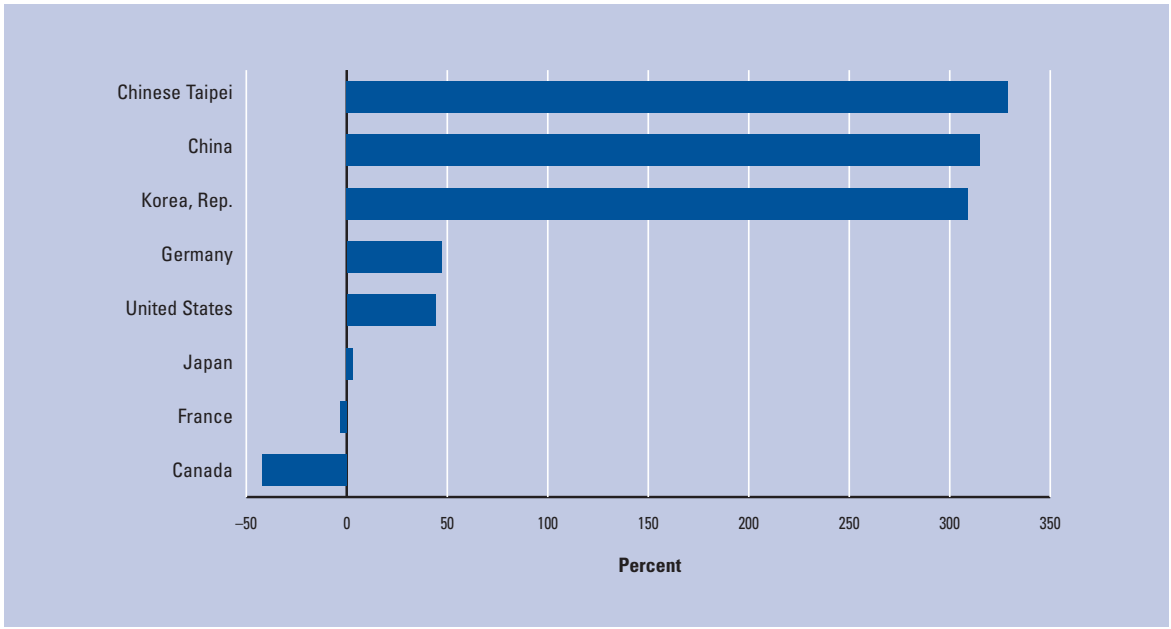


4b: Selected ICT services industries




Source: OECD estimates based on ANBERD and RDS databases, June 2008. See also OECD, 2007.
Note: Research and development (ISIC 73): Research and experimental development on natural sciences and engineering and on social sciences and humanities.

**Figure 5: Growth of R&D expenditures of top ICT firms, 2000–06 (current terms, percent)**




Source: OECD *Information Technology Outlook* database.



Other than China and India, ICT companies from OECD enhanced engagement countries (Brazil, Indonesia, and South Africa) and OECD accession countries (Chile, Estonia, Israel, Russia, and Slovenia) are not in the top R&D spending group.[8] In some cases, this may be due to lack of reporting (e.g., some Israeli and Russian ICT firms potentially qualify for inclusion, but no data are available). In most cases, however, R&D expenditures or revenues of these countries' ICT firms are not high enough.

For the top 100 R&D-spending ICT firms, the largest shares are in electronics (33 percent), IT equipment (19 percent), communications equipment (17 percent), and semiconductor firms (14 percent). Telecommunications firms have progressively reduced their R&D expenditures and made up only about 5 percent of the top 100 total in 2006.[9] The largest growth of R&D expenditures over the period 2000–06 was in sectors with lower initial shares: Internet, software, and semiconductor firms.

*Top ICT R&D spenders by firm*

Microsoft, Samsung, IBM, and Intel lead the list of ICT firms ranked by R&D expenditure (Table 1). In 2007, Samsung overtook IBM in reported R&D spending. The first three firms were also top R&D spenders across all industries in 2006, just behind Toyota Motor (US$7.7 billion), Pfizer (US$7.6 billion), and Ford Motor Corp. (US$7.2 billion) in the automotive and pharmaceutical sectors.

In terms of growth in R&D spending, the leaders are Google (114 percent, Internet firm), SanDisk (91 percent, IT equipment), Research in Motion (63 percent, communication equipment), Lenovo (54 percent, IT equipment) and Nvidia (42 percent, electronics and components) (all compound annual growth rate (CAGR), in current US dollar terms), followed by a group of Internet, service, and software firms despite their smaller number in the overall top 250 (Table 2). China and India each have one firm in the top 10 in terms of growth.

Non-OECD firms are over-represented in terms of R&D growth, in part because of their low starting level. Apart from Lenovo (China) and Infosys (India), which are in the top 10, there are a significant number of IT, electronic equipment, and semiconductor firms from Chinese Taipei (Lite-on Technology, AU Optronics, Taiwan Semiconductor, Benq/Qisda) and communication equipment firms from China (Huawei, ZTE) among the top 50.[10]

Semiconductor and hardware firms (communication and IT equipment, electronics) are the most intensive in terms of R&D expenditures per employee. Broadcom (semiconductors) leads with US$213,000 per employee, followed by Qualcomm (communications equipment), Nvidia (electronics and components), and SanDisk (IT equipment). Software firms such as Electronic Arts, Microsoft, Adobe Systems, and Intuit are also R&D leaders. US ICT firms dominate the top 50, with notable exceptions such as Nintendo (Japan), Advantest

**Table 1: Top ICT R&D spenders: Absolute expenditure, 2006 and 2007 (US dollars, millions)**

| Rank | Company | Country | Industry | R&D 2006 | R&D 2007 |
|---|---|---|---|---|---|
| 1 | Microsoft | United States | Software | 6,584 | 7,121 |
| 2 | Siemens | Germany | Electronics & components | 6,312 | n/a |
| 3 | Samsung | Korea, Rep. | Electronics & components | 6,004 | 6,451 |
| 4 | IBM | United States | IT equipment | 6,107 | 6,153 |
| 5 | Intel | United States | Semiconductors | 5,873 | 5,700 |
| 6 | Nokia[1] | Finland | Communication equipment | 4,896 | n/a |
| 7 | Matsushita (Panasonic) | Japan | Electronics & components | 4,854 | 4,909 |
| 8 | Sony | Japan | Electronics & components | 4,675 | 4,619 |
| 9 | Cisco | United States | Communication equipment | 4,067 | 4,499 |
| 10 | Motorola | United States | Communication equipment | 4,106 | 4,429 |

Source: OECD *Information Technology Outlook* database.

1. From 2007, Nokia consolidates financial information for Nokia Siemens Networks, a joint venture between Nokia and Siemens. Nokia's reported 2007 R&D expenditure of US$7.730 million is therefore not comparable to earlier expenditures.

**Table 2: Top ICT R&D spenders: Expenditure growth, 2000–07 (CAGR, based on current US dollars)**

| Rank | Company | Country | Industry | Growth (%) 2000–07 |
|---|---|---|---|---|
| 1 | Google | United States | Internet | 113.5 |
| 2 | SanDisk | United States | IT equipment | 91.2 |
| 3 | Research in Motion | Canada | Communication equipment | 63.1 |
| 4 | Lenovo | China | IT equipment | 54.0 |
| 5 | Nvidia | United States | Electronics & components | 42.2 |
| 6 | Infosys | India | Services | 39.5 |
| 7 | Yahoo! | United States | Internet | 38.5 |
| 8 | eBay | United States | Internet | 35.2 |
| 9 | Symantec/Veritas | United States | Software | 34.6 |
| 10 | Jabil Circuit | United States | Electronics & components | 33.6 |

Source: OECD *Information Technology Outlook* database.



(Japan), ASM Lithography (the Netherlands), Samsung (Korea), LG Electronics (Korea), Qimonda (Germany), Nortel Networks (Canada), Nokia (Finland), and Ericsson (Sweden). Few other European or Japanese firms are among the top 50.

*Trends in R&D intensity*

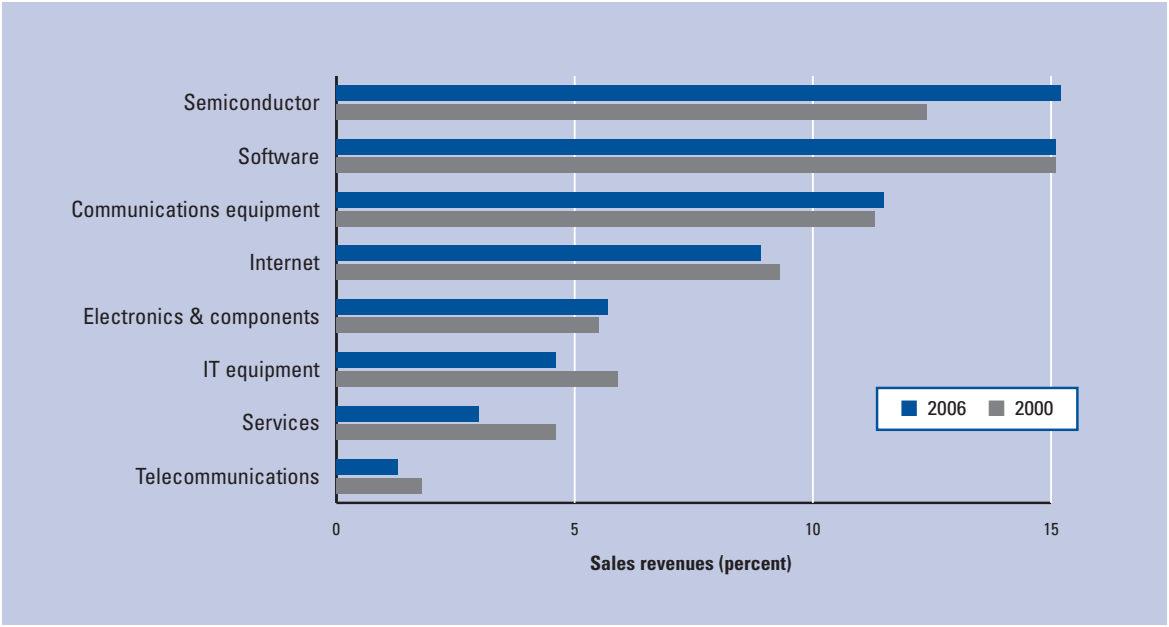
R&D expenditure as a share of sales revenues is another measure of R&D intensity. Semiconductor firms lead by this measure (Figure 6). The top 10 firms in this ranking spent between one-fifth and one-third of their revenues on R&D.

On average, in 2006, semiconductor and software firms were the most R&D-intensive, with average R&D spending equivalent to around 15 percent of revenues. Semiconductor firms had a strong increase in R&D intensity between 2000 and 2006, while IT equipment, services, and telecommunication firms have seen an overall decrease.

IT equipment firms such as Apple, Dell, and Hewlett Packard are often seen as leading innovators, but with R&D intensity below 5 percent they are at the lower end of the top 100 ranking of this variable. Apple's very strong revenue growth, coupled with slower increases in R&D, have led to declining R&D intensities in recent years (3.3 percent in 2007), even though the company is well known for product innovations, leading design and strong branding. Other IT equipment firms with strong consumer product operations from Chinese Taipei and China such as Benq/Qisda, Lenovo, ASUStek, and Acer are also at the lower end of the ranking in R&D intensity, but they tend to innovate most in process technology and supply arrangements. Internet firms such as Amazon and Expedia have stronger R&D intensities (over 5 percent), but they are still far from other US Internet firms such as Google (13 percent) or Yahoo! (16 percent).

Firms from the United States dominate the list of the most R&D intensive. Only one Japanese firm—Advantest (IT equipment)—has been in this top 50 for some years, and some other Japanese companies (e.g., Rohm, Pioneer, Omron, Yokogawa Electric) have oscillated between 50th and 60th place. There are two Chinese communications equipment firms (ZTE and Huawei) in the top 50 most R&D-intensive ICT firms, sharing leading positions with firms such as Juniper

**Figure 6: Average R&D intensity of top ICT firms by sector, 2000 and 2006**




Source: OECD *Information Technology Outlook* database.



Networks, Tellabs, Qualcomm, Motorola, Avaya, and Cisco (all from the United States); Nortel Networks, Research in Motion (both from Canada); Ericsson (Sweden); Alcatel-Lucent (France); and Nokia (Finland).

### ICT-related R&D in other industries

ICT-related R&D is increasingly crucial to technological advances and innovation in non-ICT sectors and products. These include space, defense, infrastructure (e.g., power grids), automobiles, automation, robots, logistics, aviation, health care, environment monitoring, and toys.

A large share of the R&D in non-ICT industries—about one-quarter of economy-wide total ICT R&D—leads to ICT products. Moreover, in some non-ICT sectors, expenditures on R&D that result in ICT products are a large share of total R&D expenditures.[11] Data for European countries show that in the Czech Republic, around 25 percent of ICT R&D in 2006 was performed in non-ICT industries. In Denmark, close to 20 percent of business ICT R&D in 2005 was conducted in non-ICT industries, and in Norway, around 25 percent of ICT R&D was performed outside the ICT sector in 2006.

Within the Asia-Pacific region, in 2006 Japan spent US$5.5 billion on ICT-related R&D activities outside the ICT industry, or 24 percent of economy-wide ICT R&D spending (Figure 7). The biggest share was in transport equipment, which is dominated by the country's carmakers and suppliers, and in electrical and general machinery manufacturing. In Australia, non-ICT-industries were responsible for over 60 percent of all ICT R&D expenditure in 2005–06. Finance and insurance represented 34 percent, largely owing to in-house R&D of large Australian banks.

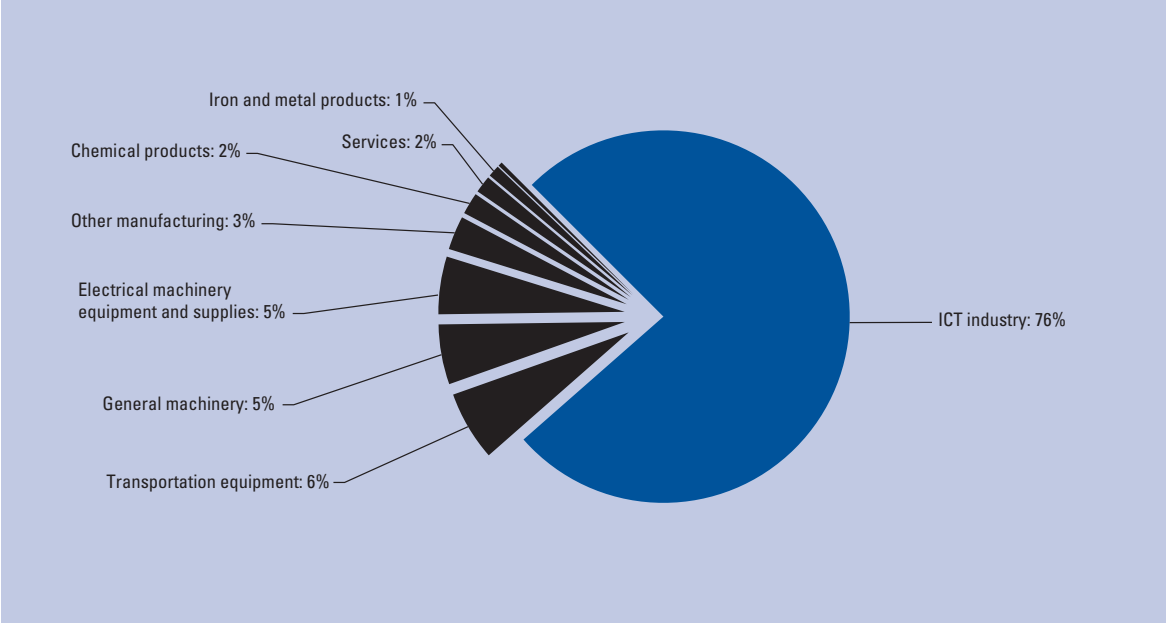
Software development plays a particularly important role in ICT R&D expenditures of non-ICT industries, notably in finance and publishing, but also in manufacturing (e.g., machinery). For example, in the United States in 2005, about 30 percent of software was developed by non-ICT industries—in the chemical, finance and insurance, automotive, and real estate sectors; in other manufacturing activities; and in service activities such as newspapers and architecture.

## Trends in the organization of an increasingly globalized ICT R&D

The ICT sector is R&D-intensive but is also innovative in terms of how it organizes R&D. It has benefited from partnerships with public research and employed a mix of internal and external as well as national and international R&D strategies. While all have been used for many years, the organization of R&D has been changing: collaboration and internationalization of R&D are seen as major sources of innovation for the industry, and there are signs that they are increasing.

In recent years OECD countries have substantially raised their overall public funding for R&D.[12] Data on government budget appropriations or outlays for R&D (GBAORD) show that between 2000 and 2006, gov-

**Figure 7: Japanese ICT R&D expenditures, in ICT and non-ICT sectors, 2006**




Source: Japanese Statistics Bureau, 2007.



ernment R&D budgets in the OECD area expanded by 6.8 percent annually, faster than GDP, although with considerable differences among countries. Because of the complex interactions among research, development, and innovation, the ICT sector has always relied heavily on publicly funded R&D and on partnerships involving government, public-sector research organizations, industry, and universities for long-term basic scientific research. ICT firms are often part of regionally concentrated clusters or set up labs close to universities to benefit from spillovers of public ICT-related R&D. The relative importance of access to public research results increases in times of falling company budgets for basic research.

### Globalization of ICT R&D

The internationalization of R&D is not a new phenomenon, but it is occurring at a much faster pace today. Moreover, it is spreading more widely—to emerging economies as well. In most OECD countries, the share of foreign affiliates in industry R&D is growing as foreign firms acquire local R&D-performing firms (e.g., through mergers and acquisitions) or establish new subsidiaries. Along with the pharmaceutical, biotechnology, chemical, health, and automotive sectors, the ICT industry has considerable foreign R&D investment. ICT firms and public research organizations have increasingly internationalized their activities and are establishing R&D laboratories in, or links with, foreign locations, including in non-OECD countries. The ICT sector thus follows the trend of globalizing R&D activities as multinational enterprises more and more aim at exploiting globally available knowledge and skills.[13]

Yet the available data that are produced with long time lags show that most ICT firms still conduct the majority of their R&D in their home country. In 2005, around 12 percent of business ICT R&D in the OECD was under foreign control, and most international R&D relationships were among affiliated companies rather than between domestic and foreign-owned ICT firms or laboratories. Moreover, the R&D intensity of affiliates abroad is generally far lower than R&D intensity in the home country. The need for secrecy, the strong network effects, the search for spillovers, and the high costs of dispersed R&D centers favor concentrating R&D activities in a few places.

Outside the home country, ICT-related R&D investments are generally within the OECD area, with Japanese and European ICT firms mostly establishing R&D centers in the United States, and US ICT firms mainly establishing centers in Europe and increasingly in Asia (see Box 1). Japan and Korea attract comparatively little foreign ICT R&D.

More recent data, however, would show the rapid increase in internationalization that has occurred since 2005. Globalized business ICT R&D networks now involve leading firms such as Cisco, HP, IBM, Nokia, Motorola, Toshiba, NEC, Microsoft, and Google, which are likely to have between five and ten global ICT research centers. A quarter of Samsung's workforce

### Box 1: R&D activities of US affiliates

US-based non-bank multinational enterprises (MNEs) have more than doubled the value of their overseas R&D activities through their foreign affiliates since the mid-1990s, to US$28.3 billion in 2005 or around 15 percent of total R&D expenditures of US MNEs (home and abroad).[1] In 2005, seven countries—the United Kingdom, Germany, Canada, France, Japan, and, more recently, Singapore and China—accounted for two-thirds of total R&D performed by US foreign affiliates. The share of R&D in computers and electronic products is about 20 percent of total US MNE R&D abroad—a share that has fallen slightly—but the share of ICT services has increased to around 5 percent of total overseas R&D.

**R&D performed abroad by majority-owned foreign affiliates of US parent companies, 2002 and 2005 (current US$ millions)**

| Industry/sector | 2002 | 2005 |
|---|---|---|
| All industries | 21,063 | 28,316 |
| Manufacturing | 18,736 | 24,036 |
| Computers and electronic products | 4,975 | 5,376 |
| Non-manufacturing | | |
| Information services and data processing services | 24 | 657 |
| Computer systems design and related services | 447 | n/a |

Source: National Science Board, 2008; Bureau of Economic Analysis, 2007.
Note: Data for Computer systems design and related services for 2005 are suppressed for reasons of confidentiality.
1. BEA 2007, Table 3.6.

(36,000 employees) is involved in R&D with facilities in Korea, India, China, Russia, the United States, and Japan. Global innovation networks also increasingly involve smaller firms.[14]

The internationalization of ICT R&D more and more entails establishing ICT R&D centers in emerging economies. The sector is one of the first to have transformed these into fully fledged elements of globalized research networks. Despite internationalization, R&D activities remain tightly clustered, as in previous national examples.[15] Only a few non-OECD locations are increasingly involved on a larger scale: China (Shanghai and Beijing), Israel (Haifa), India (Bangalore and Delhi), Russia (Moscow and St. Petersburg), and, to a lesser extent, cities in Chinese Taipei, Malaysia, and Singapore.

Affiliates under foreign control continue to devote a smaller share of turnover to R&D than do national firms. However, in contrast to a few years ago when foreign R&D, particularly in developing countries, mainly reflected an investment requirement or the mere need to adapt product for the local market, some foreign research activities now complement headquarter research activities. For example, Hewlett Packard's data mining in Russia, IBM's research on speech technologies in India and embedded systems in China, and Intel/Yahoo!'s software or search technologies in Israel all draw on the local talent pool of domestic firms and research organizations. In addition, ICT firms from emerging markets (e.g., Huawei, Tata) increasingly have their own globalized innovation networks.

### Collaborative R&D and "open innovation" on an international scale

The terms *collaborative R&D* and *open innovation* are more and more used to characterize new forms of R&D and innovation that rely less on traditional in-house R&D and more on collaborating on research and innovation with universities, public laboratories, other firms, and other knowledge sources. Major incentives include cost and risk reduction (especially for pre-competitive R&D) and possibilities of entering new markets with jointly developed technologies.[16] Such collaboration is increasingly international and spans across various ICT sectors and adjacent industries (e.g., biotechnology).

Externally organized R&D activities of the ICT business sector have mainly taken the following forms:

- partnerships, framework agreements, or R&D contracts with universities, R&D laboratories, and research institutes, often with a focus on longer-term R&D (including the creation of joint laboratories or high-technology zones by ICT firms on university campuses);[17]
- the involvement of PhD and postdoctoral researchers in the work of company R&D labs;
- R&D partnerships, industrial technology alliances, and consortia of ICT firms (some focused on upstream research and some on product co-development); and
- prospecting for new ideas from individuals and startups with promising research (including through venture capital, incubation and acquisitions, and new participative web strategies).

These trends have strengthened with the greater internationalization of collaboration and the development of global innovation networks. ICT R&D has become more modular and increasingly takes place outside the OECD region. The internationalization of R&D in general is also driven by the growing use of ICT as the basic international science and technology infrastructure (e.g., broadband research networks), by programs that encourage international research collaboration (e.g., the EU's Seventh Framework Programme (FP7) focuses on cooperation with entities from Asian countries) and by

specialized organizations (e.g., the International Technology Roadmap for Semiconductors). Long-standing public research organizations (Fraunhofer ICT institutes in Germany, Battelle in the United States, VTT in Finland, or TNO in the Netherlands) also increasingly form global research alliances or public-corporate R&D consortia.

At the firm level, Asia is becoming the target for new collaboration, both within Asia (e.g., co-development of optical storage media by Samsung and Toshiba) and between OECD ICT firms and Asian partners. Chinese and Indian firms in particular have become strategic research partners for OECD ICT firms (e.g., Siemens and China's Huawei; Ericsson and China's Datang Telecom on alternative 3G network protocols; Agilent and China's Chengdu Qianfeng on communication test equipment; Microsoft and India's Infosys on enterprise resource planning software; Yahoo! and India's Tata on cloud computing). OECD ICT firms also collaborate with Asian universities (e.g., Philips with China's Zhejiang University, US Xybernaut with Beijing University of Aeronautics for software solutions). A few alliances are also forming between Indian and Chinese ICT firms (mainly in the area of software and ICT services) and between Russian and Chinese ICT firms (e.g., Russia's Sitronics and ZTE for global navigation satellite systems).

Besides the new collaboration with Asia at the firm level, R&D partnerships and alliances have encompassed different ICT subsectors, often with links to universities. Semiconductors and microelectronics pioneered such collaboration in the ICT sector in the 1970s. Recent examples include (1) the Reliable Adaptive Distributed Systems Laboratory (RAD Lab) at the University of Berkeley, which is supported by Google, Sun Microsystems, Microsoft, Siemens, Oracle, Cisco and others; (2) RESERVOIR, a research initiative led by IBM in the field of cloud computing, with support from the EU FP7, involving ICT firms from the United States (e.g., Sun Microsystems), the European Union (e.g., SAP, Telefonica), and European universities; (3) Microsoft's and Intel's joint funding of academic research into software development for parallel computing, business intelligence, and radio-frequency identification (RFID); and (4) the joint laboratory for large-scale computer network research formed by the Chinese companies Baidu and Huawei. Collaboration between ICT firms on horizontal topics such as the environment is also more and more common (e.g., the StEP initiative for e-waste).

ICT R&D is also becoming more interdisciplinary, with more research involving nanotechnology, biotechnology, and ICT firms. Such collaboration has not been widely publicized (e.g., Sun Microsystems and SimBioSys for pharmaceuticals; the BioIT Alliance, co-founded by Microsoft, HP, Sun Microsystems, and pharmaceutical and biotechnology companies; Google's investment in 23andMe, a company providing personalized genome analysis).

Finally, a growing number of research partnerships have formed around open standards or common technology platforms. The Open Handset Alliance (formerly Google Android) engages in developing an open source mobile platform: its over 30 members include Google, Broadcom, Intel, China Mobile, KDDI, and Samsung. Further examples of joint handset development platforms include the LiMo Foundation (whose founding members are Motorola, NEC, NTT DoCoMo, Orange, Panasonic, Samsung, and Vodafone) and the joint venture Symbian, which was taken over by Nokia in December 2008 to develop it as a nonprofit organization with many partners in bases in Europe, Korea, Japan, the United States, China, and India. Open source software development and the rising co-development of application interfaces and services are also leading to collaboration and externally focused ICT R&D. The Eclipse Foundation is an open source platform supported by IBM that creates development environments—for example, for enterprise software. Yahoo! partners with the Apache Software Foundation on the development of Hadoop, an open source project for distributed computing and data-intensive applications that is being used for commercial purposes by Amazon Web Services, as well as for research into distributed computing by Yahoo! in collaboration with Computational Research Laboratories (India), IBM, and Google.

In sum, ICT companies increasingly use in-house R&D and their knowledge base (including their intellectual property portfolios) to build more and more complex global innovation networks, to shape global standards, to develop platform strategies, and to access globalizing markets for knowledge workers.[18]

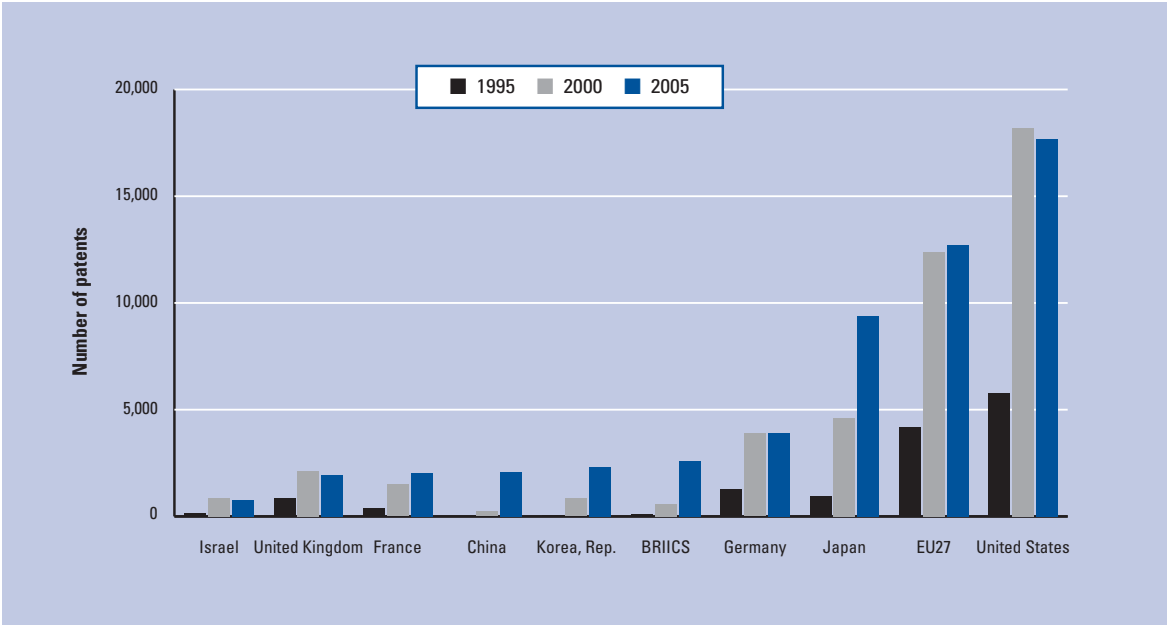
According to Innovation Surveys, the ICT sector is one of the most collaborative sectors after the energy and chemical industries.[19] Among innovative ICT firms in four EU countries, about 34 percent engage in some type of collaboration for innovation (versus 24 percent of all firms), and 13 percent of ICT firms cooperate with universities and public research organizations (versus 8.5 percent of all firms).

In spite of these examples, there are few comparable data on expenditures or on the impact of R&D collaboration and alliances. Some of the available data suggest that ICT firms and institutions have a large array of cooperative activities, particularly of an exploratory nature, but that the competitive dynamics of the industry mean that most development and innovation close to market is still often tightly held within firms. The organization of joint R&D projects continues to raise potential difficulties relating to the sharing of research results and the protection of strategic company information.

### Internationalization of ICT-related patents

The number of ICT-related patents grew significantly from the mid 1990s to 2005, when some 50,500 international ICT-related patent applications were filed under

**Figure 8: ICT-related patents filed under the PCT, by country, 1994–2005**




Source: OECD, Patent database, June 2008.
Note: BRIICS stands for Brazil, Russia, India, Indonesia, China, and South Africa, all of which are OECD accession or enhanced engagement countries.



the Patent Co-operation Treaty (PCT) with an average increase of 16 percent a year (CAGR) over 1995–2005.[20] From 2000 to 2004, ICT was the third fastest growing technical field among PCT international applications (an increase of 28 percent), behind medical (up 32.2 percent) and audiovisual technology (up 28.3 percent).

The United States, Europe, and Japan continue to lead in terms of total PCT applications (Figure 8). The number of ICT-related patents grew considerably in Korea and in China, with 2,308 and 2,099 international patents, respectively, in 2005; Chinese ICT patents more than doubled between 2004 and 2005. Resident ICT patent filings in the home country have grown particularly significantly in Korea and China. The main drivers are Samsung (Korea), LG Electronics (Korea), Huawei (China), Electronics and Telecommunications Research Institute (Korea), ZTE (China), and NHN (Korea).

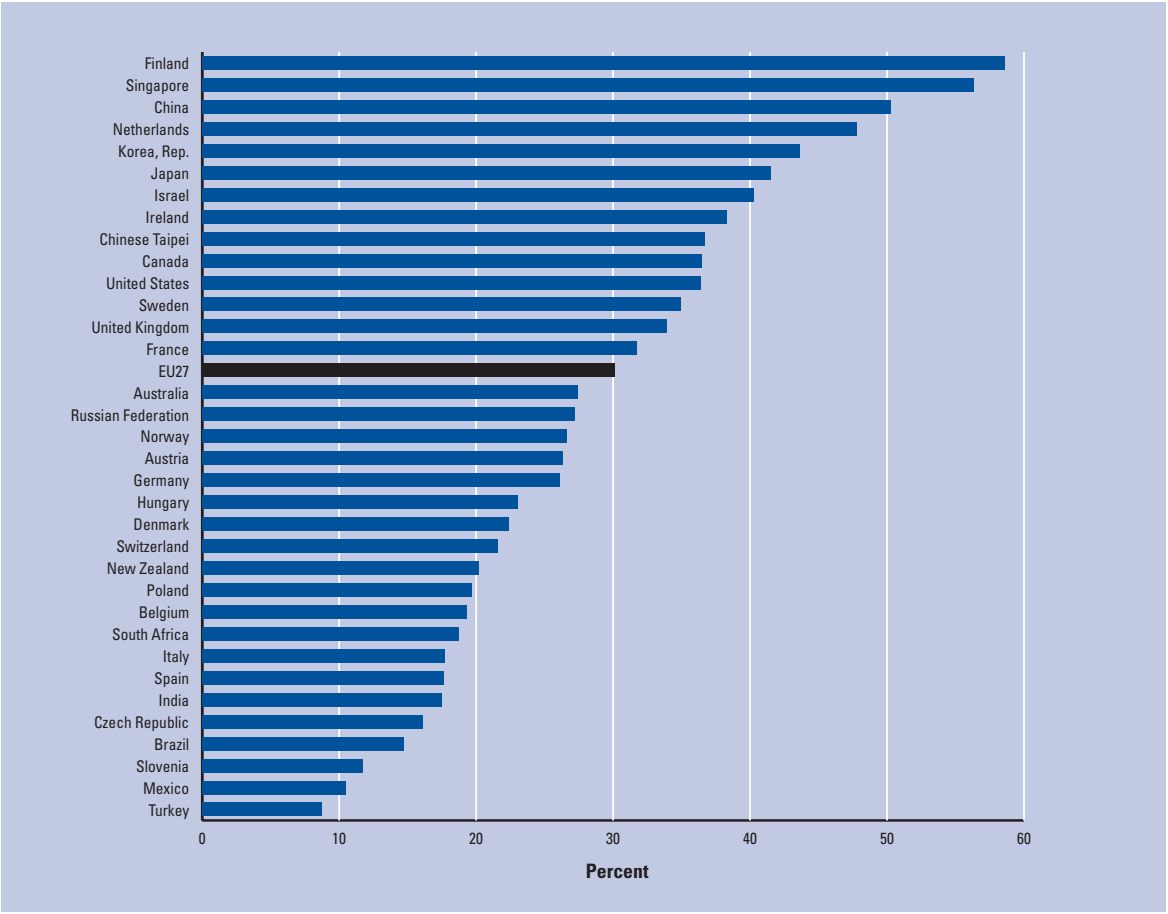
ICT-related patents represent on average 35 percent of total PCT filings, and the share of ICT patents has been rising in almost all countries since the late 1990s (Figure 9). The shares are higher in some countries owing to the focus on ICT inventions in Finland (59 percent of all national PCT filings), Singapore (56 percent), the Netherlands (48 percent), Korea (44 percent), and Japan (41 percent). The proportion of ICT patents in total Chinese filings tripled in a decade, from 17.3 percent in 1996–98 to 50.3 percent in 2002–05. India, Russia, South Africa, Brazil, Chile, and other OECD-enhanced engagement or accession countries are lower, with Israel as the exception. The United States (35 percent of all ICT-related patents), Japan (18 percent), and Germany (8 percent) lead in ICT-related patenting under the PCT and together make up well over half of ICT patent filings. Korea stands sixth, just before China, which is ahead of many other OECD economies.

Patent data also reveal that ICT patents are more internationalized than patents of other sectors: 17.5 percent of all ICT patents granted between 2001 and 2003 involve cross-border ownership.[21] Non-OECD countries such as China, India, Brazil, and Russia still show a high level of foreign ownership in ICT-related patents. Patent data also confirm the growing role of non-ICT industries in ICT R&D and innovation. In Europe, for example, the automotive sector accounted for 4 percent of total software patents.[22]

Clustering on international level is also evident when looking at patent data. Table 3 shows the regional clusters with the greatest intensity of ICT patenting. Next to other regions in the OECD, Japan, the United States, and Korea take up the first spots. China and Israel are now also represented in this ranking.

ICT firms occupy the top positions with respect to patents granted or applications for patents. Patent grants result from applications a few years earlier and are more a retrospective than prospective indicator. As shown in Table 4, 18 ICT firms are among the first 20 firms with patents granted by the United States Patent and Trademark Office (USPTO).

## Figure 9: Revealed technology advantage of countries in ICT, 2003–05




Source: OECD, Patent and REGPAT Databases, June 2008; EPO *Worldwide Statistical Patent Database,* October 2007.
Note: Patent counts are based on the priority date and the inventor's country of residence, and use fractional counts on PCT filings at international phase (European Patent Office, or EPO, designations). The figure shows the share of ICT in the country's patents relative to the share of ICT in total patents, by country. Only countries/economies with more than 250 patents over the period are included in the graph.

## Table 3: Top 15 regions in ICT-related patents, 2003–05

| Region[1] | Country | ICT patents | Share (%) of total |
|---|---|---|---|
| Tokyo | Japan | 9,382 | 6.8 |
| San Jose–San Francisco–Oakland | United States | 8,576 | 6.2 |
| New York-Newark-Bridgeport | United States | 4,420 | 3.2 |
| Capital region (Seoul–Incheon–Gyeonggi-do) | Korea, Rep. | 4,412 | 3.2 |
| Noord-Brabant | Netherlands | 3,801 | 2.8 |
| Boston–Worcester–Manchester | United States | 3,579 | 2.6 |
| Kanagawa | Japan | 3,390 | 2.5 |
| San Diego–Carlsbad–San Marcos | United States | 2,788 | 2.0 |
| Osaka | Japan | 2,701 | 2.0 |
| Los Angeles–Long Beach–Riverside | United States | 2,687 | 2.0 |
| Île de France | France | 2,424 | 1.8 |
| Oberbayern | Germany | 2,295 | 1.7 |
| Shenzhen–Guangdong | China | 2,033 | 1.5 |
| Seattle–Tacoma–Olympia | United States | 1,998 | 1.5 |
| Israel | Israel | 1,974 | 1.4 |

Source: OECD, Patent and REGPAT Databases, June 2008 (see also OECD, 2008f); EPO *Worldwide Statistical Patent Database,* October 2007.
Note: Patent counts are based on the priority date and the inventor's country/region of residence, and they use fractional counts of PCT filings at international phase (EPO designations).
1. The regional breakdown is presented at EU's Nomenclature of Units for Territorial Statistics (NUTS) level 2, except for Japan (NUTS 3), the United Kingdom (NUTS 1), and the United States (TL 3). In this breakdown, smaller countries such as Denmark and Israel are treated as regions.

**Table 4: ICT firms among the top 20 patenting firms, 2007**

| Rank | Firm | Country | Number of patents |
|---|---|---|---|
| 1 | IBM | United States | 3,125 |
| 2 | Samsung | Korea, Rep. | 2,723 |
| 3 | Canon Inc | Japan | 1,983 |
| 4 | Matsushita Electric Industrial | Japan | 1,910 |
| 5 | Intel | United States | 1,864 |
| 6 | Microsoft | United States | 1,637 |
| 7 | Toshiba | Japan | 1,519 |
| 8 | Micron Technology | United States | 1,476 |
| 9 | Hewlett Packard | United States | 1,466 |
| 10 | Sony | Japan | 1,454 |
| 11 | Hitachi | Japan | 1,381 |
| 12 | Fujitsu | Japan | 1,293 |
| 13 | Seiko Epson | Japan | 1,205 |
| 15 | Infineon Tech AG | Germany | 847 |
| 17 | Texas Instruments | United States | 749 |
| 18 | Ricoh | Japan | 727 |
| 19 | Siemens | Germany | 698 |
| 20 | LG Electronics | Korea, Rep. | 682 |

Source: USPTO, 2008.
Note: The USPTO does not publish patent applications but patents granted. Figures show the total number of patents granted to these firms, in all industries, and not only ICT-related patents



The majority of the top 20 patent applicants in Europe, Japan, and under the PCT are ICT firms: 13 out of 20 in Europe, 14 out of 20 in Japan, and 16 out of 20 under the PCT.[23] No ICT firm from outside the OECD region or from OECD accession/enhanced engagement countries is in the top 20 firms granted patents in the United States or among the top 20 applicants at the European Patent Office (EPO) or the Japan Patent Office (JPO). The picture is different for applications under the PCT. Whereas Huawei occupies slot number 93 at the EPO (1,365 applications in 2007, according to Eurostat 2007), it is in fourth position for PCT patent applications.

Patent applications rose by 41 percent from 2006 to 2007 at the Chinese patent office (SIPO), owing in large part to ICT applications (mainly for communications equipment). Huawei, with 1,544 applications, ranked first in 2007. Four out of ten patent applications came from foreign entities, with firms from Chinese Taipei among the top ten applicants. Samsung was the leader in foreign patent applications in China. Matsushita Electric Industrial, Philips, and IBM were also among the leaders.

Strong growth in ICT sector patenting is first and foremost a result of high R&D expenditures and the innovative nature of the ICT sector. It also reflects the trend toward more patenting, new ICT subsectors, patenting by non-OECD ICT firms, and the rise of new forms of patenting—for example, of software or business methods in certain OECD countries. Additional drivers are strategies to take out multitudes of patents (so-called patent thickets) or to bring technologies to market; interest in licensing technologies, including by firms specializing in patenting; the desire to ward off patent disputes; and the building of a domestic technology base to avoid paying royalties.

The ICT sector has also played a leading role in post-R&D alliances, product innovation, and other innovation related to intellectual property. ICT firms have long been, and are increasingly, engaged in strategies involving, for example, technology cross-licensing (including to competitors), the creation of patent pools (e.g., the MPEG-2 patent pool), patent clearinghouses, and the granting of patents to wide communities of users (e.g., IBM). These commercial exchanges of intellectual property allow for combining patented technologies from various sources into new products, for potentially avoiding patent disputes, and for facilitating product innovation at lower costs.

However, the overall impact of increased patenting and of new intellectual property alliances on innovation and the patent system remains unclear. Patent data need to be complemented by research that seeks to establish better patent quality indicators and links with the measurement of innovation.

## Conclusion

The ICT industry leads in R&D expenditures, employment, and patents; the software and semiconductor sectors are particularly R&D-intensive. The share of ICT R&D conducted in non-ICT industries is also high (about one-quarter of total ICT R&D), and in some non-ICT sectors, ICT R&D spending (especially software-related) accounts for a large share of total R&D. The United States and Japan still have a large lead in terms of ICT firms' R&D expenditures and of ICT firms that spend the most. Korea has caught up impressively in this area. Although some other OECD and non-OECD countries also have relatively high levels of ICT R&D spending, ICT R&D expenditures from non-OECD ICT firms (especially from China and India, but also other emerging economies) are still comparatively low. However, new ICT firms from non-OECD countries are emerging rapidly, are increasingly R&D-intensive, and are rapidly forging new partnerships with OECD ICT firms and research organizations.

The organization of R&D in the ICT sector continues to evolve, in particular around new kinds of collaboration involving emerging ICT subsectors or common standards and technology platforms. The sector's research activities are increasingly international, although ICT firms commonly form global R&D networks with a limited number of R&D centers located in only a few locations. Moreover, the reliance on long-term ICT-related public R&D and public-private collaboration continues to be important for the ICT sector. There has been a striking growth in the number of ICT patents from the OECD region (in particular from Korea) but

also from non-OECD ICT firms (e.g., some Chinese firms). The impacts of this patent increase—that is, whether this increase spurs or deters innovation—merit more study.

## Notes

1 OECD work on ICT R&D and innovation is conducted in the recently published *OECD Information Technology Outlook 2008* and in the context of the OECD Innovation Strategy (www.oecd.org/innovation/strategy). The topics of globalization of R&D activities and open innovation are elaborated in more detail in OECD 2008a, b, c, and d. The OECD develops the guidelines for international measurement of R&D, innovation, and patents. See OECD 2002, 2006, 2008e.

2 OECD 2008a.

3 The BRICS countries are Brazil, Russia, India, China, and South Africa.

4 The OECD 21 countries are Austria, Australia, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, the Netherlands, Norway, Poland, Portugal, Spain, the United Kingdom, and the United States.

5 The EU15 countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

6 See also Jaruzelski and Dehoff 2007.

7 In compliance with the policies of the authors' institution, this chapter exceptionally employs OECD's terminology for Taiwan, China.

8 In May 2007, OECD countries agreed to invite Chile, Estonia, Israel, Russia, and Slovenia to open discussions for membership in the Organisation and offered enhanced engagement, with a view to possible membership, to Brazil, China, India, Indonesia, and South Africa. The approval of "road maps" in December 2008 marks the start of accession talks with Chile, Estonia, Israel, Russia, and Slovenia. See http://www.oecd.org/document/33/0,3343,en_2649_34487_38603809_1_1_1_1,00.html.

9 OECD 2009.

10 See OECD 2006.

11 Not considered is ICT research that leads to non-ICT products that can also be identified in product-field data.

12 OECD 2008a.

13 Wunsch-Vincent 2000; OECD 2008a, 2008c.

14 Ernst 2008.

15 In the United States, for example, 70 percent of the R&D performed by all domestic and foreign computer and electronic firms in 2005 took place in four locations: Cambridge and Route 128 in Massachusetts; the Silicon Hills of Austin, Texas; Champaign County in Illinois; and Silicon Valley in California.

16 Freeman and Soete 2007.

17 Examples of partnerships with universities include Oracle and the European Organisation for Nuclear Research (CERN) for grid-computing technologies; Microsoft, Nokia, Hitachi, and Toshiba with research centers at the University of Cambridge; and Fujitsu with the Universities of Tokyo and Cambridge on quantum technologies.

18 Ernst 2008; Dedrick and Kraemer 2008.

19 OECD, based on the Fourth European Community Innovation Survey (CIS4).

20 See OECD 2008c.

21 OECD 2008c.

22 Hall et al. 2006.

23 See OECD 2008e for methodology.

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# Part 2

# ICT as a Bridge to Increased Growth and Competitiveness: Selected Case Studies

CHAPTER 2.1

# How Outsourcing Can Help Mobilize Talents Globally: Egypt's Success Story

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> Egypt's strategy is based on the development of outsourcing capability with the objective of competing efficiently worldwide and maximizing the revenues generated by the investments in this industry.
>
> *—Dr. Tarek Kamel, Minister of Communications and Information Technology, Egypt*

Under the current wave of globalization, a variety of new forms of international trade has emerged, accompanied by profound changes in the ways in which talents can be mobilized and combined across national borders. Outsourcing has become one major component of this new landscape, and Egypt one of its champions.

The outsourcing market continues to grow. With some estimates placing the value of the total worldwide outsourcing market, including information technology outsourcing (ITO) and business process outsourcing (BPO), at almost US$300 billion at the end of 2007—an increase of about 19 percent over the previous year—service providers and their enterprise customers are seeking new regions where low-cost, high-quality work can be done.

From the point of view of emerging economies, outsourcing represents an innovative way of benefitting from globalization while offering international businesses new ways of mobilizing talents worldwide, and at the best price. Over the last 20 years or so, countries such as India, China, and other Asian economies have significantly benefited from the outsourcing wave. Progressively, several middle-income countries in Europe (Hungary and Poland, for example), Latin America (Mexico and Brazil, for instance) and the Middle East (Egypt, the United Arab Emirates, and Jordan, in particular) also became outsourcing hubs.

The evidence shows that outsourcing has entered a new phase, whereby emerging countries are no longer just offering lower-cost labor to accomplish unsophisticated tasks (the "airline stubs" syndrome). Instead, through outsourcing, they can create jobs of growing quality and sophistication, with significant positive spillovers on their respective national processes of economic growth, technological development, and skills upgrading.

In this new context, the experience of Egypt is remarkable. Many observers see this 80 million person economy as the emerging gateway for outsourcing in the Middle East. This emergence, however, did not happen by chance.[1] The purpose of this chapter is to show



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how Egypt's success in the area of outsourcing has been the result of a carefully built strategy to create the proper environment for business and generate the required spirit of mutual trust and partnership.

### Building a network of trust and partnership with global business

Egypt's road to success in outsourcing started with a limited number of small steps. One pioneering experience was developed with IBM. The company started its presence in Egypt with a small application development center, which was an early precursor of outsourcing. It picked up momentum in the late 1990s, when the IT outsourcing pace began to speed up. The first project undertaken by IBM in Egypt was to "Arabize" some IT projects; this was followed by software development projects.

By the end of the 1980s, the Information Decision Support Centre (IDSC) of the Egyptian Cabinet was established with the aim of introducing information communication technologies (ICT) within the Egyptian government and leveraging it for the country's socioeconomic development. Later on (by the end of the 1990s), President Mubarak announced the launching of a national program for ICT in Egypt along with the establishment of a new Ministry of Communications and Information Technology (MCIT) headed by Dr Ahmed Nazif, who later became Egypt's Prime Minister. In 2004, the Egyptian government, represented by the MCIT, realized the importance of establishing by law a specialized entity, the Information Technology Industry Development Agency (ITIDA),[2] which would shoulder the major role of developing Egypt's IT industry through the implementation of special programs tailored to attract foreign direct investment (FDI) to Egypt. The targets were private investors, private companies, and multinational corporations (MNCs), with a particular focus on BPO activities. This renewed focus on BPO, call centers, and technical support centers was very successful: from 2004 to 2008, the total volume of Egypt's offshore industry grew from US$100–150 million to US$700 million.

In recent years, seizing a larger share of the global outsourcing market has become a priority objective for the Egyptian government. Several key measures have been implemented to achieve this goal, with immediate results: in 2007, Egypt was ranked 13th as an outsourcing destination, according to the A.T. Kearney Global Services Location Index.[3] This puts Egypt ahead of delivery locations in Eastern Europe such as the Czech Republic, Hungary, and Poland, as well as other African locations such as South Africa and Tunisia.

### A closer look at the ingredients of Egypt's current outsourcing strategy and initiatives

A more detailed analysis of Egypt's strategy vis-à-vis the BPO market offers important lessons with regard to how a country can become a regional leader in outsourcing while maximizing the resulting benefits within its own national economy. Among the key components of this strategy, Egypt's national vision and framework and its national strategy deserve particular attention, as well as some of the key initiatives they allowed and supported.

#### National vision and framework

The Egyptian national vision is mainly focused on attracting more FDI, especially in BPO activities, in view of its positive spillover on employment rates. This is carried out through a comprehensive framework that aims to attract more MNCs that are interested in BPO, encouraging technology and know-how transfer and building qualified human capital that would meet international standards while being cost-competitive.

#### National strategy

The national strategy established for the development of the BPO market in Egypt is defined by the *ITIDA's strategy grid,* which includes the following pillars:

- Ensure that all requirements (human resources, infrastructure, legislative matters, etc.) are ready and available. This was a prerequisite for promoting Egypt as a BPO destination.
- Enhance the volume and quality of the local talent pool, particularly through the training of 4,500 university students (this is expected to scale up to 40,000 students within three years) with a view of enhancing their skills in order to make them able to contribute to the BPO segment.
- Promote Egypt as a BPO destination using the services of a world-class public relations company.
- Offer ready-made incentive packages tailored to suit all investors in accordance with the numbers of positions to be deployed in Egypt, training and telecommunications costs, and so on.
- Encourage local companies to cooperate with foreign investors.
- Provide single-window clearance, thanks to full cooperation from relevant governmental agencies and authorities.

### Key initiatives

Egypt has been undertaking many initiatives with the objective of creating an attractive and conducive business environment for multinational organizations. The government announced the development of a new delivery business hub, called *Maadi Investment Park,* which is specifically aimed at attracting BPO companies. This hub will be centrally located in Cairo and easily accessible by public transportation. Moreover, a UK-based company (SpinVox) has signed a deal to establish a business center in Alexandria, while several other leading MNCs are also actively considering Alexandria as a business hub.

MCIT also took a number of initiatives focusing on the development of the necessary high-quality human capital needed to drive forward the IT and BPO industries:

- **Talent building:** The National Telecom Institute (NTI), the Information Technology Institute (ITI), and the E-Learning Competence Center (e-LCC) are providing specialized ICT training programs. An internationally competitive IT industry requires a strong pool of local talents. Over the next four years, MCIT will focus on the enhancement of specialized technical skills as well as on programs that provide participants with additional soft and business skills. MCIT will also transform the basic ICT literacy programs into certification programs and will provide academic programs to develop managerial and business skills for practitioners in the ICT sector.

- **Developing research:** MCIT championed the establishment of the Nile University, a high-tech, nonprofit research and development institution specialized in engineering technology and business administration. The university's Executive Development Program, designed in collaboration with the Egyptian Foundation for Technology Education Development (EFTED), offers general management training courses for middle- to senior-level managers working in both private- and public-sector companies in the Middle East region.

- **Providing strategic training:** The Software Engineering Competence Center (SECC) is providing Capability Maturity Model (CMM) and Capability Maturity Model Integrated (CMMI) services to local software companies, offering technical and financial support to help them achieve level 2 and 3 CMMI accreditation. Project staff members provide consulting advice, training, pre-appraisal, and formal appraisal services. The project's goal is to train software engineers on software standards application as part of the system development life cycle. It also aims at offering training on data collection and analysis, strategic planning, and business models. The SECC, in partnership with the Customer Operations Performance Center (COPC), is also involved in providing technical and financial support to Egypt's contact center industry to help it compete at the world level.

- **Developing basic BPO skills:** A pilot university project has been launched to train 5,000 students on basic BPO skills. This course is being offered to final year students in Cairo University, Ain Shams University, and Alexandria University. MCIT has roped in the leading BPO partners, such as IBM, Infosys, and Firstsource, to be the content developers and to train the trainers and delivery partners in this important talent-enablement program. The aspiration of MCIT is to scale this program to 20,000 students in the next two to three years and, in parallel, launch a finishing school program also scaling up to 20,000 students by 2011–12.

- **Adding partnerships:** One of the initiatives hosted by ITIDA is implemented by McKinsey & Company. Known as the *Talent Pool Initiative,* or "Edu-Egypt," its main goal is to enhance the supply of talent pool within universities and train 4,500 students in the next academic semester. It is expected to scale up to 40,000 students within the next three years. This will work for both the outsourcing and the captive industry in BPO service lines. This program is being designed and customized for Egypt by Indian BPO service providers (IBM Daksh, Infosys BPO, and Firstsource) and will cover English language and voice training (including grammar, accent, mother tongue influence neutralization, comprehension, and writing), soft skills and presentation skills, customer servicing, culture sensitivity, analytical and reasoning skills, and basic personal computer and data skills.

## Sources of Egypt's advantage and success in BPO

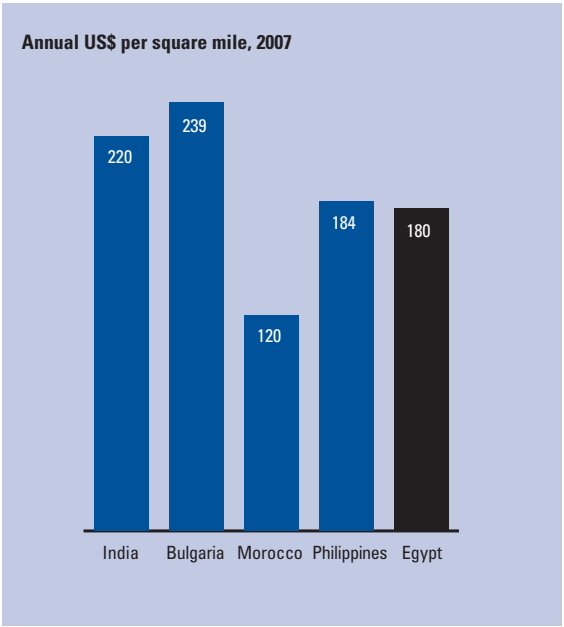
The following ingredients deserve particular attention in the context of Egypt's goal to be among the top five BPO destinations within the next 10 years: attractive costs, a competitive pool of human resources, a stable macroeconomic environment, strategic geographical locations, government support, telecommunications infrastructure, and an improved business environment.

### Attractive cost of operation

Egypt's cost competitiveness is not only sustainable but also expected to improve. This is primarily due to the low cost of human resources, telecommunications, and infrastructure (see Figure 1). It is possible to hire

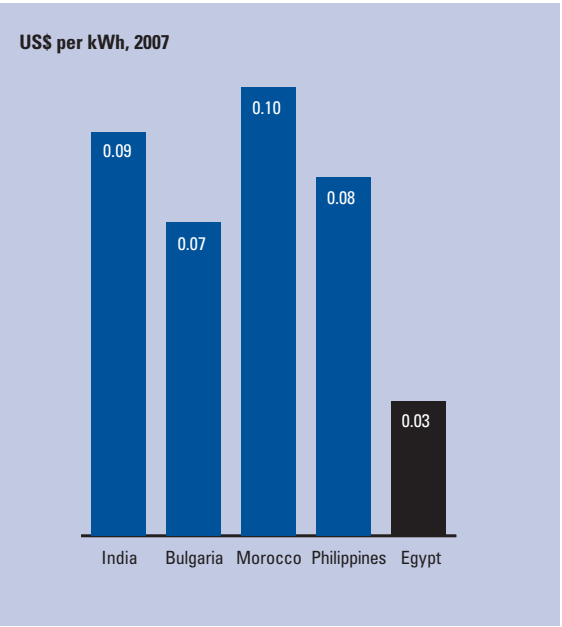
## Figure 1: Egypt's cost advantage in ICT

1a: Real estate cost




Source: McKinsey Global Institute, 2008b.

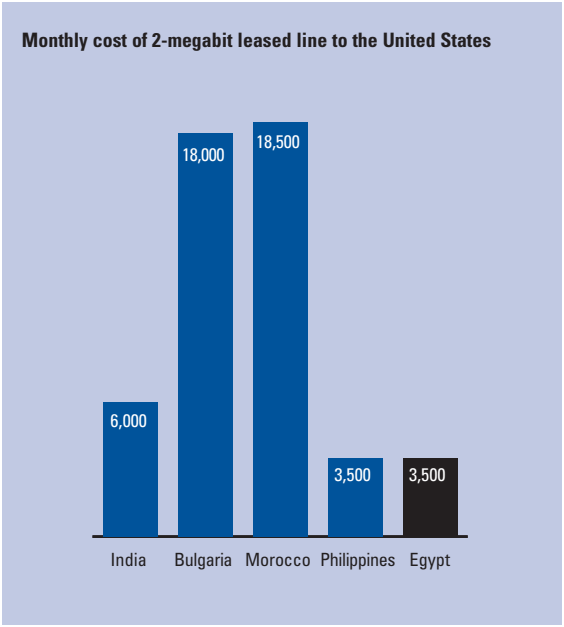
1b: Electricity cost (commercial)




Source: McKinsey Global Institute, 2008b.

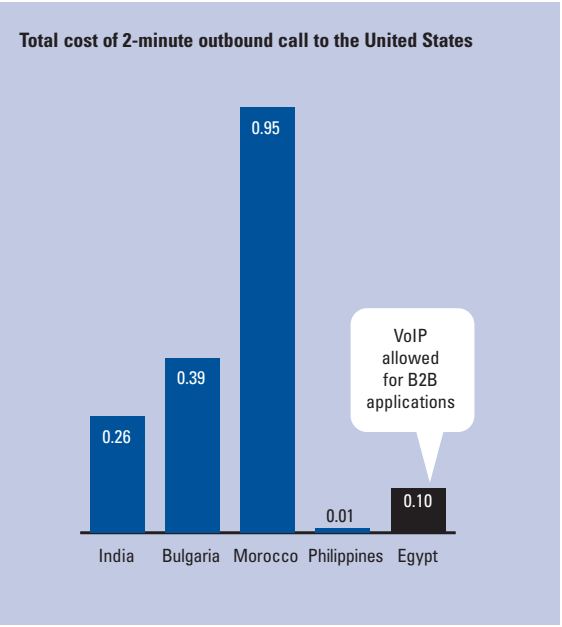


1c: Internet usage charges




Source: McKinsey Global Institute, 2008b.

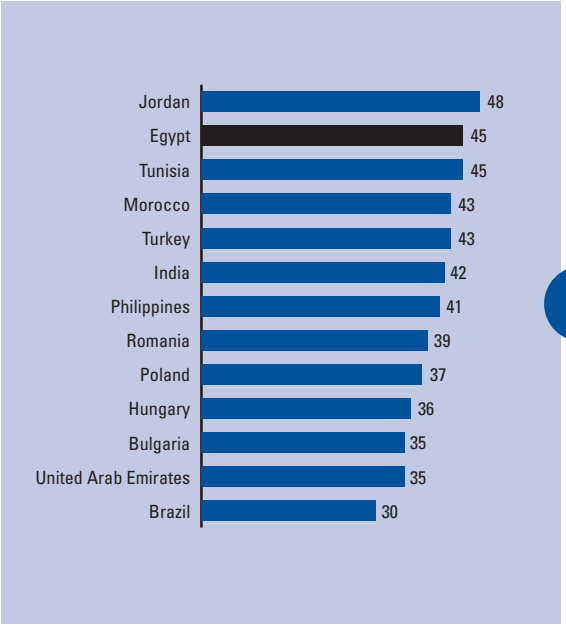
1d: Telecommunications cost




Source: McKinsey Global Institute, 2008b.

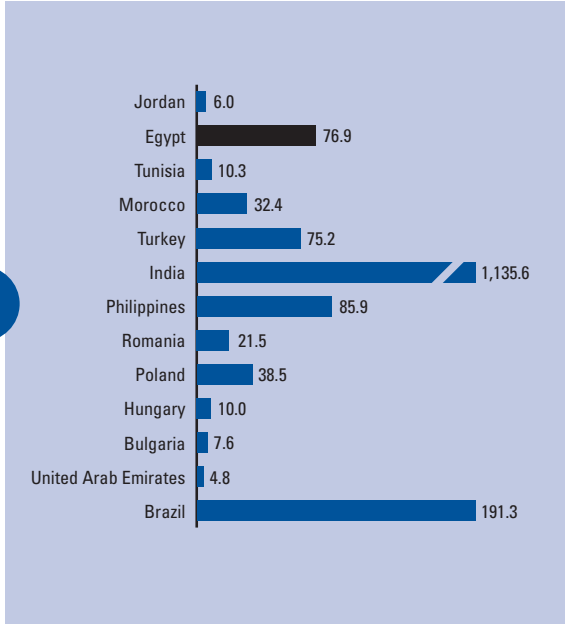
**Figure 2: Egypt's population**

2a: Population 15–39 years old, percent (2007)




Source: McKinsey Global Institute 2008b.

2b: Population size, millions (2007)




Source: UNFPA, 2007.



high-quality BPO agents in Cairo for US$225 to US$250 per month, whereas for other established and emerging countries—such as the Philippines and India—the figure is about twice as high. Real estate, electricity, and telecommunications costs are also competitive.

### A strong focus on human resources

Egypt's large population (close to 80 million) is also young, with an average age of 24 (see Figure 2). This constitutes a strong advantage in a world in which talent needs to be built (or upgraded) at a rapid pace. Egypt is rich in talented, skilled workers who are eager to work and value multilingual abilities. Egypt has also been able to build on its familiarity with Western culture and its long-established international educational institutions (English, French, and German high schools and universities).[4]

Moreover, around 330,000 students graduate annually from universities in Egypt; hence the total number of multilingual and therefore suitable talent pool willing to work in the BPO industry in Cairo is estimated to be at least 24,000. Combined with its solid base of IT and technical skills, this provides Egypt with a strong critical mass of talents available to the global BPO industry (see Figure 3). Together with an advantageous geographical position (Egypt is at the crossroads of Europe, the Middle East, and Africa, and is in a favorable time zone for working with Europe-based companies), such elements have helped Egypt to make attractive value propositions to the global BPO industry.

### Leveraging Egypt's stable macroeconomic environment

With an average growth rate of 7 to 8 percent a year, a fairly stable currency, and strong financial and credit markets, Egypt has been an attractive business and investment destination over the last decade. This has been reinforced by the government's policy of allocating a substantial portion of public investment to the development and improvement of infrastructure, especially telecommunications.

Figure 4 shows the evolution of total investment from 2003 to 2007.

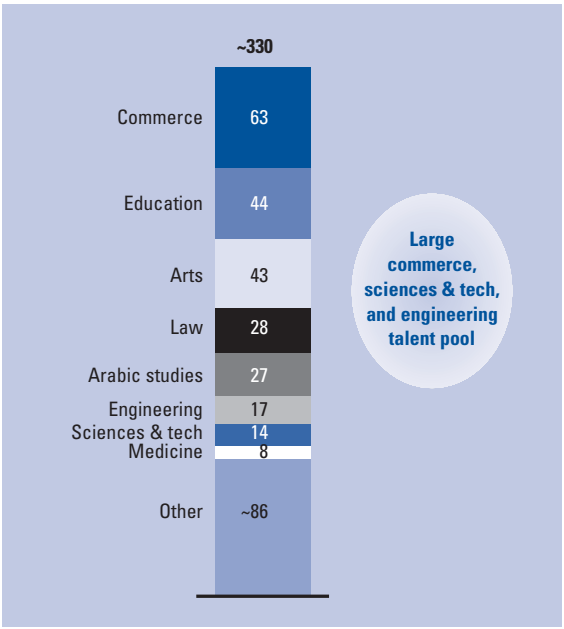
The Egyptian government has leveraged its advantages by offering incentive packages to both local and foreign investors. The government works in partnership with every investor to customize an incentive package that caters to the specific investor's needs. Such packages include tax exemptions and reductions for ICT industries, reduced land prices to investors in the ICT sector, and eased export and import regulations.

### A special focus on offering world-class telecommunications infrastructure and services

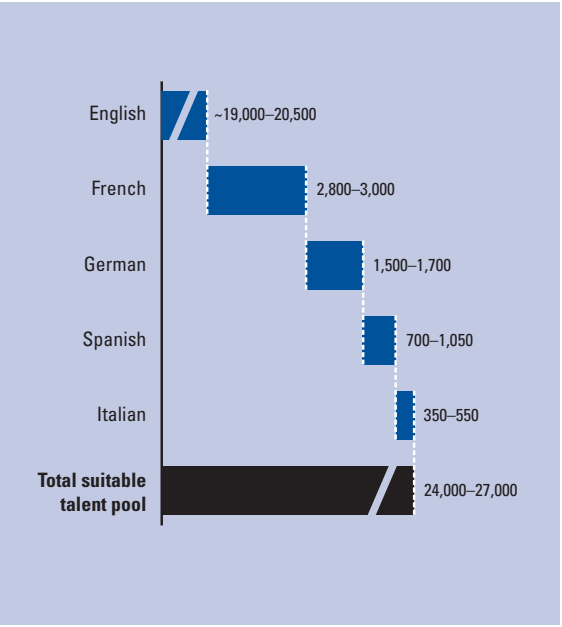
Efforts made by Egypt over the last decade have allowed significant improvements that have benefitted its BPO strategy. Currently, Egypt enjoys high-quality network facilities that are built around a world-class infrastructure, including 10 gb/s optical fiber and 2.5 gb/s rings, delivering services over a public switched telephone network (PSTN). Mobile and packet-based networks spread across the country. Internet and telephone penetration have increased significantly as a result (see Figures 5 and 6).

## Figure 3: Egypt's talent pool

3a: Annual number of graduating students (thousands)



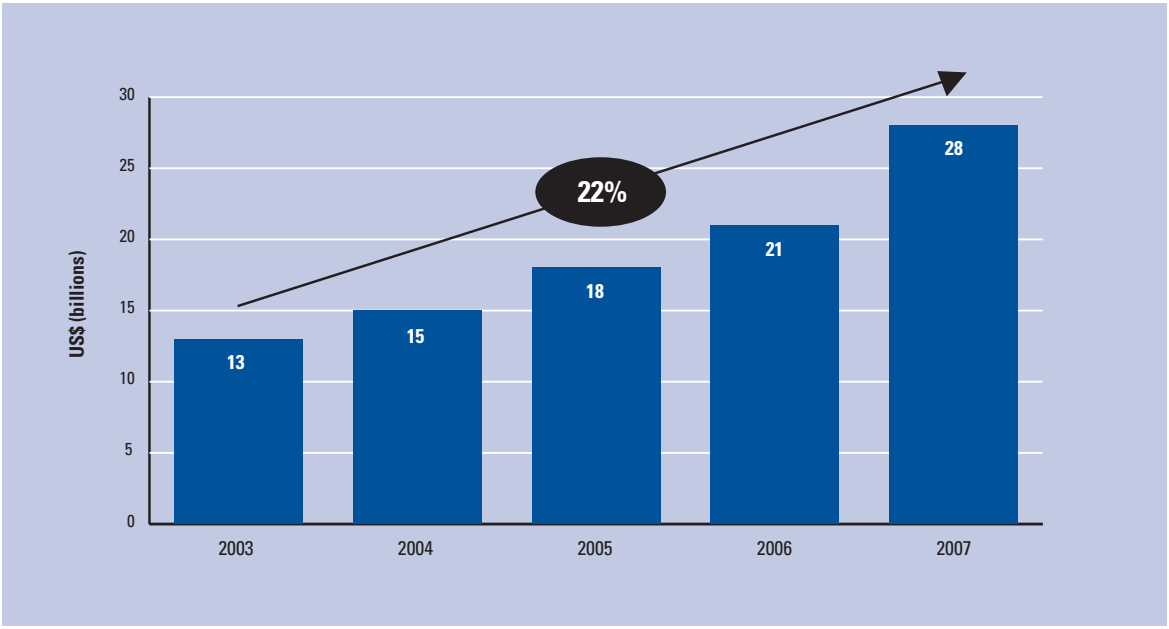

3b: Total suitable and willing talent pool (number of graduates)




Source: McKinsey Global Institute, 2008b.
Note: The figures above refer to the greater Cairo metropolitan area alone, not the entire country.

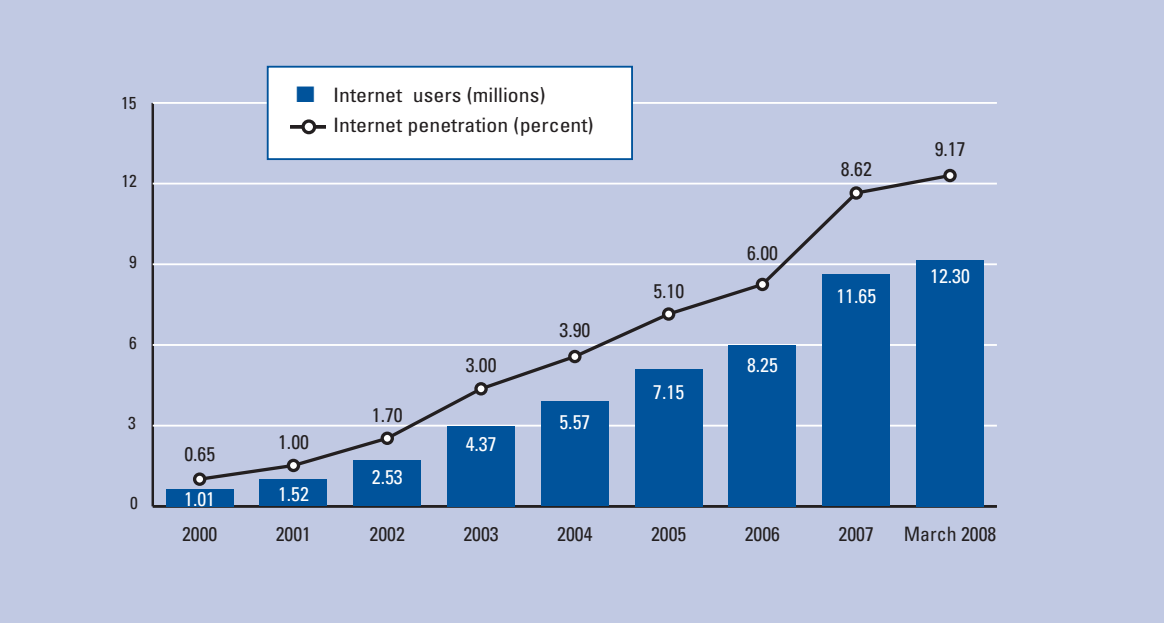


## Figure 4: Total investment evolution, 2003–07




Source: McKinsey Global Institute, 2008a.

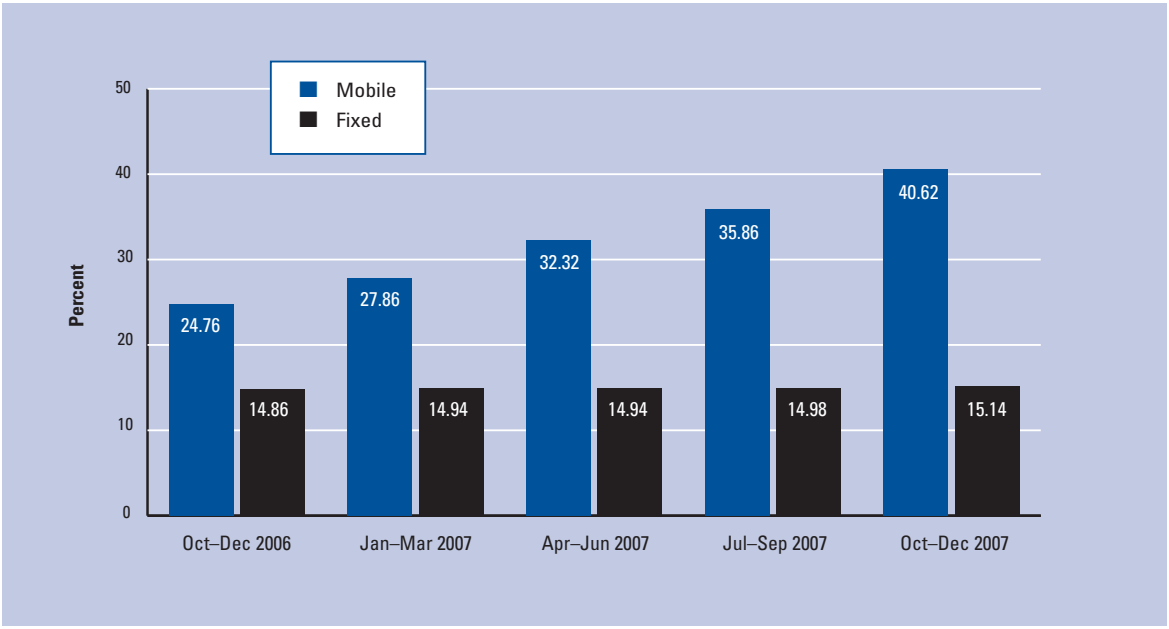
## Figure 5: Internet users and penetration




Source: Ministry of Communications and Information Technology, Egypt.



## Figure 6: Mobile and fixed telephony diffusion rates




Source: Ministry of Communications and Information Technology, Egypt.

Special projects have been launched to showcase the new business capabilities that such infrastructure makes possible. For example, Egypt's first Contact Center Park in Maadi should help the country to benefit from the strategic advantages described earlier. The Smart Village Business Park, located outside Cairo, has attracted a number of global IT players thanks to its state-of-the-art infrastructure. Additional business parks are planned in Alexandria, Damietta, and New Cairo.

### Providing a business-friendly environment

One of the main pillars of the business environment that has helped Egypt to attract outsourcing companies is its set of labor laws and regulations. Reforms of the Egyptian labor laws in 2003 created a very powerful, flexible workforce and removed many of the previous impediments to recruiting staff. Reforms have focused on creating a balance between employees' and employers' rights. Specifically, the reforms have addressed areas such as the employer's right to fire an employee under relevant conditions. The reforms also regulated the employee's right to strike peacefully according to a set of controls and procedures.

Since 2004, the Egyptian government has been consistently working to increase the attractiveness of Egypt's business environment. Hence an antitrust law and a unified tax law have been promulgated. The latter increased the transparency of the Egyptian tax system and reduced corporate and personal taxes by half (see Box 1).

**Box 1: Egypt's main reforms**

**Tax reforms (initiated in 2005)**

- Highest personal tax rate cut from 32 percent to 20 percent
- Corporate tax rate cut from 42 percent to 20 percent
- Streamlined collection procedures adopted

**Customs reforms (initiated in 1991)**

- Tariffs reduced from an average of 14.6 percent to 6.2 percent
- Tariff bands simplified and reduced from 27 to 6
- Streamlined customs procedures adopted

**Financial sector reforms (initiated in 1991)**

- Banking sector consolidated and restructured
- Privatization of public banks initiated
- Supervisory role of autonomous Central Bank strengthened
- Anti–money laundering regulations brought in line with international standards instated (2002)

The attractiveness of Egypt's business environment has been further enhanced by the government's incentive packages offered to investors, mentioned earlier. Besides tax exemptions, land price reductions, and easing of regulations, these packages include training programs for professionals in the ICT industry who are intended to be recruited by investors, and the assignment of a government official to facilitate investors' interaction with government organizations.

## Egypt's current and future challenges as a BPO champion

Thanks to the combination of structural advantages and government policies described above, Egypt has become one of the main success stories in the outsourcing scene of the last few years. However, in the current context of financial crisis and modified international economic relations, Egypt has to prepare for unprecedented challenges to maintain its position as a successful BPO destination.

Current and future challenges include, for example, intellectual property rights and security risks. Moreover, Egypt cannot afford to relax its efforts to promote itself as a BPO destination: on the international outsourcing scene, compared with pioneers such as China and India, it is still viewed as a relatively new player. The country must also improve access to finance and micro-financing for small- and medium-size enterprises.

In terms of human resources, Egypt's challenges include the lack of "middle-level graduates" (i.e., those who have achieved a level somewhere between that of university graduates and technical institute graduates). Such profiles are in high demand among outsourcing companies, especially those offering IT and engineering services. This shortage leads to hiring university graduates to perform less-skilled jobs that, in turn, de-motivates them and causes both a fast turnover and suboptimal use of financial resources and talents.

Overcoming potential middle management bottlenecks is another challenge that needs to be tackled. Egyptian middle managers lack the skills to run different processes and businesses. In that context, the efforts already deployed by the Egyptian government to encourage MNCs in transferring the know-how and the managerial skills required will need to be pursued.

In the rapid development of its outsourcing activities, Egypt has benefitted from the existence of a vibrant and abundant fabric of small- and medium-sized enterprises. This is now creating an additional challenge, as many of those small players have relied on their own set of norms, standards, and practices. Now faced with the rigors of international competition, such standards and practices need to be harmonized and brought in line with international benchmarks.

### Box 2: Seven lessons learned from Egypt's outsourcing experience

Among the lessons that other countries may wish to adapt from Egypt's success in outsourcing, the following are particularly clear:

1. Investment in the talent pool to enhance suitability is vital to ensure the long-term viability of the country's service delivery strategy. Similarly, it is crucial to ensure overall supply in terms of infrastructure and have connectivity at world-class levels and ahead of the demand curve.
2. Creation of a well-funded investment agency with adequate regulatory authority is critical. Egypt's ITIDA is an example of how a public-private partnership can work effectively in this domain.
3. A promotion campaign is essential after making sure that all requirements are already in place. It is only prudent to launch a marketing campaign for a location only when supply in terms of talent pool and infrastructure is ready. Documented examples of successful outsourcing ventures are the best marketers for a location.
4. Getting key decision makers, such as ministers, signed off and committed to an explicit target is a strong signal of overall commitment and is viewed very positively by investors.
5. There is a clear need to focus on fair, transparent policies and international regulatory laws such as employment laws, data security, and intellectual property laws.
6. International expertise and consultancy firms should be used in launching and implementing the early phase of the strategy so as to bring into the country the much-needed know-how and to open different opportunities.
7. Many high-impact programs—such as the incentive packages to encourage BPO foreign investors—must be in place to accelerate the growth of the industry; these should go hand in hand with programs to encourage local companies.

Last but not least, Egypt's ability to move from a monopoly-based telecommunications environment to a competitive market for telecommunication services will be a litmus test for many foreign investors contemplating an increase in their activities in the country, especially in the BPO sector.

## Conclusions

Egypt's efforts to build itself as a first-class competitor in the area of outsourcing have led to measurable success. They also offer a basis for further efforts and ambitions in this area.

The way in which Egypt has chosen to pursue this path can be a source of inspiration and reference for other emerging economies. A central characteristic of Egypt's strategy has been to focus on a few "natural" strengths (its young population, high level of education, and the availability of a language-proficient and internationally open talent pool), and to combine those with (1) a series of targeted government measures (especially on the regulatory side) and (2) a selected use of external expertise (especially in the early stages of the process).

Moreover, Egypt has put a critical emphasis on the merits of *communicating* about its outsourcing strategy and achievements, be it externally (to attract additional outsourcing partners from abroad) or internally (to encourage more Egyptian private businesses to be involved). Public-private partnerships have played a central role in building mutual respect among the various players involved and in feeding an appetite for further collaboration (see Box 2).

In the emerging global knowledge economy, the relative mobility of factors is changing as rapidly as their relative prices. In such a maelstrom of changes, outsourcing—and BPO in particular—is assuming different forms, directions, and volumes. Whether the current crisis leads companies to focus on cost reductions or on new strategies to conquer markets, BPO is bound to attract increasing interest worldwide. As the size of the outsourcing market increases, however, early and new contenders such as Egypt should expect increased competition.

For all outsourcing host countries, current or prospective, moving to (or staying at) the top of the list of BPO destinations will require a constant adaptation of national and corporate strategies as well as increased agility in responding to unexpected changes in relative factor prices. Central to such agility will be efforts to always maintain a high level of responsiveness in terms of the skills and human resources required. As e-skills (i.e., skills for the knowledge economy) continue to be further defined and identified across the world, national outsourcing strategies will remain a laboratory where inputs from governments and businesses will continue to be combined and shaped to provide innovative approaches and environments (see Box 3). In turbulent times even more than in quieter periods, innovative thinking and strategies will be required. There are reasons to think that Egypt will live up to the challenge.

### Box 3: Three examples of successful outsourcing strategies in Egypt

**Orange Business Services**

The MSC (Major Service Centre), established in Cairo, is the largest service center that Orange operates globally. Its physical security meets the highest standards required by Orange's global clients, and it provides many different services—such as solution designs, service delivery management, and online support and design implementations. It operates 24 hours a day, 7 days a week, and has a highly resilient network architecture. It provides service for a large array of technical functions for Orange's global multinational clients. The MSC currently employs more than 1,500 highly qualified and trained staff in the 23 languages supported by the company. The largest support teams are those that employ Arabic, English, French, German, Italian, and Spanish.

Orange Corporation has chosen Egypt for its qualified and low-cost talent pool and its ability to comply with technical and language requirements. Moreover, the government incentive package offered by the Egyptian government includes:

- reduced international circuit charges,
- relocation costs from downtown Cairo to the Smart Village, and
- reduced cost of staff training.

**Oracle Global Support Center (GSC)**

Oracle GSC is located in Cairo within the Smart Village. It employs over 400 world-class engineers to support over 100,000 customers in 140 countries worldwide. In 1999, Oracle group headquarters in the United States began investigating whether Egypt could make a good outsourcing destination and verified that the country's labor productivity and the quality of its infrastructure were no less than they are in any other part of the world. It was opened in June 2005 with 20 engineers in its application product support division; currently, Egypt GSC is the fastest-growing center for Oracle around the globe. It started by importing its entire consultancy from abroad. Today, Oracle's Egypt GSC is satisfying all its human resources needs from Egypt.

Oracle has chosen the Egyptian market because of its time-zone affinity with Europe, its cost competitive environment, and the large highly skilled labor pool with multilingual skills: Arabic, English, French, German, Italian, and Spanish. Moreover, the excellent government support (including education programs for working Egyptian professionals) and an advanced telecommunications infrastructure are important advantages.

**Xceed Contact Center**

Xceed is one of the companies established in late 2001 to act as the IT arm for Telecom Egypt, the incumbent operator. Today Xceed is the largest and most sophisticated contact center in the southern Mediterranean region, offering BOP and inbound and outbound integrated customer contact solutions.

Arabic, English, French, Italian, Spanish, Greek, Portuguese, and Hebrew are languages currently supported by Xceed for its clients worldwide; it also has a capacity of 1,600 Web-enabled workstations.



## Note

1 For example, Egypt won the first place for the best outsourcing provider for the year 2008 from the National British Society for Outsourcing Services.

2 The Information Technology Industry Development Agency (ITIDA) is a governmental entity affiliated with the Ministry of Communications and Information Technology. It is responsible for growing and developing Egypt's position as a leading global outsourcing location by attracting foreign direct investments to the industry and maximizing the exports of IT services and applications.

3 A. T. Kearney 2007.

4 Traditionally, Egyptians have been noted for their neutral accent in Arabic; moreover, the Egyptian Arabic dialect is commonly understood among Arab speaking countries.

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CHAPTER 2.2

# IT Korea: Past, Present, and Future

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Half a century after the Korean War, Korea, Rep. (Korea) has become one of the leading information technology (IT) nations of the 21st century. Korea has achieved rapid economic growth by focusing on the electronics industry. It has grown to be an economic power by revitalizing the IT industry, whose remarkable leadership began at the turn of the 21st century. Many have analyzed the reasons for Korea's amazing economic growth, looking at its proactive acceptance of technology, value-added development with enhanced performance, and quick transition through industrial structuring. Now Korea is facing the financial crisis that is currently sweeping the world, along with a slowdown in the growth of the IT industry, so the proactive development of new IT-enabled growth engines is essential.

This chapter provides an account of the four development phases of the history of the Korean IT industry and the progress of related policies. We start by reviewing the first phase (which lasted until 1980), looking at how Korea has achieved economic growth on the basis of the electronics industry. We then describe the second phase (early 1980–90) and consider how the electronics industry evolved into the IT industry and the third phase (early 1990–2000), looking at the growth and consolidation of IT in Korea. Next, we focus on the fourth phase, in which Korea's global IT leadership was established with the IT839 Policy. Finally, we introduce Korea's vision of the New IT Initiative, which seeks a new momentum for the future of the industry as an engine of economic growth.



## Phase I: The electronics industry in its infancy

As early as the 1920s, Korea operated telecommunications networks that included the wired telephone line that connected Seoul and Incheon; it had also launched the first radio broadcasting station, Gyeongseong Station. During the Korean War, which broke out in 1950, most of the country's industrial infrastructure was destroyed and Korea's electronics industry was left paralyzed. Forty-three percent of its industrial facilities and 41 percent of its power-generating facilities were ruined. About half of the nation's mining facilities, which provided most of the energy at that time, were also destroyed. The power shortages were the biggest hardship for Korea in those days. The power supply dropped to just 20 percent of its pre-war level immediately after the war, making it impossible to produce home appliances in the domestic market. The power shortage continued until the Korea Electric Power Corporation was established in 1961.

We are grateful to Dr Moonki Choi, President of the Electronics and Telecommunications Research Institute, and Dr Changhee Hyun, Executive Director at the Electronics and Telecommunications Research Institute, for their support and comments.

### Electronics after the Korean War (late 1950s)

The desire to develop vacuum tubes (devices used to modify electric signals, which were crucial for the development of electronic technology), grew when US and Japanese vacuum tube products were introduced to the Korean market. Goldstar (now LG Electronics) started to produce Korea's first radios one year after its establishment in 1959. It was the start of Korea's electronics industry.

As the volume of commercial capital from foreign aid expanded during the process of economic development, conglomerates such as Samsung Electronics, LG Electronics, and Hyundai emerged. The proportion of the manufacturing sector devoted to electronics increased, mainly because of the successful industrialization of these conglomerates during the eight years after the war, when they registered an annual growth rate of 10.8 percent. Electric and telecommunications infrastructure had recovered to its pre-war level by the early 1960s.

### The rise of the electronics industry (1960s)

After General Jung Hee Park seized power in 1961, Korea's real economic development took off. The government recognized that the electronics and IT industries were promising and began to actively promote their development. To fulfill its goal of developing the two industries, the government pushed electric power and telephones as the priority infrastructure of the national modernization policy that focused on (1) the construction of the infrastructure industry, (2) the promotion of exports, and (3) the renovation of state-managed businesses.

At that time, Korea's electric power and telecommunications industries were promoted by the Electric Power Bureau within the Ministry of Commerce and the Electric Power and the Telecommunication Bureau within the Ministry of Postal Services, respectively. The former led the electronics industry by introducing several regulations, such as the Electricity Business Act, while the latter attempted to create demand for telecommunications services.

The government announced its first Five-Year Economic Development Plan in February 1962. A notable aspect of this plan is the measure that increased foreign capital inflows. The government allowed an unlimited inflow of foreign capital to promote the electronics industry and opened the way for governmental support. To enhance research and development (R&D) capability, the first national research institute, the Korea Institute for Science and Technology (KIST), was established in 1966; this institute performed the role of providing a talent pool to the IT industry. The division of electronics and telecommunications in KIST became an independent institution, the Electronics and Telecommunications Research Institute (ETRI), which laid the foundations for the domestic production of electronic products. Although the establishment of KIST was based on US assistance in return for sending Korean troops to Vietnam, it consequently helped the advancement of Korea's science and technology. As the fruit of these efforts, LG Electronics introduced Korea's first black-and-white television, the model VD-191, which captured 10 percent of the domestic market only five months after its launch.

### The Age of Exports (early 1970s)

Around the beginning of the 1970s, owing to the Act on the Development and Creation of Industrial Complex for Export, enacted in 1964, specialized industrial complexes were established. These included government-owned industrial complexes, free export zones, local government-owned industrial complexes, and civil industrial complexes, all of which contributed to the emergence of the Age of Exports.

Since the adoption of the Act for Promotion of Industry Complex Development in 1973, the development of industrial complexes has matured and the Kumi Industrial Complex and the Masan Free Export Zone have become the Mecca of the electronics industry in Korea. In the 1970s, Korea started to build large industrial complexes across the nation. The Korea Electronics Export Association, established in 1970, contributed to building up a single export channel of electronic products, exploring the overseas market more aggressively. Owing to the efforts made by the industry and government, the value of electronics exports increased from a mere US$50,000 in 1962 to US$1 billion in 1976.

On a related note, the Korea Advanced Institute of Science and Technology (KAIST) was created in 1973 to become one of the world's leading research universities. Over the years, KAIST has supplied quality Masters and PhD graduates who have become the foundational human resources for the sustainable growth of IT technology and industry.

### Oil shocks and the development of the electronic switching system (late 1970s)

After the first oil crisis in 1973, the Korean electronics industry began to focus on the development of promising products with large growth potential. In 1976, the Korea International Trade Association commissioned Arthur D. Little (ADL), a consultancy, to do a study on the long-term outlook of Korea's electronics industry. ADL suggested focusing on 24 items, including the color TV, video cassette recorder (VCR), Private Branch eXchanger (PBX), and computer and peripheral devices. The move toward manufacturing these promising items was made on the basis of this report.

The first color TV was successfully developed in 1974; exports reached 110,000 units in 1977. Three manufacturers (Korea National, Samsung Electronics, and LG Electronics), who were already producing home appliances, were ready to produce color TVs. These

companies began to compete for their mass production, thus cultivating the capability of quality enhancement.

After the successful development of the color TV, national attention shifted to the development of the electronic switching system, which was planned by KIST in 1976. Also ETRI was created in 1977. ETRI contracted foreign partners for technical cooperation, and launched the production of the electronic switching system. However, the second oil shock in 1978 caused the export-led electronics industry to face another difficult period of negative growth, as a result of the new protectionism and import regulations imposed by developed countries.

### Phase II: The emergence of the IT industry

After its somewhat erratic beginning mentioned above, the electronics industry developed further and consolidated. Also an IT industry truly emerged and began to grow quickly.

#### The electronics industry's transformation (early 1980s)

The government started color TV broadcasting in December 1980, ushering in the era of this medium. As a variety of sports turned professional in the early 1980s, people came to derive more entertainment from color TV and demand skyrocketed. This spurred the development of other related electronics industries. Color TV made a significant contribution to the domestic production and export of VCRs because it enabled video viewing. Content, including adult movies, was produced in large quantities, and the videotape market grew vibrantly, thus popularizing the VCR.

#### The IT industry comes into its own (late 1980s)

In the 1980s, Korea's IT industry truly emerged. The Korea Electric and Telecommunications Corporation (current KT) and Korea Data Telecommunication (current LG Dacom Corporation) were established in 1981 and 1982, respectively. ETRI succeeded in the domestic development of the electronic switching system TDX-1 in 1984. By 1987, the number of wired telephones exceeded 10 million; R&D in the telecommunications field progressed greatly after the Seoul Olympics, which were held in 1988. In this period, the local development of personal computers (PCs), which gave strong momentum to the IT industry, really took off. The PC industry—which really got off the ground when Samsung Electronics developed an 8-bit PC, the SPC-1000, in December 1982—saw an enormous growth in production from 1983 to 1988, increasing from 17,000 PC units to 205,000.

After the 1988 Olympics, the happy era of the Age of the Three Lows (low interest rates, low oil prices, and low dollar value) was over, and profitability worsened rapidly amidst the global competition. Thus the electronics industry was forced to change its strategy, moving from an emphasis on stable growth with low-cost production to high value added creation through high-investment production systems. Korea's position as one of the world's leading IT countries was established in this period, and the electronics industry began to expand its business to incorporate the production of semiconductors and mobile telecommunications.

### Phase III: Growth of the IT industry

The next phase of the evolution of the IT industry involved the globalization of enterprises as well as many technological advances.

#### Initial development (early 1990s)

TDX-10, a time-division switching system that has been called the "pioneer" of Korea's telecommunications industry, was developed by ETRI with purely local technology in 1991. This resulted in an import substitution effect worth 300 billion Korean won (about US$300 million) earned every year after 1992; the TDX-10 provided the basis for various applied products, such as the pager and code division multiple access (CDMA) products.

The IT industry's growth was closely associated with the spread of telecommunication services. After a long debate, CDMA was adopted over time division multiple access (TDMA) as the general standard. KCS-1, Korea's first prototype of the CDMA system, was produced in 1993 after a contract with US Qualcomm for the joint development of the CDMA digital cellular system; as a result, the world's first CDMA digital mobile phone service was commercialized in 1996.

In the 1990s, Samsung Electronics and LG Electronics, which by then had grown into global conglomerates, became the core of Korea's IT development. Samsung Electronics became the world's leader in the home appliance business in the early 1990s, overwhelming Motorola (which had dominated Korea's mobile phone market for 10 years), and made Anycall a world-famous brand. Developing the world's first 64MB DRAM in 1992, Samsung Electronics also became a global leader in the DRAM semiconductor field. LG Electronics also started investing massively overseas, growing quickly into a global player.

#### The blossoming of the mobile telecommunications industry (late 1990s)

By passing the Framework Act on Informationalization Promotion and laying out the plans for a high-speed information network in 1995, the Korean government revealed its strong intention of fostering the IT industry. As the mobile telecommunications industry diversified into the personal communication services (PCS), cordless telephone generation 2 (CT-2), and wireless data services in 1997, the number of mobile telecommunications subscribers soared, reaching 22.68 million at the

end of 1997. The increased export of mobile phones led to the expansion of related industries. SK Telecom, KTF, and LG Telcom became important players in mobile services.

With the foreign exchange crisis of November 1997, however, both domestic and overseas markets instantly shrank, causing negative growth. A great number of businesses went bankrupt as a result of the fall in the value of the Korean won and the rise in interest rates. The electronics industry was not immune to this crisis; it experienced a long series of bankruptcies and anticipated difficult times ahead.

The government introduced a number of initiatives—such as those encouraging foreign capital loans, providing elastic tax rates, and offering an extension of trade liberalization measures—to overcome the crisis. The electronics industry underwent restructuring and improved its management system by pushing ahead with big deals in the semiconductor and home appliance markets, two sectors where excessive investment had been made. Fortunately, the IT industry encountered a new boost in the worldwide dot-com boom. The exports of the information and telecommunication technologies (ICT) sector have since increased dramatically. It is widely recognized that the IT industry at this time was the biggest contributor to Korea in terms of overcoming the financial crisis, and that IT products had become Korea's main export after 2000.



### Broadband Internet and e-commerce

Broadband has spread enormously in Korea, thereby facilitating massive Internet diffusion. The use of asymmetric digital subscriber lines (ADSL) on the traditional fixed telephone lines outpaced the use of cable modems. The International Telecommunication Union (ITU) ascribed this result partly to demand conditions in Korea. More than 90 percent of Korean households live within 4 kilometers of a local exchange. Most offices and half of the households are in apartment complexes. With short distances from the switching stations, signal decay—which is the main disadvantage of ADSL technology—could be avoided.[1] Since 2001, Korea has been consistently ranked among the countries with the highest broadband penetration.

Through broadband Internet, e-commerce has spread widely. The penetration of electronic marketing is about 15 percent of the retail market, the usage of Internet banking has exceeded the volume of service of branch offices, and Internet stock trading occupies about 60 percent of transactions. The comprehensive cases of e-commerce and e-business developed in Korea are published in the by Lee et al. case collection.[2] The cases included the global business process (Samsung SDI),[3] integration of ERP and eSCM (Volvo Construction Equipment Korea),[4] supply chain evolution (POSCO),[5] electronic procurement (iMarketKorea),[6] customer relationship management (SK Telecom),[7] knowledge management (LG CNS),[8] relationship-based online community (Cyworld.com;[9] NHN),[10] smart-chip based mobile banking (KB Bank),[11] online brokerage (Kiwoom.com),[12] and online auction (Internet Auction Co.).[13]

## Phase IV: Global IT leadership

Korea has seen tremendous success in its IT industry, establishing itself as a global player in the international markets. Moreover, this success has had an important impact on the country's economic growth and competitiveness.

### The IT industry's contribution to the national economy

By contributing to economic growth and export expansion, the IT industry played an important role in Korea's achieving a per capita income of US$20,000 and overcoming the financial crisis of the late 1990s. It stabilized the macroeconomic environment through economic growth, job creation, improving the trade balance, and price reductions, as summarized in Table 1.

**Table 1: Contribution of the IT industry, 1997–2007**

| Area | Impact |
|---|---|
| **Economic growth** | • The real value-added of the IT industry grew by 18.2 percent per year on average between 1997 and 2007.<br>• The IT industry accounted for 1.7 percent of the 4.4 percent annual average GDP growth between 1997 and 2007.<br>• The IT industry accounted for 16.9 percent of real GDP in 2007. |
| **Job creation** | • Jobs in the IT industry increased by 4.2 percent between 1997 and 2006 (the average of all industries was 1.15 percent in the same period).<br>• The IT industry accounted for 16.6 percent of jobs created across all industries between 1997 and 2006. |
| **Export** | • The IT industry accounted for 33.5 percent of all exports in 2007.<br>• The accumulated surplus by the IT industry during the 1997–July 2007 period was $329.7 billion. |
| **Price drop** | • The IT consumer price was down by 6.10 percent (3.31 percent up for the entire economy) during the 1997–2007 period.<br>• The IT producer price was down by 5.71 percent (2.78 percent up for the entire economy) during the 1997–2007 period. |

Source: Korean Information Society Development Institute, 2007.

### Table 2: Growth of the IT service fields

| Industry | Growth | |
|---|---|---|
| **E-commerce market size** | 113 trillion Korean won in 2001 | 516 trillion Korean won in 2007 |
| **Internet banking** | 10.92 million customers in 2001 | 42.39 million customers in 2007 |
| **Online stock trading (%)** | 857 trillion Korean won in 2001 (46.7 percent of total) | 1,388 trillion Korean won in 2006 (54.4 percent of total) |

Source: Korean Information Society Development Institute, 2007.

### Table 3: Stages of IT policy evolution

| | IT SERVICE INFRASTRUCTURE | | | | IT MANUFACTURING | |
|---|---|---|---|---|---|---|
| **Category** | **Cyber Korea 21** | **e-Korea Vision 2006** | **Broadband IT Korea 2007** | **u-Korea** | **IT 839** | **u-IT 839** |
| Period | 1999~2002 | 2002~06 | 2003~07 | 2006~present | 2004~06 | 2006~present |
| **Characteristics** | • IT industry promotion by building applications<br>• Government-led, capital investment centric | | | | • Integrate IT industry by associating services, infrastructure and devices with one another | |
| **Results** | • Built the world's best IT infrastructure<br>• Started new services such as DMB and WiBro<br>• Created a secure digital environment | | | | • Secured globally cutting-edge IT technologies<br>• Led international standards: T-DMB as the European standard (July 2005), and WiBro as the ITU 3G standard (October 2007) | |
| **Limitations** | • IT is mainly used for entertainment and games<br>• Insufficient integration with traditional industries that could maximize the benefits of IT<br>• Inconsistent policies because of frequent changes of plans | | | | • Limited convergence of IT and traditional industries<br>• Supply-centered; market demand not fully reflected<br>• Poor implementation because of the conflicts between ministries | |

Source: Korean Information Society Development Institute, 2007.



The complementary relationship between the IT device manufacturing industry and the IT service infrastructure resulted in high growth for the industry. IT manufacturing evolved into a world player, with products supported by cutting-edge technology and manufacturing productivity. Thirteen products—including semiconductors, cellular phones, and liquid crystal displays (LCDs)—accounted for more than US$1 billion in exports in 2007. The IT device field is an exceptional manufacturing sector that has maintained a high growth rate of over 10 percent every year since 2000. The IT service infrastructure was able to maintain a virtuous circle within the IT manufacturing industry owing to the spread of broadcasting and telecommunications services. Some 93 percent of the entire population (43.49 million people) were using mobile phones, and more than 95 percent of households were using high-speed Internet as of 2007. In addition, the percentage of households subscribing to paid channels such as satellite broadcasting had reached 78.6 percent, while the rate of subscription to new services such as digital multimedia broadcasting (DMB) and Internet protocol TV (IPTV) was increasing steadily.

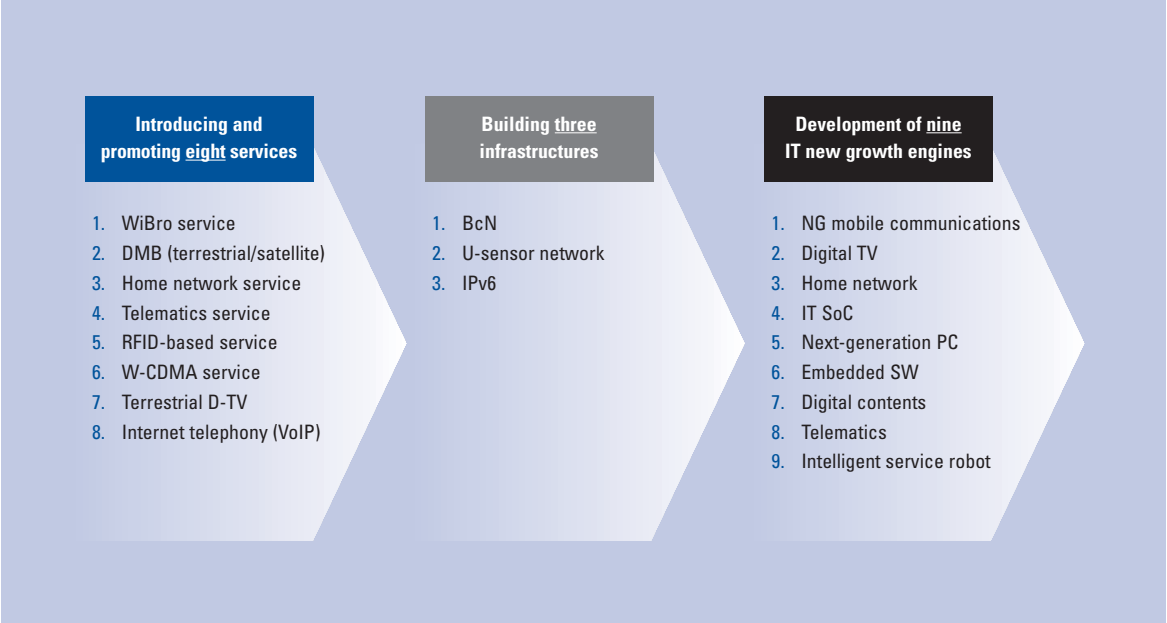
The applications of the IT industry spread to both the private and public sectors. As IT was being used more and more in a variety of fields, including e-commerce, finance, education and medical services, the potential market growth of the supporting software industry burgeoned. IT services became a routine part of people's daily lives and government services, as well as essential to the industries summarized in Table 2. Although the system integration business is very competitive, the software package industry has not achieved a global competitiveness level, partly because of language and cultural barriers.

#### IT industry policy: IT839

In the early 2000s, with the collapse of the dot-com bubble and the slowdown in IT sector growth, the Korean IT industry had to find new opportunities. The growth strategy for IT service infrastructure and IT manufacturing evolved in stages, as noted in Table 3. For infrastructure, the vision of e-Korea (which involved ADSL-based broadband Internet) evolved to become u-Korea (ubiquitous broadband mobile Internet), and IT manufacturing evolved correspondingly.

In 2003, the Korean government began to seek a new momentum that would drive the growth of the country for the next 10 years. To this end, the Ministry of Information and Communication (MIC) has established the IT839 project as a major item on the national agenda (see Figure 1). IT839 aims to establish a virtuous

**Figure 1: The IT839 project**




Source: Korean Ministry of Knowledge Economy.



circle structure by harmonizing eight new services, including wireless broadband (WiBro) and DMB; three cutting-edge infrastructure items (broadband convergence network (BcN), ubiquitous sensor network (USN), and Internet protocol version 6 (IPv6); and nine new growth engines (new-generation mobile telecommunications, digital TV, telematics; and so on). To implement the R&D projects of IT839, the government adopted the merit-based project manager system and restructured the organization of ETRI, which was the primary technology developer.

IT839 has achieved the following goals: (1) effectively branding IT839 in order to create wide support from the public, (2) synergizing the value chain of the IT industry, and (3) forecasting the impact of industry policy and enhancing the accountability of project managers.

Through these projects, Korea enhanced its capacity to be more adaptive to the demand trend of the global market. Since the successful implementation of IT839, Korea has upgraded its IT stance and gone from being a technology-absorbing country to being a technology-leading country, reducing the gap in this area with the United States and strengthening the basis of global collaboration. The applications are mainly developed for entertainment and games, however, and integration with traditional manufacturing and service industries is not yet sufficient.

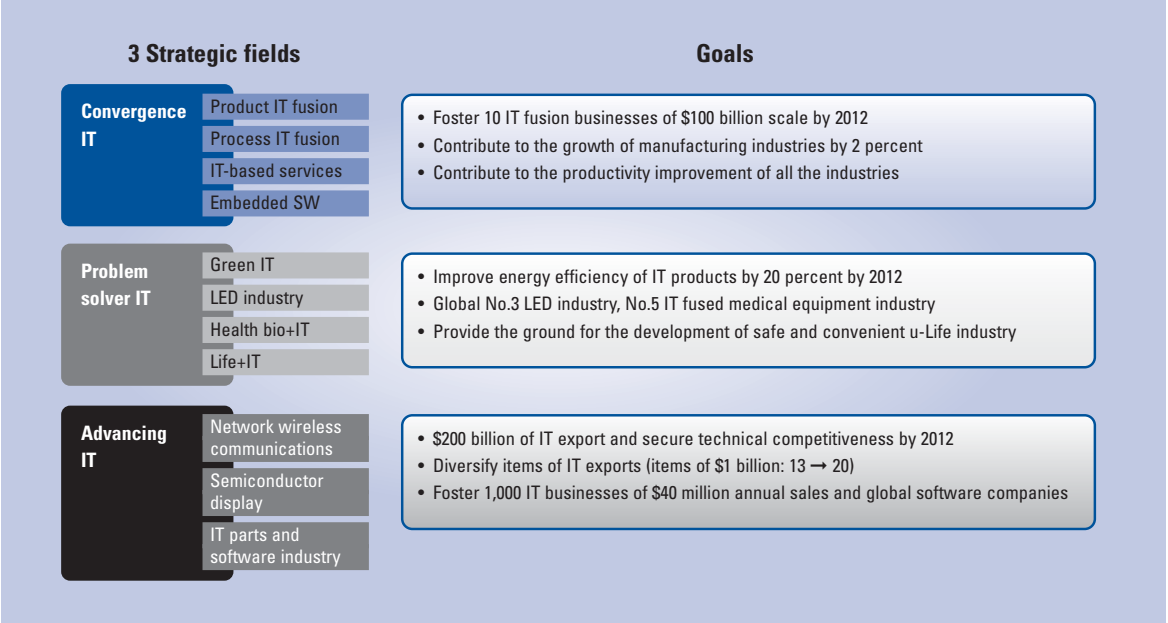
### The future of IT

An overall slowdown in the IT industry has been recently observed around the world as demand has reached the saturation point. The IT device industry, in particular, has experienced a more serious slowdown than IT services, and has reached a watershed, and can no longer follow its export-centered policy. Because China, Taiwan, and India are emerging as strong players in this sector, in addition to the United States and Japan, Korea's position has been further weakened. As a new type of demand is emerging because of the aging of Korea's population, among other factors, a new form of IT industry has become necessary.

#### A new strategy for the IT industry

Korea's new administration merged MIC with the Ministry of Knowledge Economy (MKE), established the Korea Communications Commission (KCC) in 2008, and proposed a "New IT Strategy." This strategy reflects the facts that (1) the source of growth should be found outside—for example, in integration with manufacturing and services—rather than inside the IT industry in order to sustain the latter's growth potential; and that (2) IT should be actively used to address social problems, proceeding with green IT to help environmental sustainability and providing new products to assist the country's aging society, for example. By seeking new IT niches sooner than other countries, Korea may be able to be the first mover for new future markets. The MKE announced that it will develop the IT

**Figure 2: Three major areas and goals in the New IT Strategy**




Source: Korean Ministry of Knowledge Economy.



industry with a differentiated strategy by extending its scope of integration according to the notions put forth by the New IT Strategy.

### Characteristics of the New IT Strategy

The ultimate goal of the New IT Strategy is to improve the industrial structure and address social problems by applying IT. It differs strategically from previous policies by providing for:

- transition from quantitative expansion to qualitative improvement of the traditional industry;
- expansion from IT to other industries;
- transition from imitation strategy to market leader strategy;
- transition from government/conglomerate-centered policy to private sector-centered policy with government support; and
- deregulation and demand creation.

The government is planning to implement the New IT Strategy in three main areas by integrating previously separate industrial fields to carry out the policies stated above. The details are as follows (see Figure 2).

1. Converging IT with major industries
   - — Promote the fusion of IT with major industries and strengthen the basis of the fusion.
   - — Promote IT use in traditional industries by improving productivity and renovating the industry structure.
   - — Enhance the productivity of the service industry using IT.
   - — Use software as a catalyst for inter-industry fusion, and develop the software for all industries.
2. Solving economic and social problems by using IT
   - — *Green IT:* Enhance the energy efficient and environmentally friendly characteristics of IT products and establish the medium- and long-term policy to implement this.
   - — *Light-emitting diode (LED) industry:* Enhance the competitive power of the LED lighting industry and upgrade it to become the world's third largest producer. To this end, support pilot energy-saving projects.
   - — *IT combined medical devices:* Upgrade the medical device makers to become the world's fifth largest makers by combining the devices with IT.
   - — *u-Life:* Make life safer and more convenient by deploying IT applications more effectively.

3. Advancing IT products

   — *Semiconductors:* Foster the development of system semiconductor devices on the robust basis of memory devices, and nurture small- and medium-sized enterprises (SMEs) in the equipment and materials industries.

   — *Display:* Maintain the leading edge in display devices and improve thin and flexible display technology power.

   — *Wireless communication equipment:* Spread the mobile phone success of large companies overseas and to SMEs.

   — *Broadcasting communication service and network:* Construct a productive circulation system composed of devices and services and support their exportation.

   — *IT parts:* Strengthen the competitive powers of IT parts of high potential.

   — *Software industry:* Cultivate software companies that have globally competitive power.

The investment plan for the New IT Strategy industries is shown in Table 4; future prospects of the IT industry after the plan's implementation are depicted in Figure 3.

The Korean government plans to modify the organization and provide support to the industry, in order to accomplish the goals of the New IT Strategy by 2012: US$200 billion in exports and US$300 billion in domestic production; to cultivate at least 10 IT fusion industries whose market sizes are larger than US$1 billion; and nurture 1,000 IT companies whose sales are at least US$40 million and 10 global software companies. The government's plan included the following policy items:

- Enact the "Act for the Promotion of Information Communication Industries" (tentative name).
- Reduce the R&D funding obligation of the wired communications service providers by 0.1 percent per year (and the dominant providers' obligation by 0.15 percent) to zero in 5 years.
- Integrate the overseas marketing and center for IT to KOTRA, and organize a dedicated team.
- Invest US$230 million to train 20,000 IT workers by 2012.
- Strengthen intellectual property rights and the ability to respond to the patent attacks from overseas companies.

**Table 4: Investment plan for the New IT Strategy's industries**

| CLASSIFICATION | | 2008 budget (Korean won, millions) |
|---|---|---|
| Fusing IT with other industries | • Fusion of industrial technologies[a] | 87.5 |
| | • IT utilization (including non-R&D) | 25.5 |
| | • Software and computing[b] | 157.5 |
| IT solution for socioeconomic problems | • LED (including non-R&D) | 35.8 |
| | • Medical equipment (including non-R&D) | 50.6 |
| | • Green IT (including non-R&D) | 2.5 |
| | • u-Life | 8.1 |
| IT advancement | • Semiconductor | 101.8 |
| | • Display | 32.0 |
| | • Mobile communications[c] | 52.4 |
| | • Network (BcN, etc.) | 54.0 |
| | • IT parts (sensor, fused parts, etc.) | 80.2 |
| **TOTAL** | | **687.9** |

Source: Korean Ministry of Knowledge Economy.
a Non-R&D included in IT utilization, LED, medical equipment, and Green IT.
b The fusion of industrial technologies, software, and computing is in accordance with the 14 Major Source Technologies defined by the Ministry of Knowledge Economy (in addition to the separately defined IT parts).
c The development of broadcasting and communication technologies will be driven jointly with the Broadcasting and Communications Committee, and provide the basis for market launching.

### Lessons from the Korean IT experience

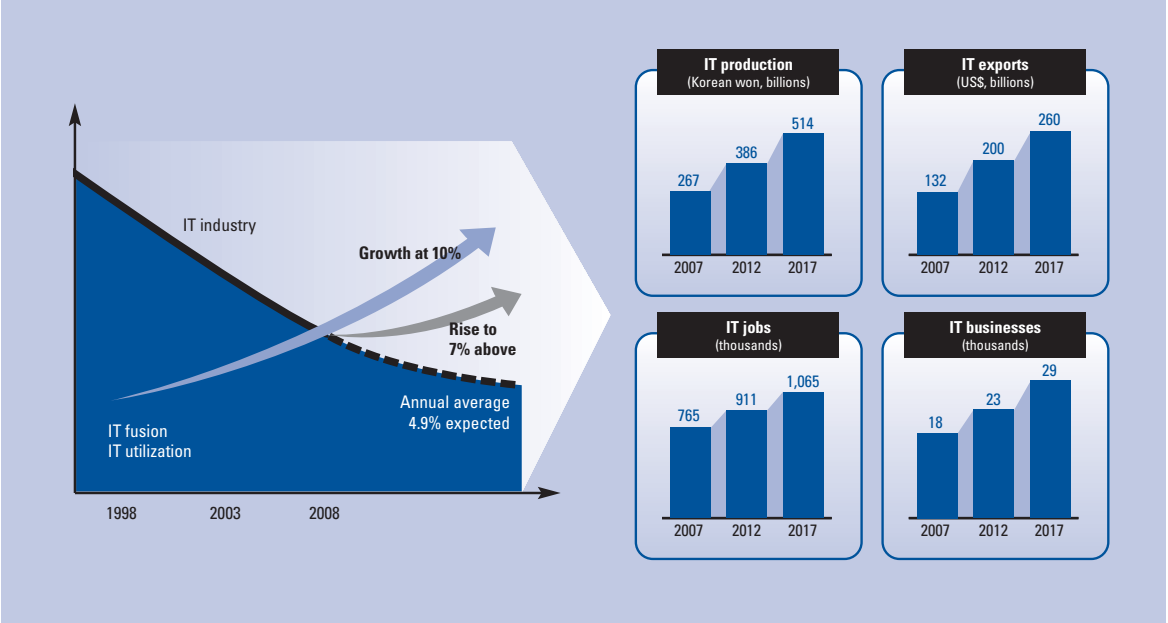
Korea has become a world leader in IT hardware and telecommunications. The key factors that contributed to make this happen are:

1. The boundary between the IT hardware and electronics industries has become blurred, particularly with respect to memory chips, displayers, and mobile phones. Thus the strong electronics industry, led by Samsung Electronics and LG Electronics, provided the foundation for the IT device industry. Hence we can say that a strong electronics industry is a key enabler of the IT hardware industry.

2. To become an ICT global leader, leadership in technology is a must. Samsung Electronics and LG Electronics have committed to become the leaders in memory chip, display, and mobile phone technologies. They compete in both the domestic and global markets. In the telecommunications industry, SK Telecom has risen to the challenge and succeeded in being the first to develop CDMA commercial technology, thus becoming the leader in CDMA-based telecommunications service business.

3. The proactive role of government policy in the telecommunications industry was crucial in propagating new standard platforms such as ADSL for the Internet and CDMA for mobile phones.

**Figure 3: Future prospects of the IT industry after the implementation of the New IT Strategy**




Source: Korean Ministry of Knowledge Economy.



4. As the policy of IT839 has shown, the integrated development of IT services, infrastructure, and devices creates synergies and is essential along the industry's value chain.

5. Developing the global marketing force of large corporations, such as Samsung Electronics and LG Electronics, provided the main business drivers for global IT business. These firms could lead the cluster of IT manufacturing business.

6. In their quest for world-class IT excellence, Korean IT corporations had to overcome many different challenges, including financial crises and oil shocks, and had to discover new answers every time.

7. Korea was not successful in the software package business. Software exports from non–English-speaking countries seem difficult because of the language barrier. However, the software industry is regarded as an important sector for the development of knowledge-intensive employment.

8. Korea is now facing an IT slowdown. To overcome the current challenge, the country is investigating new opportunities by integrating IT with traditional industries, both in product and process innovation.

## Conclusion

Korea relies heavily on exports, of which IT-related products account for one third.[14] Considering this high dependency and the huge potential of IT, it is quite reasonable to focus national development efforts on the IT industries. The current global recession poses both challenges and opportunities for Korean IT companies. To cope with the challenges, the primary concern is to secure the competitive edge of the major players. This will be achieved more effectively by focusing on technology development rather than on cost. This approach is quite different from the strategy adopted during the 1980s and 1990s, which depended primarily on cost reduction.

The New IT Strategy will determine the future of the IT industry in Korea. While the IT839 strategy of the early 2000s was aimed at the development of the overall IT industries by strengthening collaboration among services, infrastructure, and devices, the New IT Strategy aims at the creation of new demand by integrating IT with traditional industries, thus benefiting both. The strategy also converts government initiation to private-sector initiation. However, some aspects of the New IT Strategy remain the same as before: upgrade the technology, lead the global standard, and educate highly qualified workers.

During the Korean War, General MacArthur said, "It will take at least 100 years to rebuild this country." But Korea succeeded in becoming one of the 13 largest economies in the world in less than half a century. This

phenomenal effort may justly be termed the "Miracle on the Han River." One more take-off with IT will transform Korea into a truly advanced economy. Many are watching Korea to see how it will utilize its opportunity and potential amidst the daunting global economic outlook and the slowing growth rate of the IT industry.

## Notes

1 Jeon and Bae 2007.

2 Lee et al. 2007d.

3 Lee et al. 2007b.

4 Lee and Park 2007.

5 Kim and Cho 2007.

6 Lee and Lee 2007.

7 Park 2007.

8 Lee et al. 2007c.

9 Kwon and Lee 2007.

10 Lee et al. 2007a.

11 Chung and Cho 2007.

12 Min et al. 2007.

13 Yoo et al. 2007.

14 OECD 2006.



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CHAPTER 2.3

# Will the Soccer World Cup of 2014 Help Bridge the Social Gap through the Promotion of ICT and E-government in Brazil?

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The development of e-government in Brazil and the full use of information and communication technologies (ICT) by the population mirror the social divide that taints society: one of the most elaborate electronic voting systems in the world and a remarkable online tax return operation coexist with poor broadband penetration and computer illiteracy in many parts of the country, especially among the poor. Progress is being made, though. Two major projects in particular are capturing hearts and minds and may help bridge the social gap with ICT and e-government: the *e-Brasil* Project, which promotes a broad agenda of public policies aimed at building a more equitable and more competitive country through intensive use of ICT, and the 2014-Bis Program, which intends to dazzle the world with developments in the country that are unique in terms of technology, scope, approach, and social impact.

## The last 25 years of ICT in Brazil

In 1984, Brazil was living under the military government of General João Baptista de Oliveira Figueiredo. It was a time of high and variable inflation, high unemployment, debt crises, heavy state involvement in the economy, and a slow, carefully managed transition toward a civilian president elected indirectly by Congress in January 1985.

In October of 1984, during the twilight of the military regime, Congress passed the so-called National Information Technology Policy, also known as the Informatics Law *(Lei 7.232 Política Nacional de Informática),* reserving the national information technology (IT) market for Brazilian firms for the following eight years. The Informatics Law had the support of some nationalist military officers, linked to the Brazilian national intelligence service and working in the Special Secretariat for Informatics (*Secretaria Especial de Informática,* or SEI), under the National Security Council. These military officers had formed an unusual alliance with left-leaning intellectuals and an influential lobby composed of several associations linked to the IT sector (ABICOMP, defending the interests of Brazilian computer-makers; SBC, representing university professors of IT and related fields; and APPD, an unofficial union of computer technicians).

In 1983 there were about 54 Brazilian computer manufacturers, of which only 11 had existed prior to 1974; 25 were created after 1978.[1] These companies mainly produced "clones" of Sinclair, TRS, and Apple computers. Most firms used copied software and operational systems. Peripherals had more local content, since adaptations had to be made in software and keyboards for the introduction of Portuguese language and special graphic signs. Many local companies started producing printers, modems, terminals, and videos.

In Brazil, the word *informática*—usually translated as information technology—defines a broad, albeit vague, sector comprised of industries manufacturing products

that embody digital components. The Informatics Law was applied to computers, scientific instrumentation, electronic telecommunications, terminals, peripheral equipment, and software, but in practice it could cover any high-technology industry.

The law and the SEI were the subject of much debate from the start. With the transition to civilian governments, the power of the alliance that supported them was reduced. Domestic and international opposition to the existing policy mounted,[2] with growing evidence of better performance by the IT industries in other emerging economies (e.g., Korea, Rep. (Korea), Taiwan) using different means to promote their IT sectors.[3] A new Informatics Law *(Lei 8248)* was approved by Congress in October 1991, during the government of Fernando Collor, the first president directly elected by Brazilian citizens since the end of the military regime. In addition to changing in the previous Informatics Law, the Collor government adopted a number of other measures to liberalize international trade.

The new Informatics Law changed the definition of *Brazilian company* in order to attract foreign capital, and created new fiscal incentives. But the "market reserve" policy was maintained and expired as per the previous law, in October 1992. Under the new law, the SEI was replaced by the Secretariat for Information Technology and Automation Policy (SEPIN), an entity within the normal government structure. The market reserve policy, although criticized by many people, had the effect of establishing the infrastructure for education at all levels in the country: technical courses became available everywhere, hundreds of undergraduate computer science courses were inaugurated in all major universities, and a sophisticated network of laboratories and graduate programs in computer science was established. Large numbers of IT professionals became available for the growing industry and for the new IT programs that succeeded the old policy.

It was also in 1992 that the National Research Network (now the National Research and Teaching Network, or RNP) was established with support from the Ministry of Science and Technology (much along the lines of the National Science Foundation's support for Internet development in the United States). Along with the RNP, the Ministry created a program to promote Brazilian software development and exports (Softex) under the National Council of Scientific and Technological Development (CNPq), and promoted the development and online publishing of the first websites of federal government agencies.

Access to the Internet was limited to the government and academic users through the RNP until 1995, when it became available to the private sector. Growth was slow at first, with several government institutions trying to control the Internet. Telecommunications was then a monopoly controlled by the state company TELEBRÁS. Both TELEBRÁS and its long-distance subsidiary EMBRATEL wanted to control the new service. It took courage from the then Minister of Communications, Sérgio Motta, not only to open the new service to the private sector but to explicitly prohibit the two state companies and their subsidiaries from entering the new business.

The development of the information society in Brazil was the subject of a pioneering effort by the same Ministry of Science and Technology from 1999 to 2000. A team coordinated from that Ministry produced a report known as the *Livro Verde* (Green Book) in the year 2000.[4] Then, in 2004, the subject of e-government in Brazil was treated in a ground-breaking way in *E-gov.br – a próxima revolução brasileira* (E.gov.br – The Next Brazilian Revolution).[5] Contributions by 44 specialists documented and analyzed Brazil's achievements in building an information society and conducting a wide range of e-government activities in education, health, public safety, justice, elections, legislation, and public administration. Brazil's major regions and the federal, state, and local governments were covered. Shortly after this publication, another book appeared, *E-government – o governo eletrônico no Brasil* (E-government – Electronic Government in Brazil), with contributions by 30 specialists.[6]

The major boost to e-development in Brazil came from the judiciary: the establishment of full electronic voting in 2000. A very sophisticated system was implemented and has been in operation since then (see Box 1). That system gave a particular boost to the Brazilian IT and software industry, especially after the international exposure of the subject during the disastrous display of incompetence by the state of Florida in the United States during the 2000 US presidential elections.

Another major e-government achievement was the system for income tax returns. The banking systems were very elaborate in Brazil because of the rampant inflation up to 1994 (interest had to be credited to individual accounts on a daily basis). In view of the above, the government developed a system that initially accepted declarations on disks and then was updated to accept online declarations on the Internet (see Box 2).

### Brazil in numbers

Brazil has a population of around 200 million, of which 85 percent live in the cities. Most of the population is concentrated in the metropolitan areas of state capitals—mega cities such as São Paulo, Rio de Janeiro, Salvador, and Belo Horizonte. GDP per capita is around US$7,000, and has been recently growing at an annual rate of 4 percent.[7] International trade amounted to US$300 billion in 2007, with a positive balance of US$30 billion. Half the country's exports are now manufactures.[8] The trade surplus allowed the country to amass US$188 billion in foreign reserves up to 2008 and helped the government face the turbulent waters of the

### Box 1: Brazil's electronic voting system

Brazil's Supreme Electoral Court (TSE) supervises 27 Regional Electoral Courts that in turn run elections in Brazil's 2,886 electoral zones. In 1986, the TSE initiated a process that led to entirely electronic elections throughout Brazil in the 2000 municipal elections. Since that year, all Brazil's federal, state, and municipal elections have been conducted on electronic voting machines, with the full results of elections becoming available on the same day the elections were held. In the last municipal elections in October 2008, the electorate numbered almost 129 million, voting at 400,558 voting sites. The sophisticated system, which provides for many controls to prevent fraud, has not resulted in any serious questioning of its security and validity by any of the country's major political parties. No fraud has been detected in the 12 years since its introduction. Nevertheless, there have been improvements to the ballot boxes in each election: in 2008, for the first time booths with biometric identification (using electronic fingerprint readers) were tested in three municipalities. The TSE's objective is to extend this system throughout the country by 2018.

Source: TSE, available at www.tse.gov.br/internet/eleicoes/votoeletronico/sumario.htm; Camarão, 2004.

### Box 2: Brazil's electronic tax filing system for personal income tax

Almost all personal income tax declarations in Brazil are filed online. Even in 2003, 95.6 percent of declarations were filed electronically, either online or on a disk. In 2007, 23.9 million declarations for the calendar year 2007, or 98.8 percent of the total, were filed over the Internet, using a program available for download from the federal tax agency (*Secretaria de Receita Federal*) at www.receita.fazenda.gov.br/principal/Informacoes/InfoDeclara/declaraPF.htm. In 2007, the latest year for which household computer and Internet statistics are available from the National Household Sample Survey, there were 11.4 million homes with computers with access to the Internet and 15 million with a computer. Assuming 15 million homes had a computer with an Internet connection in 2008, as many as 62.8 percent of the declarations filed over the Internet could have been filed from homes. Many returns may have been filed over the Internet by professional tax preparers, at workplaces, or from public Internet access points.

Source: For declarations filed in 2003, *Receita Federal,* 2007; for declarations filed in 2008, www.receita.fazenda.gov.br/AutomaticoSRFsinot/2008/04/30/2008_04_30_21_36_05_137597168.html; and for households with computers having an Internet connection in 2007, http://www.sidra.ibge.gov.br/pnad/pnadpb.asp, calculations for Table 2387.

recent economic turmoil in a much better position than it has in previous crises.[9]

In the last 50 years, the economy has changed quickly from agricultural to industrial and to services-based. The services sector now accounts for two-thirds of the country's GDP and is still growing in proportion to agriculture and industry.

After the privatization of the state telecommunications companies in 1999, the basic IT infrastructure grew rapidly. The country has over 150 million mobile lines in 2009; that number is still growing at the incredible rate of 1,300,000 a month (as of January 2009), despite the economic downturn occasioned by the global economic crisis. Although the number of computers has increased dramatically, aided by government credit programs and (until the last quarter of 2008) favorable exchange rate developments, access to the Internet is growing at a slower pace. Only 20 percent of the households have access to the Internet today, of which half are high-speed broadband connections. But there are large differences in household Internet access by both region and income class, as revealed by 2007 data from the National Household Sample Survey (Table 1). Households are grouped into three classes of income: those earning more than 20 times the monthly minimum wage, those earning between 10 and 20 times the monthly minimum wage, and those earning less than 10 times the monthly minimum wage.

Another important survey, from the Brazilian Network Information Center, provides a broader look at Internet use by the urban population.[10] Together the two surveys reveal the principal factors associated with Internet use in Brazil: geographic location, income, social class, education, age, and—to a lesser extent—gender. Therefore, in designing digital inclusion policies, these differences need to be taken into account.

The Brazilian Network Information Center survey also provides a wealth of other interesting data on Internet use by both individuals and businesses in Brazil.

### Table 1: Households with Internet access by level of income, 2007

| | Households | | Households with an Internet connection (percent) | | | |
|---|---|---|---|---|---|---|
| | Number | | | > 20 times monthly min. wage | 10–20 times monthly min. wage | < 10 times monthly min. wage |
| Region | (thousands) | Percent | Total | | | |
| **Brazil** | **56,344** | **100.0** | **20.2** | **83.0** | **68.7** | **14.1** |
| Southeast | 25,151 | 44.6 | 18.9 | 85.2 | 72.4 | 19.9 |
| South | 8,879 | 15.8 | 16.9 | 83.2 | 67.3 | 17.8 |
| Central-West | 4, 163 | 7.4 | 12.1 | 83.6 | 66.0 | 10.8 |
| Northeast | 14,252 | 25.3 | 5.4 | 76.6 | 62.0 | 5.9 |
| North | 3,900 | 6.9 | 4.4 | 70.0 | 50.9 | 5.2 |

Source: IBGE, 2008, Table 2.387.

One of the most striking trends is the important and rapidly growing role of public access points, especially those operated as private-sector businesses, called *lan houses* or *cybercafés*. In 2007, almost half of all reasonably frequent Internet users patronized these establishments; more than had access to the Internet at any other location, with the percentage being significantly higher for the poorest regions, the Northeast and North. These usage patterns also provide useful input for the design of digital inclusion policies.

The rollout of digital television broadcasts began in São Paulo in December 2007 and is scheduled to reach the capitals of all Brazil's states by the end of 2009. Beginning in 2013, no new conventional (analogical) channels will be authorized; at the end of June 2016, analogical transmissions will be completely phased out. Limited interactivity is already possible with one-way transmissions.

Digital TV should stimulate developments (already underway) and the use of powerful new tools for education (t-learning), interaction with governments (t-government), commerce (t-commerce), and banking (t-banking). Given the high cost of telephony and both satellite and cable TV in Brazil, the availability of free or low-cost wireless Internet is likely to be critical in developing interactive applications.



It remains to be seen what incentives for the development of such new applications will be provided by government policies and the market. Furthermore, there are issues concerning business models that need to be solved if private broadcasters, which command the largest TV audiences, are to make heavy use of the potential for two-way interactivity.

## Main obstacles to IT use in Brazil

There are a number of obstacles to a wider IT diffusion in Brazil, as follows.

### Education and training

Although the personal computer (PC) is pervasive today in every office in Brazil and around the world, we tend to forget that this has not always been the case. The IBM PC was launched in 1981, so the one-computer-per-desk landscape has been with us for only the last 20 years or so. That means the generation that graduated in and before the 1980s may not be computer-savvy and, in many cases, not even computer-literate. Many people of that generation hold government positions today and they may not promote—in some cases even resist—the adoption of new, unfamiliar technologies.

The government raised salaries and contracted, through highly competitive admission programs, hundreds of thousands of new employees. These are well-educated and bright young people who will help change the ways government is practiced. However, the government needs to start large training programs for existing executives who hold the responsibility of managing government programs today. One possibility would be direct incentives, such as government financing of home computers and Internet connections.

### "Petty power"

We all know the type: "Mr Souza" is the only guy in the government office who knows how to fill in the blanks in that particular paper-form 37-B. He is very important because of this. Then one day the new guys arrive and start to plan a move toward the Internet by which all the information that applies to using form 37-B will be online. What does "Mr Souza" do? He boycotts the change, obviously, since this threatens his powerful position in the office.

This is no stretch of the imagination, it happens often! And cases such as "Mr Souza's" are not the only problems. The Internet switches command from the tool builder to the user of the tool—in other words, from the computer people in the government office to the citizens. Employees in computer support groups are sometimes major hindrances to change. And they may be particularly dangerous, since they are the ones who have to implement many of the changes. There is always a reaction against change, particularly in government. Things tend to be left as they are, even when many people think the way they are does not make sense.

Once again the solution is training, but one should also involve the legacy employees directly, from the beginning, and share decisions and action plans with them. Both "Mr Souza" and the computer specialists must feel they are integral parts of the process of change.

### Cultural change

Even a couple of centuries after becoming a federation of independent republics, Brazil still seems to see its governments as the royal family. This phenomenon has many historical explanations, but what is important here is the effect that feeling has on the actual government members and officials. They are separated from the population and they often seem to think they are in fact royals upon whom some deity laid the mantle and transferred power to govern the people. Even discounting exaggeration, many government officials do think they do not have an obligation to serve the people who pay their salaries. They may even think that they are doing a favor to the citizens! This absurd mindset prevails in many aspects of government and must be tackled head on in order to implement successful e-government initiatives in Brazil and in many countries around the world.

## The *e-Brasil* Project

Brazil has lacked a unifying vision of its development objectives. The country suffers from deep-seated social problems rooted in a highly unequal distribution of income, wealth, and access to education and health

services, among many other issues. These inequalities not only threaten social cohesion and undermine public safety, they also cut economic competitiveness. How can Brazil, with large contingents of functional illiterates, compete with countries such as Korea and China, which are building electronic lifelong learning systems for their labor forces?

Public frustration with crime, corruption, unresponsive political institutions, tortoise-like judicial systems, and lack of economic opportunities is widespread. Throughout 2008 there was still no real consensus on development strategies among key elites or the public at large. The federal and state elections of 2006 provided an opportunity to discuss these problems and promote a national debate on how to accelerate socioeconomic development, improve competitiveness, and induce much-needed massive investments—from domestic and international sources. To a certain extent this happened, but in general the necessary debate was derailed by political scandals that captured headlines and dominated national attention. With a discussion centered on long-term projects by the government teams that took office in January 2007, and now that the municipal elections of October 2008 are over, there are many opportunities to raise critical development questions and propose new solutions in a systematic manner.

There is a need for a new development vision with a mobilizing power similar to the one that inspired late Brazilian President Juscelino Kubitschek's campaign slogan in the "Fifty years of progress in five" and his Plan of Goals *(Plano de Metas)* for his government (1956–61). Building the automobile industry, a national highway network, and a new capital, Brasília, in the nation's heartland together were central to Kubitschek's vision. JK, as he was known, remains one of Brazil's most popular presidents.

Innovative governments—such as those of Canada, China, Finland, Ireland, Korea, and Singapore—have shown that ICT can help accelerate economic and social development. Countries in South Asia, with India and Sri Lanka in the lead, have begun formulating national e-development strategies and attracting financing for their implementation from the World Bank and other international and domestic sources of funding.

### Definition and scope

The *e-Brasil* Project seeks to raise awareness first of politicians and then of the population at large about the advantages of a coherent e-development strategy. This will help build a more equitable society and a more competitive economy—goals widely accepted in Brazil. The Project team reviewed international and Brazilian experience and produced recommendations for public policies to achieve these twin goals.

The Project, built on pioneering efforts such as the Green Book of 2000 and the publications on e-government in 2004, is a collective effort by a network of over 61 Brazilian and international practitioners and specialists with diverse institutional and political affiliations supported by an advisory council. They are united by the conviction that, with an intensive use of ICT, it is possible for Brazil to overcome the obstacles that prevent it from being a developed first-world country. These obstacles are most notably its highly unequal distribution of income, wealth, and knowledge as well as factors such as corruption and excessive bureaucracy.

### Main programs and current state

By 2008, the *e-Brasil* Project had published three books, two of them before the state and federal elections of October 2006, and the last and by far the most complete in September of 2007.[11] The last two books include chapters on the *e-Brasil* Project of policy recommendations and the "10 commandments" program—a concise summary of these recommendations—for *e-Brasil* candidates (see Box 3).

An interactive, bilingual (Portuguese and English) Web portal promoting the *e-Brasil* vision and policy program and offering links to institutions of the Brazilian ICT sector was established in 2006.[12] The portal is part of a broader strategic communication campaign that seeks to raise general awareness, through the electronic and print media, on ICT opportunities.

What have been the results of the *e-Brasil* Project through 2008? Progress has been visible at the political level, especially in important states such as São Paulo, Rio de Janeiro, Ceará, and Minas Gerais. At least two states, Acre and the Federal District, have initiated programs to make broadband Internet available to their residents free of charge while enhancing their e-government offerings. A nationwide movement to create more digital towns and cities is developing. In the municipal elections of 2008, candidates for mayor in many *municípios,* including the largest in the country, São Paulo and Rio de Janeiro, called for adoption of some of the key *e-Brasil* policies, such as free or low-cost Internet connectivity for their populations.

At the federal level there have been important initiatives to expand computer ownership and public telecenters in all the country's 5,564 *municípios,* to bring broadband Internet and computers to all the nation's schools, and to support the rollout of interactive digital television with a huge development potential for education, health, e-government, and e-commerce applications as well as entertainment and information. These programs are expected to accelerate in 2009.

### E-government at the state level

The widespread use of ICT has been affecting the state governments for a number of years. However, it has only been in the past few years that they have accepted the concept that ICT could be used not only for their internal benefit but also for the benefit of society,

### Box 3: Main pledges in *e-Brasil*'s "10 commandments" program for e-candidates

The *e-Brasil* Project launched a campaign to identify *e-Brasil* candidates in 2006: politicians that would pledge to try to implement the 10 activities listed below. The idea was to make each person aware that with his or her leadership it would be possible to implement public policies, programs, and projects that would not only achieve their goals but would also win recognition from the population and votes in the future. These "commandments" would of course be different for candidates for president, governors, mayors, and legislators. But they would all have common elements.

1. **Digital inclusion and e-development.** It is crucial to accelerate the access of all the population to broadband Internet, using, for the poorer members of the population, alternative models of sustainability that exempt them from paying access fees. Using these models, remuneration of the supplier comes through advertising, public budgets, and/or resources from federal funds. Priority should go to schools, telecenters, and other collective access points.

2. **E-education and lifelong training.** Education and training are the highest sectoral priority: they are a means for democratizing access to knowledge to improve opportunities for employment, income distribution, and national competitiveness in an ever-more knowledge-based world economy. Governments should accelerate the computerization of public schools, giving them broadband Internet connections.

3. **E-public safety.** Governments should interlink databases and promote inter-operability of all the public safety agencies: the prison system; the federal state, civil, and military police forces; the information system of the Ministry of Justice; and civil guards at the municipal level.

4. **E-health.** A health-care network with broadband connections should be created, interlinking all the health units (federal, state, and municipal), creating an environment conducive to training, fostering medical consultations, making appointments online, obtaining second opinions, and practicing telemedicine.

5. **E-public services and management.** Improve the delivery of public services to citizens through the construction and operation of integrated service centers (one-stop shops), such as the *Poupatempo* program in São Paulo, the *SAC* in Bahia, the *Vapt Vupt* in Goiás, the *Super Fácil* in Amapá, and the *Tudo Fácil* in Rio Grande do Sul. The master rule should be "never ask a citizen for information that the state already has about him or her or their companies."[1]

6. **Government e-procurement of goods and services.** Establish or improve Internet portals for procurement, allowing for easy access to information about government future needs and for electronic bidding. Early implementation has demonstrated a drastic reduction in expenditures by state governments.

7. **E-justice.** Promote the simplification of procedures for judges and court personnel that result in speeding up the handling of cases. Some measures may involve a new legal framework for electronic judicial processes.

8. **E-commerce.** Promote the widespread use of electronic transactions by providing incentives for the use of digital certificates in commerce and in relations with government. This will reduce costs and diminish many obstacles still in place for international transactions.

9. **Encouraging development of the ICT sector.** No country is trying to produce every component of the IT supply chain. There is a need for a national plan for the sector stating very clearly what is and what is not to be produced locally. Hesitant policies for semiconductors, for instance, have resulted in little investment and poor results. The software sector, on the other hand, seems very promising and should have carefully designed incentives that range from lowering taxes to promoting government purchases locally.

10. **Strategy, coordination, and leadership.** Electronic government policy should enter the priority agenda of the federal, state, and municipal governments and be aligned with other e-development policies. Leadership is fundamental and should begin at the highest level of the executive branch, the President of the Republic for the federal government, the governors for the states, and the mayors for the municipalities.

**Note**

1 Costa 2007b.

making the activity of government more responsive to the citizens' needs. With the arrival of the Internet and the growth of electronic businesses in the private sector, the public sector had to rethink its hierarchical and bureaucratic models and change its way of conducting business.[13]

Brazil is a federative republic with 26 states plus 1 federal district. In the past 10 years, some of these states' governments have started to promote e-government initiatives to increase the transparency of the administration, promote citizens' participation in the surveillance of public power, and provide information and public services through electronic means.

Effectiveness of these local initiatives varies widely from one state to another. One of the authors recently conducted a survey of the development stage of e-government initiatives in 19 states.[14] The survey focused on the official governmental website of each state, and checked 30 information and government provision services divided into three groups: e-governance (6 services), e-democracy (4 services), and e-information (20 services). Respondents of the survey were chosen from two groups: the local managers in government who were responsible for the services and academics in the field of electronic government. They were asked to rank each service in terms of the quality of the offering and its level of importance, using the following questions:

1. Service offer OK? (0 = not offered; 1 = partially offered; 2 = offered in full), and

2. Level of importance? (0 = not important; 1 = some importance; 2 = medium importance; 3 = high importance; 4 = top importance)

The results of the survey are shown in Table 2, suggesting this set of services was an interesting set to focus on. One can notice that quality of service is poor and many basic services—such as access to public libraries, school enrollment, and information on public health issues—are on average not offered at all.[15]

This survey may be useful both for the federal government and for the states. On the federal level, government can determine which services are considered



**Table 2: Survey of e-government in the Brazilian states**

| | | Government managers | | Academia |
|---|---|---|---|---|
| Group | Service | Quality of service (Question 1, average) | Importance (Question 2, average) | Importance (Question 2, average) |
| **E-governance** | 1. State budget and planning | 1.46 | 3.51 | 3.46 |
| | 2. Results of actions | 1.30 | 3.62 | 3.62 |
| | 3. Performance indexes | 0.48 | 2.87 | 3.27 |
| | 4. Policies, rules, and regulations | 1.39 | 3.36 | 3.32 |
| | 5. Ombudsman and State Attorney | 1.50 | 3.79 | 3.62 |
| | 6. Official newspaper and government news | 1.82 | 3.46 | 3.05 |
| **E-democracy** | 1. Complaint and suggestion box | 1.63 | 3.73 | 3.57 |
| | 2. Live contact, opinion polls | 0.62 | 3.04 | 2.95 |
| | 3. Participatory budget | 0.73 | 3.28 | 3.57 |
| | 4. Shared planning | 0.33 | 3.10 | 3.35 |
| **E-information** | 1. Procurement | 1.84 | 3.88 | 3.76 |
| | 2. Suppliers | 1.41 | 3.34 | 3.24 |
| | 3. Automatic receipts | 1.67 | 3.48 | 3.62 |
| | 4. Tax forms and automatic form filling | 1.43 | 3.57 | 3.68 |
| | 5. Information on the judiciary and state congress | 1.38 | 2.85 | 3.11 |
| | 6. School enrollment | 0.68 | 3.42 | 3.38 |
| | 7. Distance learning | 0.74 | 3.18 | 2.73 |
| | 8. Online issuance of documents | 0.86 | 3.68 | 3.46 |
| | 9. Tax collection | 1.52 | 3.29 | 3.57 |
| | 10. Job opportunities | 1.06 | 3.22 | 3.00 |
| | 11. Motor vehicle registry | 1.51 | 3.54 | 3.57 |
| | 12. Driver license | 1.22 | 3.38 | 3.41 |
| | 13. Reporting of crime | 1.39 | 3.45 | 3.38 |
| | 14. Address updating | 0.68 | 2.91 | 3.19 |
| | 15. Opening/closing of companies | 0.96 | 3.45 | 3.27 |
| | 16. Environmental licenses | 0.93 | 3.22 | 3.22 |
| | 17. Public health | 0.55 | 3.68 | 3.76 |
| | 18. Information on private pension funds | 0.86 | 3.40 | 3.51 |
| | 19. Public library | 0.26 | 2.84 | 3.19 |
| | 20. Economic and social statistics | 1.31 | 3.16 | 3.19 |

Source: Magalhães, 2008.
Note: The quality of service question was not answered by academic respondents because they were summoned at the national level, and some of the local (state) services were accessible only with a local presence (address, ID, driving license, etc.).

important and, of those, which are not being offered by the states, and plan accordingly. For an individual state, it is possible to check its position on a single service and compare it with the national average. This information, together with the perceived level of importance of each service, may indicate the best way for local governments to plan their investment strategically as they go about implementing their own e-government initiatives, along with considerations of cost, political impact, and ease of implementation.

It is important to note that in any implementation of e-government strategies, governments have to tackle several other processes, such as e-literacy and access to the services by poorer citizens (see Box 3).

### The future and the 2014-Bis Program

Soccer—*football* in some countries—is arguably the most popular sport in the world. In Brazil it is *the* sport, overshadowing any other by far. *Fédération Internationale de Football Association* (FIFA)'s 20th World Cup will be held in Brazil in 2014. The World Cup is rivaled in importance and audience only by the Summer Olympics, which are also held every four years. Separated from the Summer Olympics by two years, the Cup is a major undertaking by the host country; it is contested in several rounds involving 80 games in different cities. Brazil expects to receive between 600,000 and 1,000,000 foreign tourists for the 2014 event, along with internal travelling in large numbers. Furthermore, 3.3 billion people are expected to watch it on television (digital and analog), cellular, computer screens, and other means. The necessary infrastructure for the World Cup is huge and includes the capacity of the stadiums, transport between cities (the internal flux of tourists depends upon the preliminary results and cannot be predicted beforehand), airports, and accommodation in the cities. Several private and government bodies in Brazil are involved in planning the organization of the event.

The Brazilian Innovation Agency (FINEP), another government agency, is planning a parallel program to show Brazil in a different light: not only the land of Carnival, beaches, football, and Samba, but also the land of creativity, of well-being, of friendship. The program has been dubbed the "2014-Bis Program," a pun with the first plane ever to fly: the 14-Bis, piloted by Brazilian inventor Santos Dumont in Paris in 1906.

### The 2014-Bis Program

The Program motto is "How to dazzle (fascinate/amaze/touch) the World in 2014." The idea is to show everything in Brazil that is creative/innovative coming from two sources: novel initiatives every country is attempting to do and where Brazil is on par or leading the way, as well as projects that exist only in Brazil.

In the first category, there are several major breakthroughs to be demonstrated by the country. One internationally famous geneticist, Dr Sergio Pena, perfected a theory that states that there is no such thing as race: DNA studies of ancestry prove scientifically that we are all equally different or… we are all the same.[16] Besides that, according to Dr Pena, if there were races, Brazil would be the miscegenation champion in the world. Following this concept, the country will launch the World Cup of 2014 under the motto "we are one and the same" by analyzing saliva samples from the 22 players of each of the 32 teams. Another Brazilian researcher, Dr Miguel Nicolelis, now working at Duke University, developed a means of detecting the electrical commands of motion on the cortex of monkeys. That scientific breakthrough may now be used to command motion for people with all sorts of motor disabilities. One of them might even shoot the kick-off on the inaugural game! Other top research in Brazil is related to the search and extraction of deep-water oil. All of these developments may be shown in the games and will convey the idea of a scientifically developed country.

As for things uniquely Brazilian, Brazil has, in the Amazon, the world's largest rainforest, one fifth of the world's drinking water reserves, and a biodiversity that is a real treasure and not yet fully measured. This natural wealth will be experienced by both the tourists and the world audience through the modern means of ICT (see Box 4).

Though Brazil's scientific development and natural resources will be highlighted in the 2014 World Cup, the most relevant aspect of the Cup in the context of this chapter is the ICT program and the impact it might have on the country's infrastructure.

### Promoting ICT and e-government

Many of the projects in the 2014-Bis Program are related to ICT. The Program focuses on three different audiences: the 1 million foreign tourists, the 200 million Brazilians (total population), and the 3.3 billion viewers worldwide. For the foreign tourists, the most interesting project is the "electronic passport" (see Box 4 for a list of the Program's projects). This device, to be handed out to tourists either at a Brazilian consulate abroad or at the port of entry, will be able to identify its user unequivocally through some kind of biometric data (fingerprints, iris scan, or other technology) and will be his or her companion during the entire stay in Brazil: to go through customs without stopping, to buy tickets for the games, to book hotels, to find medical help, to get information about tourist destinations, to buy travel tickets, to look for help, to call home, to play games, and many other daily activities.

For the Brazilians who will not be at the games, there will be easy and free access to the transmission through high-quality digital TV, traditional TV, and several forms of public venues, where the population can watch the games in large, high-definition displays placed in *praças* (public squares). For the international viewers, all sorts of games and gimmicks will be offered—such as a virtual tour of the Amazon, where the viewer will experience the scenery, watch birds and other animal life, get information about the trees and the geography, and learn about the local ecosystem.

All of these developments will not be for the games alone, of course. Many sorts of positive side effects are expected in addition to economic development. Among these is a major social development through social inclusion and upgrades of infrastructure, which many people are hoping for. For instance, if the electronic passport is to become the tourist companion, all the guides will have to be proficient in the workings of the device. One of the projects in the Program will train, beginning in 2009, 13- to 14-year-olds from deprived communities in the 12 cities (1,000 each) where the games will take place, so that they become computer savvy and learn language skills in English and Spanish. These youngsters, who will be 18 or 19 by the year of the Cup, will be tour guides during the games and will have a much better chance of securing good jobs afterward. In the 12 cities that will host the games, all the areas the tourist will pass through will have to be "illuminated" by high-speed wireless access to the Internet, a basic infrastructure that will remain after the games and benefit the local communities. Mobile phones, already used widely in the country (there are now 150,000,000 lines), will be upgraded by the operating companies to include better displays to enable video viewing and other services. These devices will have an impact on productivity and access to services. Government services can be improved by access to these devices, and many people predict even today that the mobile phone will become *the* device for e-government in Brazil.

A fortunate coincidence with the political calendar will help the deployment and acceleration of these projects. Presidential elections are held in the country every four years, and the President can be re-elected once. President Lula is already in his second term and cannot run again in the next election, in October 2010. Whoever is elected in 2010 will probably be running for re-election in 2014, and the open campaign runs from July to September: the World Cup will happen at the beginning of the political campaign. Presidential hopefuls today for the 2010 election all know the importance of the event and will do whatever they can today and after 2010 to have a major success in 2014—not only for the games themselves but also for their impact in the country. To that end, it is expected that major emphasis will be placed on the 2014-Bis Program from 2009 onward.

### Box 4: Main projects in the 2014-Bis Program

- **We are one and the same.** Saliva samples taken from each one of the 22 players in the 32 teams will be studied for DNA ancestry: the idea is to prove scientifically that we are one and the same people, regardless of skin color, geography, or religion.
- **The electronic passport.** A device will be issued to visitors that is capable of high-speed access to the Internet and that (1) unmistakably identifies its user through personal biometric data and (2) is capable of doing irrefutable transactions in the name of the user.
- **The Amazon experience.** A virtual tour of the Amazon will be available where the user will be able to navigate rivers, stop and identify birds and animals, learn about trees and their importance in terms of biodiversity, and learn about geography and climate change.
- **The virtual soccer game.** A massively multiplayer online game (MMOG) will allow players to compete against other soccer players anywhere in the world, choose player characteristics, devise game tactics, and have an almost live impression of playing the game.
- **Virtual hang gliding.** In a virtual experience of hang gliding over the 12 towns in Brazil where the games will be held, such as Rio, São Paulo, Brasília, the user will strap him- or herself to the actual wings and watch the scenery through special glasses; arm and body movements will determine the actual flight course.
- **The green game.** A special study will be undertaken for the feasibility and the physical implementation of a green game, in which every aspect of the realization of a game in a stadium, including transport of the audience and lighting, involves no carbon emission.
- **The green football.** Development of a special football built with "vegetable leather," with exactly the same characteristics of the leather or plastic balls in use today, will allow the extension of the concept to other "green leather" products.
- **Social guides.** This program encompasses large-scale in-site five-year training of 1,000 guides for the games in each one of the 12 cities where the games will be played. Boys and girls who are 13- to 14-years old today will take lessons and become knowledgeable in English, Spanish, and computers.
- ***Peladão.*** Some of the tourists enjoy playing soccer as well as watching it. A special tournament will be organized for them, one *Peladão (pelada)* is a slang for a friendly soccer game in Brazil) game for each official game. Teams will be drawn and the games will be transmitted on the Internet.
- **Brazilian music for all.** Brazilian music can be heard all over the globe, sometimes without the listener aware that it is Brazilian. This project will make all sorts of Brazilian music freely available to all, ranging from *samba* and *bossa nova* to classical.

## Conclusions

The achievements, challenges, and programs discussed above are bound to have a number of important impacts on people and human resources as well as on social and economic issues affecting Brazil's society.

### People

As a result of growing globalization and expansion of the private sector, ICT issues in government go increasingly beyond execution in the direction of regulation and policymaking. This requires even more sophisticated competences in ICT and process management, for which executives have to master additional areas, such as development economics, standardization, and international relations. In particular, ICT executives have to be able to interact with and influence partners from the private sector and other governments and supranational institutions that tend to be highly competent, and they will have to deal with complex issues in diversified environments.

Thus a crucial area for the future of Brazil's e-development is the training of future e-leaders, who ideally combine a good knowledge of public administration, economics, political science, and ICT. Unfortunately, the Brazilian educational system, like that of many other countries, has been slow in adapting its curricula and approaches to develop the well-prepared, network-savvy leaders needed to realize the full potential of the ICT revolution. The existing programs still favor traditional disciplinary "silos," leaving it mostly to the individuals to develop these new competences.

Building on Brazil's experience and that of other countries, the *e-Brasil* Project and the *Fundação Dom Cabral* seek to join forces with other institutions in the BRIC economies to develop an international Executive Masters in Public Administration program for future e-leaders and a central academic institution (perhaps a consortium) in Europe or North America.[17] It is possible that other groupings, such as South Africa and the Arab countries, may also be included. This is envisaged as a one-year to 18-month program for promising civil servants in subnational and national governments and private-sector representatives (initially 25 from each country), selected in national competitions.

The program would be kicked off with a one-week seminar in a partnering institution in Europe or North America, possibly jointly with the World Bank Institute. The participants would then return to their countries and pursue a blended (web-based and face-to-face) learning program and conduct their research in-country. The program would take candidates from either the public administrator stream or the ICT specialist stream and give them interdisciplinary training in both fields. At the end of the program, there would be a competition to select the best theses, which would be presented by their authors at a final seminar in the central location, with all participants present as well as the incoming cohort for the next program cycle. Funding for the program would come from participating country sources, ICT multinationals, foundations, the World Bank, and other international development agency–supported projects in the field.

### Impact on Brazilian society

The Internet and all the related ICT may bring about an opportunity to tackle long-standing problems in Brazilian society. For instance, providing good education in remote parts of the country was previously almost impossible. With the Internet, there is a fighting chance to achieve it. Control of the Amazon forest: it is now possible, even considering the huge geographical area involved. Good quality medicine to rural areas: this is now possible. For this reason, we claim that there should be no reference to a "digital divide": the expression conveys the wrong idea that something bad happened because of the Internet, as if everything was well before and suddenly the Internet came about and caused a problem. Nothing is further from the truth. We believe the focus should be on digital inclusion of the entire population and the intensive use of ICT to accelerate Brazil's socioeconomic development.

The *e-Brasil* Project, which has been pushing the concept for almost four years, and the 2014-Bis Program, which is now starting, both point to a wealth of real possibilities to promote e-development. An energetic and inspired leadership; strategic communication through all the mass media, but especially television and the Internet; and catching the imagination of Brazil's highly creative population are the key.

Brazilians are certain Brazil will come out top in 2014. But in the unlikely event that Brazil does not win the title in the 2014 World Cup, at least we can all go back home and say proudly that the 2014-Bis Program was worth the effort, for all its originally unintended consequences for the country.

## Notes

1 Schwartzman 1985.

2 Garcia and Roselino 2009.

3 Luizo 1996.

4 Takahashi 2000.

5 Chahin et al. 2004.

6 Ferrer and Santos 2004.

7 IMF 2008.

8 See Brazil at a glance, available at http://devdata.worldbank.org/AAG/bra_aag.pdf.

9 IMF 2008.

10 CETIC.BR 2008.

11 See Knight 2006; Knight and Fernandes 2006; and Knight et al. 2007.

12 See www.e-brasil.org.br.

13 Costa 2001.

14 Magalhães 2008.

15 Costa 2007b.

16 Parra 2003.

17 Costa 2007a.

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# Part 3

## Country/Economy Profiles

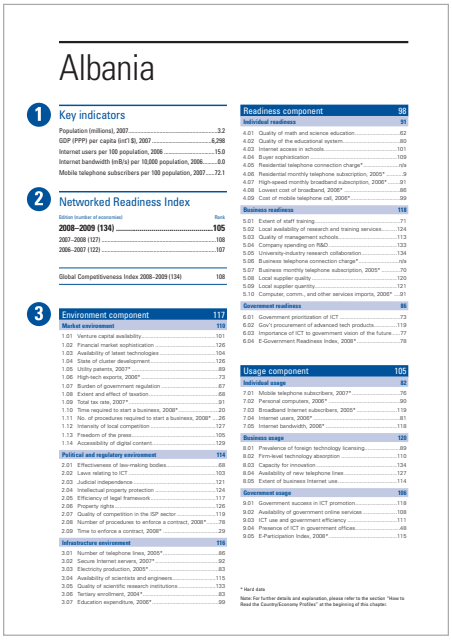
# How to Read the Country/Economy Profiles

The following pages present the profiles of the 134 economies covered by *The Global Information Technology Report 2008–2009*. They provide a picture of the level of ICT development of an economy by grouping information under the following sections:

1. Key indicators: population in million of inhabitants, gross domestic product (GDP) valued at purchasing power parity (PPP) per capita, Internet users per 100 population, Internet bandwidth measured in megabytes per second (mB/s) per 10,000 population, and mobile telephone subscribers per 100 population.[1]

2. Overall Networked Readiness Index (NRI) ranking for 2008–2009, which gives insight into overall ICT readiness; one can compare this ranking with those of the NRI 2006–2007 and NRI 2007–2008 if the economy was covered in those editions. Also shown is the economy's ranking on the World Economic Forum's Global Competitiveness Index 2008–2009.[2]

3. Detailed ranking for the three component subindexes, the nine pillars, and the 68 variables of the NRI. The numbering of the variables matches the numbering of the Data Tables found at the end of the *Report*, which provide descriptions, rankings, and scores for all the variables. For hard data indicators (identified by *), the year of the value used to calculate the rank appears next to the title. The section "Technical Notes and Sources" at the end of the *Report* provides further details on each indicator, including its definition, method of computation, and full sources. For Survey variables, the rank shown is derived from the results of the 2007 and 2008 editions of the World Economic Forum's Executive Opinion Survey. Note that for the sake of readability, the years of Survey data points were omitted. For more information on the framework and computation of the NRI, as well as on the Executive Opinion Survey, please refer to Chapter 1.1.


Albania

1 Key indicators

Population (millions), 2007 ..... 3.2
GDP (PPP) per capita (int'l $), 2007 ..... 6,298
Internet users per 100 population, 2006 ..... 15.0
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 72.1

2 Networked Readiness Index

Edition (number of economies) — Rank
2008–2009 (134) ..... 105
2007–2008 (127) ..... 108
2006–2007 (122) ..... 107

Global Competitiveness Index 2008–2009 (134) 108

3 Environment component 117
Market environment 110
1.01 Venture capital availability ..... 101
1.02 Financial market sophistication ..... 126
1.03 Availability of latest technologies ..... 104
1.04 State of cluster development ..... 126
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 73
1.07 Burden of government regulation ..... 67
1.08 Extent and effect of taxation ..... 68
1.09 Total tax rate, 2007* ..... 91
1.10 Time required to start a business, 2008* ..... 20
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 127
1.13 Freedom of the press ..... 105
1.14 Accessibility of digital content ..... 129
Political and regulatory environment 114
2.01 Effectiveness of law-making bodies ..... 68
2.02 Laws relating to ICT ..... 103
2.03 Judicial independence ..... 121
2.04 Intellectual property protection ..... 124
2.05 Efficiency of legal framework ..... 117
2.06 Property rights ..... 126
2.07 Quality of competition in the ISP sector ..... 119
2.08 Number of procedures to enforce a contract, 2008* ..... 78
2.09 Time to enforce a contract, 2008* ..... 29
Infrastructure environment 116
3.01 Number of telephone lines, 2005* ..... 86
3.02 Secure Internet servers, 2007* ..... 92
3.03 Electricity production, 2005* ..... 83
3.04 Availability of scientists and engineers ..... 115
3.05 Quality of scientific research institutions ..... 133
3.06 Tertiary enrollment, 2004* ..... 83
3.07 Education expenditure, 2006* ..... 99

Readiness component 98
Individual readiness 91
4.01 Quality of math and science education ..... 62
4.02 Quality of the educational system ..... 80
4.03 Internet access in schools ..... 101
4.04 Buyer sophistication ..... 109
4.05 Residential telephone connection charge* ..... n/a
4.06 Residential monthly telephone subscription, 2005* ..... 9
4.07 High-speed monthly broadband subscription, 2006* ..... 91
4.08 Lowest cost of broadband, 2006* ..... 86
4.09 Cost of mobile telephone call, 2006* ..... 99
Business readiness 118
5.01 Extent of staff training ..... 71
5.02 Local availability of research and training services ..... 124
5.03 Quality of management schools ..... 113
5.04 Company spending on R&D ..... 133
5.05 University-industry research collaboration ..... 134
5.06 Business telephone connection charge* ..... n/a
5.07 Business monthly telephone subscription, 2005* ..... 70
5.08 Local supplier quality ..... 120
5.09 Local supplier quantity ..... 121
5.10 Computer, comm., and other services imports, 2006* ..... 91
Government readiness 86
6.01 Government prioritization of ICT ..... 73
6.02 Gov't procurement of advanced tech products ..... 119
6.03 Importance of ICT to government vision of the future ..... 77
6.04 E-Government Readiness Index, 2008* ..... 78

Usage component 105
Individual usage 82
7.01 Mobile telephone subscribers, 2007* ..... 76
7.02 Personal computers, 2006* ..... 90
7.03 Broadband Internet subscribers, 2005* ..... 119
7.04 Internet users, 2006* ..... 81
7.05 Internet bandwidth, 2006* ..... 118
Business usage 120
8.01 Prevalence of foreign technology licensing ..... 89
8.02 Firm-level technology absorption ..... 110
8.03 Capacity for innovation ..... 134
8.04 Availability of new telephone lines ..... 127
8.05 Extent of business Internet use ..... 114
Government usage 106
9.01 Government success in ICT promotion ..... 118
9.02 Availability of government online services ..... 109
9.03 ICT use and government efficiency ..... 111
9.04 Presence of ICT in government offices ..... 48
9.05 E-Participation Index, 2008* ..... 115

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

## Notes

1 The source for population is the World Bank's *World Development Indicators Online Database* (retrieved November 4, 2008) and Republic of China (Taiwan)'s National Statistics (retrieved January 12, 2009). GDP figures are from the International Monetary Fund's *World Economic Outlook Database* (October 2008 edition). Data on Internet users, Internet bandwidth, and mobile telephony are from the International Telecommunication Union's *World Telecommunication/ICT Indicators 2008* (September 2008 update) and from national sources.

2 See World Economic Forum. 2008. *The Global Competitiveness Report 2008–2009*. Geneva: World Economic Forum.

# List of Countries/Economies

# Albania

## Key indicators

Population (millions), 2007 ..... 3.2
GDP (PPP) per capita (int'l $), 2007 ..... 6,298
Internet users per 100 population, 2006 ..... 15.0
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 72.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **105** |
| 2007–2008 (127) | 108 |
| 2006–2007 (122) | 107 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 108 |



## Environment component 117

### Market environment 110

1.01 Venture capital availability ..... 101
1.02 Financial market sophistication ..... 126
1.03 Availability of latest technologies ..... 104
1.04 State of cluster development ..... 126
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 73
1.07 Burden of government regulation ..... 67
1.08 Extent and effect of taxation ..... 68
1.09 Total tax rate, 2007* ..... 91
1.10 Time required to start a business, 2008* ..... 20
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 127
1.13 Freedom of the press ..... 105
1.14 Accessibility of digital content ..... 129

### Political and regulatory environment 114

2.01 Effectiveness of law-making bodies ..... 68
2.02 Laws relating to ICT ..... 103
2.03 Judicial independence ..... 121
2.04 Intellectual property protection ..... 124
2.05 Efficiency of legal framework ..... 117
2.06 Property rights ..... 126
2.07 Quality of competition in the ISP sector ..... 119
2.08 Number of procedures to enforce a contract, 2008* ..... 78
2.09 Time to enforce a contract, 2008* ..... 29

### Infrastructure environment 116

3.01 Number of telephone lines, 2005* ..... 86
3.02 Secure Internet servers, 2007* ..... 92
3.03 Electricity production, 2005* ..... 83
3.04 Availability of scientists and engineers ..... 115
3.05 Quality of scientific research institutions ..... 133
3.06 Tertiary enrollment, 2004* ..... 83
3.07 Education expenditure, 2006* ..... 99

## Readiness component 98

### Individual readiness 91

4.01 Quality of math and science education ..... 62
4.02 Quality of the educational system ..... 80
4.03 Internet access in schools ..... 101
4.04 Buyer sophistication ..... 109
4.05 Residential telephone connection charge* ..... n/a
4.06 Residential monthly telephone subscription, 2005* ..... 9
4.07 High-speed monthly broadband subscription, 2006* ..... 91
4.08 Lowest cost of broadband, 2006* ..... 86
4.09 Cost of mobile telephone call, 2006* ..... 99

### Business readiness 118

5.01 Extent of staff training ..... 71
5.02 Local availability of research and training services ..... 124
5.03 Quality of management schools ..... 113
5.04 Company spending on R&D ..... 133
5.05 University-industry research collaboration ..... 134
5.06 Business telephone connection charge* ..... n/a
5.07 Business monthly telephone subscription, 2005* ..... 70
5.08 Local supplier quality ..... 120
5.09 Local supplier quantity ..... 121
5.10 Computer, comm., and other services imports, 2006* ..... 91

### Government readiness 86

6.01 Government prioritization of ICT ..... 73
6.02 Gov't procurement of advanced tech products ..... 119
6.03 Importance of ICT to government vision of the future ..... 77
6.04 E-Government Readiness Index, 2008* ..... 78

## Usage component 105

### Individual usage 82

7.01 Mobile telephone subscribers, 2007* ..... 76
7.02 Personal computers, 2006* ..... 90
7.03 Broadband Internet subscribers, 2005* ..... 119
7.04 Internet users, 2006* ..... 81
7.05 Internet bandwidth, 2006* ..... 118

### Business usage 120

8.01 Prevalence of foreign technology licensing ..... 89
8.02 Firm-level technology absorption ..... 110
8.03 Capacity for innovation ..... 134
8.04 Availability of new telephone lines ..... 127
8.05 Extent of business Internet use ..... 114

### Government usage 106

9.01 Government success in ICT promotion ..... 118
9.02 Availability of government online services ..... 108
9.03 ICT use and government efficiency ..... 111
9.04 Presence of ICT in government offices ..... 48
9.05 E-Participation Index, 2008* ..... 115

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Algeria

## Key indicators

Population (millions), 2007 ..... 33.9
GDP (PPP) per capita (int'l $), 2007 ..... 6,539
Internet users per 100 population, 2007 ..... 10.3
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.9
Mobile telephone subscribers per 100 population, 2007 ..... 81.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **108** |
| 2007–2008 (127) | 88 |
| 2006–2007 (122) | 80 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 99 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Argentina

## Key indicators

Population (millions), 2007 ..... 39.5
GDP (PPP) per capita (int'l $), 2007 ..... 13,318
Internet users per 100 population, 2007 ..... 23.5
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 6.9
Mobile telephone subscribers per 100 population, 2007 ..... 102.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **87** |
| 2007–2008 (127) | 77 |
| 2006–2007 (122) | 63 |

Global Competitiveness Index 2008–2009 (134) 88



### Environment component 107

**Market environment 128**

1.01 Venture capital availability ..... 108
1.02 Financial market sophistication ..... 88
1.03 Availability of latest technologies ..... 99
1.04 State of cluster development ..... 82
1.05 Utility patents, 2007* ..... 45
1.06 High-tech exports, 2006* ..... 66
1.07 Burden of government regulation ..... 119
1.08 Extent and effect of taxation ..... 130
1.09 Total tax rate, 2007* ..... 128
1.10 Time required to start a business, 2008* ..... 89
1.11 No. of procedures required to start a business, 2008* ..... 121
1.12 Intensity of local competition ..... 109
1.13 Freedom of the press ..... 121
1.14 Accessibility of digital content ..... 55

**Political and regulatory environment 120**

2.01 Effectiveness of law-making bodies ..... 132
2.02 Laws relating to ICT ..... 106
2.03 Judicial independence ..... 125
2.04 Intellectual property protection ..... 116
2.05 Efficiency of legal framework ..... 126
2.06 Property rights ..... 127
2.07 Quality of competition in the ISP sector ..... 82
2.08 Number of procedures to enforce a contract, 2008* ..... 55
2.09 Time to enforce a contract, 2008* ..... 77

**Infrastructure environment 56**

3.01 Number of telephone lines, 2007* ..... 57
3.02 Secure Internet servers, 2007* ..... 59
3.03 Electricity production, 2005* ..... 67
3.04 Availability of scientists and engineers ..... 81
3.05 Quality of scientific research institutions ..... 90
3.06 Tertiary enrollment, 2005* ..... 22
3.07 Education expenditure, 2006* ..... 76

### Readiness component 81

**Individual readiness 68**

4.01 Quality of math and science education ..... 98
4.02 Quality of the educational system ..... 105
4.03 Internet access in schools ..... 90
4.04 Buyer sophistication ..... 48
4.05 Residential telephone connection charge, 2007* ..... 60
4.06 Residential monthly telephone subscription, 2007* ..... 51
4.07 High-speed monthly broadband subscription, 2006* ..... 38
4.08 Lowest cost of broadband, 2006* ..... 45
4.09 Cost of mobile telephone call, 2006* ..... 56

**Business readiness 57**

5.01 Extent of staff training ..... 86
5.02 Local availability of research and training services ..... 60
5.03 Quality of management schools ..... 26
5.04 Company spending on R&D ..... 81
5.05 University-industry research collaboration ..... 75
5.06 Business telephone connection charge, 2007* ..... 54
5.07 Business monthly telephone subscription, 2007* ..... 57
5.08 Local supplier quality ..... 65
5.09 Local supplier quantity ..... 62
5.10 Computer, comm., and other services imports, 2007* ..... 59

**Government readiness 117**

6.01 Government prioritization of ICT ..... 128
6.02 Gov't procurement of advanced tech products ..... 123
6.03 Importance of ICT to government vision of the future ..... 131
6.04 E-Government Readiness Index, 2008* ..... 39

### Usage component 77

**Individual usage 52**

7.01 Mobile telephone subscribers, 2007* ..... 39
7.02 Personal computers, 2005* ..... 64
7.03 Broadband Internet subscribers, 2007* ..... 44
7.04 Internet users, 2007* ..... 62
7.05 Internet bandwidth, 2006* ..... 47

**Business usage 85**

8.01 Prevalence of foreign technology licensing ..... 91
8.02 Firm-level technology absorption ..... 83
8.03 Capacity for innovation ..... 79
8.04 Availability of new telephone lines ..... 85
8.05 Extent of business Internet use ..... 71

**Government usage 91**

9.01 Government success in ICT promotion ..... 128
9.02 Availability of government online services ..... 71
9.03 ICT use and government efficiency ..... 113
9.04 Presence of ICT in government offices ..... 120
9.05 E-Participation Index, 2008* ..... 22

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Armenia

## Key indicators

Population (millions), 2007 ..... 3.0
GDP (PPP) per capita (int'l $), 2007 ..... 4,946
Internet users per 100 population, 2006 ..... 5.7
Internet bandwidth (mB/s) per 10,000 population ..... n/a
Mobile telephone subscribers per 100 population, 2005 ..... 10.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **114** |
| 2007–2008 (127) | 106 |
| 2006–2007 (122) | 96 |

Global Competitiveness Index 2008–2009 (134) 97

## Environment component 109

### Market environment 120

1.01 Venture capital availability ..... 130
1.02 Financial market sophistication ..... 107
1.03 Availability of latest technologies ..... 116
1.04 State of cluster development ..... 130
1.05 Utility patents, 2007* ..... 65
1.06 High-tech exports, 2006* ..... 88
1.07 Burden of government regulation ..... 71
1.08 Extent and effect of taxation ..... 84
1.09 Total tax rate, 2007* ..... 52
1.10 Time required to start a business, 2008* ..... 54
1.11 No. of procedures required to start a business, 2008* ..... 75
1.12 Intensity of local competition ..... 132
1.13 Freedom of the press ..... 130
1.14 Accessibility of digital content ..... 101

### Political and regulatory environment 116

2.01 Effectiveness of law-making bodies ..... 95
2.02 Laws relating to ICT ..... 105
2.03 Judicial independence ..... 123
2.04 Intellectual property protection ..... 108
2.05 Efficiency of legal framework ..... 97
2.06 Property rights ..... 69
2.07 Quality of competition in the ISP sector ..... 127
2.08 Number of procedures to enforce a contract, 2008* ..... 123
2.09 Time to enforce a contract, 2008* ..... 13

### Infrastructure environment 86

3.01 Number of telephone lines, 2005* ..... 66
3.02 Secure Internet servers, 2007* ..... 83
3.03 Electricity production, 2005* ..... 76
3.04 Availability of scientists and engineers ..... 80
3.05 Quality of scientific research institutions ..... 101
3.06 Tertiary enrollment, 2006* ..... 65
3.07 Education expenditure, 2006* ..... 97

## Readiness component 111

### Individual readiness 109

4.01 Quality of math and science education ..... 76
4.02 Quality of the educational system ..... 98
4.03 Internet access in schools ..... 103
4.04 Buyer sophistication ..... 88
4.05 Residential telephone connection charge, 2007* ..... 75
4.06 Residential monthly telephone subscription, 2007* ..... 73
4.07 High-speed monthly broadband subscription, 2006* ..... 107
4.08 Lowest cost of broadband, 2006* ..... 112
4.09 Cost of mobile telephone call, 2005* ..... 76

### Business readiness 111

5.01 Extent of staff training ..... 117
5.02 Local availability of research and training services ..... 125
5.03 Quality of management schools ..... 124
5.04 Company spending on R&D ..... 96
5.05 University-industry research collaboration ..... 116
5.06 Business telephone connection charge, 2007* ..... 77
5.07 Business monthly telephone subscription, 2007* ..... 105
5.08 Local supplier quality ..... 111
5.09 Local supplier quantity ..... 114
5.10 Computer, comm., and other services imports, 2007* ..... 111

### Government readiness 116

6.01 Government prioritization of ICT ..... 120
6.02 Gov't procurement of advanced tech products ..... 122
6.03 Importance of ICT to government vision of the future ..... 116
6.04 E-Government Readiness Index, 2008* ..... 91

## Usage component 120

### Individual usage 108

7.01 Mobile telephone subscribers, 2005* ..... 126
7.02 Personal computers, 2005* ..... 60
7.03 Broadband Internet subscribers, 2005* ..... 103
7.04 Internet users, 2006* ..... 105
7.05 Internet bandwidth* ..... n/a

### Business usage 111

8.01 Prevalence of foreign technology licensing ..... 125
8.02 Firm-level technology absorption ..... 109
8.03 Capacity for innovation ..... 68
8.04 Availability of new telephone lines ..... 110
8.05 Extent of business Internet use ..... 116

### Government usage 125

9.01 Government success in ICT promotion ..... 119
9.02 Availability of government online services ..... 129
9.03 ICT use and government efficiency ..... 127
9.04 Presence of ICT in government offices ..... 94
9.05 E-Participation Index, 2008* ..... 105

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Australia

## Key indicators

Population (millions), 2007 ..... 21.0
GDP (PPP) per capita (int'l $), 2007 ..... 36,226
Internet users per 100 population, 2007 ..... 54.2
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 55.4
Mobile telephone subscribers per 100 population, 2007 ..... 102.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **14** |
| 2007–2008 (127) | 14 |
| 2006–2007 (122) | 15 |

Global Competitiveness Index 2008–2009 (134) 18



### Environment component 10

**Market environment 22**

1.01 Venture capital availability ..... 13
1.02 Financial market sophistication ..... 7
1.03 Availability of latest technologies ..... 20
1.04 State of cluster development ..... 34
1.05 Utility patents, 2007* ..... 16
1.06 High-tech exports, 2006* ..... 60
1.07 Burden of government regulation ..... 85
1.08 Extent and effect of taxation ..... 62
1.09 Total tax rate, 2007* ..... 90
1.10 Time required to start a business, 2008* ..... 2
1.11 No. of procedures required to start a business, 2008* ..... 3
1.12 Intensity of local competition ..... 18
1.13 Freedom of the press ..... 17
1.14 Accessibility of digital content ..... 25

**Political and regulatory environment 9**

2.01 Effectiveness of law-making bodies ..... 3
2.02 Laws relating to ICT ..... 15
2.03 Judicial independence ..... 8
2.04 Intellectual property protection ..... 10
2.05 Efficiency of legal framework ..... 10
2.06 Property rights ..... 13
2.07 Quality of competition in the ISP sector ..... 35
2.08 Number of procedures to enforce a contract, 2008* ..... 11
2.09 Time to enforce a contract, 2008* ..... 32

**Infrastructure environment 8**

3.01 Number of telephone lines, 2007* ..... 19
3.02 Secure Internet servers, 2007* ..... 6
3.03 Electricity production, 2005* ..... 10
3.04 Availability of scientists and engineers ..... 33
3.05 Quality of scientific research institutions ..... 8
3.06 Tertiary enrollment, 2006* ..... 15
3.07 Education expenditure, 2006* ..... 48

### Readiness component 15

**Individual readiness 13**

4.01 Quality of math and science education ..... 19
4.02 Quality of the educational system ..... 9
4.03 Internet access in schools ..... 18
4.04 Buyer sophistication ..... 19
4.05 Residential telephone connection charge, 2007* ..... 12
4.06 Residential monthly telephone subscription, 2007* ..... 22
4.07 High-speed monthly broadband subscription, 2006* ..... 20
4.08 Lowest cost of broadband, 2006* ..... 29
4.09 Cost of mobile telephone call, 2006* ..... 22

**Business readiness 22**

5.01 Extent of staff training ..... 17
5.02 Local availability of research and training services ..... 15
5.03 Quality of management schools ..... 11
5.04 Company spending on R&D ..... 23
5.05 University-industry research collaboration ..... 19
5.06 Business telephone connection charge, 2007* ..... 12
5.07 Business monthly telephone subscription, 2007* ..... 37
5.08 Local supplier quality ..... 14
5.09 Local supplier quantity ..... 42
5.10 Computer, comm., and other services imports, 2007* ..... 63

**Government readiness 15**

6.01 Government prioritization of ICT ..... 26
6.02 Gov't procurement of advanced tech products ..... 30
6.03 Importance of ICT to government vision of the future ..... 22
6.04 E-Government Readiness Index, 2008* ..... 8

### Usage component 17

**Individual usage 18**

7.01 Mobile telephone subscribers, 2007* ..... 38
7.02 Personal computers, 2006* ..... 7
7.03 Broadband Internet subscribers, 2007* ..... 16
7.04 Internet users, 2007* ..... 25
7.05 Internet bandwidth, 2007* ..... 18

**Business usage 21**

8.01 Prevalence of foreign technology licensing ..... 12
8.02 Firm-level technology absorption ..... 17
8.03 Capacity for innovation ..... 29
8.04 Availability of new telephone lines ..... 41
8.05 Extent of business Internet use ..... 21

**Government usage 9**

9.01 Government success in ICT promotion ..... 36
9.02 Availability of government online services ..... 15
9.03 ICT use and government efficiency ..... 26
9.04 Presence of ICT in government offices ..... 11
9.05 E-Participation Index, 2008* ..... 5

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Austria

## Key indicators

Population (millions), 2007 ..... 8.3
GDP (PPP) per capita (int'l $), 2007 ..... 38,181
Internet users per 100 population, 2007 ..... 51.2
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 66.8
Mobile telephone subscribers per 100 population, 2007 ..... 116.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **16** |
| 2007–2008 (127) | 15 |
| 2006–2007 (122) | 17 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 14 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Azerbaijan

## Key indicators

Population (millions), 2007 ..... 8.6
GDP (PPP) per capita (int'l $), 2007 ..... 7,618
Internet users per 100 population, 2007 ..... 12.2
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 7.1
Mobile telephone subscribers per 100 population, 2007 ..... 50.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **60** |
| 2007–2008 (127) | 67 |
| 2006–2007 (122) | 71 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 69 |



## Environment component 67

### Market environment 63

1.01 Venture capital availability ..... 60
1.02 Financial market sophistication ..... 77
1.03 Availability of latest technologies ..... 56
1.04 State of cluster development ..... 107
1.05 Utility patents, 2007* ..... 68
1.06 High-tech exports, 2006* ..... 111
1.07 Burden of government regulation ..... 15
1.08 Extent and effect of taxation ..... 38
1.09 Total tax rate, 2007* ..... 64
1.10 Time required to start a business, 2008* ..... 45
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 96
1.13 Freedom of the press ..... 108
1.14 Accessibility of digital content ..... 58

### Political and regulatory environment 54

2.01 Effectiveness of law-making bodies ..... 47
2.02 Laws relating to ICT ..... 45
2.03 Judicial independence ..... 84
2.04 Intellectual property protection ..... 69
2.05 Efficiency of legal framework ..... 64
2.06 Property rights ..... 80
2.07 Quality of competition in the ISP sector ..... 60
2.08 Number of procedures to enforce a contract, 2008* ..... 78
2.09 Time to enforce a contract, 2008* ..... 9

### Infrastructure environment 81

3.01 Number of telephone lines, 2007* ..... 77
3.02 Secure Internet servers, 2007* ..... 108
3.03 Electricity production, 2005* ..... 69
3.04 Availability of scientists and engineers ..... 28
3.05 Quality of scientific research institutions ..... 40
3.06 Tertiary enrollment, 2006* ..... 96
3.07 Education expenditure, 2006* ..... 103

## Readiness component 57

### Individual readiness 78

4.01 Quality of math and science education ..... 92
4.02 Quality of the educational system ..... 78
4.03 Internet access in schools ..... 49
4.04 Buyer sophistication ..... 90
4.05 Residential telephone connection charge, 2005* ..... 109
4.06 Residential monthly telephone subscription, 2005* ..... 28
4.07 High-speed monthly broadband subscription, 2006* ..... 83
4.08 Lowest cost of broadband, 2006* ..... 99
4.09 Cost of mobile telephone call, 2005* ..... 77

### Business readiness 61

5.01 Extent of staff training ..... 39
5.02 Local availability of research and training services ..... 67
5.03 Quality of management schools ..... 119
5.04 Company spending on R&D ..... 67
5.05 University-industry research collaboration ..... 47
5.06 Business telephone connection charge, 2005* ..... 113
5.07 Business monthly telephone subscription, 2005* ..... 99
5.08 Local supplier quality ..... 88
5.09 Local supplier quantity ..... 84
5.10 Computer, comm., and other services imports, 2007* ..... 2

### Government readiness 40

6.01 Government prioritization of ICT ..... 35
6.02 Gov't procurement of advanced tech products ..... 23
6.03 Importance of ICT to government vision of the future ..... 23
6.04 E-Government Readiness Index, 2008* ..... 81

## Usage component 57

### Individual usage 94

7.01 Mobile telephone subscribers, 2007* ..... 88
7.02 Personal computers, 2005* ..... 98
7.03 Broadband Internet subscribers, 2005* ..... 112
7.04 Internet users, 2007* ..... 85
7.05 Internet bandwidth, 2007* ..... 46

### Business usage 55

8.01 Prevalence of foreign technology licensing ..... 59
8.02 Firm-level technology absorption ..... 52
8.03 Capacity for innovation ..... 39
8.04 Availability of new telephone lines ..... 80
8.05 Extent of business Internet use ..... 68

### Government usage 35

9.01 Government success in ICT promotion ..... 20
9.02 Availability of government online services ..... 44
9.03 ICT use and government efficiency ..... 34
9.04 Presence of ICT in government offices ..... 28
9.05 E-Participation Index, 2008* ..... 47

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Bahrain

## Key indicators

Population (millions), 2007 ..... 0.8
GDP (PPP) per capita (int'l $), 2007 ..... 31,899
Internet users per 100 population, 2007 ..... 33.2
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 5.5
Mobile telephone subscribers per 100 population, 2007 ..... 148.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **37** |
| 2007–2008 (127) | 45 |
| 2006–2007 (122) | 50 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 37 |

## Environment component 37

### Market environment 27

1.01 Venture capital availability ..... 26
1.02 Financial market sophistication ..... 20
1.03 Availability of latest technologies ..... 24
1.04 State of cluster development ..... 38
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 123
1.07 Burden of government regulation ..... 17
1.08 Extent and effect of taxation ..... 2
1.09 Total tax rate, 2007* ..... 5
1.10 Time required to start a business, 2008* ..... 23
1.11 No. of procedures required to start a business, 2008* ..... 46
1.12 Intensity of local competition ..... 46
1.13 Freedom of the press ..... 92
1.14 Accessibility of digital content ..... 29

### Political and regulatory environment 49

2.01 Effectiveness of law-making bodies ..... 66
2.02 Laws relating to ICT ..... 37
2.03 Judicial independence ..... 48
2.04 Intellectual property protection ..... 27
2.05 Efficiency of legal framework ..... 50
2.06 Property rights ..... 37
2.07 Quality of competition in the ISP sector ..... 58
2.08 Number of procedures to enforce a contract, 2008* ..... 122
2.09 Time to enforce a contract, 2008* ..... 89

### Infrastructure environment 49

3.01 Number of telephone lines, 2006* ..... 53
3.02 Secure Internet servers, 2007* ..... 40
3.03 Electricity production, 2005* ..... 11
3.04 Availability of scientists and engineers ..... 94
3.05 Quality of scientific research institutions ..... 100
3.06 Tertiary enrollment, 2006* ..... 64
3.07 Education expenditure, 2006* ..... 62

## Readiness component 38

### Individual readiness 35

4.01 Quality of math and science education ..... 68
4.02 Quality of the educational system ..... 56
4.03 Internet access in schools ..... 37
4.04 Buyer sophistication ..... 36
4.05 Residential telephone connection charge, 2007* ..... 27
4.06 Residential monthly telephone subscription, 2007* ..... 3
4.07 High-speed monthly broadband subscription, 2006* ..... 45
4.08 Lowest cost of broadband, 2006* ..... 57
4.09 Cost of mobile telephone call, 2006* ..... 20

### Business readiness 62

5.01 Extent of staff training ..... 60
5.02 Local availability of research and training services ..... 72
5.03 Quality of management schools ..... 85
5.04 Company spending on R&D ..... 82
5.05 University-industry research collaboration ..... 101
5.06 Business telephone connection charge, 2007* ..... 26
5.07 Business monthly telephone subscription, 2006* ..... 8
5.08 Local supplier quality ..... 38
5.09 Local supplier quantity ..... 47
5.10 Computer, comm., and other services imports, 2006* ..... 106

### Government readiness 28

6.01 Government prioritization of ICT ..... 21
6.02 Gov't procurement of advanced tech products ..... 27
6.03 Importance of ICT to government vision of the future ..... 19
6.04 E-Government Readiness Index, 2008* ..... 42

## Usage component 35

### Individual usage 44

7.01 Mobile telephone subscribers, 2007* ..... 4
7.02 Personal computers, 2006* ..... 41
7.03 Broadband Internet subscribers, 2006* ..... 47
7.04 Internet users, 2007* ..... 48
7.05 Internet bandwidth, 2006* ..... 51

### Business usage 45

8.01 Prevalence of foreign technology licensing ..... 29
8.02 Firm-level technology absorption ..... 36
8.03 Capacity for innovation ..... 118
8.04 Availability of new telephone lines ..... 36
8.05 Extent of business Internet use ..... 60

### Government usage 29

9.01 Government success in ICT promotion ..... 27
9.02 Availability of government online services ..... 32
9.03 ICT use and government efficiency ..... 28
9.04 Presence of ICT in government offices ..... 30
9.05 E-Participation Index, 2008* ..... 34

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Bangladesh

## Key indicators

Population (millions), 2007 ..... 158.6
GDP (PPP) per capita (int'l $), 2007 ..... 1,311
Internet users per 100 population, 2007 ..... 0.3
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.1
Mobile telephone subscribers per 100 population, 2007 ..... 21.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **130** |
| 2007–2008 (127) | 124 |
| 2006–2007 (122) | 118 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 111 |





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Barbados

## Key indicators

Population (millions), 2007 ..... 0.3
GDP (PPP) per capita (int'l $), 2007 ..... 18,559
Internet users per 100 population, 2005 ..... 59.5
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 22.3
Mobile telephone subscribers per 100 population, 2006 ..... 87.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **36** |
| 2007–2008 (127) | 38 |
| 2006–2007 (122) | 40 |

Global Competitiveness Index 2008–2009 (134) 47

## Environment component 31

### Market environment 71

1.01 Venture capital availability ..... 74
1.02 Financial market sophistication ..... 47
1.03 Availability of latest technologies ..... 30
1.04 State of cluster development ..... 64
1.05 Utility patents, 2007* ..... 34
1.06 High-tech exports, 2005* ..... 43
1.07 Burden of government regulation ..... 29
1.08 Extent and effect of taxation ..... 33
1.09 Total tax rate* ..... n/a
1.10 Time required to start a business* ..... n/a
1.11 No. of procedures required to start a business* ..... n/a
1.12 Intensity of local competition ..... 101
1.13 Freedom of the press ..... 44
1.14 Accessibility of digital content ..... 44

### Political and regulatory environment 25

2.01 Effectiveness of law-making bodies ..... 6
2.02 Laws relating to ICT ..... 46
2.03 Judicial independence ..... 17
2.04 Intellectual property protection ..... 31
2.05 Efficiency of legal framework ..... 19
2.06 Property rights ..... 24
2.07 Quality of competition in the ISP sector ..... 66
2.08 Number of procedures to enforce a contract* ..... n/a
2.09 Time to enforce a contract* ..... n/a

### Infrastructure environment 25

3.01 Number of telephone lines, 2005* ..... 15
3.02 Secure Internet servers, 2007* ..... 24
3.03 Electricity production, 2005* ..... 61
3.04 Availability of scientists and engineers ..... 61
3.05 Quality of scientific research institutions ..... 44
3.06 Tertiary enrollment, 2007* ..... 34
3.07 Education expenditure, 2006* ..... 10

## Readiness component 37

### Individual readiness 33

4.01 Quality of math and science education ..... 15
4.02 Quality of the educational system ..... 15
4.03 Internet access in schools ..... 45
4.04 Buyer sophistication ..... 42
4.05 Residential telephone connection charge, 2007* ..... 41
4.06 Residential monthly telephone subscription, 2007* ..... 81
4.07 High-speed monthly broadband subscription, 2006* ..... 56
4.08 Lowest cost of broadband, 2006* ..... 50
4.09 Cost of mobile telephone call, 2006* ..... 66

### Business readiness 56

5.01 Extent of staff training ..... 41
5.02 Local availability of research and training services ..... 54
5.03 Quality of management schools ..... 36
5.04 Company spending on R&D ..... 59
5.05 University-industry research collaboration ..... 41
5.06 Business telephone connection charge, 2007* ..... 37
5.07 Business monthly telephone subscription, 2007* ..... 66
5.08 Local supplier quality ..... 58
5.09 Local supplier quantity ..... 101
5.10 Computer, comm., and other services imports, 2005* ..... 88

### Government readiness 38

6.01 Government prioritization of ICT ..... 19
6.02 Gov't procurement of advanced tech products ..... 65
6.03 Importance of ICT to government vision of the future ..... 47
6.04 E-Government Readiness Index, 2008* ..... 46

## Usage component 42

### Individual usage 35

7.01 Mobile telephone subscribers, 2006* ..... 54
7.02 Personal computers, 2005* ..... 49
7.03 Broadband Internet subscribers, 2006* ..... 23
7.04 Internet users, 2005* ..... 19
7.05 Internet bandwidth, 2005* ..... 31

### Business usage 60

8.01 Prevalence of foreign technology licensing ..... 62
8.02 Firm-level technology absorption ..... 47
8.03 Capacity for innovation ..... 77
8.04 Availability of new telephone lines ..... 72
8.05 Extent of business Internet use ..... 55

### Government usage 71

9.01 Government success in ICT promotion ..... 31
9.02 Availability of government online services ..... 101
9.03 ICT use and government efficiency ..... 72
9.04 Presence of ICT in government offices ..... 58
9.05 E-Participation Index, 2008* ..... 70

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Belgium

## Key indicators

Population (millions), 2007 ..... 10.6
GDP (PPP) per capita (int'l $), 2007 ..... 35,388
Internet users per 100 population, 2007 ..... 49.9
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 111.8
Mobile telephone subscribers per 100 population, 2007 ..... 97.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **24** |
| 2007–2008 (127) | 25 |
| 2006–2007 (122) | 24 |

Global Competitiveness Index 2008–2009 (134) 19



## Environment component 23

### Market environment 28

1.01 Venture capital availability ..... 25
1.02 Financial market sophistication ..... 16
1.03 Availability of latest technologies ..... 18
1.04 State of cluster development ..... 27
1.05 Utility patents, 2007* ..... 21
1.06 High-tech exports, 2006* ..... 31
1.07 Burden of government regulation ..... 106
1.08 Extent and effect of taxation ..... 132
1.09 Total tax rate, 2007* ..... 106
1.10 Time required to start a business, 2008* ..... 4
1.11 No. of procedures required to start a business, 2008* ..... 4
1.12 Intensity of local competition ..... 6
1.13 Freedom of the press ..... 13
1.14 Accessibility of digital content ..... 18

### Political and regulatory environment 22

2.01 Effectiveness of law-making bodies ..... 58
2.02 Laws relating to ICT ..... 29
2.03 Judicial independence ..... 19
2.04 Intellectual property protection ..... 20
2.05 Efficiency of legal framework ..... 35
2.06 Property rights ..... 19
2.07 Quality of competition in the ISP sector ..... 41
2.08 Number of procedures to enforce a contract, 2008* ..... 4
2.09 Time to enforce a contract, 2008* ..... 54

### Infrastructure environment 19

3.01 Number of telephone lines, 2007* ..... 23
3.02 Secure Internet servers, 2007* ..... 27
3.03 Electricity production, 2005* ..... 18
3.04 Availability of scientists and engineers ..... 20
3.05 Quality of scientific research institutions ..... 5
3.06 Tertiary enrollment, 2006* ..... 23
3.07 Education expenditure, 2006* ..... 19

## Readiness component 16

### Individual readiness 5

4.01 Quality of math and science education ..... 3
4.02 Quality of the educational system ..... 4
4.03 Internet access in schools ..... 24
4.04 Buyer sophistication ..... 17
4.05 Residential telephone connection charge, 2006* ..... 26
4.06 Residential monthly telephone subscription, 2006* ..... 44
4.07 High-speed monthly broadband subscription, 2006* ..... 17
4.08 Lowest cost of broadband, 2006* ..... 16
4.09 Cost of mobile telephone call, 2006* ..... 35

### Business readiness 7

5.01 Extent of staff training ..... 13
5.02 Local availability of research and training services ..... 11
5.03 Quality of management schools ..... 5
5.04 Company spending on R&D ..... 14
5.05 University-industry research collaboration ..... 8
5.06 Business telephone connection charge, 2006* ..... 25
5.07 Business monthly telephone subscription, 2006* ..... 27
5.08 Local supplier quality ..... 5
5.09 Local supplier quantity ..... 12
5.10 Computer, comm., and other services imports, 2007* ..... 21

### Government readiness 35

6.01 Government prioritization of ICT ..... 58
6.02 Gov't procurement of advanced tech products ..... 41
6.03 Importance of ICT to government vision of the future ..... 59
6.04 E-Government Readiness Index, 2008* ..... 24

## Usage component 23

### Individual usage 19

7.01 Mobile telephone subscribers, 2007* ..... 41
7.02 Personal computers, 2006* ..... 25
7.03 Broadband Internet subscribers, 2007* ..... 11
7.04 Internet users, 2007* ..... 30
7.05 Internet bandwidth, 2005* ..... 8

### Business usage 19

8.01 Prevalence of foreign technology licensing ..... 18
8.02 Firm-level technology absorption ..... 25
8.03 Capacity for innovation ..... 15
8.04 Availability of new telephone lines ..... 17
8.05 Extent of business Internet use ..... 24

### Government usage 40

9.01 Government success in ICT promotion ..... 54
9.02 Availability of government online services ..... 33
9.03 ICT use and government efficiency ..... 53
9.04 Presence of ICT in government offices ..... 51
9.05 E-Participation Index, 2008* ..... 27

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Benin

## Key indicators



## Networked Readiness Index



## Environment component 110



## Readiness component 126



## Usage component 110



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Bolivia

## Key indicators

Population (millions), 2007 ..... 9.5
GDP (PPP) per capita (int'l $), 2007 ..... 4,084
Internet users per 100 population, 2007 ..... 10.5
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.4
Mobile telephone subscribers per 100 population, 2007 ..... 34.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **128** |
| 2007–2008 (127) | 111 |
| 2006–2007 (122) | 104 |

Global Competitiveness Index 2008–2009 (134) 118





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Bosnia and Herzegovina

## Key indicators

Population (millions), 2007 ..... 3.8
GDP (PPP) per capita (int'l $), 2007 ..... 7,074
Internet users per 100 population, 2007 ..... 26.8
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 5.1
Mobile telephone subscribers per 100 population, 2007 ..... 62.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **106** |
| 2007–2008 (127) | 95 |
| 2006–2007 (122) | 89 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 107 |

## Environment component 116

### Market environment 122

1.01 Venture capital availability ..... 113
1.02 Financial market sophistication ..... 120
1.03 Availability of latest technologies ..... 123
1.04 State of cluster development ..... 133
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 67
1.07 Burden of government regulation ..... 129
1.08 Extent and effect of taxation ..... 112
1.09 Total tax rate, 2007* ..... 72
1.10 Time required to start a business, 2008* ..... 115
1.11 No. of procedures required to start a business, 2008* ..... 108
1.12 Intensity of local competition ..... 98
1.13 Freedom of the press ..... 90
1.14 Accessibility of digital content ..... 65

### Political and regulatory environment 122

2.01 Effectiveness of law-making bodies ..... 128
2.02 Laws relating to ICT ..... 118
2.03 Judicial independence ..... 116
2.04 Intellectual property protection ..... 125
2.05 Efficiency of legal framework ..... 128
2.06 Property rights ..... 121
2.07 Quality of competition in the ISP sector ..... 73
2.08 Number of procedures to enforce a contract, 2008* ..... 67
2.09 Time to enforce a contract, 2008* ..... 80

### Infrastructure environment 92

3.01 Number of telephone lines, 2007* ..... 52
3.02 Secure Internet servers, 2007* ..... 76
3.03 Electricity production, 2005* ..... 60
3.04 Availability of scientists and engineers ..... 100
3.05 Quality of scientific research institutions ..... 128
3.06 Tertiary enrollment, 2004* ..... 73
3.07 Education expenditure* ..... n/a

## Readiness component 97

### Individual readiness 73

4.01 Quality of math and science education ..... 45
4.02 Quality of the educational system ..... 92
4.03 Internet access in schools ..... 89
4.04 Buyer sophistication ..... 119
4.05 Residential telephone connection charge, 2006* ..... 94
4.06 Residential monthly telephone subscription, 2006* ..... 69
4.07 High-speed monthly broadband subscription, 2006* ..... 54
4.08 Lowest cost of broadband, 2006* ..... 40
4.09 Cost of mobile telephone call, 2006* ..... 85

### Business readiness 108

5.01 Extent of staff training ..... 126
5.02 Local availability of research and training services ..... 126
5.03 Quality of management schools ..... 107
5.04 Company spending on R&D ..... 119
5.05 University-industry research collaboration ..... 125
5.06 Business telephone connection charge, 2006* ..... 85
5.07 Business monthly telephone subscription, 2006* ..... 87
5.08 Local supplier quality ..... 113
5.09 Local supplier quantity ..... 93
5.10 Computer, comm., and other services imports, 2007* ..... 104

### Government readiness 122

6.01 Government prioritization of ICT ..... 103
6.02 Gov't procurement of advanced tech products ..... 131
6.03 Importance of ICT to government vision of the future ..... 127
6.04 E-Government Readiness Index, 2008* ..... 85

## Usage component 108

### Individual usage 71

7.01 Mobile telephone subscribers, 2007* ..... 83
7.02 Personal computers, 2006* ..... 76
7.03 Broadband Internet subscribers, 2007* ..... 67
7.04 Internet users, 2007* ..... 55
7.05 Internet bandwidth, 2007* ..... 54

### Business usage 108

8.01 Prevalence of foreign technology licensing ..... 106
8.02 Firm-level technology absorption ..... 133
8.03 Capacity for innovation ..... 126
8.04 Availability of new telephone lines ..... 76
8.05 Extent of business Internet use ..... 91

### Government usage 129

9.01 Government success in ICT promotion ..... 126
9.02 Availability of government online services ..... 125
9.03 ICT use and government efficiency ..... 132
9.04 Presence of ICT in government offices ..... 110
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Botswana

## Key indicators

Population (millions), 2007 ..... 1.9
GDP (PPP) per capita (int'l $), 2007 ..... 16,516
Internet users per 100 population, 2007 ..... 4.3
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.4
Mobile telephone subscribers per 100 population, 2007 ..... 75.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **77** |
| 2007–2008 (127) | 78 |
| 2006–2007 (122) | 67 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 56 |



### Environment component 58

**Market environment 70**

1.01 Venture capital availability ..... 45
1.02 Financial market sophistication ..... 71
1.03 Availability of latest technologies ..... 64
1.04 State of cluster development ..... 81
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 82
1.07 Burden of government regulation ..... 38
1.08 Extent and effect of taxation ..... 19
1.09 Total tax rate, 2007* ..... 7
1.10 Time required to start a business, 2008* ..... 123
1.11 No. of procedures required to start a business, 2008* ..... 86
1.12 Intensity of local competition ..... 79
1.13 Freedom of the press ..... 46
1.14 Accessibility of digital content ..... 108

**Political and regulatory environment 47**

2.01 Effectiveness of law-making bodies ..... 13
2.02 Laws relating to ICT ..... 92
2.03 Judicial independence ..... 26
2.04 Intellectual property protection ..... 77
2.05 Efficiency of legal framework ..... 33
2.06 Property rights ..... 48
2.07 Quality of competition in the ISP sector ..... 102
2.08 Number of procedures to enforce a contract, 2008* ..... 12
2.09 Time to enforce a contract, 2008* ..... 119

**Infrastructure environment 77**

3.01 Number of telephone lines, 2007* ..... 100
3.02 Secure Internet servers, 2007* ..... 94
3.03 Electricity production, 2005* ..... 109
3.04 Availability of scientists and engineers ..... 111
3.05 Quality of scientific research institutions ..... 66
3.06 Tertiary enrollment, 2005* ..... 111
3.07 Education expenditure, 2006* ..... 2

### Readiness component 78

**Individual readiness 67**

4.01 Quality of math and science education ..... 82
4.02 Quality of the educational system ..... 50
4.03 Internet access in schools ..... 98
4.04 Buyer sophistication ..... 84
4.05 Residential telephone connection charge, 2007* ..... 47
4.06 Residential monthly telephone subscription, 2007* ..... 74
4.07 High-speed monthly broadband subscription, 2006* ..... 53
4.08 Lowest cost of broadband, 2006* ..... 61
4.09 Cost of mobile telephone call, 2006* ..... 30

**Business readiness 96**

5.01 Extent of staff training ..... 69
5.02 Local availability of research and training services ..... 104
5.03 Quality of management schools ..... 105
5.04 Company spending on R&D ..... 95
5.05 University-industry research collaboration ..... 66
5.06 Business telephone connection charge, 2007* ..... 53
5.07 Business monthly telephone subscription, 2007* ..... 78
5.08 Local supplier quality ..... 118
5.09 Local supplier quantity ..... 130
5.10 Computer, comm., and other services imports, 2006* ..... 66

**Government readiness 70**

6.01 Government prioritization of ICT ..... 52
6.02 Gov't procurement of advanced tech products ..... 50
6.03 Importance of ICT to government vision of the future ..... 56
6.04 E-Government Readiness Index, 2008* ..... 97

### Usage component 89

**Individual usage 89**

7.01 Mobile telephone subscribers, 2007* ..... 70
7.02 Personal computers, 2006* ..... 81
7.03 Broadband Internet subscribers, 2007* ..... 97
7.04 Internet users, 2007* ..... 111
7.05 Internet bandwidth, 2007* ..... 90

**Business usage 93**

8.01 Prevalence of foreign technology licensing ..... 73
8.02 Firm-level technology absorption ..... 73
8.03 Capacity for innovation ..... 98
8.04 Availability of new telephone lines ..... 104
8.05 Extent of business Internet use ..... 103

**Government usage 72**

9.01 Government success in ICT promotion ..... 51
9.02 Availability of government online services ..... 107
9.03 ICT use and government efficiency ..... 91
9.04 Presence of ICT in government offices ..... 74
9.05 E-Participation Index, 2008* ..... 39

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Brazil

## Key indicators

Population (millions), 2007 ..... 191.6
GDP (PPP) per capita (int'l $), 2007 ..... 9,703
Internet users per 100 population, 2007 ..... 26.1
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 1.5
Mobile telephone subscribers per 100 population, 2007 ..... 63.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **59** |
| 2007–2008 (127) | 59 |
| 2006–2007 (122) | 53 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 64 |

## Environment component 87

### Market environment 119

1.01 Venture capital availability ..... 79
1.02 Financial market sophistication ..... 21
1.03 Availability of latest technologies ..... 58
1.04 State of cluster development ..... 43
1.05 Utility patents, 2007* ..... 58
1.06 High-tech exports, 2006* ..... 39
1.07 Burden of government regulation ..... 133
1.08 Extent and effect of taxation ..... 134
1.09 Total tax rate, 2007* ..... 118
1.10 Time required to start a business, 2008* ..... 129
1.11 No. of procedures required to start a business, 2008* ..... 127
1.12 Intensity of local competition ..... 43
1.13 Freedom of the press ..... 34
1.14 Accessibility of digital content ..... 63

### Political and regulatory environment 82

2.01 Effectiveness of law-making bodies ..... 119
2.02 Laws relating to ICT ..... 49
2.03 Judicial independence ..... 68
2.04 Intellectual property protection ..... 79
2.05 Efficiency of legal framework ..... 98
2.06 Property rights ..... 70
2.07 Quality of competition in the ISP sector ..... 44
2.08 Number of procedures to enforce a contract, 2008* ..... 115
2.09 Time to enforce a contract, 2008* ..... 86

### Infrastructure environment 65

3.01 Number of telephone lines, 2007* ..... 63
3.02 Secure Internet servers, 2007* ..... 57
3.03 Electricity production, 2005* ..... 73
3.04 Availability of scientists and engineers ..... 57
3.05 Quality of scientific research institutions ..... 43
3.06 Tertiary enrollment, 2005* ..... 76
3.07 Education expenditure, 2006* ..... 64

## Readiness component 58

### Individual readiness 81

4.01 Quality of math and science education ..... 124
4.02 Quality of the educational system ..... 117
4.03 Internet access in schools ..... 67
4.04 Buyer sophistication ..... 69
4.05 Residential telephone connection charge, 2005* ..... 49
4.06 Residential monthly telephone subscription, 2005* ..... 100
4.07 High-speed monthly broadband subscription, 2006* ..... 58
4.08 Lowest cost of broadband, 2006* ..... 38
4.09 Cost of mobile telephone call, 2006* ..... 93

### Business readiness 37

5.01 Extent of staff training ..... 46
5.02 Local availability of research and training services ..... 26
5.03 Quality of management schools ..... 58
5.04 Company spending on R&D ..... 31
5.05 University-industry research collaboration ..... 50
5.06 Business telephone connection charge, 2005* ..... 44
5.07 Business monthly telephone subscription, 2005* ..... 106
5.08 Local supplier quality ..... 41
5.09 Local supplier quantity ..... 13
5.10 Computer, comm., and other services imports, 2007* ..... 18

### Government readiness 65

6.01 Government prioritization of ICT ..... 112
6.02 Gov't procurement of advanced tech products ..... 84
6.03 Importance of ICT to government vision of the future ..... 73
6.04 E-Government Readiness Index, 2008* ..... 45

## Usage component 41

### Individual usage 62

7.01 Mobile telephone subscribers, 2007* ..... 82
7.02 Personal computers, 2005* ..... 48
7.03 Broadband Internet subscribers, 2007* ..... 55
7.04 Internet users, 2007* ..... 57
7.05 Internet bandwidth, 2005* ..... 69

### Business usage 32

8.01 Prevalence of foreign technology licensing ..... 48
8.02 Firm-level technology absorption ..... 42
8.03 Capacity for innovation ..... 27
8.04 Availability of new telephone lines ..... 39
8.05 Extent of business Internet use ..... 28

### Government usage 32

9.01 Government success in ICT promotion ..... 74
9.02 Availability of government online services ..... 26
9.03 ICT use and government efficiency ..... 50
9.04 Presence of ICT in government offices ..... 43
9.05 E-Participation Index, 2008* ..... 22

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Brunei Darussalam

## Key indicators

Population (millions), 2007 ..... 0.4
GDP (PPP) per capita (int'l $), 2007 ..... 50,790
Internet users per 100 population, 2006 ..... 41.7
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 14.5
Mobile telephone subscribers per 100 population, 2006 ..... 78.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **63** |
| 2007–2008 (127) | n/a |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 39 |



## Environment component 91

### Market environment 106

1.01 Venture capital availability ..... 78
1.02 Financial market sophistication ..... 68
1.03 Availability of latest technologies ..... 59
1.04 State of cluster development ..... 78
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 99
1.07 Burden of government regulation ..... 58
1.08 Extent and effect of taxation ..... 10
1.09 Total tax rate, 2007* ..... 55
1.10 Time required to start a business, 2008* ..... 127
1.11 No. of procedures required to start a business, 2008* ..... 127
1.12 Intensity of local competition ..... 81
1.13 Freedom of the press ..... 125
1.14 Accessibility of digital content ..... 45

### Political and regulatory environment 78

2.01 Effectiveness of law-making bodies ..... 27
2.02 Laws relating to ICT ..... 85
2.03 Judicial independence ..... 54
2.04 Intellectual property protection ..... 52
2.05 Efficiency of legal framework ..... 47
2.06 Property rights ..... 62
2.07 Quality of competition in the ISP sector ..... 124
2.08 Number of procedures to enforce a contract, 2008* ..... 130
2.09 Time to enforce a contract, 2008* ..... 63

### Infrastructure environment 84

3.01 Number of telephone lines, 2006* ..... 61
3.02 Secure Internet servers, 2007* ..... 55
3.03 Electricity production, 2005* ..... 21
3.04 Availability of scientists and engineers ..... 117
3.05 Quality of scientific research institutions ..... 93
3.06 Tertiary enrollment, 2006* ..... 95
3.07 Education expenditure, 2006* ..... 101

## Readiness component 50

### Individual readiness 40

4.01 Quality of math and science education ..... 53
4.02 Quality of the educational system ..... 48
4.03 Internet access in schools ..... 36
4.04 Buyer sophistication ..... 99
4.05 Residential telephone connection charge, 2006* ..... 10
4.06 Residential monthly telephone subscription, 2006* ..... 13
4.07 High-speed monthly broadband subscription, 2006* ..... 40
4.08 Lowest cost of broadband, 2006* ..... 60
4.09 Cost of mobile telephone call, 2006* ..... 19

### Business readiness 67

5.01 Extent of staff training ..... 61
5.02 Local availability of research and training services ..... 105
5.03 Quality of management schools ..... 88
5.04 Company spending on R&D ..... 92
5.05 University-industry research collaboration ..... 76
5.06 Business telephone connection charge, 2006* ..... 11
5.07 Business monthly telephone subscription, 2006* ..... 7
5.08 Local supplier quality ..... 82
5.09 Local supplier quantity ..... 63
5.10 Computer, comm., and other services imports, 2006* ..... 72

### Government readiness 45

6.01 Government prioritization of ICT ..... 30
6.02 Gov't procurement of advanced tech products ..... 45
6.03 Importance of ICT to government vision of the future ..... 30
6.04 E-Government Readiness Index, 2008* ..... 79

## Usage component 58

### Individual usage 54

7.01 Mobile telephone subscribers, 2006* ..... 67
7.02 Personal computers, 2005* ..... 65
7.03 Broadband Internet subscribers, 2007* ..... 61
7.04 Internet users, 2006* ..... 41
7.05 Internet bandwidth, 2006* ..... 35

### Business usage 67

8.01 Prevalence of foreign technology licensing ..... 83
8.02 Firm-level technology absorption ..... 53
8.03 Capacity for innovation ..... 103
8.04 Availability of new telephone lines ..... 64
8.05 Extent of business Internet use ..... 51

### Government usage 65

9.01 Government success in ICT promotion ..... 25
9.02 Availability of government online services ..... 95
9.03 ICT use and government efficiency ..... 48
9.04 Presence of ICT in government offices ..... 53
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Bulgaria

## Key indicators



## Networked Readiness Index





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Burkina Faso

## Key indicators

Population (millions), 2007 ..... 14.8
GDP (PPP) per capita (int'l $), 2007 ..... 1,206
Internet users per 100 population, 2006 ..... 0.6
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 10.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **113** |
| 2007–2008 (127) | 103 |
| 2006–2007 (122) | 99 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 127 |



## Environment component 98

### Market environment 95

1.01 Venture capital availability ..... 132
1.02 Financial market sophistication ..... 101
1.03 Availability of latest technologies ..... 115
1.04 State of cluster development ..... 119
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2004* ..... 75
1.07 Burden of government regulation ..... 42
1.08 Extent and effect of taxation ..... 82
1.09 Total tax rate, 2007* ..... 73
1.10 Time required to start a business, 2008* ..... 45
1.11 No. of procedures required to start a business, 2008* ..... 16
1.12 Intensity of local competition ..... 102
1.13 Freedom of the press ..... 81
1.14 Accessibility of digital content ..... 111

### Political and regulatory environment 72

2.01 Effectiveness of law-making bodies ..... 55
2.02 Laws relating to ICT ..... 100
2.03 Judicial independence ..... 89
2.04 Intellectual property protection ..... 68
2.05 Efficiency of legal framework ..... 75
2.06 Property rights ..... 72
2.07 Quality of competition in the ISP sector ..... 96
2.08 Number of procedures to enforce a contract, 2008* ..... 63
2.09 Time to enforce a contract, 2008* ..... 44

### Infrastructure environment 114

3.01 Number of telephone lines, 2006* ..... 125
3.02 Secure Internet servers, 2007* ..... 124
3.03 Electricity production, 2005* ..... 130
3.04 Availability of scientists and engineers ..... 113
3.05 Quality of scientific research institutions ..... 76
3.06 Tertiary enrollment, 2006* ..... 123
3.07 Education expenditure, 2006* ..... 53

## Readiness component 125

### Individual readiness 133

4.01 Quality of math and science education ..... 89
4.02 Quality of the educational system ..... 113
4.03 Internet access in schools ..... 124
4.04 Buyer sophistication ..... 106
4.05 Residential telephone connection charge, 2007* ..... 118
4.06 Residential monthly telephone subscription, 2007* ..... 122
4.07 High-speed monthly broadband subscription, 2006* ..... 109
4.08 Lowest cost of broadband, 2006* ..... 115
4.09 Cost of mobile telephone call, 2006* ..... 127

### Business readiness 109

5.01 Extent of staff training ..... 125
5.02 Local availability of research and training services ..... 80
5.03 Quality of management schools ..... 79
5.04 Company spending on R&D ..... 110
5.05 University-industry research collaboration ..... 108
5.06 Business telephone connection charge, 2007* ..... 117
5.07 Business monthly telephone subscription, 2007* ..... 120
5.08 Local supplier quality ..... 76
5.09 Local supplier quantity ..... 71
5.10 Computer, comm., and other services imports* ..... n/a

### Government readiness 105

6.01 Government prioritization of ICT ..... 76
6.02 Gov't procurement of advanced tech products ..... 47
6.03 Importance of ICT to government vision of the future ..... 60
6.04 E-Government Readiness Index, 2008* ..... 130

## Usage component 101

### Individual usage 127

7.01 Mobile telephone subscribers, 2007* ..... 125
7.02 Personal computers, 2006* ..... 119
7.03 Broadband Internet subscribers, 2006* ..... 116
7.04 Internet users, 2006* ..... 128
7.05 Internet bandwidth, 2006* ..... 107

### Business usage 104

8.01 Prevalence of foreign technology licensing ..... 122
8.02 Firm-level technology absorption ..... 99
8.03 Capacity for innovation ..... 62
8.04 Availability of new telephone lines ..... 95
8.05 Extent of business Internet use ..... 120

### Government usage 67

9.01 Government success in ICT promotion ..... 44
9.02 Availability of government online services ..... 92
9.03 ICT use and government efficiency ..... 56
9.04 Presence of ICT in government offices ..... 79
9.05 E-Participation Index, 2008* ..... 58

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Burundi

## Key indicators



## Networked Readiness Index





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Cambodia

## Key indicators

Population (millions), 2007 ..... 14.4
GDP (PPP) per capita (int'l $), 2007 ..... 1,818
Internet users per 100 population, 2007 ..... 0.5
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 17.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **126** |
| 2007–2008 (127) | 115 |
| 2006–2007 (122) | 106 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 109 |



## Environment component 125

### Market environment 112

1.01 Venture capital availability ..... 95
1.02 Financial market sophistication ..... 114
1.03 Availability of latest technologies ..... 109
1.04 State of cluster development ..... 60
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2004* ..... 102
1.07 Burden of government regulation ..... 87
1.08 Extent and effect of taxation ..... 44
1.09 Total tax rate, 2007* ..... 13
1.10 Time required to start a business, 2008* ..... 125
1.11 No. of procedures required to start a business, 2008* ..... 75
1.12 Intensity of local competition ..... 118
1.13 Freedom of the press ..... 112
1.14 Accessibility of digital content ..... 98

### Political and regulatory environment 117

2.01 Effectiveness of law-making bodies ..... 80
2.02 Laws relating to ICT ..... 122
2.03 Judicial independence ..... 118
2.04 Intellectual property protection ..... 110
2.05 Efficiency of legal framework ..... 91
2.06 Property rights ..... 118
2.07 Quality of competition in the ISP sector ..... 121
2.08 Number of procedures to enforce a contract, 2008* ..... 109
2.09 Time to enforce a contract, 2008* ..... 34

### Infrastructure environment 132

3.01 Number of telephone lines, 2007* ..... 132
3.02 Secure Internet servers, 2007* ..... 112
3.03 Electricity production, 2005* ..... 127
3.04 Availability of scientists and engineers ..... 126
3.05 Quality of scientific research institutions ..... 120
3.06 Tertiary enrollment, 2006* ..... 113
3.07 Education expenditure, 2006* ..... 121

## Readiness component 124

### Individual readiness 123

4.01 Quality of math and science education ..... 122
4.02 Quality of the educational system ..... 112
4.03 Internet access in schools ..... 107
4.04 Buyer sophistication ..... 65
4.05 Residential telephone connection charge, 2007* ..... 117
4.06 Residential monthly telephone subscription, 2007* ..... 123
4.07 High-speed monthly broadband subscription, 2006* ..... 105
4.08 Lowest cost of broadband, 2006* ..... 113
4.09 Cost of mobile telephone call, 2005* ..... 98

### Business readiness 122

5.01 Extent of staff training ..... 107
5.02 Local availability of research and training services ..... 115
5.03 Quality of management schools ..... 123
5.04 Company spending on R&D ..... 75
5.05 University-industry research collaboration ..... 106
5.06 Business telephone connection charge, 2007* ..... 115
5.07 Business monthly telephone subscription, 2007* ..... 122
5.08 Local supplier quality ..... 117
5.09 Local supplier quantity ..... 126
5.10 Computer, comm., and other services imports, 2007* ..... 79

### Government readiness 106

6.01 Government prioritization of ICT ..... 99
6.02 Gov't procurement of advanced tech products ..... 85
6.03 Importance of ICT to government vision of the future ..... 92
6.04 E-Government Readiness Index, 2008* ..... 110

## Usage component 115

### Individual usage 124

7.01 Mobile telephone subscribers, 2007* ..... 121
7.02 Personal computers, 2006* ..... 125
7.03 Broadband Internet subscribers, 2007* ..... 105
7.04 Internet users, 2007* ..... 130
7.05 Internet bandwidth, 2007* ..... 102

### Business usage 112

8.01 Prevalence of foreign technology licensing ..... 108
8.02 Firm-level technology absorption ..... 106
8.03 Capacity for innovation ..... 107
8.04 Availability of new telephone lines ..... 120
8.05 Extent of business Internet use ..... 108

### Government usage 100

9.01 Government success in ICT promotion ..... 98
9.02 Availability of government online services ..... 122
9.03 ICT use and government efficiency ..... 71
9.04 Presence of ICT in government offices ..... 119
9.05 E-Participation Index, 2008* ..... 53

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Cameroon

## Key indicators

Population (millions), 2007 ..... 18.5
GDP (PPP) per capita (int'l $), 2007 ..... 2,094
Internet users per 100 population, 2006 ..... 2.2
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.1
Mobile telephone subscribers per 100 population, 2007 ..... 24.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **123** |
| 2007–2008 (127) | 118 |
| 2006–2007 (122) | 113 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Canada

## Key indicators

Population (millions), 2007 ..... 33.0
GDP (PPP) per capita (int'l $), 2007 ..... 38,614
Internet users per 100 population, 2006 ..... 76.8
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 67.1
Mobile telephone subscribers per 100 population, 2007 ..... 61.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **10** |
| 2007–2008 (127) | 13 |
| 2006–2007 (122) | 11 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 10 |



## Environment component 8

### Market environment 15

1.01 Venture capital availability ..... 19
1.02 Financial market sophistication ..... 6
1.03 Availability of latest technologies ..... 9
1.04 State of cluster development ..... 16
1.05 Utility patents, 2007* ..... 10
1.06 High-tech exports, 2006* ..... 29
1.07 Burden of government regulation ..... 40
1.08 Extent and effect of taxation ..... 88
1.09 Total tax rate, 2007* ..... 76
1.10 Time required to start a business, 2008* ..... 6
1.11 No. of procedures required to start a business, 2008* ..... 1
1.12 Intensity of local competition ..... 23
1.13 Freedom of the press ..... 10
1.14 Accessibility of digital content ..... 12

### Political and regulatory environment 17

2.01 Effectiveness of law-making bodies ..... 9
2.02 Laws relating to ICT ..... 14
2.03 Judicial independence ..... 9
2.04 Intellectual property protection ..... 19
2.05 Efficiency of legal framework ..... 14
2.06 Property rights ..... 8
2.07 Quality of competition in the ISP sector ..... 26
2.08 Number of procedures to enforce a contract, 2008* ..... 55
2.09 Time to enforce a contract, 2008* ..... 71

### Infrastructure environment 4

3.01 Number of telephone lines, 2007* ..... 8
3.02 Secure Internet servers, 2007* ..... 5
3.03 Electricity production, 2005* ..... 3
3.04 Availability of scientists and engineers ..... 7
3.05 Quality of scientific research institutions ..... 4
3.06 Tertiary enrollment, 2004* ..... 24
3.07 Education expenditure, 2006* ..... 35

## Readiness component 14

### Individual readiness 9

4.01 Quality of math and science education ..... 13
4.02 Quality of the educational system ..... 8
4.03 Internet access in schools ..... 13
4.04 Buyer sophistication ..... 14
4.05 Residential telephone connection charge, 2005* ..... 15
4.06 Residential monthly telephone subscription, 2005* ..... 33
4.07 High-speed monthly broadband subscription, 2006* ..... 11
4.08 Lowest cost of broadband, 2006* ..... 16
4.09 Cost of mobile telephone call, 2006* ..... 26

### Business readiness 19

5.01 Extent of staff training ..... 19
5.02 Local availability of research and training services ..... 10
5.03 Quality of management schools ..... 4
5.04 Company spending on R&D ..... 22
5.05 University-industry research collaboration ..... 14
5.06 Business telephone connection charge* ..... n/a
5.07 Business monthly telephone subscription, 2005* ..... 41
5.08 Local supplier quality ..... 12
5.09 Local supplier quantity ..... 17
5.10 Computer, comm., and other services imports, 2007* ..... 43

### Government readiness 20

6.01 Government prioritization of ICT ..... 37
6.02 Gov't procurement of advanced tech products ..... 29
6.03 Importance of ICT to government vision of the future ..... 35
6.04 E-Government Readiness Index, 2008* ..... 7

## Usage component 11

### Individual usage 12

7.01 Mobile telephone subscribers, 2007* ..... 84
7.02 Personal computers, 2006* ..... 1
7.03 Broadband Internet subscribers, 2007* ..... 9
7.04 Internet users, 2006* ..... 4
7.05 Internet bandwidth, 2005* ..... 14

### Business usage 12

8.01 Prevalence of foreign technology licensing ..... 2
8.02 Firm-level technology absorption ..... 18
8.03 Capacity for innovation ..... 18
8.04 Availability of new telephone lines ..... 8
8.05 Extent of business Internet use ..... 8

### Government usage 13

9.01 Government success in ICT promotion ..... 38
9.02 Availability of government online services ..... 13
9.03 ICT use and government efficiency ..... 22
9.04 Presence of ICT in government offices ..... 14
9.05 E-Participation Index, 2008* ..... 11

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Chad

## Key indicators

Population (millions), 2007 ..... 10.8
GDP (PPP) per capita (int'l $), 2007 ..... 1,669
Internet users per 100 population, 2006 ..... 0.6
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 8.5

## Networked Readiness Index

Edition (number of economies) — Rank

**2008–2009 (134) ..... 134**
2007–2008 (127) ..... 127
2006–2007 (122) ..... 122

Global Competitiveness Index 2008–2009 (134) 134



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Chile

## Key indicators

Population (millions), 2007 ..... 16.6
GDP (PPP) per capita (int'l $), 2007 ..... 13,921
Internet users per 100 population, 2007 ..... 33.5
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 8.1
Mobile telephone subscribers per 100 population, 2007 ..... 83.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **39** |
| 2007–2008 (127) | 34 |
| 2006–2007 (122) | 31 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 28 |



## Environment component 42

### Market environment 35

1.01 Venture capital availability ..... 37
1.02 Financial market sophistication ..... 26
1.03 Availability of latest technologies ..... 42
1.04 State of cluster development ..... 53
1.05 Utility patents, 2007* ..... 40
1.06 High-tech exports, 2006* ..... 80
1.07 Burden of government regulation ..... 34
1.08 Extent and effect of taxation ..... 45
1.09 Total tax rate, 2007* ..... 16
1.10 Time required to start a business, 2008* ..... 76
1.11 No. of procedures required to start a business, 2008* ..... 75
1.12 Intensity of local competition ..... 19
1.13 Freedom of the press ..... 21
1.14 Accessibility of digital content ..... 22

### Political and regulatory environment 35

2.01 Effectiveness of law-making bodies ..... 59
2.02 Laws relating to ICT ..... 26
2.03 Judicial independence ..... 52
2.04 Intellectual property protection ..... 63
2.05 Efficiency of legal framework ..... 30
2.06 Property rights ..... 40
2.07 Quality of competition in the ISP sector ..... 16
2.08 Number of procedures to enforce a contract, 2008* ..... 55
2.09 Time to enforce a contract, 2008* ..... 52

### Infrastructure environment 57

3.01 Number of telephone lines, 2007* ..... 64
3.02 Secure Internet servers, 2007* ..... 53
3.03 Electricity production, 2005* ..... 63
3.04 Availability of scientists and engineers ..... 35
3.05 Quality of scientific research institutions ..... 62
3.06 Tertiary enrollment, 2006* ..... 42
3.07 Education expenditure, 2006* ..... 84

## Readiness component 43

### Individual readiness 58

4.01 Quality of math and science education ..... 107
4.02 Quality of the educational system ..... 86
4.03 Internet access in schools ..... 41
4.04 Buyer sophistication ..... 29
4.05 Residential telephone connection charge, 2005* ..... 48
4.06 Residential monthly telephone subscription, 2005* ..... 71
4.07 High-speed monthly broadband subscription, 2006* ..... 50
4.08 Lowest cost of broadband, 2006* ..... 47
4.09 Cost of mobile telephone call, 2005* ..... 86

### Business readiness 42

5.01 Extent of staff training ..... 48
5.02 Local availability of research and training services ..... 46
5.03 Quality of management schools ..... 19
5.04 Company spending on R&D ..... 64
5.05 University-industry research collaboration ..... 51
5.06 Business telephone connection charge, 2005* ..... 43
5.07 Business monthly telephone subscription, 2005* ..... 50
5.08 Local supplier quality ..... 28
5.09 Local supplier quantity ..... 20
5.10 Computer, comm., and other services imports, 2007* ..... 90

### Government readiness 42

6.01 Government prioritization of ICT ..... 54
6.02 Gov't procurement of advanced tech products ..... 53
6.03 Importance of ICT to government vision of the future ..... 40
6.04 E-Government Readiness Index, 2008* ..... 40

## Usage component 38

### Individual usage 49

7.01 Mobile telephone subscribers, 2007* ..... 59
7.02 Personal computers, 2005* ..... 51
7.03 Broadband Internet subscribers, 2007* ..... 43
7.04 Internet users, 2007* ..... 46
7.05 Internet bandwidth, 2005* ..... 43

### Business usage 31

8.01 Prevalence of foreign technology licensing ..... 40
8.02 Firm-level technology absorption ..... 33
8.03 Capacity for innovation ..... 57
8.04 Availability of new telephone lines ..... 20
8.05 Extent of business Internet use ..... 27

### Government usage 31

9.01 Government success in ICT promotion ..... 65
9.02 Availability of government online services ..... 12
9.03 ICT use and government efficiency ..... 17
9.04 Presence of ICT in government offices ..... 29
9.05 E-Participation Index, 2008* ..... 66

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# China

## Key indicators

Population (millions), 2007 ..... 1,320.0
GDP (PPP) per capita (int'l $), 2007 ..... 5,325
Internet users per 100 population, 2007 ..... 15.8
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 2.8
Mobile telephone subscribers per 100 population, 2007 ..... 41.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **46** |
| 2007–2008 (127) | 57 |
| 2006–2007 (122) | 59 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 30 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Colombia

## Key indicators

Population (millions), 2007 ..... 46.1
GDP (PPP) per capita (int'l $), 2007 ..... 7,968
Internet users per 100 population, 2007 ..... 26.2
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 5.5
Mobile telephone subscribers per 100 population, 2007 ..... 73.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **64** |
| 2007–2008 (127) | 69 |
| 2006–2007 (122) | 64 |

Global Competitiveness Index 2008–2009 (134) 74





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Costa Rica

## Key indicators



## Networked Readiness Index





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Côte d'Ivoire

## Key indicators

Population (millions), 2007 ..... 19.3
GDP (PPP) per capita (int'l $), 2007 ..... 1,737
Internet users per 100 population, 2006 ..... 1.6
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 36.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **111** |
| 2007–2008 (127) | n/a |
| 2006–2007 (122) | n/a |

Global Competitiveness Index 2008–2009 (134) 110



### Environment component 113

**Market environment 104**

1.01 Venture capital availability ..... 134
1.02 Financial market sophistication ..... 97
1.03 Availability of latest technologies ..... 73
1.04 State of cluster development ..... 74
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 38
1.07 Burden of government regulation ..... 111
1.08 Extent and effect of taxation ..... 85
1.09 Total tax rate, 2007* ..... 76
1.10 Time required to start a business, 2008* ..... 100
1.11 No. of procedures required to start a business, 2008* ..... 86
1.12 Intensity of local competition ..... 83
1.13 Freedom of the press ..... 109
1.14 Accessibility of digital content ..... 109

**Political and regulatory environment 124**

2.01 Effectiveness of law-making bodies ..... 123
2.02 Laws relating to ICT ..... 130
2.03 Judicial independence ..... 132
2.04 Intellectual property protection ..... 131
2.05 Efficiency of legal framework ..... 132
2.06 Property rights ..... 113
2.07 Quality of competition in the ISP sector ..... 54
2.08 Number of procedures to enforce a contract, 2008* ..... 37
2.09 Time to enforce a contract, 2008* ..... 102

**Infrastructure environment 95**

3.01 Number of telephone lines, 2006* ..... 115
3.02 Secure Internet servers, 2007* ..... 109
3.03 Electricity production, 2005* ..... 113
3.04 Availability of scientists and engineers ..... 27
3.05 Quality of scientific research institutions ..... 104
3.06 Tertiary enrollment* ..... n/a
3.07 Education expenditure, 2006* ..... 49

### Readiness component 112

**Individual readiness 113**

4.01 Quality of math and science education ..... 71
4.02 Quality of the educational system ..... 106
4.03 Internet access in schools ..... 108
4.04 Buyer sophistication ..... 118
4.05 Residential telephone connection charge, 2007* ..... 87
4.06 Residential monthly telephone subscription, 2007* ..... 127
4.07 High-speed monthly broadband subscription, 2006* ..... 97
4.08 Lowest cost of broadband, 2006* ..... 97
4.09 Cost of mobile telephone call, 2006* ..... 128

**Business readiness 104**

5.01 Extent of staff training ..... 68
5.02 Local availability of research and training services ..... 84
5.03 Quality of management schools ..... 62
5.04 Company spending on R&D ..... 113
5.05 University-industry research collaboration ..... 127
5.06 Business telephone connection charge, 2007* ..... 80
5.07 Business monthly telephone subscription, 2007* ..... 126
5.08 Local supplier quality ..... 70
5.09 Local supplier quantity ..... 82
5.10 Computer, comm., and other services imports, 2007* ..... 65

**Government readiness 118**

6.01 Government prioritization of ICT ..... 71
6.02 Gov't procurement of advanced tech products ..... 80
6.03 Importance of ICT to government vision of the future ..... 111
6.04 E-Government Readiness Index, 2008* ..... 127

### Usage component 103

**Individual usage 110**

7.01 Mobile telephone subscribers, 2007* ..... 101
7.02 Personal computers, 2005* ..... 106
7.03 Broadband Internet subscribers, 2006* ..... 107
7.04 Internet users, 2006* ..... 119
7.05 Internet bandwidth, 2006* ..... 105

**Business usage 75**

8.01 Prevalence of foreign technology licensing ..... 74
8.02 Firm-level technology absorption ..... 41
8.03 Capacity for innovation ..... 122
8.04 Availability of new telephone lines ..... 43
8.05 Extent of business Internet use ..... 104

**Government usage 121**

9.01 Government success in ICT promotion ..... 68
9.02 Availability of government online services ..... 128
9.03 ICT use and government efficiency ..... 126
9.04 Presence of ICT in government offices ..... 123
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Croatia

## Key indicators

Population (millions), 2007 ..... 4.4
GDP (PPP) per capita (int'l $), 2007 ..... 15,532
Internet users per 100 population, 2007 ..... 43.8
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 25.3
Mobile telephone subscribers per 100 population, 2007 ..... 110.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **49** |
| 2007–2008 (127) | 49 |
| 2006–2007 (122) | 46 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 61 |

## Environment component 54

### Market environment 77

1.01 Venture capital availability ..... 83
1.02 Financial market sophistication ..... 65
1.03 Availability of latest technologies ..... 70
1.04 State of cluster development ..... 114
1.05 Utility patents, 2007* ..... 35
1.06 High-tech exports, 2006* ..... 37
1.07 Burden of government regulation ..... 107
1.08 Extent and effect of taxation ..... 97
1.09 Total tax rate, 2007* ..... 31
1.10 Time required to start a business, 2008* ..... 100
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 68
1.13 Freedom of the press ..... 96
1.14 Accessibility of digital content ..... 51

### Political and regulatory environment 67

2.01 Effectiveness of law-making bodies ..... 54
2.02 Laws relating to ICT ..... 51
2.03 Judicial independence ..... 94
2.04 Intellectual property protection ..... 58
2.05 Efficiency of legal framework ..... 88
2.06 Property rights ..... 84
2.07 Quality of competition in the ISP sector ..... 48
2.08 Number of procedures to enforce a contract, 2008* ..... 67
2.09 Time to enforce a contract, 2008* ..... 66

### Infrastructure environment 46

3.01 Number of telephone lines, 2007* ..... 31
3.02 Secure Internet servers, 2007* ..... 36
3.03 Electricity production, 2005* ..... 65
3.04 Availability of scientists and engineers ..... 58
3.05 Quality of scientific research institutions ..... 50
3.06 Tertiary enrollment, 2006* ..... 50
3.07 Education expenditure, 2006* ..... 54

## Readiness component 47

### Individual readiness 41

4.01 Quality of math and science education ..... 30
4.02 Quality of the educational system ..... 66
4.03 Internet access in schools ..... 46
4.04 Buyer sophistication ..... 82
4.05 Residential telephone connection charge, 2007* ..... 68
4.06 Residential monthly telephone subscription, 2007* ..... 4
4.07 High-speed monthly broadband subscription, 2006* ..... 47
4.08 Lowest cost of broadband, 2006* ..... 41
4.09 Cost of mobile telephone call, 2006* ..... 51

### Business readiness 45

5.01 Extent of staff training ..... 64
5.02 Local availability of research and training services ..... 47
5.03 Quality of management schools ..... 77
5.04 Company spending on R&D ..... 45
5.05 University-industry research collaboration ..... 43
5.06 Business telephone connection charge, 2007* ..... 63
5.07 Business monthly telephone subscription, 2007* ..... 53
5.08 Local supplier quality ..... 73
5.09 Local supplier quantity ..... 90
5.10 Computer, comm., and other services imports, 2007* ..... 13

### Government readiness 56

6.01 Government prioritization of ICT ..... 72
6.02 Gov't procurement of advanced tech products ..... 69
6.03 Importance of ICT to government vision of the future ..... 70
6.04 E-Government Readiness Index, 2008* ..... 47

## Usage component 49

### Individual usage 42

7.01 Mobile telephone subscribers, 2007* ..... 27
7.02 Personal computers, 2006* ..... 38
7.03 Broadband Internet subscribers, 2007* ..... 38
7.04 Internet users, 2007* ..... 35
7.05 Internet bandwidth, 2006* ..... 29

### Business usage 57

8.01 Prevalence of foreign technology licensing ..... 56
8.02 Firm-level technology absorption ..... 100
8.03 Capacity for innovation ..... 42
8.04 Availability of new telephone lines ..... 37
8.05 Extent of business Internet use ..... 66

### Government usage 75

9.01 Government success in ICT promotion ..... 73
9.02 Availability of government online services ..... 82
9.03 ICT use and government efficiency ..... 85
9.04 Presence of ICT in government offices ..... 54
9.05 E-Participation Index, 2008* ..... 70

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Cyprus

## Key indicators

Population (millions), 2007 ..... 0.8
GDP (PPP) per capita (int'l $), 2007 ..... 27,171
Internet users per 100 population, 2007 ..... 44.5
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 5.4
Mobile telephone subscribers per 100 population, 2007 ..... 115.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **33** |
| 2007–2008 (127) | 41 |
| 2006–2007 (122) | 43 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 40 |



## Environment component 28

### Market environment 41

1.01 Venture capital availability ..... 30
1.02 Financial market sophistication ..... 36
1.03 Availability of latest technologies ..... 35
1.04 State of cluster development ..... 29
1.05 Utility patents, 2007* ..... 32
1.06 High-tech exports, 2006* ..... 48
1.07 Burden of government regulation ..... 21
1.08 Extent and effect of taxation ..... 14
1.09 Total tax rate* ..... n/a
1.10 Time required to start a business* ..... n/a
1.11 No. of procedures required to start a business* ..... n/a
1.12 Intensity of local competition ..... 26
1.13 Freedom of the press ..... 27
1.14 Accessibility of digital content ..... 47

### Political and regulatory environment 27

2.01 Effectiveness of law-making bodies ..... 19
2.02 Laws relating to ICT ..... 40
2.03 Judicial independence ..... 24
2.04 Intellectual property protection ..... 35
2.05 Efficiency of legal framework ..... 23
2.06 Property rights ..... 29
2.07 Quality of competition in the ISP sector ..... 30
2.08 Number of procedures to enforce a contract* ..... n/a
2.09 Time to enforce a contract* ..... n/a

### Infrastructure environment 27

3.01 Number of telephone lines, 2007* ..... 21
3.02 Secure Internet servers, 2007* ..... 20
3.03 Electricity production, 2005* ..... 38
3.04 Availability of scientists and engineers ..... 23
3.05 Quality of scientific research institutions ..... 63
3.06 Tertiary enrollment, 2006* ..... 62
3.07 Education expenditure, 2006* ..... 21

## Readiness component 35

### Individual readiness 18

4.01 Quality of math and science education ..... 10
4.02 Quality of the educational system ..... 10
4.03 Internet access in schools ..... 38
4.04 Buyer sophistication ..... 26
4.05 Residential telephone connection charge, 2007* ..... 43
4.06 Residential monthly telephone subscription, 2007* ..... 54
4.07 High-speed monthly broadband subscription, 2006* ..... 36
4.08 Lowest cost of broadband, 2006* ..... 36
4.09 Cost of mobile telephone call, 2006* ..... 11

### Business readiness 50

5.01 Extent of staff training ..... 56
5.02 Local availability of research and training services ..... 49
5.03 Quality of management schools ..... 42
5.04 Company spending on R&D ..... 49
5.05 University-industry research collaboration ..... 59
5.06 Business telephone connection charge, 2007* ..... 38
5.07 Business monthly telephone subscription, 2007* ..... 38
5.08 Local supplier quality ..... 42
5.09 Local supplier quantity ..... 60
5.10 Computer, comm., and other services imports, 2007* ..... 86

### Government readiness 34

6.01 Government prioritization of ICT ..... 45
6.02 Gov't procurement of advanced tech products ..... 36
6.03 Importance of ICT to government vision of the future ..... 42
6.04 E-Government Readiness Index, 2008* ..... 35

## Usage component 36

### Individual usage 37

7.01 Mobile telephone subscribers, 2007* ..... 18
7.02 Personal computers, 2006* ..... 27
7.03 Broadband Internet subscribers, 2007* ..... 35
7.04 Internet users, 2007* ..... 34
7.05 Internet bandwidth, 2005* ..... 53

### Business usage 40

8.01 Prevalence of foreign technology licensing ..... 43
8.02 Firm-level technology absorption ..... 50
8.03 Capacity for innovation ..... 51
8.04 Availability of new telephone lines ..... 33
8.05 Extent of business Internet use ..... 42

### Government usage 49

9.01 Government success in ICT promotion ..... 42
9.02 Availability of government online services ..... 31
9.03 ICT use and government efficiency ..... 39
9.04 Presence of ICT in government offices ..... 46
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Czech Republic

## Key indicators

Population (millions), 2007 ..... 10.3
GDP (PPP) per capita (int'l $), 2007 ..... 24,229
Internet users per 100 population, 2007 ..... 43.2
Internet bandwidth (mB/s) per 10,000 population ..... n/a
Mobile telephone subscribers per 100 population, 2007 ..... 128.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **32** |
| 2007–2008 (127) | 36 |
| 2006–2007 (122) | 34 |

Global Competitiveness Index 2008–2009 (134) 33

## Environment component 36

### Market environment 40

1.01 Venture capital availability ..... 68
1.02 Financial market sophistication ..... 49
1.03 Availability of latest technologies ..... 49
1.04 State of cluster development ..... 35
1.05 Utility patents, 2007* ..... 33
1.06 High-tech exports, 2006* ..... 26
1.07 Burden of government regulation ..... 115
1.08 Extent and effect of taxation ..... 61
1.09 Total tax rate, 2007* ..... 86
1.10 Time required to start a business, 2008* ..... 41
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 13
1.13 Freedom of the press ..... 39
1.14 Accessibility of digital content ..... 21

### Political and regulatory environment 52

2.01 Effectiveness of law-making bodies ..... 91
2.02 Laws relating to ICT ..... 39
2.03 Judicial independence ..... 61
2.04 Intellectual property protection ..... 51
2.05 Efficiency of legal framework ..... 86
2.06 Property rights ..... 63
2.07 Quality of competition in the ISP sector ..... 50
2.08 Number of procedures to enforce a contract, 2008* ..... 9
2.09 Time to enforce a contract, 2008* ..... 107

### Infrastructure environment 33

3.01 Number of telephone lines, 2006* ..... 47
3.02 Secure Internet servers, 2007* ..... 31
3.03 Electricity production, 2005* ..... 20
3.04 Availability of scientists and engineers ..... 11
3.05 Quality of scientific research institutions ..... 26
3.06 Tertiary enrollment, 2006* ..... 39
3.07 Education expenditure, 2006* ..... 67

## Readiness component 31

### Individual readiness 23

4.01 Quality of math and science education ..... 8
4.02 Quality of the educational system ..... 26
4.03 Internet access in schools ..... 19
4.04 Buyer sophistication ..... 41
4.05 Residential telephone connection charge, 2007* ..... 2
4.06 Residential monthly telephone subscription, 2006* ..... 75
4.07 High-speed monthly broadband subscription, 2006* ..... 42
4.08 Lowest cost of broadband, 2006* ..... 30
4.09 Cost of mobile telephone call, 2006* ..... 33

### Business readiness 23

5.01 Extent of staff training ..... 28
5.02 Local availability of research and training services ..... 23
5.03 Quality of management schools ..... 34
5.04 Company spending on R&D ..... 26
5.05 University-industry research collaboration ..... 26
5.06 Business telephone connection charge, 2007* ..... 3
5.07 Business monthly telephone subscription, 2006* ..... 68
5.08 Local supplier quality ..... 21
5.09 Local supplier quantity ..... 8
5.10 Computer, comm., and other services imports, 2006* ..... 22

### Government readiness 43

6.01 Government prioritization of ICT ..... 61
6.02 Gov't procurement of advanced tech products ..... 35
6.03 Importance of ICT to government vision of the future ..... 96
6.04 E-Government Readiness Index, 2008* ..... 25

## Usage component 33

### Individual usage 25

7.01 Mobile telephone subscribers, 2007* ..... 11
7.02 Personal computers, 2005* ..... 33
7.03 Broadband Internet subscribers, 2007* ..... 30
7.04 Internet users, 2007* ..... 37
7.05 Internet bandwidth* ..... n/a

### Business usage 22

8.01 Prevalence of foreign technology licensing ..... 37
8.02 Firm-level technology absorption ..... 38
8.03 Capacity for innovation ..... 24
8.04 Availability of new telephone lines ..... 27
8.05 Extent of business Internet use ..... 19

### Government usage 77

9.01 Government success in ICT promotion ..... 108
9.02 Availability of government online services ..... 78
9.03 ICT use and government efficiency ..... 90
9.04 Presence of ICT in government offices ..... 59
9.05 E-Participation Index, 2008* ..... 58

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Denmark

## Key indicators

Population (millions), 2007 ..... 5.5
GDP (PPP) per capita (int'l $), 2007 ..... 37,265
Internet users per 100 population, 2007 ..... 64.3
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 346.0
Mobile telephone subscribers per 100 population, 2007 ..... 114.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **1** |
| 2007–2008 (127) | 1 |
| 2006–2007 (122) | 1 |

Global Competitiveness Index 2008–2009 (134) 3



### Environment component 4

#### Market environment 9

1.01 Venture capital availability ..... 9
1.02 Financial market sophistication ..... 11
1.03 Availability of latest technologies ..... 4
1.04 State of cluster development ..... 11
1.05 Utility patents, 2007* ..... 14
1.06 High-tech exports, 2006* ..... 25
1.07 Burden of government regulation ..... 25
1.08 Extent and effect of taxation ..... 124
1.09 Total tax rate, 2007* ..... 24
1.10 Time required to start a business, 2008* ..... 9
1.11 No. of procedures required to start a business, 2008* ..... 8
1.12 Intensity of local competition ..... 25
1.13 Freedom of the press ..... 1
1.14 Accessibility of digital content ..... 5

#### Political and regulatory environment 2

2.01 Effectiveness of law-making bodies ..... 2
2.02 Laws relating to ICT ..... 1
2.03 Judicial independence ..... 5
2.04 Intellectual property protection ..... 3
2.05 Efficiency of legal framework ..... 1
2.06 Property rights ..... 2
2.07 Quality of competition in the ISP sector ..... 14
2.08 Number of procedures to enforce a contract, 2008* ..... 41
2.09 Time to enforce a contract, 2008* ..... 27

#### Infrastructure environment 6

3.01 Number of telephone lines, 2007* ..... 14
3.02 Secure Internet servers, 2007* ..... 7
3.03 Electricity production, 2005* ..... 30
3.04 Availability of scientists and engineers ..... 13
3.05 Quality of scientific research institutions ..... 12
3.06 Tertiary enrollment, 2006* ..... 7
3.07 Education expenditure, 2006* ..... 4

### Readiness component 2

#### Individual readiness 4

4.01 Quality of math and science education ..... 20
4.02 Quality of the educational system ..... 6
4.03 Internet access in schools ..... 6
4.04 Buyer sophistication ..... 8
4.05 Residential telephone connection charge, 2005* ..... 37
4.06 Residential monthly telephone subscription, 2005* ..... 26
4.07 High-speed monthly broadband subscription, 2006* ..... 15
4.08 Lowest cost of broadband, 2006* ..... 22
4.09 Cost of mobile telephone call, 2006* ..... 3

#### Business readiness 6

5.01 Extent of staff training ..... 1
5.02 Local availability of research and training services ..... 6
5.03 Quality of management schools ..... 8
5.04 Company spending on R&D ..... 6
5.05 University-industry research collaboration ..... 7
5.06 Business telephone connection charge, 2005* ..... 34
5.07 Business monthly telephone subscription, 2005* ..... 16
5.08 Local supplier quality ..... 9
5.09 Local supplier quantity ..... 15
5.10 Computer, comm., and other services imports, 2004* ..... 41

#### Government readiness 2

6.01 Government prioritization of ICT ..... 3
6.02 Gov't procurement of advanced tech products ..... 10
6.03 Importance of ICT to government vision of the future ..... 7
6.04 E-Government Readiness Index, 2008* ..... 2

### Usage component 1

#### Individual usage 3

7.01 Mobile telephone subscribers, 2007* ..... 23
7.02 Personal computers, 2006* ..... 8
7.03 Broadband Internet subscribers, 2007* ..... 1
7.04 Internet users, 2007* ..... 16
7.05 Internet bandwidth, 2006* ..... 1

#### Business usage 2

8.01 Prevalence of foreign technology licensing ..... 1
8.02 Firm-level technology absorption ..... 6
8.03 Capacity for innovation ..... 7
8.04 Availability of new telephone lines ..... 3
8.05 Extent of business Internet use ..... 5

#### Government usage 1

9.01 Government success in ICT promotion ..... 6
9.02 Availability of government online services ..... 3
9.03 ICT use and government efficiency ..... 3
9.04 Presence of ICT in government offices ..... 4
9.05 E-Participation Index, 2008* ..... 3

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Dominican Republic

## Key indicators

Population (millions), 2007 ..... 9.8
GDP (PPP) per capita (int'l $), 2007 ..... 8,116
Internet users per 100 population, 2007 ..... 17.2
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 1.5
Mobile telephone subscribers per 100 population, 2007 ..... 56.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **75** |
| 2007–2008 (127) | 75 |
| 2006–2007 (122) | 66 |

Global Competitiveness Index 2008–2009 (134) 98

### Environment component 85

#### Market environment 64

1.01 Venture capital availability ..... 93
1.02 Financial market sophistication ..... 85
1.03 Availability of latest technologies ..... 87
1.04 State of cluster development ..... 85
1.05 Utility patents, 2007* ..... 76
1.06 High-tech exports* ..... n/a
1.07 Burden of government regulation ..... 93
1.08 Extent and effect of taxation ..... 125
1.09 Total tax rate, 2007* ..... 49
1.10 Time required to start a business, 2008* ..... 57
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 87
1.13 Freedom of the press ..... 68
1.14 Accessibility of digital content ..... 35

#### Political and regulatory environment 75

2.01 Effectiveness of law-making bodies ..... 110
2.02 Laws relating to ICT ..... 58
2.03 Judicial independence ..... 103
2.04 Intellectual property protection ..... 73
2.05 Efficiency of legal framework ..... 120
2.06 Property rights ..... 90
2.07 Quality of competition in the ISP sector ..... 40
2.08 Number of procedures to enforce a contract, 2008* ..... 41
2.09 Time to enforce a contract, 2008* ..... 46

#### Infrastructure environment 108

3.01 Number of telephone lines, 2007* ..... 94
3.02 Secure Internet servers, 2007* ..... 63
3.03 Electricity production, 2005* ..... 86
3.04 Availability of scientists and engineers ..... 107
3.05 Quality of scientific research institutions ..... 124
3.06 Tertiary enrollment, 2004* ..... 61
3.07 Education expenditure, 2006* ..... 117

### Readiness component 79

#### Individual readiness 87

4.01 Quality of math and science education ..... 131
4.02 Quality of the educational system ..... 131
4.03 Internet access in schools ..... 83
4.04 Buyer sophistication ..... 79
4.05 Residential telephone connection charge, 2006* ..... 61
4.06 Residential monthly telephone subscription, 2006* ..... 103
4.07 High-speed monthly broadband subscription, 2006* ..... 62
4.08 Lowest cost of broadband, 2006* ..... 66
4.09 Cost of mobile telephone call, 2006* ..... 73

#### Business readiness 89

5.01 Extent of staff training ..... 78
5.02 Local availability of research and training services ..... 89
5.03 Quality of management schools ..... 100
5.04 Company spending on R&D ..... 100
5.05 University-industry research collaboration ..... 95
5.06 Business telephone connection charge, 2006* ..... 69
5.07 Business monthly telephone subscription, 2006* ..... 82
5.08 Local supplier quality ..... 75
5.09 Local supplier quantity ..... 57
5.10 Computer, comm., and other services imports, 2007* ..... 114

#### Government readiness 47

6.01 Government prioritization of ICT ..... 29
6.02 Gov't procurement of advanced tech products ..... 72
6.03 Importance of ICT to government vision of the future ..... 37
6.04 E-Government Readiness Index, 2008* ..... 65

### Usage component 56

#### Individual usage 85

7.01 Mobile telephone subscribers, 2007* ..... 86
7.02 Personal computers, 2005* ..... 97
7.03 Broadband Internet subscribers, 2007* ..... 71
7.04 Internet users, 2007* ..... 76
7.05 Internet bandwidth, 2007* ..... 66

#### Business usage 59

8.01 Prevalence of foreign technology licensing ..... 58
8.02 Firm-level technology absorption ..... 62
8.03 Capacity for innovation ..... 91
8.04 Availability of new telephone lines ..... 32
8.05 Extent of business Internet use ..... 76

#### Government usage 37

9.01 Government success in ICT promotion ..... 43
9.02 Availability of government online services ..... 29
9.03 ICT use and government efficiency ..... 27
9.04 Presence of ICT in government offices ..... 60
9.05 E-Participation Index, 2008* ..... 36

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Ecuador

## Key indicators

Population (millions), 2007 ..... 13.3
GDP (PPP) per capita (int'l $), 2007 ..... 7,242
Internet users per 100 population, 2006 ..... 11.5
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 2.2
Mobile telephone subscribers per 100 population, 2007 ..... 75.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **116** |
| 2007–2008 (127) | 107 |
| 2006–2007 (122) | 97 |

Global Competitiveness Index 2008–2009 (134) 104





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Egypt

## Key indicators

Population (millions), 2007 ..... 75.5
GDP (PPP) per capita (int'l $), 2007 ..... 5,495
Internet users per 100 population, 2007 ..... 11.4
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 1.4
Mobile telephone subscribers per 100 population, 2007 ..... 39.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **76** |
| 2007–2008 (127) | 63 |
| 2006–2007 (122) | 77 |

Global Competitiveness Index 2008–2009 (134) 81



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# El Salvador

## Key indicators

Population (millions), 2007 ..... 6.9
GDP (PPP) per capita (int'l $), 2007 ..... 5,847
Internet users per 100 population, 2007 ..... 11.1
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 89.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **78** |
| 2007–2008 (127) | 66 |
| 2006–2007 (122) | 61 |

Global Competitiveness Index 2008–2009 (134) 79



## Environment component 92

### Market environment 56

1.01 Venture capital availability ..... 81
1.02 Financial market sophistication ..... 43
1.03 Availability of latest technologies ..... 105
1.04 State of cluster development ..... 86
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 83
1.07 Burden of government regulation ..... 51
1.08 Extent and effect of taxation ..... 32
1.09 Total tax rate, 2007* ..... 43
1.10 Time required to start a business, 2008* ..... 50
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 67
1.13 Freedom of the press ..... 43
1.14 Accessibility of digital content ..... 56

### Political and regulatory environment 86

2.01 Effectiveness of law-making bodies ..... 118
2.02 Laws relating to ICT ..... 83
2.03 Judicial independence ..... 97
2.04 Intellectual property protection ..... 104
2.05 Efficiency of legal framework ..... 95
2.06 Property rights ..... 82
2.07 Quality of competition in the ISP sector ..... 46
2.08 Number of procedures to enforce a contract, 2008* ..... 14
2.09 Time to enforce a contract, 2008* ..... 104

### Infrastructure environment 112

3.01 Number of telephone lines, 2007* ..... 75
3.02 Secure Internet servers, 2007* ..... 67
3.03 Electricity production, 2005* ..... 100
3.04 Availability of scientists and engineers ..... 124
3.05 Quality of scientific research institutions ..... 127
3.06 Tertiary enrollment, 2006* ..... 82
3.07 Education expenditure, 2006* ..... 102

## Readiness component 80

### Individual readiness 82

4.01 Quality of math and science education ..... 108
4.02 Quality of the educational system ..... 102
4.03 Internet access in schools ..... 95
4.04 Buyer sophistication ..... 72
4.05 Residential telephone connection charge, 2007* ..... 23
4.06 Residential monthly telephone subscription, 2007* ..... 16
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband, 2006* ..... 75
4.09 Cost of mobile telephone call, 2006* ..... 10

### Business readiness 82

5.01 Extent of staff training ..... 66
5.02 Local availability of research and training services ..... 81
5.03 Quality of management schools ..... 70
5.04 Company spending on R&D ..... 117
5.05 University-industry research collaboration ..... 115
5.06 Business telephone connection charge, 2007* ..... 23
5.07 Business monthly telephone subscription, 2007* ..... 26
5.08 Local supplier quality ..... 80
5.09 Local supplier quantity ..... 95
5.10 Computer, comm., and other services imports, 2006* ..... 98

### Government readiness 75

6.01 Government prioritization of ICT ..... 88
6.02 Gov't procurement of advanced tech products ..... 95
6.03 Importance of ICT to government vision of the future ..... 67
6.04 E-Government Readiness Index, 2008* ..... 64

## Usage component 67

### Individual usage 76

7.01 Mobile telephone subscribers, 2007* ..... 52
7.02 Personal computers, 2005* ..... 82
7.03 Broadband Internet subscribers, 2007* ..... 76
7.04 Internet users, 2007* ..... 89
7.05 Internet bandwidth, 2007* ..... 101

### Business usage 72

8.01 Prevalence of foreign technology licensing ..... 82
8.02 Firm-level technology absorption ..... 93
8.03 Capacity for innovation ..... 96
8.04 Availability of new telephone lines ..... 26
8.05 Extent of business Internet use ..... 77

### Government usage 51

9.01 Government success in ICT promotion ..... 87
9.02 Availability of government online services ..... 47
9.03 ICT use and government efficiency ..... 59
9.04 Presence of ICT in government offices ..... 75
9.05 E-Participation Index, 2008* ..... 30

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Estonia

## Key indicators

Population (millions), 2007 ..... 1.3
GDP (PPP) per capita (int'l $), 2007 ..... 20,584
Internet users per 100 population, 2007 ..... 58.4
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 119.8
Mobile telephone subscribers per 100 population, 2007 ..... 148.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **18** |
| 2007–2008 (127) | 20 |
| 2006–2007 (122) | 20 |

Global Competitiveness Index 2008–2009 (134) 32

## Environment component 25

### Market environment 21

1.01 Venture capital availability ..... 15
1.02 Financial market sophistication ..... 25
1.03 Availability of latest technologies ..... 21
1.04 State of cluster development ..... 75
1.05 Utility patents, 2007* ..... 30
1.06 High-tech exports, 2006* ..... 32
1.07 Burden of government regulation ..... 10
1.08 Extent and effect of taxation ..... 13
1.09 Total tax rate, 2007* ..... 86
1.10 Time required to start a business, 2008* ..... 15
1.11 No. of procedures required to start a business, 2008* ..... 16
1.12 Intensity of local competition ..... 22
1.13 Freedom of the press ..... 28
1.14 Accessibility of digital content ..... 2

### Political and regulatory environment 21

2.01 Effectiveness of law-making bodies ..... 39
2.02 Laws relating to ICT ..... 4
2.03 Judicial independence ..... 27
2.04 Intellectual property protection ..... 32
2.05 Efficiency of legal framework ..... 31
2.06 Property rights ..... 28
2.07 Quality of competition in the ISP sector ..... 1
2.08 Number of procedures to enforce a contract, 2008* ..... 55
2.09 Time to enforce a contract, 2008* ..... 41

### Infrastructure environment 26

3.01 Number of telephone lines, 2007* ..... 34
3.02 Secure Internet servers, 2007* ..... 26
3.03 Electricity production, 2005* ..... 25
3.04 Availability of scientists and engineers ..... 74
3.05 Quality of scientific research institutions ..... 25
3.06 Tertiary enrollment, 2006* ..... 21
3.07 Education expenditure, 2006* ..... 40

## Readiness component 18

### Individual readiness 19

4.01 Quality of math and science education ..... 14
4.02 Quality of the educational system ..... 30
4.03 Internet access in schools ..... 2
4.04 Buyer sophistication ..... 56
4.05 Residential telephone connection charge, 2007* ..... 46
4.06 Residential monthly telephone subscription, 2007* ..... 40
4.07 High-speed monthly broadband subscription, 2006* ..... 33
4.08 Lowest cost of broadband, 2006* ..... 42
4.09 Cost of mobile telephone call, 2006* ..... 17

### Business readiness 32

5.01 Extent of staff training ..... 35
5.02 Local availability of research and training services ..... 21
5.03 Quality of management schools ..... 32
5.04 Company spending on R&D ..... 40
5.05 University-industry research collaboration ..... 29
5.06 Business telephone connection charge, 2007* ..... 42
5.07 Business monthly telephone subscription, 2007* ..... 36
5.08 Local supplier quality ..... 35
5.09 Local supplier quantity ..... 70
5.10 Computer, comm., and other services imports, 2007* ..... 46

### Government readiness 7

6.01 Government prioritization of ICT ..... 4
6.02 Gov't procurement of advanced tech products ..... 18
6.03 Importance of ICT to government vision of the future ..... 8
6.04 E-Government Readiness Index, 2008* ..... 13

## Usage component 9

### Individual usage 14

7.01 Mobile telephone subscribers, 2007* ..... 3
7.02 Personal computers, 2006* ..... 22
7.03 Broadband Internet subscribers, 2007* ..... 22
7.04 Internet users, 2007* ..... 20
7.05 Internet bandwidth, 2007* ..... 7

### Business usage 24

8.01 Prevalence of foreign technology licensing ..... 52
8.02 Firm-level technology absorption ..... 30
8.03 Capacity for innovation ..... 40
8.04 Availability of new telephone lines ..... 23
8.05 Extent of business Internet use ..... 4

### Government usage 3

9.01 Government success in ICT promotion ..... 5
9.02 Availability of government online services ..... 1
9.03 ICT use and government efficiency ..... 2
9.04 Presence of ICT in government offices ..... 2
9.05 E-Participation Index, 2008* ..... 8

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Ethiopia

## Key indicators

Population (millions), 2007 ..... 79.1
GDP (PPP) per capita (int'l $), 2007 ..... 807
Internet users per 100 population, 2007 ..... 0.4
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 1.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **129** |
| 2007–2008 (127) | 123 |
| 2006–2007 (122) | 119 |

Global Competitiveness Index 2008–2009 (134) 121





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Finland

## Key indicators

Population (millions), 2007 ..... 5.3
GDP (PPP) per capita (int'l $), 2007 ..... 35,349
Internet users per 100 population, 2007 ..... 68.2
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 43.1
Mobile telephone subscribers per 100 population, 2007 ..... 115.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **6** |
| 2007–2008 (127) | 6 |
| 2006–2007 (122) | 4 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 6 |

## Environment component 5

### Market environment 6

1.01 Venture capital availability ..... 4
1.02 Financial market sophistication ..... 18
1.03 Availability of latest technologies ..... 3
1.04 State of cluster development ..... 6
1.05 Utility patents, 2007* ..... 4
1.06 High-tech exports, 2006* ..... 17
1.07 Burden of government regulation ..... 12
1.08 Extent and effect of taxation ..... 114
1.09 Total tax rate, 2007* ..... 84
1.10 Time required to start a business, 2008* ..... 38
1.11 No. of procedures required to start a business, 2008* ..... 4
1.12 Intensity of local competition ..... 16
1.13 Freedom of the press ..... 6
1.14 Accessibility of digital content ..... 4

### Political and regulatory environment 3

2.01 Effectiveness of law-making bodies ..... 7
2.02 Laws relating to ICT ..... 8
2.03 Judicial independence ..... 2
2.04 Intellectual property protection ..... 4
2.05 Efficiency of legal framework ..... 5
2.06 Property rights ..... 5
2.07 Quality of competition in the ISP sector ..... 11
2.08 Number of procedures to enforce a contract, 2008* ..... 31
2.09 Time to enforce a contract, 2008* ..... 8

### Infrastructure environment 7

3.01 Number of telephone lines, 2007* ..... 35
3.02 Secure Internet servers, 2007* ..... 15
3.03 Electricity production, 2005* ..... 9
3.04 Availability of scientists and engineers ..... 1
3.05 Quality of scientific research institutions ..... 9
3.06 Tertiary enrollment, 2006* ..... 2
3.07 Education expenditure, 2006* ..... 18

## Readiness component 4

### Individual readiness 1

4.01 Quality of math and science education ..... 1
4.02 Quality of the educational system ..... 1
4.03 Internet access in schools ..... 1
4.04 Buyer sophistication ..... 11
4.05 Residential telephone connection charge, 2006* ..... 35
4.06 Residential monthly telephone subscription, 2006* ..... 23
4.07 High-speed monthly broadband subscription, 2006* ..... 27
4.08 Lowest cost of broadband, 2006* ..... 3
4.09 Cost of mobile telephone call, 2006* ..... 8

### Business readiness 5

5.01 Extent of staff training ..... 11
5.02 Local availability of research and training services ..... 4
5.03 Quality of management schools ..... 9
5.04 Company spending on R&D ..... 9
5.05 University-industry research collaboration ..... 4
5.06 Business telephone connection charge, 2006* ..... 32
5.07 Business monthly telephone subscription, 2006* ..... 13
5.08 Local supplier quality ..... 13
5.09 Local supplier quantity ..... 24
5.10 Computer, comm., and other services imports, 2007* ..... 9

### Government readiness 8

6.01 Government prioritization of ICT ..... 11
6.02 Gov't procurement of advanced tech products ..... 7
6.03 Importance of ICT to government vision of the future ..... 13
6.04 E-Government Readiness Index, 2008* ..... 15

## Usage component 16

### Individual usage 16

7.01 Mobile telephone subscribers, 2007* ..... 20
7.02 Personal computers, 2005* ..... 23
7.03 Broadband Internet subscribers, 2007* ..... 6
7.04 Internet users, 2007* ..... 11
7.05 Internet bandwidth, 2005* ..... 20

### Business usage 7

8.01 Prevalence of foreign technology licensing ..... 8
8.02 Firm-level technology absorption ..... 8
8.03 Capacity for innovation ..... 5
8.04 Availability of new telephone lines ..... 2
8.05 Extent of business Internet use ..... 10

### Government usage 19

9.01 Government success in ICT promotion ..... 16
9.02 Availability of government online services ..... 18
9.03 ICT use and government efficiency ..... 14
9.04 Presence of ICT in government offices ..... 13
9.05 E-Participation Index, 2008* ..... 43

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# France

## Key indicators

Population (millions), 2007 ..... 61.7
GDP (PPP) per capita (int'l $), 2007 ..... 33,509
Internet users per 100 population, 2006 ..... 49.6
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 32.9
Mobile telephone subscribers per 100 population, 2007 ..... 89.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **19** |
| 2007–2008 (127) | 21 |
| 2006–2007 (122) | 23 |

Global Competitiveness Index 2008–2009 (134) 16





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Gambia, The

## Key indicators

Population (millions), 2007 ..... 1.7
GDP (PPP) per capita (int'l $), 2007 ..... 1,318
Internet users per 100 population, 2007 ..... 5.9
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.4
Mobile telephone subscribers per 100 population, 2007 ..... 46.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **91** |
| 2007–2008 (127) | 101 |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 87 |

## Environment component 82

### Market environment 92

1.01 Venture capital availability ..... 80
1.02 Financial market sophistication ..... 81
1.03 Availability of latest technologies ..... 74
1.04 State of cluster development ..... 57
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 118
1.07 Burden of government regulation ..... 4
1.08 Extent and effect of taxation ..... 35
1.09 Total tax rate, 2007* ..... 130
1.10 Time required to start a business, 2008* ..... 76
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 85
1.13 Freedom of the press ..... 111
1.14 Accessibility of digital content ..... 87

### Political and regulatory environment 37

2.01 Effectiveness of law-making bodies ..... 31
2.02 Laws relating to ICT ..... 75
2.03 Judicial independence ..... 46
2.04 Intellectual property protection ..... 49
2.05 Efficiency of legal framework ..... 40
2.06 Property rights ..... 56
2.07 Quality of competition in the ISP sector ..... 39
2.08 Number of procedures to enforce a contract, 2008* ..... 31
2.09 Time to enforce a contract, 2008* ..... 43

### Infrastructure environment 129

3.01 Number of telephone lines, 2007* ..... 104
3.02 Secure Internet servers, 2007* ..... 95
3.03 Electricity production, 2005* ..... 121
3.04 Availability of scientists and engineers ..... 119
3.05 Quality of scientific research institutions ..... 71
3.06 Tertiary enrollment, 2004* ..... 128
3.07 Education expenditure, 2006* ..... 116

## Readiness component 107

### Individual readiness 122

4.01 Quality of math and science education ..... 95
4.02 Quality of the educational system ..... 34
4.03 Internet access in schools ..... 94
4.04 Buyer sophistication ..... 101
4.05 Residential telephone connection charge* ..... n/a
4.06 Residential monthly telephone subscription* ..... n/a
4.07 High-speed monthly broadband subscription, 2006* ..... 101
4.08 Lowest cost of broadband, 2006* ..... 109
4.09 Cost of mobile telephone call* ..... n/a

### Business readiness 94

5.01 Extent of staff training ..... 53
5.02 Local availability of research and training services ..... 93
5.03 Quality of management schools ..... 66
5.04 Company spending on R&D ..... 112
5.05 University-industry research collaboration ..... 87
5.06 Business telephone connection charge* ..... n/a
5.07 Business monthly telephone subscription* ..... n/a
5.08 Local supplier quality ..... 74
5.09 Local supplier quantity ..... 88
5.10 Computer, comm., and other services imports, 2006* ..... 10

### Government readiness 58

6.01 Government prioritization of ICT ..... 16
6.02 Gov't procurement of advanced tech products ..... 39
6.03 Importance of ICT to government vision of the future ..... 20
6.04 E-Government Readiness Index, 2008* ..... 123

## Usage component 79

### Individual usage 101

7.01 Mobile telephone subscribers, 2007* ..... 91
7.02 Personal computers, 2006* ..... 102
7.03 Broadband Internet subscribers, 2005* ..... 121
7.04 Internet users, 2007* ..... 104
7.05 Internet bandwidth, 2007* ..... 92

### Business usage 73

8.01 Prevalence of foreign technology licensing ..... 72
8.02 Firm-level technology absorption ..... 67
8.03 Capacity for innovation ..... 82
8.04 Availability of new telephone lines ..... 75
8.05 Extent of business Internet use ..... 78

### Government usage 52

9.01 Government success in ICT promotion ..... 14
9.02 Availability of government online services ..... 66
9.03 ICT use and government efficiency ..... 32
9.04 Presence of ICT in government offices ..... 36
9.05 E-Participation Index, 2008* ..... 115

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Georgia

## Key indicators

Population (millions), 2007 ..... 4.4
GDP (PPP) per capita (int'l $), 2007 ..... 4,694
Internet users per 100 population, 2007 ..... 8.2
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.1
Mobile telephone subscribers per 100 population, 2006 ..... 38.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **88** |
| 2007–2008 (127) | 91 |
| 2006–2007 (122) | 93 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 90 |





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Germany

## Key indicators

Population (millions), 2007 ..... 82.3
GDP (PPP) per capita (int'l $), 2007 ..... 34,212
Internet users per 100 population, 2007 ..... 51.5
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 68.5
Mobile telephone subscribers per 100 population, 2007 ..... 117.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **20** |
| 2007–2008 (127) | 16 |
| 2006–2007 (122) | 16 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Ghana

## Key indicators

Population (millions), 2007 ..... 23.5
GDP (PPP) per capita (int'l $), 2007 ..... 1,426
Internet users per 100 population, 2007 ..... 2.8
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 32.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **103** |
| 2007–2008 (127) | n/a |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 102 |



## Environment component 86

### Market environment 82

1.01 Venture capital availability ..... 119
1.02 Financial market sophistication ..... 82
1.03 Availability of latest technologies ..... 101
1.04 State of cluster development ..... 101
1.05 Utility patents, 2007* ..... 82
1.06 High-tech exports, 2006* ..... 116
1.07 Burden of government regulation ..... 70
1.08 Extent and effect of taxation ..... 51
1.09 Total tax rate, 2007* ..... 32
1.10 Time required to start a business, 2008* ..... 91
1.11 No. of procedures required to start a business, 2008* ..... 75
1.12 Intensity of local competition ..... 61
1.13 Freedom of the press ..... 16
1.14 Accessibility of digital content ..... 103

### Political and regulatory environment 65

2.01 Effectiveness of law-making bodies ..... 32
2.02 Laws relating to ICT ..... 113
2.03 Judicial independence ..... 70
2.04 Intellectual property protection ..... 80
2.05 Efficiency of legal framework ..... 44
2.06 Property rights ..... 74
2.07 Quality of competition in the ISP sector ..... 117
2.08 Number of procedures to enforce a contract, 2008* ..... 55
2.09 Time to enforce a contract, 2008* ..... 53

### Infrastructure environment 107

3.01 Number of telephone lines, 2007* ..... 114
3.02 Secure Internet servers, 2007* ..... 113
3.03 Electricity production, 2005* ..... 112
3.04 Availability of scientists and engineers ..... 99
3.05 Quality of scientific research institutions ..... 70
3.06 Tertiary enrollment, 2007* ..... 108
3.07 Education expenditure, 2006* ..... 47

## Readiness component 105

### Individual readiness 110

4.01 Quality of math and science education ..... 105
4.02 Quality of the educational system ..... 75
4.03 Internet access in schools ..... 109
4.04 Buyer sophistication ..... 124
4.05 Residential telephone connection charge, 2007* ..... 121
4.06 Residential monthly telephone subscription, 2007* ..... 105
4.07 High-speed monthly broadband subscription, 2006* ..... 99
4.08 Lowest cost of broadband, 2006* ..... 107
4.09 Cost of mobile telephone call, 2006* ..... 111

### Business readiness 90

5.01 Extent of staff training ..... 103
5.02 Local availability of research and training services ..... 101
5.03 Quality of management schools ..... 76
5.04 Company spending on R&D ..... 134
5.05 University-industry research collaboration ..... 121
5.06 Business telephone connection charge, 2007* ..... 10
5.07 Business monthly telephone subscription, 2007* ..... 1
5.08 Local supplier quality ..... 104
5.09 Local supplier quantity ..... 105
5.10 Computer, comm., and other services imports, 2006* ..... 83

### Government readiness 96

6.01 Government prioritization of ICT ..... 42
6.02 Gov't procurement of advanced tech products ..... 115
6.03 Importance of ICT to government vision of the future ..... 69
6.04 E-Government Readiness Index, 2008* ..... 112

## Usage component 117

### Individual usage 115

7.01 Mobile telephone subscribers, 2007* ..... 107
7.02 Personal computers, 2005* ..... 120
7.03 Broadband Internet subscribers, 2007* ..... 104
7.04 Internet users, 2007* ..... 115
7.05 Internet bandwidth, 2006* ..... 97

### Business usage 114

8.01 Prevalence of foreign technology licensing ..... 104
8.02 Firm-level technology absorption ..... 107
8.03 Capacity for innovation ..... 130
8.04 Availability of new telephone lines ..... 116
8.05 Extent of business Internet use ..... 100

### Government usage 108

9.01 Government success in ICT promotion ..... 85
9.02 Availability of government online services ..... 130
9.03 ICT use and government efficiency ..... 115
9.04 Presence of ICT in government offices ..... 100
9.05 E-Participation Index, 2008* ..... 58

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Greece

## Key indicators

Population (millions), 2007 ..... 11.2
GDP (PPP) per capita (int'l $), 2007 ..... 29,146
Internet users per 100 population, 2007 ..... 22.8
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 5.9
Mobile telephone subscribers per 100 population, 2007 ..... 110.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **55** |
| 2007–2008 (127) | 56 |
| 2006–2007 (122) | 48 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 67 |

## Environment component 45

### Market environment 79

1.01 Venture capital availability ..... 71
1.02 Financial market sophistication ..... 52
1.03 Availability of latest technologies ..... 62
1.04 State of cluster development ..... 88
1.05 Utility patents, 2007* ..... 38
1.06 High-tech exports, 2006* ..... 42
1.07 Burden of government regulation ..... 116
1.08 Extent and effect of taxation ..... 72
1.09 Total tax rate, 2007* ..... 82
1.10 Time required to start a business, 2008* ..... 57
1.11 No. of procedures required to start a business, 2008* ..... 121
1.12 Intensity of local competition ..... 52
1.13 Freedom of the press ..... 26
1.14 Accessibility of digital content ..... 96

### Political and regulatory environment 61

2.01 Effectiveness of law-making bodies ..... 53
2.02 Laws relating to ICT ..... 76
2.03 Judicial independence ..... 62
2.04 Intellectual property protection ..... 44
2.05 Efficiency of legal framework ..... 71
2.06 Property rights ..... 51
2.07 Quality of competition in the ISP sector ..... 61
2.08 Number of procedures to enforce a contract, 2008* ..... 78
2.09 Time to enforce a contract, 2008* ..... 106

### Infrastructure environment 24

3.01 Number of telephone lines, 2007* ..... 10
3.02 Secure Internet servers, 2007* ..... 42
3.03 Electricity production, 2005* ..... 42
3.04 Availability of scientists and engineers ..... 17
3.05 Quality of scientific research institutions ..... 73
3.06 Tertiary enrollment, 2006* ..... 1
3.07 Education expenditure, 2006* ..... 92

## Readiness component 60

### Individual readiness 56

4.01 Quality of math and science education ..... 49
4.02 Quality of the educational system ..... 82
4.03 Internet access in schools ..... 75
4.04 Buyer sophistication ..... 51
4.05 Residential telephone connection charge, 2006* ..... 16
4.06 Residential monthly telephone subscription, 2006* ..... 50
4.07 High-speed monthly broadband subscription, 2006* ..... 35
4.08 Lowest cost of broadband, 2006* ..... 44
4.09 Cost of mobile telephone call, 2006* ..... 47

### Business readiness 68

5.01 Extent of staff training ..... 81
5.02 Local availability of research and training services ..... 87
5.03 Quality of management schools ..... 80
5.04 Company spending on R&D ..... 85
5.05 University-industry research collaboration ..... 90
5.06 Business telephone connection charge, 2006* ..... 15
5.07 Business monthly telephone subscription, 2006* ..... 34
5.08 Local supplier quality ..... 61
5.09 Local supplier quantity ..... 75
5.10 Computer, comm., and other services imports, 2006* ..... 89

### Government readiness 67

6.01 Government prioritization of ICT ..... 74
6.02 Gov't procurement of advanced tech products ..... 103
6.03 Importance of ICT to government vision of the future ..... 97
6.04 E-Government Readiness Index, 2008* ..... 44

## Usage component 69

### Individual usage 48

7.01 Mobile telephone subscribers, 2007* ..... 29
7.02 Personal computers, 2006* ..... 62
7.03 Broadband Internet subscribers, 2007* ..... 37
7.04 Internet users, 2007* ..... 63
7.05 Internet bandwidth, 2005* ..... 49

### Business usage 77

8.01 Prevalence of foreign technology licensing ..... 46
8.02 Firm-level technology absorption ..... 90
8.03 Capacity for innovation ..... 89
8.04 Availability of new telephone lines ..... 59
8.05 Extent of business Internet use ..... 97

### Government usage 85

9.01 Government success in ICT promotion ..... 90
9.02 Availability of government online services ..... 70
9.03 ICT use and government efficiency ..... 77
9.04 Presence of ICT in government offices ..... 88
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Guatemala

## Key indicators

Population (millions), 2007 ..... 13.3
GDP (PPP) per capita (int'l $), 2007 ..... 4,702
Internet users per 100 population, 2006 ..... 10.2
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.6
Mobile telephone subscribers per 100 population, 2007 ..... 76.0

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **82** |
| 2007–2008 (127) | 80 |
| 2006–2007 (122) | 79 |

Global Competitiveness Index 2008–2009 (134) 84



### Environment component 99

**Market environment 54**

1.01 Venture capital availability ..... 75
1.02 Financial market sophistication ..... 73
1.03 Availability of latest technologies ..... 72
1.04 State of cluster development ..... 61
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 85
1.07 Burden of government regulation ..... 32
1.08 Extent and effect of taxation ..... 40
1.09 Total tax rate, 2007* ..... 51
1.10 Time required to start a business, 2008* ..... 71
1.11 No. of procedures required to start a business, 2008* ..... 100
1.12 Intensity of local competition ..... 55
1.13 Freedom of the press ..... 30
1.14 Accessibility of digital content ..... 31

**Political and regulatory environment 104**

2.01 Effectiveness of law-making bodies ..... 126
2.02 Laws relating to ICT ..... 80
2.03 Judicial independence ..... 90
2.04 Intellectual property protection ..... 109
2.05 Efficiency of legal framework ..... 99
2.06 Property rights ..... 87
2.07 Quality of competition in the ISP sector ..... 17
2.08 Number of procedures to enforce a contract, 2008* ..... 27
2.09 Time to enforce a contract, 2008* ..... 128

**Infrastructure environment 117**

3.01 Number of telephone lines, 2006* ..... 88
3.02 Secure Internet servers, 2007* ..... 72
3.03 Electricity production, 2005* ..... 106
3.04 Availability of scientists and engineers ..... 90
3.05 Quality of scientific research institutions ..... 103
3.06 Tertiary enrollment, 2006* ..... 104
3.07 Education expenditure, 2006* ..... 122

### Readiness component 83

**Individual readiness 89**

4.01 Quality of math and science education ..... 120
4.02 Quality of the educational system ..... 118
4.03 Internet access in schools ..... 93
4.04 Buyer sophistication ..... 59
4.05 Residential telephone connection charge, 2006* ..... 101
4.06 Residential monthly telephone subscription, 2006* ..... 95
4.07 High-speed monthly broadband subscription, 2006* ..... 84
4.08 Lowest cost of broadband, 2006* ..... 91
4.09 Cost of mobile telephone call, 2006* ..... 75

**Business readiness 71**

5.01 Extent of staff training ..... 55
5.02 Local availability of research and training services ..... 48
5.03 Quality of management schools ..... 47
5.04 Company spending on R&D ..... 60
5.05 University-industry research collaboration ..... 52
5.06 Business telephone connection charge, 2006* ..... 97
5.07 Business monthly telephone subscription, 2006* ..... 76
5.08 Local supplier quality ..... 43
5.09 Local supplier quantity ..... 45
5.10 Computer, comm., and other services imports, 2006* ..... 115

**Government readiness 82**

6.01 Government prioritization of ICT ..... 100
6.02 Gov't procurement of advanced tech products ..... 68
6.03 Importance of ICT to government vision of the future ..... 75
6.04 E-Government Readiness Index, 2008* ..... 87

### Usage component 66

**Individual usage 86**

7.01 Mobile telephone subscribers, 2007* ..... 68
7.02 Personal computers, 2005* ..... 101
7.03 Broadband Internet subscribers, 2005* ..... 96
7.04 Internet users, 2006* ..... 93
7.05 Internet bandwidth, 2005* ..... 83

**Business usage 44**

8.01 Prevalence of foreign technology licensing ..... 66
8.02 Firm-level technology absorption ..... 51
8.03 Capacity for innovation ..... 65
8.04 Availability of new telephone lines ..... 22
8.05 Extent of business Internet use ..... 32

**Government usage 63**

9.01 Government success in ICT promotion ..... 81
9.02 Availability of government online services ..... 37
9.03 ICT use and government efficiency ..... 42
9.04 Presence of ICT in government offices ..... 71
9.05 E-Participation Index, 2008* ..... 105

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Guyana

## Key indicators

Population (millions), 2007 ..... 0.7
GDP (PPP) per capita (int'l $), 2007 ..... 3,841
Internet users per 100 population, 2007 ..... 25.7
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.5
Mobile telephone subscribers per 100 population, 2005 ..... 37.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **100** |
| 2007–2008 (127) | 102 |
| 2006–2007 (122) | 98 |

Global Competitiveness Index 2008–2009 (134) 115



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Honduras

## Key indicators

Population (millions), 2007 ..... 7.1
GDP (PPP) per capita (int'l $), 2007 ..... 4,085
Internet users per 100 population, 2006 ..... 4.7
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.1
Mobile telephone subscribers per 100 population, 2006 ..... 30.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **95** |
| 2007–2008 (127) | 90 |
| 2006–2007 (122) | 94 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 82 |



### Environment component 97

**Market environment 78**

1.01 Venture capital availability ..... 63
1.02 Financial market sophistication ..... 76
1.03 Availability of latest technologies ..... 102
1.04 State of cluster development ..... 72
1.05 Utility patents, 2007* ..... 73
1.06 High-tech exports, 2006* ..... 106
1.07 Burden of government regulation ..... 20
1.08 Extent and effect of taxation ..... 41
1.09 Total tax rate, 2007* ..... 89
1.10 Time required to start a business, 2008* ..... 61
1.11 No. of procedures required to start a business, 2008* ..... 112
1.12 Intensity of local competition ..... 93
1.13 Freedom of the press ..... 36
1.14 Accessibility of digital content ..... 78

**Political and regulatory environment 94**

2.01 Effectiveness of law-making bodies ..... 83
2.02 Laws relating to ICT ..... 89
2.03 Judicial independence ..... 91
2.04 Intellectual property protection ..... 71
2.05 Efficiency of legal framework ..... 76
2.06 Property rights ..... 77
2.07 Quality of competition in the ISP sector ..... 42
2.08 Number of procedures to enforce a contract, 2008* ..... 115
2.09 Time to enforce a contract, 2008* ..... 117

**Infrastructure environment 109**

3.01 Number of telephone lines, 2006* ..... 91
3.02 Secure Internet servers, 2007* ..... 81
3.03 Electricity production, 2005* ..... 96
3.04 Availability of scientists and engineers ..... 106
3.05 Quality of scientific research institutions ..... 122
3.06 Tertiary enrollment, 2004* ..... 88
3.07 Education expenditure, 2006* ..... 88

### Readiness component 94

**Individual readiness 98**

4.01 Quality of math and science education ..... 117
4.02 Quality of the educational system ..... 116
4.03 Internet access in schools ..... 92
4.04 Buyer sophistication ..... 70
4.05 Residential telephone connection charge, 2006* ..... 84
4.06 Residential monthly telephone subscription, 2006* ..... 78
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband, 2006* ..... 93
4.09 Cost of mobile telephone call, 2006* ..... 103

**Business readiness 93**

5.01 Extent of staff training ..... 77
5.02 Local availability of research and training services ..... 83
5.03 Quality of management schools ..... 101
5.04 Company spending on R&D ..... 94
5.05 University-industry research collaboration ..... 104
5.06 Business telephone connection charge, 2006* ..... 94
5.07 Business monthly telephone subscription, 2006* ..... 92
5.08 Local supplier quality ..... 84
5.09 Local supplier quantity ..... 92
5.10 Computer, comm., and other services imports, 2006* ..... 77

**Government readiness 101**

6.01 Government prioritization of ICT ..... 114
6.02 Gov't procurement of advanced tech products ..... 77
6.03 Importance of ICT to government vision of the future ..... 104
6.04 E-Government Readiness Index, 2008* ..... 93

### Usage component 97

**Individual usage 111**

7.01 Mobile telephone subscribers, 2006* ..... 109
7.02 Personal computers, 2006* ..... 104
7.03 Broadband Internet subscribers, 2005* ..... 128
7.04 Internet users, 2006* ..... 108
7.05 Internet bandwidth, 2005* ..... 114

**Business usage 90**

8.01 Prevalence of foreign technology licensing ..... 86
8.02 Firm-level technology absorption ..... 95
8.03 Capacity for innovation ..... 93
8.04 Availability of new telephone lines ..... 103
8.05 Extent of business Internet use ..... 49

**Government usage 86**

9.01 Government success in ICT promotion ..... 105
9.02 Availability of government online services ..... 79
9.03 ICT use and government efficiency ..... 94
9.04 Presence of ICT in government offices ..... 105
9.05 E-Participation Index, 2008* ..... 43

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Hong Kong SAR

## Key indicators

Population (millions), 2007 ..... 6.9
GDP (PPP) per capita (int'l $), 2007 ..... 42,124
Internet users per 100 population, 2007 ..... 55.0
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 132.9
Mobile telephone subscribers per 100 population, 2007 ..... 146.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **12** |
| 2007–2008 (127) | 11 |
| 2006–2007 (122) | 12 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 11 |

## Environment component 16

### Market environment 1

1.01 Venture capital availability ..... 6
1.02 Financial market sophistication ..... 2
1.03 Availability of latest technologies ..... 19
1.04 State of cluster development ..... 7
1.05 Utility patents, 2007* ..... 22
1.06 High-tech exports, 2006* ..... 2
1.07 Burden of government regulation ..... 2
1.08 Extent and effect of taxation ..... 3
1.09 Total tax rate, 2007* ..... 14
1.10 Time required to start a business, 2008* ..... 29
1.11 No. of procedures required to start a business, 2008* ..... 16
1.12 Intensity of local competition ..... 7
1.13 Freedom of the press ..... 47
1.14 Accessibility of digital content ..... 16

### Political and regulatory environment 11

2.01 Effectiveness of law-making bodies ..... 40
2.02 Laws relating to ICT ..... 12
2.03 Judicial independence ..... 13
2.04 Intellectual property protection ..... 21
2.05 Efficiency of legal framework ..... 11
2.06 Property rights ..... 12
2.07 Quality of competition in the ISP sector ..... 8
2.08 Number of procedures to enforce a contract, 2008* ..... 3
2.09 Time to enforce a contract, 2008* ..... 4

### Infrastructure environment 37

3.01 Number of telephone lines, 2007* ..... 11
3.02 Secure Internet servers, 2007* ..... 23
3.03 Electricity production, 2005* ..... 40
3.04 Availability of scientists and engineers ..... 67
3.05 Quality of scientific research institutions ..... 29
3.06 Tertiary enrollment, 2006* ..... 63
3.07 Education expenditure, 2006* ..... 91

## Readiness component 21

### Individual readiness 7

4.01 Quality of math and science education ..... 6
4.02 Quality of the educational system ..... 22
4.03 Internet access in schools ..... 10
4.04 Buyer sophistication ..... 4
4.05 Residential telephone connection charge, 2007* ..... 21
4.06 Residential monthly telephone subscription, 2007* ..... 34
4.07 High-speed monthly broadband subscription, 2006* ..... 26
4.08 Lowest cost of broadband, 2006* ..... 16
4.09 Cost of mobile telephone call, 2006* ..... 1

### Business readiness 26

5.01 Extent of staff training ..... 29
5.02 Local availability of research and training services ..... 25
5.03 Quality of management schools ..... 28
5.04 Company spending on R&D ..... 25
5.05 University-industry research collaboration ..... 22
5.06 Business telephone connection charge, 2007* ..... 20
5.07 Business monthly telephone subscription, 2007* ..... 30
5.08 Local supplier quality ..... 17
5.09 Local supplier quantity ..... 14
5.10 Computer, comm., and other services imports, 2006* ..... 71

### Government readiness 21

6.01 Government prioritization of ICT ..... 20
6.02 Gov't procurement of advanced tech products ..... 17
6.03 Importance of ICT to government vision of the future ..... 14
6.04 E-Government Readiness Index* ..... n/a

## Usage component 8

### Individual usage 9

7.01 Mobile telephone subscribers, 2007* ..... 5
7.02 Personal computers, 2006* ..... 16
7.03 Broadband Internet subscribers, 2007* ..... 10
7.04 Internet users, 2007* ..... 23
7.05 Internet bandwidth, 2007* ..... 6

### Business usage 20

8.01 Prevalence of foreign technology licensing ..... 25
8.02 Firm-level technology absorption ..... 16
8.03 Capacity for innovation ..... 33
8.04 Availability of new telephone lines ..... 10
8.05 Extent of business Internet use ..... 20

### Government usage 7

9.01 Government success in ICT promotion ..... 19
9.02 Availability of government online services ..... 8
9.03 ICT use and government efficiency ..... 7
9.04 Presence of ICT in government offices ..... 10
9.05 E-Participation Index* ..... n/a

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Hungary

## Key indicators

Population (millions), 2007 ..... 10.1
GDP (PPP) per capita (int'l $), 2007 ..... 19,020
Internet users per 100 population, 2007 ..... 41.9
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 39.9
Mobile telephone subscribers per 100 population, 2007 ..... 110.0

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **41** |
| 2007–2008 (127) | 37 |
| 2006–2007 (122) | 33 |

Global Competitiveness Index 2008–2009 (134) 62



## Environment component 41

### Market environment 44

1.01 Venture capital availability ..... 82
1.02 Financial market sophistication ..... 59
1.03 Availability of latest technologies ..... 65
1.04 State of cluster development ..... 51
1.05 Utility patents, 2007* ..... 31
1.06 High-tech exports, 2006* ..... 15
1.07 Burden of government regulation ..... 128
1.08 Extent and effect of taxation ..... 133
1.09 Total tax rate, 2007* ..... 105
1.10 Time required to start a business, 2008* ..... 6
1.11 No. of procedures required to start a business, 2008* ..... 8
1.12 Intensity of local competition ..... 38
1.13 Freedom of the press ..... 64
1.14 Accessibility of digital content ..... 38

### Political and regulatory environment 50

2.01 Effectiveness of law-making bodies ..... 103
2.02 Laws relating to ICT ..... 56
2.03 Judicial independence ..... 55
2.04 Intellectual property protection ..... 45
2.05 Efficiency of legal framework ..... 81
2.06 Property rights ..... 46
2.07 Quality of competition in the ISP sector ..... 88
2.08 Number of procedures to enforce a contract, 2008* ..... 37
2.09 Time to enforce a contract, 2008* ..... 23

### Infrastructure environment 32

3.01 Number of telephone lines, 2007* ..... 37
3.02 Secure Internet servers, 2007* ..... 39
3.03 Electricity production, 2005* ..... 56
3.04 Availability of scientists and engineers ..... 49
3.05 Quality of scientific research institutions ..... 24
3.06 Tertiary enrollment, 2006* ..... 17
3.07 Education expenditure, 2006* ..... 26

## Readiness component 52

### Individual readiness 42

4.01 Quality of math and science education ..... 36
4.02 Quality of the educational system ..... 87
4.03 Internet access in schools ..... 26
4.04 Buyer sophistication ..... 95
4.05 Residential telephone connection charge, 2006* ..... 78
4.06 Residential monthly telephone subscription, 2007* ..... 61
4.07 High-speed monthly broadband subscription, 2006* ..... 41
4.08 Lowest cost of broadband, 2006* ..... 35
4.09 Cost of mobile telephone call, 2006* ..... 50

### Business readiness 46

5.01 Extent of staff training ..... 101
5.02 Local availability of research and training services ..... 73
5.03 Quality of management schools ..... 73
5.04 Company spending on R&D ..... 83
5.05 University-industry research collaboration ..... 30
5.06 Business telephone connection charge, 2006* ..... 75
5.07 Business monthly telephone subscription, 2007* ..... 42
5.08 Local supplier quality ..... 63
5.09 Local supplier quantity ..... 76
5.10 Computer, comm., and other services imports, 2006* ..... 7

### Government readiness 60

6.01 Government prioritization of ICT ..... 98
6.02 Gov't procurement of advanced tech products ..... 116
6.03 Importance of ICT to government vision of the future ..... 83
6.04 E-Government Readiness Index, 2008* ..... 30

## Usage component 40

### Individual usage 34

7.01 Mobile telephone subscribers, 2007* ..... 31
7.02 Personal computers, 2006* ..... 31
7.03 Broadband Internet subscribers, 2007* ..... 33
7.04 Internet users, 2007* ..... 39
7.05 Internet bandwidth, 2007* ..... 21

### Business usage 51

8.01 Prevalence of foreign technology licensing ..... 61
8.02 Firm-level technology absorption ..... 68
8.03 Capacity for innovation ..... 46
8.04 Availability of new telephone lines ..... 28
8.05 Extent of business Internet use ..... 59

### Government usage 58

9.01 Government success in ICT promotion ..... 112
9.02 Availability of government online services ..... 42
9.03 ICT use and government efficiency ..... 64
9.04 Presence of ICT in government offices ..... 45
9.05 E-Participation Index, 2008* ..... 58

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Iceland

## Key indicators

Population (millions), 2007 ..... 0.3
GDP (PPP) per capita (int'l $), 2007 ..... 39,168
Internet users per 100 population, 2007 ..... 67.2
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 73.1
Mobile telephone subscribers per 100 population, 2007 ..... 115.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **7** |
| 2007–2008 (127) | 8 |
| 2006–2007 (122) | 8 |

Global Competitiveness Index 2008–2009 (134) 20

## Environment component 1

### Market environment 11

1.01 Venture capital availability ..... 21
1.02 Financial market sophistication ..... 28
1.03 Availability of latest technologies ..... 1
1.04 State of cluster development ..... 44
1.05 Utility patents, 2007* ..... 15
1.06 High-tech exports, 2006* ..... 33
1.07 Burden of government regulation ..... 3
1.08 Extent and effect of taxation ..... 11
1.09 Total tax rate, 2007* ..... 17
1.10 Time required to start a business, 2008* ..... 6
1.11 No. of procedures required to start a business, 2008* ..... 16
1.12 Intensity of local competition ..... 57
1.13 Freedom of the press ..... 11
1.14 Accessibility of digital content ..... 8

### Political and regulatory environment 10

2.01 Effectiveness of law-making bodies ..... 10
2.02 Laws relating to ICT ..... 11
2.03 Judicial independence ..... 14
2.04 Intellectual property protection ..... 8
2.05 Efficiency of legal framework ..... 13
2.06 Property rights ..... 10
2.07 Quality of competition in the ISP sector ..... 18
2.08 Number of procedures to enforce a contract, 2008* ..... 7
2.09 Time to enforce a contract, 2008* ..... 30

### Infrastructure environment 1

3.01 Number of telephone lines, 2007* ..... 4
3.02 Secure Internet servers, 2007* ..... 1
3.03 Electricity production, 2005* ..... 2
3.04 Availability of scientists and engineers ..... 15
3.05 Quality of scientific research institutions ..... 23
3.06 Tertiary enrollment, 2006* ..... 13
3.07 Education expenditure, 2006* ..... 5

## Readiness component 9

### Individual readiness 6

4.01 Quality of math and science education ..... 26
4.02 Quality of the educational system ..... 5
4.03 Internet access in schools ..... 3
4.04 Buyer sophistication ..... 24
4.05 Residential telephone connection charge, 2007* ..... 6
4.06 Residential monthly telephone subscription, 2007* ..... 20
4.07 High-speed monthly broadband subscription, 2006* ..... 22
4.08 Lowest cost of broadband, 2006* ..... 13
4.09 Cost of mobile telephone call, 2006* ..... 9

### Business readiness 20

5.01 Extent of staff training ..... 9
5.02 Local availability of research and training services ..... 17
5.03 Quality of management schools ..... 13
5.04 Company spending on R&D ..... 17
5.05 University-industry research collaboration ..... 15
5.06 Business telephone connection charge, 2007* ..... 7
5.07 Business monthly telephone subscription, 2007* ..... 17
5.08 Local supplier quality ..... 19
5.09 Local supplier quantity ..... 48
5.10 Computer, comm., and other services imports, 2007* ..... 75

### Government readiness 11

6.01 Government prioritization of ICT ..... 6
6.02 Gov't procurement of advanced tech products ..... 13
6.03 Importance of ICT to government vision of the future ..... 12
6.04 E-Government Readiness Index, 2008* ..... 21

## Usage component 14

### Individual usage 11

7.01 Mobile telephone subscribers, 2007* ..... 19
7.02 Personal computers, 2006* ..... 21
7.03 Broadband Internet subscribers, 2007* ..... 2
7.04 Internet users, 2007* ..... 12
7.05 Internet bandwidth, 2007* ..... 12

### Business usage 8

8.01 Prevalence of foreign technology licensing ..... 3
8.02 Firm-level technology absorption ..... 1
8.03 Capacity for innovation ..... 17
8.04 Availability of new telephone lines ..... 7
8.05 Extent of business Internet use ..... 16

### Government usage 21

9.01 Government success in ICT promotion ..... 11
9.02 Availability of government online services ..... 7
9.03 ICT use and government efficiency ..... 10
9.04 Presence of ICT in government offices ..... 7
9.05 E-Participation Index, 2008* ..... 95

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# India

## Key indicators

Population (millions), 2007 ..... 1,123.3
GDP (PPP) per capita (int'l $), 2007 ..... 2,563
Internet users per 100 population, 2007 ..... 6.9
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 20.0

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **54** |
| 2007–2008 (127) | 50 |
| 2006–2007 (122) | 44 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 50 |



## Environment component 60

### Market environment 50

1.01 Venture capital availability ..... 27
1.02 Financial market sophistication ..... 33
1.03 Availability of latest technologies ..... 43
1.04 State of cluster development ..... 24
1.05 Utility patents, 2007* ..... 57
1.06 High-tech exports, 2005* ..... 54
1.07 Burden of government regulation ..... 90
1.08 Extent and effect of taxation ..... 28
1.09 Total tax rate, 2007* ..... 119
1.10 Time required to start a business, 2008* ..... 83
1.11 No. of procedures required to start a business, 2008* ..... 112
1.12 Intensity of local competition ..... 11
1.13 Freedom of the press ..... 23
1.14 Accessibility of digital content ..... 61

### Political and regulatory environment 57

2.01 Effectiveness of law-making bodies ..... 25
2.02 Laws relating to ICT ..... 38
2.03 Judicial independence ..... 43
2.04 Intellectual property protection ..... 57
2.05 Efficiency of legal framework ..... 42
2.06 Property rights ..... 52
2.07 Quality of competition in the ISP sector ..... 23
2.08 Number of procedures to enforce a contract, 2008* ..... 117
2.09 Time to enforce a contract, 2008* ..... 126

### Infrastructure environment 76

3.01 Number of telephone lines, 2007* ..... 108
3.02 Secure Internet servers, 2007* ..... 99
3.03 Electricity production, 2005* ..... 104
3.04 Availability of scientists and engineers ..... 3
3.05 Quality of scientific research institutions ..... 27
3.06 Tertiary enrollment, 2006* ..... 98
3.07 Education expenditure, 2006* ..... 77

## Readiness component 40

### Individual readiness 45

4.01 Quality of math and science education ..... 17
4.02 Quality of the educational system ..... 37
4.03 Internet access in schools ..... 60
4.04 Buyer sophistication ..... 38
4.05 Residential telephone connection charge, 2007* ..... 64
4.06 Residential monthly telephone subscription, 2007* ..... 99
4.07 High-speed monthly broadband subscription, 2006* ..... 68
4.08 Lowest cost of broadband, 2006* ..... 85
4.09 Cost of mobile telephone call, 2006* ..... 74

### Business readiness 27

5.01 Extent of staff training ..... 34
5.02 Local availability of research and training services ..... 32
5.03 Quality of management schools ..... 12
5.04 Company spending on R&D ..... 29
5.05 University-industry research collaboration ..... 45
5.06 Business telephone connection charge, 2007* ..... 57
5.07 Business monthly telephone subscription, 2007* ..... 83
5.08 Local supplier quality ..... 37
5.09 Local supplier quantity ..... 4
5.10 Computer, comm., and other services imports, 2006* ..... 23

### Government readiness 57

6.01 Government prioritization of ICT ..... 24
6.02 Gov't procurement of advanced tech products ..... 88
6.03 Importance of ICT to government vision of the future ..... 33
6.04 E-Government Readiness Index, 2008* ..... 94

## Usage component 59

### Individual usage 114

7.01 Mobile telephone subscribers, 2007* ..... 120
7.02 Personal computers, 2006* ..... 94
7.03 Broadband Internet subscribers, 2007* ..... 94
7.04 Internet users, 2007* ..... 99
7.05 Internet bandwidth, 2006* ..... 96

### Business usage 30

8.01 Prevalence of foreign technology licensing ..... 30
8.02 Firm-level technology absorption ..... 26
8.03 Capacity for innovation ..... 35
8.04 Availability of new telephone lines ..... 38
8.05 Extent of business Internet use ..... 41

### Government usage 47

9.01 Government success in ICT promotion ..... 23
9.02 Availability of government online services ..... 49
9.03 ICT use and government efficiency ..... 33
9.04 Presence of ICT in government offices ..... 67
9.05 E-Participation Index, 2008* ..... 47

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Indonesia

## Key indicators

Population (millions), 2007 ..... 225.6
GDP (PPP) per capita (int'l $), 2007 ..... 3,728
Internet users per 100 population, 2007 ..... 5.6
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.5
Mobile telephone subscribers per 100 population, 2007 ..... 35.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **83** |
| 2007–2008 (127) | 76 |
| 2006–2007 (122) | 62 |

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|---|---|
| Global Competitiveness Index 2008–2009 (134) | 55 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Ireland

## Key indicators

Population (millions), 2007 ..... 4.4
GDP (PPP) per capita (int'l $), 2007 ..... 43,414
Internet users per 100 population, 2007 ..... 39.7
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 59.3
Mobile telephone subscribers per 100 population, 2007 ..... 114.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **23** |
| 2007–2008 (127) | 23 |
| 2006–2007 (122) | 21 |

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|---|---|
| Global Competitiveness Index 2008–2009 (134) | 22 |



## Environment component 14

### Market environment 7

1.01 Venture capital availability ..... 11
1.02 Financial market sophistication ..... 13
1.03 Availability of latest technologies ..... 33
1.04 State of cluster development ..... 26
1.05 Utility patents, 2007* ..... 23
1.06 High-tech exports, 2006* ..... 7
1.07 Burden of government regulation ..... 61
1.08 Extent and effect of taxation ..... 18
1.09 Total tax rate, 2007* ..... 21
1.10 Time required to start a business, 2008* ..... 33
1.11 No. of procedures required to start a business, 2008* ..... 8
1.12 Intensity of local competition ..... 39
1.13 Freedom of the press ..... 14
1.14 Accessibility of digital content ..... 43

### Political and regulatory environment 15

2.01 Effectiveness of law-making bodies ..... 20
2.02 Laws relating to ICT ..... 27
2.03 Judicial independence ..... 10
2.04 Intellectual property protection ..... 16
2.05 Efficiency of legal framework ..... 22
2.06 Property rights ..... 11
2.07 Quality of competition in the ISP sector ..... 79
2.08 Number of procedures to enforce a contract, 2008* ..... 1
2.09 Time to enforce a contract, 2008* ..... 60

### Infrastructure environment 16

3.01 Number of telephone lines, 2007* ..... 17
3.02 Secure Internet servers, 2007* ..... 14
3.03 Electricity production, 2005* ..... 35
3.04 Availability of scientists and engineers ..... 14
3.05 Quality of scientific research institutions ..... 17
3.06 Tertiary enrollment, 2006* ..... 27
3.07 Education expenditure, 2006* ..... 33

## Readiness component 23

### Individual readiness 21

4.01 Quality of math and science education ..... 23
4.02 Quality of the educational system ..... 7
4.03 Internet access in schools ..... 44
4.04 Buyer sophistication ..... 20
4.05 Residential telephone connection charge, 2006* ..... 34
4.06 Residential monthly telephone subscription, 2006* ..... 46
4.07 High-speed monthly broadband subscription, 2006* ..... 16
4.08 Lowest cost of broadband, 2006* ..... 23
4.09 Cost of mobile telephone call, 2006* ..... 24

### Business readiness 9

5.01 Extent of staff training ..... 21
5.02 Local availability of research and training services ..... 22
5.03 Quality of management schools ..... 14
5.04 Company spending on R&D ..... 20
5.05 University-industry research collaboration ..... 16
5.06 Business telephone connection charge, 2006* ..... 31
5.07 Business monthly telephone subscription, 2006* ..... 28
5.08 Local supplier quality ..... 18
5.09 Local supplier quantity ..... 33
5.10 Computer, comm., and other services imports, 2007* ..... 1

### Government readiness 31

6.01 Government prioritization of ICT ..... 68
6.02 Gov't procurement of advanced tech products ..... 43
6.03 Importance of ICT to government vision of the future ..... 46
6.04 E-Government Readiness Index, 2008* ..... 19

## Usage component 27

### Individual usage 24

7.01 Mobile telephone subscribers, 2007* ..... 21
7.02 Personal computers, 2006* ..... 18
7.03 Broadband Internet subscribers, 2007* ..... 29
7.04 Internet users, 2007* ..... 42
7.05 Internet bandwidth, 2005* ..... 16

### Business usage 29

8.01 Prevalence of foreign technology licensing ..... 26
8.02 Firm-level technology absorption ..... 29
8.03 Capacity for innovation ..... 26
8.04 Availability of new telephone lines ..... 60
8.05 Extent of business Internet use ..... 31

### Government usage 28

9.01 Government success in ICT promotion ..... 66
9.02 Availability of government online services ..... 14
9.03 ICT use and government efficiency ..... 25
9.04 Presence of ICT in government offices ..... 26
9.05 E-Participation Index, 2008* ..... 47

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Israel

## Key indicators



## Networked Readiness Index



## Environment component 24



## Readiness component 22



## Usage component 24



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Italy

## Key indicators

Population (millions), 2007 ..... 59.4
GDP (PPP) per capita (int'l $), 2007 ..... 30,365
Internet users per 100 population, 2007 ..... 54.4
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 20.6
Mobile telephone subscribers per 100 population, 2006 ..... 135.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **45** |
| 2007–2008 (127) | 42 |
| 2006–2007 (122) | 38 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 49 |



## Environment component 53

### Market environment 75

1.01 Venture capital availability ..... 87
1.02 Financial market sophistication ..... 70
1.03 Availability of latest technologies ..... 63
1.04 State of cluster development ..... 4
1.05 Utility patents, 2007* ..... 25
1.06 High-tech exports, 2006* ..... 40
1.07 Burden of government regulation ..... 130
1.08 Extent and effect of taxation ..... 129
1.09 Total tax rate, 2007* ..... 121
1.10 Time required to start a business, 2008* ..... 25
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 104
1.13 Freedom of the press ..... 86
1.14 Accessibility of digital content ..... 70

### Political and regulatory environment 92

2.01 Effectiveness of law-making bodies ..... 107
2.02 Laws relating to ICT ..... 52
2.03 Judicial independence ..... 78
2.04 Intellectual property protection ..... 42
2.05 Efficiency of legal framework ..... 114
2.06 Property rights ..... 59
2.07 Quality of competition in the ISP sector ..... 64
2.08 Number of procedures to enforce a contract, 2008* ..... 98
2.09 Time to enforce a contract, 2008* ..... 121

### Infrastructure environment 36

3.01 Number of telephone lines, 2006* ..... 20
3.02 Secure Internet servers, 2007* ..... 37
3.03 Electricity production, 2005* ..... 46
3.04 Availability of scientists and engineers ..... 45
3.05 Quality of scientific research institutions ..... 99
3.06 Tertiary enrollment, 2006* ..... 19
3.07 Education expenditure, 2006* ..... 55

## Readiness component 54

### Individual readiness 57

4.01 Quality of math and science education ..... 69
4.02 Quality of the educational system ..... 84
4.03 Internet access in schools ..... 65
4.04 Buyer sophistication ..... 40
4.05 Residential telephone connection charge, 2006* ..... 54
4.06 Residential monthly telephone subscription, 2006* ..... 49
4.07 High-speed monthly broadband subscription, 2006* ..... 13
4.08 Lowest cost of broadband, 2006* ..... 3
4.09 Cost of mobile telephone call, 2006* ..... 53

### Business readiness 38

5.01 Extent of staff training ..... 109
5.02 Local availability of research and training services ..... 35
5.03 Quality of management schools ..... 61
5.04 Company spending on R&D ..... 51
5.05 University-industry research collaboration ..... 77
5.06 Business telephone connection charge, 2006* ..... 48
5.07 Business monthly telephone subscription, 2006* ..... 47
5.08 Local supplier quality ..... 26
5.09 Local supplier quantity ..... 27
5.10 Computer, comm., and other services imports, 2007* ..... 12

### Government readiness 83

6.01 Government prioritization of ICT ..... 125
6.02 Gov't procurement of advanced tech products ..... 117
6.03 Importance of ICT to government vision of the future ..... 109
6.04 E-Government Readiness Index, 2008* ..... 27

## Usage component 37

### Individual usage 26

7.01 Mobile telephone subscribers, 2006* ..... 7
7.02 Personal computers, 2005* ..... 28
7.03 Broadband Internet subscribers, 2007* ..... 26
7.04 Internet users, 2007* ..... 24
7.05 Internet bandwidth, 2006* ..... 34

### Business usage 56

8.01 Prevalence of foreign technology licensing ..... 51
8.02 Firm-level technology absorption ..... 76
8.03 Capacity for innovation ..... 22
8.04 Availability of new telephone lines ..... 83
8.05 Extent of business Internet use ..... 83

### Government usage 68

9.01 Government success in ICT promotion ..... 113
9.02 Availability of government online services ..... 68
9.03 ICT use and government efficiency ..... 30
9.04 Presence of ICT in government offices ..... 84
9.05 E-Participation Index, 2008* ..... 53

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Jamaica

## Key indicators

Population (millions), 2007 ..... 2.7
GDP (PPP) per capita (int'l $), 2007 ..... 7,688
Internet users per 100 population, 2007 ..... 55.3
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 191.6
Mobile telephone subscribers per 100 population, 2006 ..... 93.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **53** |
| 2007–2008 (127) | 46 |
| 2006–2007 (122) | 45 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 86 |

## Environment component 65

### Market environment 65

1.01 Venture capital availability ..... 104
1.02 Financial market sophistication ..... 40
1.03 Availability of latest technologies ..... 44
1.04 State of cluster development ..... 94
1.05 Utility patents, 2007* ..... 63
1.06 High-tech exports, 2006* ..... 112
1.07 Burden of government regulation ..... 120
1.08 Extent and effect of taxation ..... 121
1.09 Total tax rate, 2007* ..... 96
1.10 Time required to start a business, 2008* ..... 20
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 51
1.13 Freedom of the press ..... 37
1.14 Accessibility of digital content ..... 52

### Political and regulatory environment 55

2.01 Effectiveness of law-making bodies ..... 72
2.02 Laws relating to ICT ..... 68
2.03 Judicial independence ..... 51
2.04 Intellectual property protection ..... 67
2.05 Efficiency of legal framework ..... 85
2.06 Property rights ..... 53
2.07 Quality of competition in the ISP sector ..... 47
2.08 Number of procedures to enforce a contract, 2008* ..... 48
2.09 Time to enforce a contract, 2008* ..... 92

### Infrastructure environment 75

3.01 Number of telephone lines, 2006* ..... 83
3.02 Secure Internet servers, 2007* ..... 54
3.03 Electricity production, 2005* ..... 64
3.04 Availability of scientists and engineers ..... 97
3.05 Quality of scientific research institutions ..... 38
3.06 Tertiary enrollment, 2003* ..... 84
3.07 Education expenditure, 2006* ..... 51

## Readiness component 72

### Individual readiness 71

4.01 Quality of math and science education ..... 115
4.02 Quality of the educational system ..... 99
4.03 Internet access in schools ..... 82
4.04 Buyer sophistication ..... 66
4.05 Residential telephone connection charge, 2006* ..... 30
4.06 Residential monthly telephone subscription, 2006* ..... 87
4.07 High-speed monthly broadband subscription, 2006* ..... 59
4.08 Lowest cost of broadband, 2006* ..... 67
4.09 Cost of mobile telephone call, 2006* ..... 67

### Business readiness 65

5.01 Extent of staff training ..... 85
5.02 Local availability of research and training services ..... 57
5.03 Quality of management schools ..... 64
5.04 Company spending on R&D ..... 58
5.05 University-industry research collaboration ..... 55
5.06 Business telephone connection charge, 2006* ..... 35
5.07 Business monthly telephone subscription, 2005* ..... 108
5.08 Local supplier quality ..... 79
5.09 Local supplier quantity ..... 99
5.10 Computer, comm., and other services imports, 2006* ..... 52

### Government readiness 69

6.01 Government prioritization of ICT ..... 55
6.02 Gov't procurement of advanced tech products ..... 102
6.03 Importance of ICT to government vision of the future ..... 63
6.04 E-Government Readiness Index, 2008* ..... 77

## Usage component 39

### Individual usage 29

7.01 Mobile telephone subscribers, 2006* ..... 47
7.02 Personal computers, 2005* ..... 71
7.03 Broadband Internet subscribers, 2006* ..... 59
7.04 Internet users, 2007* ..... 22
7.05 Internet bandwidth, 2006* ..... 4

### Business usage 63

8.01 Prevalence of foreign technology licensing ..... 63
8.02 Firm-level technology absorption ..... 59
8.03 Capacity for innovation ..... 81
8.04 Availability of new telephone lines ..... 81
8.05 Extent of business Internet use ..... 40

### Government usage 57

9.01 Government success in ICT promotion ..... 60
9.02 Availability of government online services ..... 45
9.03 ICT use and government efficiency ..... 52
9.04 Presence of ICT in government offices ..... 61
9.05 E-Participation Index, 2008* ..... 77

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Japan

## Key indicators

Population (millions), 2007 ..... 127.8
GDP (PPP) per capita (int'l $), 2007 ..... 33,596
Internet users per 100 population, 2007 ..... 68.9
Internet bandwidth (mB/s) per 10,000 population ..... n/a
Mobile telephone subscribers per 100 population, 2007 ..... 83.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **17** |
| 2007–2008 (127) | 19 |
| 2006–2007 (122) | 14 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 9 |



## Environment component 20

### Market environment 12

1.01 Venture capital availability ..... 48
1.02 Financial market sophistication ..... 48
1.03 Availability of latest technologies ..... 13
1.04 State of cluster development ..... 5
1.05 Utility patents, 2007* ..... 3
1.06 High-tech exports, 2006* ..... 14
1.07 Burden of government regulation ..... 9
1.08 Extent and effect of taxation ..... 93
1.09 Total tax rate, 2007* ..... 102
1.10 Time required to start a business, 2008* ..... 66
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 9
1.13 Freedom of the press ..... 35
1.14 Accessibility of digital content ..... 17

### Political and regulatory environment 18

2.01 Effectiveness of law-making bodies ..... 24
2.02 Laws relating to ICT ..... 32
2.03 Judicial independence ..... 25
2.04 Intellectual property protection ..... 14
2.05 Efficiency of legal framework ..... 17
2.06 Property rights ..... 15
2.07 Quality of competition in the ISP sector ..... 4
2.08 Number of procedures to enforce a contract, 2008* ..... 14
2.09 Time to enforce a contract, 2008* ..... 20

### Infrastructure environment 20

3.01 Number of telephone lines, 2007* ..... 32
3.02 Secure Internet servers, 2007* ..... 19
3.03 Electricity production, 2005* ..... 17
3.04 Availability of scientists and engineers ..... 2
3.05 Quality of scientific research institutions ..... 15
3.06 Tertiary enrollment, 2006* ..... 29
3.07 Education expenditure, 2006* ..... 96

## Readiness component 20

### Individual readiness 31

4.01 Quality of math and science education ..... 33
4.02 Quality of the educational system ..... 31
4.03 Internet access in schools ..... 25
4.04 Buyer sophistication ..... 2
4.05 Residential telephone connection charge, 2006* ..... 67
4.06 Residential monthly telephone subscription, 2006* ..... 27
4.07 High-speed monthly broadband subscription, 2006* ..... 6
4.08 Lowest cost of broadband, 2006* ..... 1
4.09 Cost of mobile telephone call* ..... n/a

### Business readiness 11

5.01 Extent of staff training ..... 5
5.02 Local availability of research and training services ..... 12
5.03 Quality of management schools ..... 82
5.04 Company spending on R&D ..... 2
5.05 University-industry research collaboration ..... 21
5.06 Business telephone connection charge, 2006* ..... 62
5.07 Business monthly telephone subscription, 2006* ..... 33
5.08 Local supplier quality ..... 4
5.09 Local supplier quantity ..... 1
5.10 Computer, comm., and other services imports, 2007* ..... 20

### Government readiness 25

6.01 Government prioritization of ICT ..... 41
6.02 Gov't procurement of advanced tech products ..... 42
6.03 Importance of ICT to government vision of the future ..... 31
6.04 E-Government Readiness Index, 2008* ..... 11

## Usage component 18

### Individual usage 13

7.01 Mobile telephone subscribers, 2007* ..... 60
7.02 Personal computers, 2006* ..... 10
7.03 Broadband Internet subscribers, 2007* ..... 18
7.04 Internet users, 2007* ..... 10
7.05 Internet bandwidth* ..... n/a

### Business usage 4

8.01 Prevalence of foreign technology licensing ..... 7
8.02 Firm-level technology absorption ..... 2
8.03 Capacity for innovation ..... 2
8.04 Availability of new telephone lines ..... 11
8.05 Extent of business Internet use ..... 11

### Government usage 34

9.01 Government success in ICT promotion ..... 59
9.02 Availability of government online services ..... 51
9.03 ICT use and government efficiency ..... 78
9.04 Presence of ICT in government offices ..... 35
9.05 E-Participation Index, 2008* ..... 11

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Jordan

## Key indicators

Population (millions), 2007 ..... 5.7
GDP (PPP) per capita (int'l $), 2007 ..... 4,906
Internet users per 100 population, 2007 ..... 19.0
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.5
Mobile telephone subscribers per 100 population, 2007 ..... 80.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **44** |
| 2007–2008 (127) | 47 |
| 2006–2007 (122) | 57 |

Global Competitiveness Index 2008–2009 (134) 48



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Kazakhstan

## Key indicators

Population (millions), 2007 ..... 15.5
GDP (PPP) per capita (int'l $), 2007 ..... 10,837
Internet users per 100 population, 2007 ..... 12.3
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 1.3
Mobile telephone subscribers per 100 population, 2007 ..... 81.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **73** |
| 2007–2008 (127) | 71 |
| 2006–2007 (122) | 73 |

Global Competitiveness Index 2008–2009 (134) 66



### Environment component 63

#### Market environment 85

1.01 Venture capital availability ..... 55
1.02 Financial market sophistication ..... 86
1.03 Availability of latest technologies ..... 93
1.04 State of cluster development ..... 80
1.05 Utility patents, 2007* ..... 74
1.06 High-tech exports, 2006* ..... 63
1.07 Burden of government regulation ..... 79
1.08 Extent and effect of taxation ..... 83
1.09 Total tax rate, 2007* ..... 50
1.10 Time required to start a business, 2008* ..... 63
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 97
1.13 Freedom of the press ..... 119
1.14 Accessibility of digital content ..... 72

#### Political and regulatory environment 70

2.01 Effectiveness of law-making bodies ..... 48
2.02 Laws relating to ICT ..... 57
2.03 Judicial independence ..... 102
2.04 Intellectual property protection ..... 75
2.05 Efficiency of legal framework ..... 67
2.06 Property rights ..... 95
2.07 Quality of competition in the ISP sector ..... 113
2.08 Number of procedures to enforce a contract, 2008* ..... 67
2.09 Time to enforce a contract, 2008* ..... 6

#### Infrastructure environment 54

3.01 Number of telephone lines, 2007* ..... 62
3.02 Secure Internet servers, 2007* ..... 97
3.03 Electricity production, 2005* ..... 49
3.04 Availability of scientists and engineers ..... 83
3.05 Quality of scientific research institutions ..... 58
3.06 Tertiary enrollment, 2006* ..... 35
3.07 Education expenditure, 2006* ..... 58

### Readiness component 75

#### Individual readiness 94

4.01 Quality of math and science education ..... 80
4.02 Quality of the educational system ..... 68
4.03 Internet access in schools ..... 54
4.04 Buyer sophistication ..... 75
4.05 Residential telephone connection charge, 2007* ..... 83
4.06 Residential monthly telephone subscription, 2007* ..... 11
4.07 High-speed monthly broadband subscription, 2006* ..... 102
4.08 Lowest cost of broadband, 2006* ..... 98
4.09 Cost of mobile telephone call, 2007* ..... 55

#### Business readiness 54

5.01 Extent of staff training ..... 92
5.02 Local availability of research and training services ..... 82
5.03 Quality of management schools ..... 98
5.04 Company spending on R&D ..... 62
5.05 University-industry research collaboration ..... 64
5.06 Business telephone connection charge, 2007* ..... 83
5.07 Business monthly telephone subscription, 2007* ..... 52
5.08 Local supplier quality ..... 98
5.09 Local supplier quantity ..... 103
5.10 Computer, comm., and other services imports, 2007* ..... 5

#### Government readiness 55

6.01 Government prioritization of ICT ..... 66
6.02 Gov't procurement of advanced tech products ..... 59
6.03 Importance of ICT to government vision of the future ..... 43
6.04 E-Government Readiness Index, 2008* ..... 73

### Usage component 78

#### Individual usage 68

7.01 Mobile telephone subscribers, 2007* ..... 63
7.02 Personal computers* ..... n/a
7.03 Broadband Internet subscribers, 2007* ..... 64
7.04 Internet users, 2007* ..... 84
7.05 Internet bandwidth, 2007* ..... 73

#### Business usage 92

8.01 Prevalence of foreign technology licensing ..... 101
8.02 Firm-level technology absorption ..... 85
8.03 Capacity for innovation ..... 50
8.04 Availability of new telephone lines ..... 99
8.05 Extent of business Internet use ..... 87

#### Government usage 66

9.01 Government success in ICT promotion ..... 56
9.02 Availability of government online services ..... 56
9.03 ICT use and government efficiency ..... 65
9.04 Presence of ICT in government offices ..... 68
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Korea, Rep.

## Key indicators

Population (millions), 2007 ..... 48.5
GDP (PPP) per capita (int'l $), 2007 ..... 24,803
Internet users per 100 population, 2007 ..... 73.8
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 10.3
Mobile telephone subscribers per 100 population, 2007 ..... 90.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **11** |
| 2007–2008 (127) | 9 |
| 2006–2007 (122) | 19 |

Global Competitiveness Index 2008–2009 (134) 13



### Environment component 17

**Market environment 14**

1.01 Venture capital availability ..... 16
1.02 Financial market sophistication ..... 35
1.03 Availability of latest technologies ..... 22
1.04 State of cluster development ..... 8
1.05 Utility patents, 2007* ..... 7
1.06 High-tech exports, 2006* ..... 8
1.07 Burden of government regulation ..... 24
1.08 Extent and effect of taxation ..... 31
1.09 Total tax rate, 2007* ..... 35
1.10 Time required to start a business, 2008* ..... 50
1.11 No. of procedures required to start a business, 2008* ..... 86
1.12 Intensity of local competition ..... 49
1.13 Freedom of the press ..... 53
1.14 Accessibility of digital content ..... 6

**Political and regulatory environment 23**

2.01 Effectiveness of law-making bodies ..... 49
2.02 Laws relating to ICT ..... 2
2.03 Judicial independence ..... 45
2.04 Intellectual property protection ..... 26
2.05 Efficiency of legal framework ..... 38
2.06 Property rights ..... 39
2.07 Quality of competition in the ISP sector ..... 3
2.08 Number of procedures to enforce a contract, 2008* ..... 48
2.09 Time to enforce a contract, 2008* ..... 6

**Infrastructure environment 13**

3.01 Number of telephone lines, 2007* ..... 16
3.02 Secure Internet servers, 2007* ..... 16
3.03 Electricity production, 2005* ..... 19
3.04 Availability of scientists and engineers ..... 19
3.05 Quality of scientific research institutions ..... 14
3.06 Tertiary enrollment, 2006* ..... 3
3.07 Education expenditure, 2006* ..... 71

### Readiness component 7

**Individual readiness 11**

4.01 Quality of math and science education ..... 11
4.02 Quality of the educational system ..... 29
4.03 Internet access in schools ..... 5
4.04 Buyer sophistication ..... 10
4.05 Residential telephone connection charge, 2007* ..... 36
4.06 Residential monthly telephone subscription, 2007* ..... 15
4.07 High-speed monthly broadband subscription, 2006* ..... 28
4.08 Lowest cost of broadband, 2006* ..... 3
4.09 Cost of mobile telephone call, 2005* ..... 21

**Business readiness 16**

5.01 Extent of staff training ..... 10
5.02 Local availability of research and training services ..... 20
5.03 Quality of management schools ..... 30
5.04 Company spending on R&D ..... 7
5.05 University-industry research collaboration ..... 12
5.06 Business telephone connection charge, 2007* ..... 33
5.07 Business monthly telephone subscription, 2007* ..... 9
5.08 Local supplier quality ..... 29
5.09 Local supplier quantity ..... 23
5.10 Computer, comm., and other services imports, 2007* ..... 37

**Government readiness 4**

6.01 Government prioritization of ICT ..... 13
6.02 Gov't procurement of advanced tech products ..... 2
6.03 Importance of ICT to government vision of the future ..... 5
6.04 E-Government Readiness Index, 2008* ..... 6

### Usage component 10

**Individual usage 20**

7.01 Mobile telephone subscribers, 2007* ..... 49
7.02 Personal computers, 2006* ..... 19
7.03 Broadband Internet subscribers, 2007* ..... 8
7.04 Internet users, 2007* ..... 7
7.05 Internet bandwidth, 2007* ..... 40

**Business usage 16**

8.01 Prevalence of foreign technology licensing ..... 23
8.02 Firm-level technology absorption ..... 15
8.03 Capacity for innovation ..... 9
8.04 Availability of new telephone lines ..... 61
8.05 Extent of business Internet use ..... 3

**Government usage 4**

9.01 Government success in ICT promotion ..... 9
9.02 Availability of government online services ..... 17
9.03 ICT use and government efficiency ..... 6
9.04 Presence of ICT in government offices ..... 6
9.05 E-Participation Index, 2008* ..... 2

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Kuwait

## Key indicators

Population (millions), 2007 ..... 2.7
GDP (PPP) per capita (int'l $), 2007 ..... 39,344
Internet users per 100 population, 2007 ..... 31.6
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 3.3
Mobile telephone subscribers per 100 population, 2007 ..... 97.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **57** |
| 2007–2008 (127) | 52 |
| 2006–2007 (122) | 54 |

Global Competitiveness Index 2008–2009 (134) 35

## Environment component 44

### Market environment 34

1.01 Venture capital availability ..... 36
1.02 Financial market sophistication ..... 50
1.03 Availability of latest technologies ..... 38
1.04 State of cluster development ..... 42
1.05 Utility patents, 2007* ..... 37
1.06 High-tech exports* ..... n/a
1.07 Burden of government regulation ..... 113
1.08 Extent and effect of taxation ..... 6
1.09 Total tax rate, 2007* ..... 2
1.10 Time required to start a business, 2008* ..... 93
1.11 No. of procedures required to start a business, 2008* ..... 112
1.12 Intensity of local competition ..... 54
1.13 Freedom of the press ..... 59
1.14 Accessibility of digital content ..... 75

### Political and regulatory environment 58

2.01 Effectiveness of law-making bodies ..... 60
2.02 Laws relating to ICT ..... 99
2.03 Judicial independence ..... 36
2.04 Intellectual property protection ..... 62
2.05 Efficiency of legal framework ..... 36
2.06 Property rights ..... 27
2.07 Quality of competition in the ISP sector ..... 65
2.08 Number of procedures to enforce a contract, 2008* ..... 125
2.09 Time to enforce a contract, 2008* ..... 70

### Infrastructure environment 45

3.01 Number of telephone lines, 2006* ..... 67
3.02 Secure Internet servers, 2007* ..... 44
3.03 Electricity production, 2005* ..... 6
3.04 Availability of scientists and engineers ..... 62
3.05 Quality of scientific research institutions ..... 54
3.06 Tertiary enrollment, 2006* ..... 87
3.07 Education expenditure, 2006* ..... 68

## Readiness component 66

### Individual readiness 62

4.01 Quality of math and science education ..... 93
4.02 Quality of the educational system ..... 94
4.03 Internet access in schools ..... 64
4.04 Buyer sophistication ..... 68
4.05 Residential telephone connection charge, 2006* ..... 40
4.06 Residential monthly telephone subscription, 2006* ..... 14
4.07 High-speed monthly broadband subscription, 2006* ..... 49
4.08 Lowest cost of broadband, 2006* ..... 49
4.09 Cost of mobile telephone call, 2006* ..... 14

### Business readiness 64

5.01 Extent of staff training ..... 57
5.02 Local availability of research and training services ..... 64
5.03 Quality of management schools ..... 89
5.04 Company spending on R&D ..... 93
5.05 University-industry research collaboration ..... 73
5.06 Business telephone connection charge, 2006* ..... 58
5.07 Business monthly telephone subscription, 2006* ..... 35
5.08 Local supplier quality ..... 30
5.09 Local supplier quantity ..... 9
5.10 Computer, comm., and other services imports, 2006* ..... 119

### Government readiness 80

6.01 Government prioritization of ICT ..... 96
6.02 Gov't procurement of advanced tech products ..... 98
6.03 Importance of ICT to government vision of the future ..... 102
6.04 E-Government Readiness Index, 2008* ..... 55

## Usage component 65

### Individual usage 51

7.01 Mobile telephone subscribers, 2007* ..... 43
7.02 Personal computers, 2005* ..... 37
7.03 Broadband Internet subscribers, 2005* ..... 83
7.04 Internet users, 2007* ..... 50
7.05 Internet bandwidth, 2005* ..... 61

### Business usage 54

8.01 Prevalence of foreign technology licensing ..... 41
8.02 Firm-level technology absorption ..... 28
8.03 Capacity for innovation ..... 94
8.04 Availability of new telephone lines ..... 70
8.05 Extent of business Internet use ..... 63

### Government usage 97

9.01 Government success in ICT promotion ..... 93
9.02 Availability of government online services ..... 97
9.03 ICT use and government efficiency ..... 93
9.04 Presence of ICT in government offices ..... 81
9.05 E-Participation Index, 2008* ..... 95

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Kenya

## Key indicators

Population (millions), 2007 ..... 37.5
GDP (PPP) per capita (int'l $), 2007 ..... 1,673
Internet users per 100 population, 2007 ..... 8.0
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 30.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **97** |
| 2007–2008 (127) | 92 |
| 2006–2007 (122) | 95 |

Global Competitiveness Index 2008–2009 (134) 93



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Kyrgyz Republic

## Key indicators

Population (millions), 2007 ..... 5.2
GDP (PPP) per capita (int'l $), 2007 ..... 2,000
Internet users per 100 population, 2007 ..... 14.1
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 1.1
Mobile telephone subscribers per 100 population, 2007 ..... 40.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **115** |
| 2007–2008 (127) | 114 |
| 2006–2007 (122) | 105 |

Global Competitiveness Index 2008–2009 (134) 122



### Environment component 105

**Market environment 115**

1.01 Venture capital availability ..... 98
1.02 Financial market sophistication ..... 115
1.03 Availability of latest technologies ..... 124
1.04 State of cluster development ..... 121
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 79
1.07 Burden of government regulation ..... 100
1.08 Extent and effect of taxation ..... 107
1.09 Total tax rate, 2007* ..... 112
1.10 Time required to start a business, 2008* ..... 41
1.11 No. of procedures required to start a business, 2008* ..... 8
1.12 Intensity of local competition ..... 123
1.13 Freedom of the press ..... 118
1.14 Accessibility of digital content ..... 92

**Political and regulatory environment 106**

2.01 Effectiveness of law-making bodies ..... 97
2.02 Laws relating to ICT ..... 115
2.03 Judicial independence ..... 122
2.04 Intellectual property protection ..... 111
2.05 Efficiency of legal framework ..... 118
2.06 Property rights ..... 124
2.07 Quality of competition in the ISP sector ..... 90
2.08 Number of procedures to enforce a contract, 2008* ..... 78
2.09 Time to enforce a contract, 2008* ..... 2

**Infrastructure environment 90**

3.01 Number of telephone lines, 2007* ..... 95
3.02 Secure Internet servers, 2007* ..... 101
3.03 Electricity production, 2005* ..... 62
3.04 Availability of scientists and engineers ..... 116
3.05 Quality of scientific research institutions ..... 123
3.06 Tertiary enrollment, 2006* ..... 51
3.07 Education expenditure, 2006* ..... 61

### Readiness component 115

**Individual readiness 105**

4.01 Quality of math and science education ..... 84
4.02 Quality of the educational system ..... 74
4.03 Internet access in schools ..... 73
4.04 Buyer sophistication ..... 103
4.05 Residential telephone connection charge, 2006* ..... 122
4.06 Residential monthly telephone subscription, 2006* ..... 94
4.07 High-speed monthly broadband subscription, 2006* ..... 94
4.08 Lowest cost of broadband, 2006* ..... 108
4.09 Cost of mobile telephone call, 2006* ..... 112

**Business readiness 128**

5.01 Extent of staff training ..... 102
5.02 Local availability of research and training services ..... 128
5.03 Quality of management schools ..... 111
5.04 Company spending on R&D ..... 118
5.05 University-industry research collaboration ..... 120
5.06 Business telephone connection charge, 2006* ..... 121
5.07 Business monthly telephone subscription, 2006* ..... 109
5.08 Local supplier quality ..... 125
5.09 Local supplier quantity ..... 125
5.10 Computer, comm., and other services imports, 2007* ..... 76

**Government readiness 124**

6.01 Government prioritization of ICT ..... 123
6.02 Gov't procurement of advanced tech products ..... 127
6.03 Importance of ICT to government vision of the future ..... 128
6.04 E-Government Readiness Index, 2008* ..... 90

### Usage component 122

**Individual usage 99**

7.01 Mobile telephone subscribers, 2007* ..... 95
7.02 Personal computers, 2005* ..... 105
7.03 Broadband Internet subscribers, 2007* ..... 106
7.04 Internet users, 2007* ..... 82
7.05 Internet bandwidth, 2007* ..... 77

**Business usage 123**

8.01 Prevalence of foreign technology licensing ..... 130
8.02 Firm-level technology absorption ..... 121
8.03 Capacity for innovation ..... 90
8.04 Availability of new telephone lines ..... 121
8.05 Extent of business Internet use ..... 101

**Government usage 126**

9.01 Government success in ICT promotion ..... 123
9.02 Availability of government online services ..... 119
9.03 ICT use and government efficiency ..... 131
9.04 Presence of ICT in government offices ..... 124
9.05 E-Participation Index, 2008* ..... 70

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Latvia

## Key indicators

Population (millions), 2007 ..... 2.3
GDP (PPP) per capita (int'l $), 2007 ..... 17,488
Internet users per 100 population, 2007 ..... 51.7
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 35.4
Mobile telephone subscribers per 100 population, 2007 ..... 97.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **48** |
| 2007–2008 (127) | 44 |
| 2006–2007 (122) | 42 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 54 |

## Environment component 47

### Market environment 49

1.01 Venture capital availability ..... 57
1.02 Financial market sophistication ..... 55
1.03 Availability of latest technologies ..... 66
1.04 State of cluster development ..... 112
1.05 Utility patents, 2007* ..... 60
1.06 High-tech exports, 2006* ..... 50
1.07 Burden of government regulation ..... 76
1.08 Extent and effect of taxation ..... 69
1.09 Total tax rate, 2007* ..... 33
1.10 Time required to start a business, 2008* ..... 45
1.11 No. of procedures required to start a business, 2008* ..... 16
1.12 Intensity of local competition ..... 63
1.13 Freedom of the press ..... 58
1.14 Accessibility of digital content ..... 50

### Political and regulatory environment 46

2.01 Effectiveness of law-making bodies ..... 86
2.02 Laws relating to ICT ..... 63
2.03 Judicial independence ..... 71
2.04 Intellectual property protection ..... 61
2.05 Efficiency of legal framework ..... 79
2.06 Property rights ..... 45
2.07 Quality of competition in the ISP sector ..... 49
2.08 Number of procedures to enforce a contract, 2008* ..... 9
2.09 Time to enforce a contract, 2008* ..... 11

### Infrastructure environment 47

3.01 Number of telephone lines, 2007* ..... 46
3.02 Secure Internet servers, 2007* ..... 38
3.03 Electricity production, 2005* ..... 74
3.04 Availability of scientists and engineers ..... 112
3.05 Quality of scientific research institutions ..... 88
3.06 Tertiary enrollment, 2006* ..... 12
3.07 Education expenditure, 2006* ..... 25

## Readiness component 59

### Individual readiness 55

4.01 Quality of math and science education ..... 57
4.02 Quality of the educational system ..... 63
4.03 Internet access in schools ..... 32
4.04 Buyer sophistication ..... 80
4.05 Residential telephone connection charge, 2006* ..... 59
4.06 Residential monthly telephone subscription, 2006* ..... 55
4.07 High-speed monthly broadband subscription, 2006* ..... 73
4.08 Lowest cost of broadband, 2006* ..... 69
4.09 Cost of mobile telephone call, 2006* ..... 88

### Business readiness 60

5.01 Extent of staff training ..... 62
5.02 Local availability of research and training services ..... 75
5.03 Quality of management schools ..... 50
5.04 Company spending on R&D ..... 72
5.05 University-industry research collaboration ..... 83
5.06 Business telephone connection charge, 2006* ..... 72
5.07 Business monthly telephone subscription, 2006* ..... 62
5.08 Local supplier quality ..... 67
5.09 Local supplier quantity ..... 107
5.10 Computer, comm., and other services imports, 2007* ..... 48

### Government readiness 76

6.01 Government prioritization of ICT ..... 94
6.02 Gov't procurement of advanced tech products ..... 100
6.03 Importance of ICT to government vision of the future ..... 110
6.04 E-Government Readiness Index, 2008* ..... 36

## Usage component 46

### Individual usage 39

7.01 Mobile telephone subscribers, 2007* ..... 42
7.02 Personal computers, 2006* ..... 30
7.03 Broadband Internet subscribers, 2007* ..... 45
7.04 Internet users, 2007* ..... 27
7.05 Internet bandwidth, 2007* ..... 22

### Business usage 62

8.01 Prevalence of foreign technology licensing ..... 70
8.02 Firm-level technology absorption ..... 81
8.03 Capacity for innovation ..... 71
8.04 Availability of new telephone lines ..... 51
8.05 Extent of business Internet use ..... 45

### Government usage 74

9.01 Government success in ICT promotion ..... 109
9.02 Availability of government online services ..... 86
9.03 ICT use and government efficiency ..... 96
9.04 Presence of ICT in government offices ..... 44
9.05 E-Participation Index, 2008* ..... 53

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Lesotho

## Key indicators

Population (millions), 2007 ..... 2.0
GDP (PPP) per capita (int'l $), 2007 ..... 1,286
Internet users per 100 population, 2007 ..... 3.5
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 22.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **118** |
| 2007–2008 (127) | 122 |
| 2006–2007 (122) | 116 |

Global Competitiveness Index 2008–2009 (134) 123



### Environment component 100

**Market environment 100**

1.01 Venture capital availability ..... 91
1.02 Financial market sophistication ..... 110
1.03 Availability of latest technologies ..... 111
1.04 State of cluster development ..... 98
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports* ..... n/a
1.07 Burden of government regulation ..... 73
1.08 Extent and effect of taxation ..... 102
1.09 Total tax rate, 2007* ..... 8
1.10 Time required to start a business, 2008* ..... 100
1.11 No. of procedures required to start a business, 2008* ..... 46
1.12 Intensity of local competition ..... 120
1.13 Freedom of the press ..... 128
1.14 Accessibility of digital content ..... 133

**Political and regulatory environment 110**

2.01 Effectiveness of law-making bodies ..... 100
2.02 Laws relating to ICT ..... 98
2.03 Judicial independence ..... 95
2.04 Intellectual property protection ..... 86
2.05 Efficiency of legal framework ..... 105
2.06 Property rights ..... 120
2.07 Quality of competition in the ISP sector ..... 105
2.08 Number of procedures to enforce a contract, 2008* ..... 98
2.09 Time to enforce a contract, 2008* ..... 96

**Infrastructure environment 89**

3.01 Number of telephone lines, 2006* ..... 110
3.02 Secure Internet servers, 2007* ..... 110
3.03 Electricity production, 2005* ..... 116
3.04 Availability of scientists and engineers ..... 96
3.05 Quality of scientific research institutions ..... 117
3.06 Tertiary enrollment, 2006* ..... 116
3.07 Education expenditure, 2006* ..... 1

### Readiness component 119

**Individual readiness 114**

4.01 Quality of math and science education ..... 106
4.02 Quality of the educational system ..... 79
4.03 Internet access in schools ..... 106
4.04 Buyer sophistication ..... 89
4.05 Residential telephone connection charge, 2007* ..... 111
4.06 Residential monthly telephone subscription, 2007* ..... 126
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband* ..... n/a
4.09 Cost of mobile telephone call, 2005* ..... 110

**Business readiness 126**

5.01 Extent of staff training ..... 75
5.02 Local availability of research and training services ..... 109
5.03 Quality of management schools ..... 112
5.04 Company spending on R&D ..... 56
5.05 University-industry research collaboration ..... 98
5.06 Business telephone connection charge, 2007* ..... 108
5.07 Business monthly telephone subscription, 2007* ..... 125
5.08 Local supplier quality ..... 127
5.09 Local supplier quantity ..... 134
5.10 Computer, comm., and other services imports, 2006* ..... 118

**Government readiness 113**

6.01 Government prioritization of ICT ..... 118
6.02 Gov't procurement of advanced tech products ..... 81
6.03 Importance of ICT to government vision of the future ..... 123
6.04 E-Government Readiness Index, 2008* ..... 95

### Usage component 121

**Individual usage 118**

7.01 Mobile telephone subscribers, 2007* ..... 114
7.02 Personal computers, 2005* ..... 126
7.03 Broadband Internet subscribers, 2005* ..... 124
7.04 Internet users, 2007* ..... 114
7.05 Internet bandwidth, 2005* ..... 122

**Business usage 117**

8.01 Prevalence of foreign technology licensing ..... 117
8.02 Firm-level technology absorption ..... 118
8.03 Capacity for innovation ..... 69
8.04 Availability of new telephone lines ..... 122
8.05 Extent of business Internet use ..... 112

**Government usage 115**

9.01 Government success in ICT promotion ..... 115
9.02 Availability of government online services ..... 104
9.03 ICT use and government efficiency ..... 110
9.04 Presence of ICT in government offices ..... 121
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Libya

## Key indicators

Population (millions), 2007 ..... 6.2
GDP (PPP) per capita (int'l $), 2007 ..... 13,593
Internet users per 100 population, 2006 ..... 4.4
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 73.0

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **101** |
| 2007–2008 (127) | 105 |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 91 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Lithuania

## Key indicators

Population (millions), 2007 ..... 3.4
GDP (PPP) per capita (int'l $), 2007 ..... 17,733
Internet users per 100 population, 2007 ..... 39.3
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 46.4
Mobile telephone subscribers per 100 population, 2007 ..... 144.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **35** |
| 2007–2008 (127) | 33 |
| 2006–2007 (122) | 39 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 44 |



## Environment component 40

### Market environment 48

1.01 Venture capital availability ..... 52
1.02 Financial market sophistication ..... 66
1.03 Availability of latest technologies ..... 51
1.04 State of cluster development ..... 76
1.05 Utility patents, 2007* ..... 43
1.06 High-tech exports, 2006* ..... 45
1.07 Burden of government regulation ..... 48
1.08 Extent and effect of taxation ..... 63
1.09 Total tax rate, 2007* ..... 81
1.10 Time required to start a business, 2008* ..... 71
1.11 No. of procedures required to start a business, 2008* ..... 46
1.12 Intensity of local competition ..... 37
1.13 Freedom of the press ..... 42
1.14 Accessibility of digital content ..... 40

### Political and regulatory environment 41

2.01 Effectiveness of law-making bodies ..... 88
2.02 Laws relating to ICT ..... 41
2.03 Judicial independence ..... 67
2.04 Intellectual property protection ..... 47
2.05 Efficiency of legal framework ..... 73
2.06 Property rights ..... 50
2.07 Quality of competition in the ISP sector ..... 32
2.08 Number of procedures to enforce a contract, 2008* ..... 14
2.09 Time to enforce a contract, 2008* ..... 3

### Infrastructure environment 39

3.01 Number of telephone lines, 2007* ..... 58
3.02 Secure Internet servers, 2007* ..... 43
3.03 Electricity production, 2005* ..... 51
3.04 Availability of scientists and engineers ..... 65
3.05 Quality of scientific research institutions ..... 46
3.06 Tertiary enrollment, 2006* ..... 11
3.07 Education expenditure, 2006* ..... 37

## Readiness component 44

### Individual readiness 36

4.01 Quality of math and science education ..... 22
4.02 Quality of the educational system ..... 64
4.03 Internet access in schools ..... 39
4.04 Buyer sophistication ..... 67
4.05 Residential telephone connection charge, 2006* ..... 69
4.06 Residential monthly telephone subscription, 2006* ..... 64
4.07 High-speed monthly broadband subscription, 2006* ..... 34
4.08 Lowest cost of broadband, 2006* ..... 27
4.09 Cost of mobile telephone call, 2006* ..... 49

### Business readiness 51

5.01 Extent of staff training ..... 38
5.02 Local availability of research and training services ..... 56
5.03 Quality of management schools ..... 52
5.04 Company spending on R&D ..... 48
5.05 University-industry research collaboration ..... 53
5.06 Business telephone connection charge, 2006* ..... 64
5.07 Business monthly telephone subscription, 2006* ..... 51
5.08 Local supplier quality ..... 36
5.09 Local supplier quantity ..... 29
5.10 Computer, comm., and other services imports, 2006* ..... 99

### Government readiness 49

6.01 Government prioritization of ICT ..... 65
6.02 Gov't procurement of advanced tech products ..... 83
6.03 Importance of ICT to government vision of the future ..... 74
6.04 E-Government Readiness Index, 2008* ..... 28

## Usage component 32

### Individual usage 32

7.01 Mobile telephone subscribers, 2007* ..... 6
7.02 Personal computers, 2006* ..... 42
7.03 Broadband Internet subscribers, 2007* ..... 34
7.04 Internet users, 2007* ..... 43
7.05 Internet bandwidth, 2007* ..... 19

### Business usage 47

8.01 Prevalence of foreign technology licensing ..... 68
8.02 Firm-level technology absorption ..... 58
8.03 Capacity for innovation ..... 52
8.04 Availability of new telephone lines ..... 42
8.05 Extent of business Internet use ..... 33

### Government usage 30

9.01 Government success in ICT promotion ..... 50
9.02 Availability of government online services ..... 36
9.03 ICT use and government efficiency ..... 43
9.04 Presence of ICT in government offices ..... 34
9.05 E-Participation Index, 2008* ..... 19

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Luxembourg

## Key indicators

Population (millions), 2007 ..... 0.5
GDP (PPP) per capita (int'l $), 2007 ..... 79,660
Internet users per 100 population, 2007 ..... 73.9
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 200.7
Mobile telephone subscribers per 100 population, 2007 ..... 129.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **21** |
| 2007–2008 (127) | 24 |
| 2006–2007 (122) | 25 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 25 |

### Environment component 22

#### Market environment 16

1.01 Venture capital availability ..... 10
1.02 Financial market sophistication ..... 4
1.03 Availability of latest technologies ..... 25
1.04 State of cluster development ..... 22
1.05 Utility patents, 2007* ..... 12
1.06 High-tech exports, 2006* ..... 30
1.07 Burden of government regulation ..... 27
1.08 Extent and effect of taxation ..... 12
1.09 Total tax rate, 2007* ..... 10
1.10 Time required to start a business, 2008* ..... 71
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 64
1.13 Freedom of the press ..... 18
1.14 Accessibility of digital content ..... 27

#### Political and regulatory environment 13

2.01 Effectiveness of law-making bodies ..... 11
2.02 Laws relating to ICT ..... 21
2.03 Judicial independence ..... 16
2.04 Intellectual property protection ..... 15
2.05 Efficiency of legal framework ..... 15
2.06 Property rights ..... 17
2.07 Quality of competition in the ISP sector ..... 45
2.08 Number of procedures to enforce a contract, 2008* ..... 7
2.09 Time to enforce a contract, 2008* ..... 21

#### Infrastructure environment 29

3.01 Number of telephone lines, 2007* ..... 13
3.02 Secure Internet servers, 2007* ..... 10
3.03 Electricity production, 2005* ..... 28
3.04 Availability of scientists and engineers ..... 82
3.05 Quality of scientific research institutions ..... 53
3.06 Tertiary enrollment, 2006* ..... 102
3.07 Education expenditure, 2006* ..... 80

### Readiness component 28

#### Individual readiness 27

4.01 Quality of math and science education ..... 54
4.02 Quality of the educational system ..... 41
4.03 Internet access in schools ..... 22
4.04 Buyer sophistication ..... 12
4.05 Residential telephone connection charge, 2006* ..... 7
4.06 Residential monthly telephone subscription, 2006* ..... 12
4.07 High-speed monthly broadband subscription, 2006* ..... 8
4.08 Lowest cost of broadband, 2006* ..... 20
4.09 Cost of mobile telephone call, 2006* ..... 4

#### Business readiness 39

5.01 Extent of staff training ..... 14
5.02 Local availability of research and training services ..... 38
5.03 Quality of management schools ..... 86
5.04 Company spending on R&D ..... 21
5.05 University-industry research collaboration ..... 34
5.06 Business telephone connection charge, 2006* ..... 8
5.07 Business monthly telephone subscription, 2006* ..... 6
5.08 Local supplier quality ..... 33
5.09 Local supplier quantity ..... 102
5.10 Computer, comm., and other services imports, 2007* ..... 81

#### Government readiness 18

6.01 Government prioritization of ICT ..... 23
6.02 Gov't procurement of advanced tech products ..... 14
6.03 Importance of ICT to government vision of the future ..... 34
6.04 E-Government Readiness Index, 2008* ..... 14

### Usage component 15

#### Individual usage 4

7.01 Mobile telephone subscribers, 2007* ..... 9
7.02 Personal computers, 2006* ..... 12
7.03 Broadband Internet subscribers, 2007* ..... 14
7.04 Internet users, 2007* ..... 6
7.05 Internet bandwidth, 2006* ..... 3

#### Business usage 23

8.01 Prevalence of foreign technology licensing ..... 24
8.02 Firm-level technology absorption ..... 31
8.03 Capacity for innovation ..... 23
8.04 Availability of new telephone lines ..... 40
8.05 Extent of business Internet use ..... 25

#### Government usage 27

9.01 Government success in ICT promotion ..... 26
9.02 Availability of government online services ..... 59
9.03 ICT use and government efficiency ..... 49
9.04 Presence of ICT in government offices ..... 38
9.05 E-Participation Index, 2008* ..... 11

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Macedonia, FYR

## Key indicators

Population (millions), 2007 ..... 2.0
GDP (PPP) per capita (int'l $), 2007 ..... 8,491
Internet users per 100 population, 2007 ..... 20.4
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 95.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **79** |
| 2007–2008 (127) | 83 |
| 2006–2007 (122) | 81 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 89 |





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Madagascar

## Key indicators



## Networked Readiness Index





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Malawi

## Key indicators

Population (millions), 2007 ..... 13.9
GDP (PPP) per capita (int'l $), 2007 ..... 793
Internet users per 100 population, 2007 ..... 1.0
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 7.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **110** |
| 2007–2008 (127) | n/a |
| 2006–2007 (122) | n/a |

Global Competitiveness Index 2008–2009 (134) 119





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Malaysia

## Key indicators

Population (millions), 2007 ..... 26.5
GDP (PPP) per capita (int'l $), 2007 ..... 13,385
Internet users per 100 population, 2007 ..... 59.7
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 1.2
Mobile telephone subscribers per 100 population, 2007 ..... 87.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **28** |
| 2007–2008 (127) | 26 |
| 2006–2007 (122) | 26 |

Global Competitiveness Index 2008–2009 (134) 21

## Environment component 26

### Market environment 18

1.01 Venture capital availability ..... 18
1.02 Financial market sophistication ..... 31
1.03 Availability of latest technologies ..... 29
1.04 State of cluster development ..... 13
1.05 Utility patents, 2007* ..... 29
1.06 High-tech exports, 2006* ..... 6
1.07 Burden of government regulation ..... 13
1.08 Extent and effect of taxation ..... 20
1.09 Total tax rate, 2007* ..... 41
1.10 Time required to start a business, 2008* ..... 33
1.11 No. of procedures required to start a business, 2008* ..... 75
1.12 Intensity of local competition ..... 31
1.13 Freedom of the press ..... 102
1.14 Accessibility of digital content ..... 39

### Political and regulatory environment 24

2.01 Effectiveness of law-making bodies ..... 8
2.02 Laws relating to ICT ..... 19
2.03 Judicial independence ..... 47
2.04 Intellectual property protection ..... 33
2.05 Efficiency of legal framework ..... 21
2.06 Property rights ..... 38
2.07 Quality of competition in the ISP sector ..... 29
2.08 Number of procedures to enforce a contract, 2008* ..... 14
2.09 Time to enforce a contract, 2008* ..... 82

### Infrastructure environment 48

3.01 Number of telephone lines, 2007* ..... 73
3.02 Secure Internet servers, 2007* ..... 56
3.03 Electricity production, 2005* ..... 58
3.04 Availability of scientists and engineers ..... 24
3.05 Quality of scientific research institutions ..... 20
3.06 Tertiary enrollment, 2005* ..... 71
3.07 Education expenditure, 2006* ..... 20

## Readiness component 19

### Individual readiness 26

4.01 Quality of math and science education ..... 21
4.02 Quality of the educational system ..... 18
4.03 Internet access in schools ..... 40
4.04 Buyer sophistication ..... 23
4.05 Residential telephone connection charge, 2007* ..... 22
4.06 Residential monthly telephone subscription, 2007* ..... 66
4.07 High-speed monthly broadband subscription, 2006* ..... 39
4.08 Lowest cost of broadband, 2006* ..... 43
4.09 Cost of mobile telephone call, 2006* ..... 29

### Business readiness 21

5.01 Extent of staff training ..... 20
5.02 Local availability of research and training services ..... 27
5.03 Quality of management schools ..... 23
5.04 Company spending on R&D ..... 18
5.05 University-industry research collaboration ..... 20
5.06 Business telephone connection charge, 2007* ..... 21
5.07 Business monthly telephone subscription, 2007* ..... 69
5.08 Local supplier quality ..... 32
5.09 Local supplier quantity ..... 16
5.10 Computer, comm., and other services imports, 2007* ..... 32

### Government readiness 12

6.01 Government prioritization of ICT ..... 10
6.02 Gov't procurement of advanced tech products ..... 6
6.03 Importance of ICT to government vision of the future ..... 9
6.04 E-Government Readiness Index, 2008* ..... 34

## Usage component 30

### Individual usage 45

7.01 Mobile telephone subscribers, 2007* ..... 53
7.02 Personal computers, 2006* ..... 35
7.03 Broadband Internet subscribers, 2007* ..... 49
7.04 Internet users, 2007* ..... 18
7.05 Internet bandwidth, 2005* ..... 74

### Business usage 25

8.01 Prevalence of foreign technology licensing ..... 27
8.02 Firm-level technology absorption ..... 21
8.03 Capacity for innovation ..... 21
8.04 Availability of new telephone lines ..... 46
8.05 Extent of business Internet use ..... 29

### Government usage 20

9.01 Government success in ICT promotion ..... 13
9.02 Availability of government online services ..... 24
9.03 ICT use and government efficiency ..... 12
9.04 Presence of ICT in government offices ..... 21
9.05 E-Participation Index, 2008* ..... 39

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Mali

## Key indicators

Population (millions), 2007 ..... 12.3
GDP (PPP) per capita (int'l $), 2007 ..... 1,038
Internet users per 100 population, 2007 ..... 0.8
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 20.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **107** |
| 2007–2008 (127) | 99 |
| 2006–2007 (122) | 101 |

Global Competitiveness Index 2008–2009 (134) 117



### Environment component 102

**Market environment 103**

1.01 Venture capital availability ..... 126
1.02 Financial market sophistication ..... 116
1.03 Availability of latest technologies ..... 95
1.04 State of cluster development ..... 127
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2004* ..... 100
1.07 Burden of government regulation ..... 35
1.08 Extent and effect of taxation ..... 57
1.09 Total tax rate, 2007* ..... 97
1.10 Time required to start a business, 2008* ..... 71
1.11 No. of procedures required to start a business, 2008* ..... 100
1.12 Intensity of local competition ..... 73
1.13 Freedom of the press ..... 54
1.14 Accessibility of digital content ..... 100

**Political and regulatory environment 77**

2.01 Effectiveness of law-making bodies ..... 41
2.02 Laws relating to ICT ..... 95
2.03 Judicial independence ..... 72
2.04 Intellectual property protection ..... 83
2.05 Efficiency of legal framework ..... 58
2.06 Property rights ..... 91
2.07 Quality of competition in the ISP sector ..... 51
2.08 Number of procedures to enforce a contract, 2008* ..... 78
2.09 Time to enforce a contract, 2008* ..... 112

**Infrastructure environment 113**

3.01 Number of telephone lines, 2007* ..... 127
3.02 Secure Internet servers, 2007* ..... 116
3.03 Electricity production, 2006* ..... 126
3.04 Availability of scientists and engineers ..... 72
3.05 Quality of scientific research institutions ..... 78
3.06 Tertiary enrollment, 2005* ..... 119
3.07 Education expenditure, 2006* ..... 85

### Readiness component 122

**Individual readiness 126**

4.01 Quality of math and science education ..... 103
4.02 Quality of the educational system ..... 119
4.03 Internet access in schools ..... 97
4.04 Buyer sophistication ..... 121
4.05 Residential telephone connection charge, 2007* ..... 125
4.06 Residential monthly telephone subscription, 2007* ..... 121
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband* ..... n/a
4.09 Cost of mobile telephone call, 2006* ..... 124

**Business readiness 123**

5.01 Extent of staff training ..... 123
5.02 Local availability of research and training services ..... 88
5.03 Quality of management schools ..... 96
5.04 Company spending on R&D ..... 103
5.05 University-industry research collaboration ..... 103
5.06 Business telephone connection charge, 2007* ..... 111
5.07 Business monthly telephone subscription, 2007* ..... 130
5.08 Local supplier quality ..... 105
5.09 Local supplier quantity ..... 73
5.10 Computer, comm., and other services imports, 2006* ..... 96

**Government readiness 73**

6.01 Government prioritization of ICT ..... 31
6.02 Gov't procurement of advanced tech products ..... 25
6.03 Importance of ICT to government vision of the future ..... 25
6.04 E-Government Readiness Index, 2008* ..... 129

### Usage component 88

**Individual usage 123**

7.01 Mobile telephone subscribers, 2007* ..... 118
7.02 Personal computers, 2007* ..... 118
7.03 Broadband Internet subscribers, 2007* ..... 113
7.04 Internet users, 2007* ..... 125
7.05 Internet bandwidth, 2007* ..... 103

**Business usage 88**

8.01 Prevalence of foreign technology licensing ..... 94
8.02 Firm-level technology absorption ..... 77
8.03 Capacity for innovation ..... 101
8.04 Availability of new telephone lines ..... 71
8.05 Extent of business Internet use ..... 86

**Government usage 54**

9.01 Government success in ICT promotion ..... 17
9.02 Availability of government online services ..... 57
9.03 ICT use and government efficiency ..... 51
9.04 Presence of ICT in government offices ..... 56
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Malta

## Key indicators

Population (millions), 2007 ..... 0.4
GDP (PPP) per capita (int'l $), 2007 ..... 23,026
Internet users per 100 population, 2007 ..... 38.9
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 57.7
Mobile telephone subscribers per 100 population, 2007 ..... 91.4

## Networked Readiness Index

Edition (number of economies) — Rank

**2008–2009 (134) ..... 26**
2007–2008 (127) ..... 27
2006–2007 (122) ..... 27

Global Competitiveness Index 2008–2009 (134) 52

## Environment component 27

### Market environment 32

1.01 Venture capital availability ..... 69
1.02 Financial market sophistication ..... 34
1.03 Availability of latest technologies ..... 26
1.04 State of cluster development ..... 95
1.05 Utility patents, 2007* ..... 36
1.06 High-tech exports, 2006* ..... 3
1.07 Burden of government regulation ..... 98
1.08 Extent and effect of taxation ..... 48
1.09 Total tax rate* ..... n/a
1.10 Time required to start a business* ..... n/a
1.11 No. of procedures required to start a business* ..... n/a
1.12 Intensity of local competition ..... 29
1.13 Freedom of the press ..... 20
1.14 Accessibility of digital content ..... 23

### Political and regulatory environment 28

2.01 Effectiveness of law-making bodies ..... 15
2.02 Laws relating to ICT ..... 24
2.03 Judicial independence ..... 28
2.04 Intellectual property protection ..... 43
2.05 Efficiency of legal framework ..... 37
2.06 Property rights ..... 32
2.07 Quality of competition in the ISP sector ..... 24
2.08 Number of procedures to enforce a contract* ..... n/a
2.09 Time to enforce a contract* ..... n/a

### Infrastructure environment 28

3.01 Number of telephone lines, 2007* ..... 18
3.02 Secure Internet servers, 2007* ..... 11
3.03 Electricity production, 2005* ..... 41
3.04 Availability of scientists and engineers ..... 73
3.05 Quality of scientific research institutions ..... 67
3.06 Tertiary enrollment, 2005* ..... 66
3.07 Education expenditure, 2006* ..... 65

## Readiness component 27

### Individual readiness 28

4.01 Quality of math and science education ..... 29
4.02 Quality of the educational system ..... 24
4.03 Internet access in schools ..... 17
4.04 Buyer sophistication ..... 54
4.05 Residential telephone connection charge, 2006* ..... 44
4.06 Residential monthly telephone subscription, 2006* ..... 35
4.07 High-speed monthly broadband subscription, 2006* ..... 1
4.08 Lowest cost of broadband, 2006* ..... 13
4.09 Cost of mobile telephone call, 2006* ..... 68

### Business readiness 47

5.01 Extent of staff training ..... 45
5.02 Local availability of research and training services ..... 96
5.03 Quality of management schools ..... 40
5.04 Company spending on R&D ..... 61
5.05 University-industry research collaboration ..... 78
5.06 Business telephone connection charge, 2006* ..... 59
5.07 Business monthly telephone subscription, 2006* ..... 55
5.08 Local supplier quality ..... 52
5.09 Local supplier quantity ..... 72
5.10 Computer, comm., and other services imports, 2007* ..... 17

### Government readiness 10

6.01 Government prioritization of ICT ..... 2
6.02 Gov't procurement of advanced tech products ..... 44
6.03 Importance of ICT to government vision of the future ..... 2
6.04 E-Government Readiness Index, 2008* ..... 29

## Usage component 26

### Individual usage 33

7.01 Mobile telephone subscribers, 2007* ..... 48
7.02 Personal computers* ..... n/a
7.03 Broadband Internet subscribers, 2007* ..... 32
7.04 Internet users, 2007* ..... 44
7.05 Internet bandwidth, 2007* ..... 17

### Business usage 37

8.01 Prevalence of foreign technology licensing ..... 34
8.02 Firm-level technology absorption ..... 43
8.03 Capacity for innovation ..... 72
8.04 Availability of new telephone lines ..... 21
8.05 Extent of business Internet use ..... 34

### Government usage 11

9.01 Government success in ICT promotion ..... 2
9.02 Availability of government online services ..... 5
9.03 ICT use and government efficiency ..... 5
9.04 Presence of ICT in government offices ..... 15
9.05 E-Participation Index, 2008* ..... 30

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Mauritania

## Key indicators

Population (millions), 2007 ..... 3.1
GDP (PPP) per capita (int'l $), 2007 ..... 2,012
Internet users per 100 population, 2006 ..... 1.0
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.3
Mobile telephone subscribers per 100 population, 2007 ..... 41.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **109** |
| 2007–2008 (127) | 97 |
| 2006–2007 (122) | 87 |

Global Competitiveness Index 2008–2009 (134) 131



### Environment component 122

**Market environment 98**

1.01 Venture capital availability ..... 116
1.02 Financial market sophistication ..... 124
1.03 Availability of latest technologies ..... 67
1.04 State of cluster development ..... 89
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports* ..... n/a
1.07 Burden of government regulation ..... 19
1.08 Extent and effect of taxation ..... 43
1.09 Total tax rate, 2007* ..... 127
1.10 Time required to start a business, 2008* ..... 57
1.11 No. of procedures required to start a business, 2008* ..... 75
1.12 Intensity of local competition ..... 116
1.13 Freedom of the press ..... 69
1.14 Accessibility of digital content ..... 113

**Political and regulatory environment 109**

2.01 Effectiveness of law-making bodies ..... 71
2.02 Laws relating to ICT ..... 119
2.03 Judicial independence ..... 99
2.04 Intellectual property protection ..... 115
2.05 Efficiency of legal framework ..... 110
2.06 Property rights ..... 99
2.07 Quality of competition in the ISP sector ..... 125
2.08 Number of procedures to enforce a contract, 2008* ..... 117
2.09 Time to enforce a contract, 2008* ..... 26

**Infrastructure environment 133**

3.01 Number of telephone lines, 2006* ..... 118
3.02 Secure Internet servers, 2007* ..... 93
3.03 Electricity production, 2005* ..... 123
3.04 Availability of scientists and engineers ..... 121
3.05 Quality of scientific research institutions ..... 131
3.06 Tertiary enrollment, 2006* ..... 117
3.07 Education expenditure, 2006* ..... 114

### Readiness component 114

**Individual readiness 120**

4.01 Quality of math and science education ..... 101
4.02 Quality of the educational system ..... 129
4.03 Internet access in schools ..... 120
4.04 Buyer sophistication ..... 127
4.05 Residential telephone connection charge, 2007* ..... 86
4.06 Residential monthly telephone subscription, 2007* ..... 110
4.07 High-speed monthly broadband subscription, 2006* ..... 112
4.08 Lowest cost of broadband, 2006* ..... 119
4.09 Cost of mobile telephone call, 2006* ..... 105

**Business readiness 106**

5.01 Extent of staff training ..... 130
5.02 Local availability of research and training services ..... 129
5.03 Quality of management schools ..... 131
5.04 Company spending on R&D ..... 122
5.05 University-industry research collaboration ..... 128
5.06 Business telephone connection charge, 2007* ..... 79
5.07 Business monthly telephone subscription, 2007* ..... 101
5.08 Local supplier quality ..... 110
5.09 Local supplier quantity ..... 59
5.10 Computer, comm., and other services imports* ..... n/a

**Government readiness 99**

6.01 Government prioritization of ICT ..... 51
6.02 Gov't procurement of advanced tech products ..... 76
6.03 Importance of ICT to government vision of the future ..... 62
6.04 E-Government Readiness Index, 2008* ..... 124

### Usage component 96

**Individual usage 105**

7.01 Mobile telephone subscribers, 2007* ..... 92
7.02 Personal computers, 2006* ..... 87
7.03 Broadband Internet subscribers, 2006* ..... 111
7.04 Internet users, 2006* ..... 123
7.05 Internet bandwidth, 2006* ..... 94

**Business usage 96**

8.01 Prevalence of foreign technology licensing ..... 118
8.02 Firm-level technology absorption ..... 79
8.03 Capacity for innovation ..... 109
8.04 Availability of new telephone lines ..... 49
8.05 Extent of business Internet use ..... 113

**Government usage 73**

9.01 Government success in ICT promotion ..... 39
9.02 Availability of government online services ..... 96
9.03 ICT use and government efficiency ..... 73
9.04 Presence of ICT in government offices ..... 65
9.05 E-Participation Index, 2008* ..... 77

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Mauritius

## Key indicators

Population (millions), 2007 ..... 1.3
GDP (PPP) per capita (int'l $), 2007 ..... 11,126
Internet users per 100 population, 2007 ..... 26.9
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 1.5
Mobile telephone subscribers per 100 population, 2007 ..... 74.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **51** |
| 2007–2008 (127) | 54 |
| 2006–2007 (122) | 51 |

Global Competitiveness Index 2008–2009 (134) 57

### Environment component 46

**Market environment 29**

1.01 Venture capital availability ..... 47
1.02 Financial market sophistication ..... 44
1.03 Availability of latest technologies ..... 47
1.04 State of cluster development ..... 55
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 21
1.07 Burden of government regulation ..... 31
1.08 Extent and effect of taxation ..... 8
1.09 Total tax rate, 2007* ..... 12
1.10 Time required to start a business, 2008* ..... 9
1.11 No. of procedures required to start a business, 2008* ..... 16
1.12 Intensity of local competition ..... 80
1.13 Freedom of the press ..... 38
1.14 Accessibility of digital content ..... 67

**Political and regulatory environment 38**

2.01 Effectiveness of law-making bodies ..... 17
2.02 Laws relating to ICT ..... 48
2.03 Judicial independence ..... 38
2.04 Intellectual property protection ..... 46
2.05 Efficiency of legal framework ..... 34
2.06 Property rights ..... 22
2.07 Quality of competition in the ISP sector ..... 103
2.08 Number of procedures to enforce a contract, 2008* ..... 63
2.09 Time to enforce a contract, 2008* ..... 101

**Infrastructure environment 79**

3.01 Number of telephone lines, 2006* ..... 45
3.02 Secure Internet servers, 2007* ..... 48
3.03 Electricity production, 2006* ..... 79
3.04 Availability of scientists and engineers ..... 114
3.05 Quality of scientific research institutions ..... 61
3.06 Tertiary enrollment, 2006* ..... 89
3.07 Education expenditure, 2006* ..... 79

### Readiness component 51

**Individual readiness 50**

4.01 Quality of math and science education ..... 58
4.02 Quality of the educational system ..... 47
4.03 Internet access in schools ..... 63
4.04 Buyer sophistication ..... 55
4.05 Residential telephone connection charge, 2007* ..... 52
4.06 Residential monthly telephone subscription, 2007* ..... 38
4.07 High-speed monthly broadband subscription, 2006* ..... 76
4.08 Lowest cost of broadband, 2006* ..... 65
4.09 Cost of mobile telephone call, 2006* ..... 25

**Business readiness 59**

5.01 Extent of staff training ..... 36
5.02 Local availability of research and training services ..... 90
5.03 Quality of management schools ..... 90
5.04 Company spending on R&D ..... 70
5.05 University-industry research collaboration ..... 69
5.06 Business telephone connection charge, 2007* ..... 71
5.07 Business monthly telephone subscription, 2007* ..... 58
5.08 Local supplier quality ..... 68
5.09 Local supplier quantity ..... 64
5.10 Computer, comm., and other services imports, 2006* ..... 54

**Government readiness 46**

6.01 Government prioritization of ICT ..... 25
6.02 Gov't procurement of advanced tech products ..... 74
6.03 Importance of ICT to government vision of the future ..... 41
6.04 E-Government Readiness Index, 2008* ..... 60

### Usage component 62

**Individual usage 60**

7.01 Mobile telephone subscribers, 2007* ..... 73
7.02 Personal computers, 2006* ..... 43
7.03 Broadband Internet subscribers, 2006* ..... 69
7.04 Internet users, 2007* ..... 54
7.05 Internet bandwidth, 2006* ..... 67

**Business usage 64**

8.01 Prevalence of foreign technology licensing ..... 60
8.02 Firm-level technology absorption ..... 64
8.03 Capacity for innovation ..... 99
8.04 Availability of new telephone lines ..... 53
8.05 Extent of business Internet use ..... 65

**Government usage 59**

9.01 Government success in ICT promotion ..... 40
9.02 Availability of government online services ..... 65
9.03 ICT use and government efficiency ..... 63
9.04 Presence of ICT in government offices ..... 62
9.05 E-Participation Index, 2008* ..... 77

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Mexico

## Key indicators

Population (millions), 2007 ..... 105.3
GDP (PPP) per capita (int'l $), 2007 ..... 14,120
Internet users per 100 population, 2007 ..... 21.4
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 1.0
Mobile telephone subscribers per 100 population, 2007 ..... 64.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **67** |
| 2007–2008 (127) | 58 |
| 2006–2007 (122) | 49 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 60 |



## Environment component 75

### Market environment 74

1.01 Venture capital availability ..... 99
1.02 Financial market sophistication ..... 56
1.03 Availability of latest technologies ..... 92
1.04 State of cluster development ..... 58
1.05 Utility patents, 2007* ..... 55
1.06 High-tech exports, 2006* ..... 22
1.07 Burden of government regulation ..... 121
1.08 Extent and effect of taxation ..... 89
1.09 Total tax rate, 2007* ..... 99
1.10 Time required to start a business, 2008* ..... 79
1.11 No. of procedures required to start a business, 2008* ..... 75
1.12 Intensity of local competition ..... 78
1.13 Freedom of the press ..... 49
1.14 Accessibility of digital content ..... 81

### Political and regulatory environment 84

2.01 Effectiveness of law-making bodies ..... 115
2.02 Laws relating to ICT ..... 69
2.03 Judicial independence ..... 86
2.04 Intellectual property protection ..... 82
2.05 Efficiency of legal framework ..... 111
2.06 Property rights ..... 89
2.07 Quality of competition in the ISP sector ..... 93
2.08 Number of procedures to enforce a contract, 2008* ..... 67
2.09 Time to enforce a contract, 2008* ..... 38

### Infrastructure environment 71

3.01 Number of telephone lines, 2007* ..... 68
3.02 Secure Internet servers, 2007* ..... 60
3.03 Electricity production, 2005* ..... 71
3.04 Availability of scientists and engineers ..... 105
3.05 Quality of scientific research institutions ..... 79
3.06 Tertiary enrollment, 2006* ..... 74
3.07 Education expenditure, 2006* ..... 31

## Readiness component 76

### Individual readiness 74

4.01 Quality of math and science education ..... 127
4.02 Quality of the educational system ..... 109
4.03 Internet access in schools ..... 76
4.04 Buyer sophistication ..... 52
4.05 Residential telephone connection charge, 2006* ..... 74
4.06 Residential monthly telephone subscription, 2007* ..... 80
4.07 High-speed monthly broadband subscription, 2006* ..... 82
4.08 Lowest cost of broadband, 2006* ..... 52
4.09 Cost of mobile telephone call, 2006* ..... 54

### Business readiness 72

5.01 Extent of staff training ..... 87
5.02 Local availability of research and training services ..... 55
5.03 Quality of management schools ..... 53
5.04 Company spending on R&D ..... 71
5.05 University-industry research collaboration ..... 84
5.06 Business telephone connection charge, 2006* ..... 70
5.07 Business monthly telephone subscription, 2007* ..... 67
5.08 Local supplier quality ..... 46
5.09 Local supplier quantity ..... 55
5.10 Computer, comm., and other services imports, 2006* ..... 112

### Government readiness 62

6.01 Government prioritization of ICT ..... 89
6.02 Gov't procurement of advanced tech products ..... 104
6.03 Importance of ICT to government vision of the future ..... 86
6.04 E-Government Readiness Index, 2008* ..... 37

## Usage component 53

### Individual usage 66

7.01 Mobile telephone subscribers, 2007* ..... 81
7.02 Personal computers, 2006* ..... 53
7.03 Broadband Internet subscribers, 2007* ..... 54
7.04 Internet users, 2007* ..... 65
7.05 Internet bandwidth, 2005* ..... 79

### Business usage 76

8.01 Prevalence of foreign technology licensing ..... 71
8.02 Firm-level technology absorption ..... 92
8.03 Capacity for innovation ..... 67
8.04 Availability of new telephone lines ..... 69
8.05 Extent of business Internet use ..... 79

### Government usage 36

9.01 Government success in ICT promotion ..... 104
9.02 Availability of government online services ..... 48
9.03 ICT use and government efficiency ..... 61
9.04 Presence of ICT in government offices ..... 85
9.05 E-Participation Index, 2008* ..... 7

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Moldova

## Key indicators



## Networked Readiness Index





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Mongolia

## Key indicators

Population (millions), 2007 ..... 2.6
GDP (PPP) per capita (int'l $), 2007 ..... 3,222
Internet users per 100 population, 2006 ..... 11.6
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 1.1
Mobile telephone subscribers per 100 population, 2006 ..... 28.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **93** |
| 2007–2008 (127) | 87 |
| 2006–2007 (122) | 90 |

Global Competitiveness Index 2008–2009 (134) 100





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Montenegro

## Key indicators

Population (millions), 2007 ..... 0.6
GDP (PPP) per capita (int'l $), 2007 ..... 9,238
Internet users per 100 population, 2007 ..... 46.8
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 12.5
Mobile telephone subscribers per 100 population, 2006 ..... 107.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **71** |
| 2007–2008 (127) | n/a |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 65 |

## Environment component 52

### Market environment 67

1.01 Venture capital availability ..... 44
1.02 Financial market sophistication ..... 67
1.03 Availability of latest technologies ..... 79
1.04 State of cluster development ..... 128
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports* ..... n/a
1.07 Burden of government regulation ..... 83
1.08 Extent and effect of taxation ..... 30
1.09 Total tax rate, 2007* ..... 29
1.10 Time required to start a business, 2008* ..... 63
1.11 No. of procedures required to start a business, 2008* ..... 121
1.12 Intensity of local competition ..... 91
1.13 Freedom of the press ..... 79
1.14 Accessibility of digital content ..... 66

### Political and regulatory environment 89

2.01 Effectiveness of law-making bodies ..... 57
2.02 Laws relating to ICT ..... 66
2.03 Judicial independence ..... 85
2.04 Intellectual property protection ..... 99
2.05 Efficiency of legal framework ..... 68
2.06 Property rights ..... 64
2.07 Quality of competition in the ISP sector ..... 115
2.08 Number of procedures to enforce a contract, 2008* ..... 123
2.09 Time to enforce a contract, 2008* ..... 65

### Infrastructure environment 30

3.01 Number of telephone lines, 2006* ..... 6
3.02 Secure Internet servers* ..... n/a
3.03 Electricity production, 2005* ..... 47
3.04 Availability of scientists and engineers ..... 71
3.05 Quality of scientific research institutions ..... 92
3.06 Tertiary enrollment, 2005* ..... 41
3.07 Education expenditure, 2007* ..... 93

## Readiness component 87

### Individual readiness 88

4.01 Quality of math and science education ..... 34
4.02 Quality of the educational system ..... 57
4.03 Internet access in schools ..... 74
4.04 Buyer sophistication ..... 63
4.05 Residential telephone connection charge, 2005* ..... 90
4.06 Residential monthly telephone subscription, 2006* ..... 124
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband, 2006* ..... 77
4.09 Cost of mobile telephone call, 2006* ..... 48

### Business readiness 91

5.01 Extent of staff training ..... 84
5.02 Local availability of research and training services ..... 78
5.03 Quality of management schools ..... 67
5.04 Company spending on R&D ..... 76
5.05 University-industry research collaboration ..... 68
5.06 Business telephone connection charge, 2005* ..... 82
5.07 Business monthly telephone subscription, 2006* ..... 123
5.08 Local supplier quality ..... 85
5.09 Local supplier quantity ..... 94
5.10 Computer, comm., and other services imports* ..... n/a

### Government readiness 78

6.01 Government prioritization of ICT ..... 91
6.02 Gov't procurement of advanced tech products ..... 67
6.03 Importance of ICT to government vision of the future ..... 68
6.04 E-Government Readiness Index, 2008* ..... 88

## Usage component 74

### Individual usage 43

7.01 Mobile telephone subscribers, 2006* ..... 34
7.02 Personal computers* ..... n/a
7.03 Broadband Internet subscribers, 2006* ..... 53
7.04 Internet users, 2007* ..... 32
7.05 Internet bandwidth, 2006* ..... 37

### Business usage 97

8.01 Prevalence of foreign technology licensing ..... 77
8.02 Firm-level technology absorption ..... 91
8.03 Capacity for innovation ..... 120
8.04 Availability of new telephone lines ..... 73
8.05 Extent of business Internet use ..... 125

### Government usage 101

9.01 Government success in ICT promotion ..... 82
9.02 Availability of government online services ..... 117
9.03 ICT use and government efficiency ..... 104
9.04 Presence of ICT in government offices ..... 80
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Morocco

## Key indicators

Population (millions), 2007 ..... 30.9
GDP (PPP) per capita (int'l $), 2007 ..... 4,094
Internet users per 100 population, 2007 ..... 21.1
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 8.0
Mobile telephone subscribers per 100 population, 2007 ..... 64.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **86** |
| 2007–2008 (127) | 74 |
| 2006–2007 (122) | 76 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 73 |



## Environment component 74

### Market environment 57

1.01 Venture capital availability ..... 67
1.02 Financial market sophistication ..... 62
1.03 Availability of latest technologies ..... 57
1.04 State of cluster development ..... 52
1.05 Utility patents, 2007* ..... 83
1.06 High-tech exports, 2006* ..... 34
1.07 Burden of government regulation ..... 46
1.08 Extent and effect of taxation ..... 66
1.09 Total tax rate, 2007* ..... 73
1.10 Time required to start a business, 2008* ..... 31
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 89
1.13 Freedom of the press ..... 101
1.14 Accessibility of digital content ..... 82

### Political and regulatory environment 74

2.01 Effectiveness of law-making bodies ..... 74
2.02 Laws relating to ICT ..... 97
2.03 Judicial independence ..... 65
2.04 Intellectual property protection ..... 78
2.05 Efficiency of legal framework ..... 62
2.06 Property rights ..... 66
2.07 Quality of competition in the ISP sector ..... 76
2.08 Number of procedures to enforce a contract, 2008* ..... 93
2.09 Time to enforce a contract, 2008* ..... 85

### Infrastructure environment 88

3.01 Number of telephone lines, 2007* ..... 98
3.02 Secure Internet servers, 2007* ..... 96
3.03 Electricity production, 2005* ..... 99
3.04 Availability of scientists and engineers ..... 68
3.05 Quality of scientific research institutions ..... 94
3.06 Tertiary enrollment, 2006* ..... 99
3.07 Education expenditure, 2006* ..... 15

## Readiness component 89

### Individual readiness 85

4.01 Quality of math and science education ..... 67
4.02 Quality of the educational system ..... 100
4.03 Internet access in schools ..... 70
4.04 Buyer sophistication ..... 46
4.05 Residential telephone connection charge, 2007* ..... 92
4.06 Residential monthly telephone subscription, 2007* ..... 113
4.07 High-speed monthly broadband subscription, 2006* ..... 77
4.08 Lowest cost of broadband, 2006* ..... 56
4.09 Cost of mobile telephone call, 2006* ..... 104

### Business readiness 92

5.01 Extent of staff training ..... 79
5.02 Local availability of research and training services ..... 69
5.03 Quality of management schools ..... 63
5.04 Company spending on R&D ..... 69
5.05 University-industry research collaboration ..... 99
5.06 Business telephone connection charge, 2007* ..... 105
5.07 Business monthly telephone subscription, 2007* ..... 112
5.08 Local supplier quality ..... 86
5.09 Local supplier quantity ..... 69
5.10 Computer, comm., and other services imports, 2006* ..... 57

### Government readiness 102

6.01 Government prioritization of ICT ..... 111
6.02 Gov't procurement of advanced tech products ..... 58
6.03 Importance of ICT to government vision of the future ..... 82
6.04 E-Government Readiness Index, 2008* ..... 113

## Usage component 87

### Individual usage 77

7.01 Mobile telephone subscribers, 2007* ..... 80
7.02 Personal computers, 2006* ..... 93
7.03 Broadband Internet subscribers, 2007* ..... 73
7.04 Internet users, 2007* ..... 66
7.05 Internet bandwidth, 2007* ..... 44

### Business usage 83

8.01 Prevalence of foreign technology licensing ..... 75
8.02 Firm-level technology absorption ..... 70
8.03 Capacity for innovation ..... 87
8.04 Availability of new telephone lines ..... 56
8.05 Extent of business Internet use ..... 110

### Government usage 95

9.01 Government success in ICT promotion ..... 45
9.02 Availability of government online services ..... 81
9.03 ICT use and government efficiency ..... 82
9.04 Presence of ICT in government offices ..... 97
9.05 E-Participation Index, 2008* ..... 123

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Mozambique

## Key indicators

Population (millions), 2007 ..... 21.4
GDP (PPP) per capita (int'l $), 2007 ..... 843
Internet users per 100 population, 2007 ..... 0.9
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 15.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **124** |
| 2007–2008 (127) | 121 |
| 2006–2007 (122) | 115 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Namibia

## Key indicators

Population (millions), 2007 ..... 2.1
GDP (PPP) per capita (int'l $), 2007 ..... 5,250
Internet users per 100 population, 2007 ..... 4.9
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.3
Mobile telephone subscribers per 100 population, 2007 ..... 38.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **92** |
| 2007–2008 (127) | 93 |
| 2006–2007 (122) | 85 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 80 |



## Environment component 59

### Market environment 73

1.01 Venture capital availability ..... 73
1.02 Financial market sophistication ..... 42
1.03 Availability of latest technologies ..... 53
1.04 State of cluster development ..... 87
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 51
1.07 Burden of government regulation ..... 52
1.08 Extent and effect of taxation ..... 52
1.09 Total tax rate, 2007* ..... 15
1.10 Time required to start a business, 2008* ..... 119
1.11 No. of procedures required to start a business, 2008* ..... 86
1.12 Intensity of local competition ..... 99
1.13 Freedom of the press ..... 41
1.14 Accessibility of digital content ..... 97

### Political and regulatory environment 32

2.01 Effectiveness of law-making bodies ..... 43
2.02 Laws relating to ICT ..... 93
2.03 Judicial independence ..... 22
2.04 Intellectual property protection ..... 37
2.05 Efficiency of legal framework ..... 32
2.06 Property rights ..... 25
2.07 Quality of competition in the ISP sector ..... 120
2.08 Number of procedures to enforce a contract, 2008* ..... 37
2.09 Time to enforce a contract, 2008* ..... 10

### Infrastructure environment 101

3.01 Number of telephone lines, 2007* ..... 102
3.02 Secure Internet servers, 2007* ..... 64
3.03 Electricity production, 2005* ..... 95
3.04 Availability of scientists and engineers ..... 132
3.05 Quality of scientific research institutions ..... 109
3.06 Tertiary enrollment, 2006* ..... 107
3.07 Education expenditure, 2006* ..... 7

## Readiness component 104

### Individual readiness 101

4.01 Quality of math and science education ..... 121
4.02 Quality of the educational system ..... 114
4.03 Internet access in schools ..... 102
4.04 Buyer sophistication ..... 73
4.05 Residential telephone connection charge, 2007* ..... 70
4.06 Residential monthly telephone subscription, 2007* ..... 89
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband* ..... n/a
4.09 Cost of mobile telephone call, 2006* ..... 95

### Business readiness 98

5.01 Extent of staff training ..... 44
5.02 Local availability of research and training services ..... 134
5.03 Quality of management schools ..... 133
5.04 Company spending on R&D ..... 78
5.05 University-industry research collaboration ..... 113
5.06 Business telephone connection charge, 2007* ..... 65
5.07 Business monthly telephone subscription, 2007* ..... 77
5.08 Local supplier quality ..... 90
5.09 Local supplier quantity ..... 128
5.10 Computer, comm., and other services imports, 2006* ..... 51

### Government readiness 121

6.01 Government prioritization of ICT ..... 108
6.02 Gov't procurement of advanced tech products ..... 113
6.03 Importance of ICT to government vision of the future ..... 124
6.04 E-Government Readiness Index, 2008* ..... 104

## Usage component 102

### Individual usage 95

7.01 Mobile telephone subscribers, 2007* ..... 97
7.02 Personal computers, 2006* ..... 39
7.03 Broadband Internet subscribers, 2007* ..... 117
7.04 Internet users, 2007* ..... 107
7.05 Internet bandwidth, 2007* ..... 95

### Business usage 84

8.01 Prevalence of foreign technology licensing ..... 64
8.02 Firm-level technology absorption ..... 74
8.03 Capacity for innovation ..... 112
8.04 Availability of new telephone lines ..... 67
8.05 Extent of business Internet use ..... 95

### Government usage 124

9.01 Government success in ICT promotion ..... 116
9.02 Availability of government online services ..... 114
9.03 ICT use and government efficiency ..... 123
9.04 Presence of ICT in government offices ..... 114
9.05 E-Participation Index, 2008* ..... 105

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Nepal

## Key indicators

Population (millions), 2007 ..... 28.1
GDP (PPP) per capita (int'l $), 2007 ..... 1,078
Internet users per 100 population, 2007 ..... 1.2
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.0
Mobile telephone subscribers per 100 population, 2006 ..... 4.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **127** |
| 2007–2008 (127) | 119 |
| 2006–2007 (122) | 108 |

Global Competitiveness Index 2008–2009 (134) 126



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Netherlands

## Key indicators

Population (millions), 2007 ..... 16.4
GDP (PPP) per capita (int'l $), 2007 ..... 38,995
Internet users per 100 population, 2007 ..... 91.4
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 205.2
Mobile telephone subscribers per 100 population, 2006 ..... 105.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **9** |
| 2007–2008 (127) | 7 |
| 2006–2007 (122) | 6 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 8 |



## Environment component 11

### Market environment 8

1.01 Venture capital availability ..... 3
1.02 Financial market sophistication ..... 8
1.03 Availability of latest technologies ..... 15
1.04 State of cluster development ..... 12
1.05 Utility patents, 2007* ..... 13
1.06 High-tech exports, 2006* ..... 18
1.07 Burden of government regulation ..... 81
1.08 Extent and effect of taxation ..... 60
1.09 Total tax rate, 2007* ..... 58
1.10 Time required to start a business, 2008* ..... 25
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 3
1.13 Freedom of the press ..... 3
1.14 Accessibility of digital content ..... 11

### Political and regulatory environment 12

2.01 Effectiveness of law-making bodies ..... 21
2.02 Laws relating to ICT ..... 20
2.03 Judicial independence ..... 6
2.04 Intellectual property protection ..... 11
2.05 Efficiency of legal framework ..... 9
2.06 Property rights ..... 14
2.07 Quality of competition in the ISP sector ..... 9
2.08 Number of procedures to enforce a contract, 2008* ..... 4
2.09 Time to enforce a contract, 2008* ..... 59

### Infrastructure environment 14

3.01 Number of telephone lines, 2007* ..... 22
3.02 Secure Internet servers, 2007* ..... 8
3.03 Electricity production, 2005* ..... 36
3.04 Availability of scientists and engineers ..... 25
3.05 Quality of scientific research institutions ..... 10
3.06 Tertiary enrollment, 2006* ..... 25
3.07 Education expenditure, 2006* ..... 36

## Readiness component 12

### Individual readiness 15

4.01 Quality of math and science education ..... 16
4.02 Quality of the educational system ..... 13
4.03 Internet access in schools ..... 12
4.04 Buyer sophistication ..... 13
4.05 Residential telephone connection charge* ..... n/a
4.06 Residential monthly telephone subscription, 2006* ..... 43
4.07 High-speed monthly broadband subscription, 2006* ..... 4
4.08 Lowest cost of broadband, 2006* ..... 1
4.09 Cost of mobile telephone call, 2006* ..... 44

### Business readiness 8

5.01 Extent of staff training ..... 8
5.02 Local availability of research and training services ..... 3
5.03 Quality of management schools ..... 10
5.04 Company spending on R&D ..... 11
5.05 University-industry research collaboration ..... 11
5.06 Business telephone connection charge* ..... n/a
5.07 Business monthly telephone subscription, 2006* ..... 21
5.08 Local supplier quality ..... 6
5.09 Local supplier quantity ..... 11
5.10 Computer, comm., and other services imports, 2007* ..... 8

### Government readiness 23

6.01 Government prioritization of ICT ..... 50
6.02 Gov't procurement of advanced tech products ..... 37
6.03 Importance of ICT to government vision of the future ..... 51
6.04 E-Government Readiness Index, 2008* ..... 5

## Usage component 4

### Individual usage 1

7.01 Mobile telephone subscribers, 2006* ..... 37
7.02 Personal computers, 2006* ..... 2
7.03 Broadband Internet subscribers, 2007* ..... 4
7.04 Internet users, 2007* ..... 1
7.05 Internet bandwidth, 2005* ..... 2

### Business usage 14

8.01 Prevalence of foreign technology licensing ..... 11
8.02 Firm-level technology absorption ..... 27
8.03 Capacity for innovation ..... 11
8.04 Availability of new telephone lines ..... 13
8.05 Extent of business Internet use ..... 15

### Government usage 22

9.01 Government success in ICT promotion ..... 53
9.02 Availability of government online services ..... 28
9.03 ICT use and government efficiency ..... 35
9.04 Presence of ICT in government offices ..... 19
9.05 E-Participation Index, 2008* ..... 16

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# New Zealand

## Key indicators

Population (millions), 2007 ..... 4.2
GDP (PPP) per capita (int'l $), 2007 ..... 26,611
Internet users per 100 population, 2007 ..... 80.4
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 11.4
Mobile telephone subscribers per 100 population, 2007 ..... 101.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **22** |
| 2007–2008 (127) | 22 |
| 2006–2007 (122) | 22 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 24 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Nicaragua

## Key indicators

Population (millions), 2007 ..... 5.6
GDP (PPP) per capita (int'l $), 2007 ..... 2,629
Internet users per 100 population, 2006 ..... 2.8
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 37.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **125** |
| 2007–2008 (127) | 116 |
| 2006–2007 (122) | 103 |

Global Competitiveness Index 2008–2009 (134) 120





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Nigeria

## Key indicators

Population (millions), 2007 ..... 148.0
GDP (PPP) per capita (int'l $), 2007 ..... 2,028
Internet users per 100 population, 2007 ..... 6.8
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 27.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **90** |
| 2007–2008 (127) | 94 |
| 2006–2007 (122) | 88 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 94 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Norway

## Key indicators

Population (millions), 2007 ..... 4.7
GDP (PPP) per capita (int'l $), 2007 ..... 53,152
Internet users per 100 population, 2007 ..... 80.9
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 93.1
Mobile telephone subscribers per 100 population, 2007 ..... 110.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **8** |
| 2007–2008 (127) | 10 |
| 2006–2007 (122) | 10 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 15 |



## Environment component 7

### Market environment 19

1.01 Venture capital availability ..... 2
1.02 Financial market sophistication ..... 19
1.03 Availability of latest technologies ..... 6
1.04 State of cluster development ..... 20
1.05 Utility patents, 2007* ..... 19
1.06 High-tech exports, 2006* ..... 57
1.07 Burden of government regulation ..... 49
1.08 Extent and effect of taxation ..... 55
1.09 Total tax rate, 2007* ..... 66
1.10 Time required to start a business, 2008* ..... 25
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 21
1.13 Freedom of the press ..... 5
1.14 Accessibility of digital content ..... 10

### Political and regulatory environment 6

2.01 Effectiveness of law-making bodies ..... 4
2.02 Laws relating to ICT ..... 7
2.03 Judicial independence ..... 12
2.04 Intellectual property protection ..... 12
2.05 Efficiency of legal framework ..... 6
2.06 Property rights ..... 9
2.07 Quality of competition in the ISP sector ..... 5
2.08 Number of procedures to enforce a contract, 2008* ..... 37
2.09 Time to enforce a contract, 2008* ..... 18

### Infrastructure environment 5

3.01 Number of telephone lines, 2007* ..... 26
3.02 Secure Internet servers, 2007* ..... 12
3.03 Electricity production, 2005* ..... 1
3.04 Availability of scientists and engineers ..... 18
3.05 Quality of scientific research institutions ..... 22
3.06 Tertiary enrollment, 2006* ..... 10
3.07 Education expenditure, 2006* ..... 9

## Readiness component 8

### Individual readiness 17

4.01 Quality of math and science education ..... 56
4.02 Quality of the educational system ..... 11
4.03 Internet access in schools ..... 20
4.04 Buyer sophistication ..... 15
4.05 Residential telephone connection charge, 2006* ..... 24
4.06 Residential monthly telephone subscription, 2006* ..... 17
4.07 High-speed monthly broadband subscription, 2006* ..... 9
4.08 Lowest cost of broadband, 2006* ..... 16
4.09 Cost of mobile telephone call, 2005* ..... 6

### Business readiness 18

5.01 Extent of staff training ..... 7
5.02 Local availability of research and training services ..... 18
5.03 Quality of management schools ..... 22
5.04 Company spending on R&D ..... 19
5.05 University-industry research collaboration ..... 17
5.06 Business telephone connection charge, 2006* ..... 24
5.07 Business monthly telephone subscription, 2006* ..... 10
5.08 Local supplier quality ..... 11
5.09 Local supplier quantity ..... 22
5.10 Computer, comm., and other services imports, 2007* ..... 60

### Government readiness 5

6.01 Government prioritization of ICT ..... 14
6.02 Gov't procurement of advanced tech products ..... 16
6.03 Importance of ICT to government vision of the future ..... 16
6.04 E-Government Readiness Index, 2008* ..... 3

## Usage component 7

### Individual usage 8

7.01 Mobile telephone subscribers, 2007* ..... 28
7.02 Personal computers, 2006* ..... 15
7.03 Broadband Internet subscribers, 2007* ..... 7
7.04 Internet users, 2007* ..... 2
7.05 Internet bandwidth, 2005* ..... 10

### Business usage 10

8.01 Prevalence of foreign technology licensing ..... 5
8.02 Firm-level technology absorption ..... 9
8.03 Capacity for innovation ..... 13
8.04 Availability of new telephone lines ..... 9
8.05 Extent of business Internet use ..... 14

### Government usage 12

9.01 Government success in ICT promotion ..... 15
9.02 Availability of government online services ..... 11
9.03 ICT use and government efficiency ..... 13
9.04 Presence of ICT in government offices ..... 9
9.05 E-Participation Index, 2008* ..... 16

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Oman

## Key indicators

Population (millions), 2007 ..... 2.6
GDP (PPP) per capita (int'l $), 2007 ..... 23,987
Internet users per 100 population, 2007 ..... 13.1
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 4.8
Mobile telephone subscribers per 100 population, 2007 ..... 96.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **50** |
| 2007–2008 (127) | 53 |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 38 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Pakistan

## Key indicators

Population (millions), 2007 ..... 162.4
GDP (PPP) per capita (int'l $), 2007 ..... 2,594
Internet users per 100 population, 2007 ..... 10.7
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.4
Mobile telephone subscribers per 100 population, 2007 ..... 48.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **98** |
| 2007–2008 (127) | 89 |
| 2006–2007 (122) | 84 |

Global Competitiveness Index 2008–2009 (134) 101



### Environment component 112

**Market environment 84**

1.01 Venture capital availability ..... 86
1.02 Financial market sophistication ..... 79
1.03 Availability of latest technologies ..... 88
1.04 State of cluster development ..... 66
1.05 Utility patents, 2007* ..... 88
1.06 High-tech exports, 2006* ..... 72
1.07 Burden of government regulation ..... 78
1.08 Extent and effect of taxation ..... 42
1.09 Total tax rate, 2007* ..... 22
1.10 Time required to start a business, 2008* ..... 68
1.11 No. of procedures required to start a business, 2008* ..... 100
1.12 Intensity of local competition ..... 112
1.13 Freedom of the press ..... 76
1.14 Accessibility of digital content ..... 91

**Political and regulatory environment 107**

2.01 Effectiveness of law-making bodies ..... 79
2.02 Laws relating to ICT ..... 86
2.03 Judicial independence ..... 93
2.04 Intellectual property protection ..... 84
2.05 Efficiency of legal framework ..... 94
2.06 Property rights ..... 93
2.07 Quality of competition in the ISP sector ..... 68
2.08 Number of procedures to enforce a contract, 2008* ..... 119
2.09 Time to enforce a contract, 2008* ..... 118

**Infrastructure environment 121**

3.01 Number of telephone lines, 2007* ..... 109
3.02 Secure Internet servers, 2007* ..... 114
3.03 Electricity production, 2005* ..... 105
3.04 Availability of scientists and engineers ..... 89
3.05 Quality of scientific research institutions ..... 80
3.06 Tertiary enrollment, 2006* ..... 114
3.07 Education expenditure, 2006* ..... 119

### Readiness component 101

**Individual readiness 111**

4.01 Quality of math and science education ..... 109
4.02 Quality of the educational system ..... 104
4.03 Internet access in schools ..... 81
4.04 Buyer sophistication ..... 94
4.05 Residential telephone connection charge, 2006* ..... 79
4.06 Residential monthly telephone subscription, 2006* ..... 102
4.07 High-speed monthly broadband subscription, 2006* ..... 104
4.08 Lowest cost of broadband, 2006* ..... 110
4.09 Cost of mobile telephone call, 2006* ..... 72

**Business readiness 83**

5.01 Extent of staff training ..... 119
5.02 Local availability of research and training services ..... 103
5.03 Quality of management schools ..... 94
5.04 Company spending on R&D ..... 86
5.05 University-industry research collaboration ..... 82
5.06 Business telephone connection charge, 2006* ..... 74
5.07 Business monthly telephone subscription, 2006* ..... 89
5.08 Local supplier quality ..... 93
5.09 Local supplier quantity ..... 66
5.10 Computer, comm., and other services imports, 2007* ..... 29

**Government readiness 95**

6.01 Government prioritization of ICT ..... 57
6.02 Gov't procurement of advanced tech products ..... 91
6.03 Importance of ICT to government vision of the future ..... 84
6.04 E-Government Readiness Index, 2008* ..... 105

### Usage component 92

**Individual usage 93**

7.01 Mobile telephone subscribers, 2007* ..... 90
7.02 Personal computers* ..... n/a
7.03 Broadband Internet subscribers, 2007* ..... 102
7.04 Internet users, 2007* ..... 90
7.05 Internet bandwidth, 2007* ..... 89

**Business usage 86**

8.01 Prevalence of foreign technology licensing ..... 76
8.02 Firm-level technology absorption ..... 84
8.03 Capacity for innovation ..... 73
8.04 Availability of new telephone lines ..... 89
8.05 Extent of business Internet use ..... 89

**Government usage 96**

9.01 Government success in ICT promotion ..... 69
9.02 Availability of government online services ..... 94
9.03 ICT use and government efficiency ..... 87
9.04 Presence of ICT in government offices ..... 96
9.05 E-Participation Index, 2008* ..... 83

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Panama

## Key indicators

Population (millions), 2007 ..... 3.3
GDP (PPP) per capita (int'l $), 2007 ..... 10,351
Internet users per 100 population, 2007 ..... 15.7
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 2.9
Mobile telephone subscribers per 100 population, 2007 ..... 71.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **66** |
| 2007–2008 (127) | 64 |
| 2006–2007 (122) | 65 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 58 |

### Environment component 57

#### Market environment 45

1.01 Venture capital availability ..... 28
1.02 Financial market sophistication ..... 27
1.03 Availability of latest technologies ..... 68
1.04 State of cluster development ..... 45
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 122
1.07 Burden of government regulation ..... 37
1.08 Extent and effect of taxation ..... 76
1.09 Total tax rate, 2007* ..... 93
1.10 Time required to start a business, 2008* ..... 33
1.11 No. of procedures required to start a business, 2008* ..... 46
1.12 Intensity of local competition ..... 72
1.13 Freedom of the press ..... 56
1.14 Accessibility of digital content ..... 68

#### Political and regulatory environment 66

2.01 Effectiveness of law-making bodies ..... 122
2.02 Laws relating to ICT ..... 50
2.03 Judicial independence ..... 115
2.04 Intellectual property protection ..... 48
2.05 Efficiency of legal framework ..... 96
2.06 Property rights ..... 47
2.07 Quality of competition in the ISP sector ..... 43
2.08 Number of procedures to enforce a contract, 2008* ..... 27
2.09 Time to enforce a contract, 2008* ..... 93

#### Infrastructure environment 68

3.01 Number of telephone lines, 2007* ..... 78
3.02 Secure Internet servers, 2007* ..... 35
3.03 Electricity production, 2005* ..... 81
3.04 Availability of scientists and engineers ..... 91
3.05 Quality of scientific research institutions ..... 87
3.06 Tertiary enrollment, 2006* ..... 49
3.07 Education expenditure, 2006* ..... 57

### Readiness component 70

#### Individual readiness 69

4.01 Quality of math and science education ..... 112
4.02 Quality of the educational system ..... 108
4.03 Internet access in schools ..... 80
4.04 Buyer sophistication ..... 53
4.05 Residential telephone connection charge, 2006* ..... 63
4.06 Residential monthly telephone subscription, 2006* ..... 57
4.07 High-speed monthly broadband subscription, 2006* ..... 67
4.08 Lowest cost of broadband, 2006* ..... 80
4.09 Cost of mobile telephone call, 2006* ..... 61

#### Business readiness 75

5.01 Extent of staff training ..... 58
5.02 Local availability of research and training services ..... 65
5.03 Quality of management schools ..... 91
5.04 Company spending on R&D ..... 63
5.05 University-industry research collaboration ..... 74
5.06 Business telephone connection charge, 2006* ..... 56
5.07 Business monthly telephone subscription, 2006* ..... 80
5.08 Local supplier quality ..... 53
5.09 Local supplier quantity ..... 68
5.10 Computer, comm., and other services imports, 2007* ..... 108

#### Government readiness 61

6.01 Government prioritization of ICT ..... 90
6.02 Gov't procurement of advanced tech products ..... 52
6.03 Importance of ICT to government vision of the future ..... 57
6.04 E-Government Readiness Index, 2008* ..... 75

### Usage component 73

#### Individual usage 79

7.01 Mobile telephone subscribers, 2007* ..... 77
7.02 Personal computers, 2005* ..... 85
7.03 Broadband Internet subscribers, 2007* ..... 82
7.04 Internet users, 2007* ..... 79
7.05 Internet bandwidth, 2005* ..... 63

#### Business usage 58

8.01 Prevalence of foreign technology licensing ..... 50
8.02 Firm-level technology absorption ..... 56
8.03 Capacity for innovation ..... 102
8.04 Availability of new telephone lines ..... 54
8.05 Extent of business Internet use ..... 57

#### Government usage 70

9.01 Government success in ICT promotion ..... 78
9.02 Availability of government online services ..... 43
9.03 ICT use and government efficiency ..... 60
9.04 Presence of ICT in government offices ..... 89
9.05 E-Participation Index, 2008* ..... 77

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Paraguay

## Key indicators

Population (millions), 2007 ..... 6.1
GDP (PPP) per capita (int'l $), 2007 ..... 4,510
Internet users per 100 population, 2007 ..... 4.6
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 1.5
Mobile telephone subscribers per 100 population, 2007 ..... 70.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **122** |
| 2007–2008 (127) | 120 |
| 2006–2007 (122) | 114 |

Global Competitiveness Index 2008–2009 (134) 124



### Environment component 121

**Market environment 97**

1.01 Venture capital availability ..... 124
1.02 Financial market sophistication ..... 121
1.03 Availability of latest technologies ..... 129
1.04 State of cluster development ..... 122
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 86
1.07 Burden of government regulation ..... 59
1.08 Extent and effect of taxation ..... 22
1.09 Total tax rate, 2007* ..... 46
1.10 Time required to start a business, 2008* ..... 93
1.11 No. of procedures required to start a business, 2008* ..... 46
1.12 Intensity of local competition ..... 117
1.13 Freedom of the press ..... 55
1.14 Accessibility of digital content ..... 105

**Political and regulatory environment 131**

2.01 Effectiveness of law-making bodies ..... 131
2.02 Laws relating to ICT ..... 131
2.03 Judicial independence ..... 133
2.04 Intellectual property protection ..... 127
2.05 Efficiency of legal framework ..... 133
2.06 Property rights ..... 129
2.07 Quality of competition in the ISP sector ..... 133
2.08 Number of procedures to enforce a contract, 2008* ..... 67
2.09 Time to enforce a contract, 2008* ..... 78

**Infrastructure environment 98**

3.01 Number of telephone lines, 2007* ..... 99
3.02 Secure Internet servers, 2007* ..... 88
3.03 Electricity production, 2005* ..... 16
3.04 Availability of scientists and engineers ..... 131
3.05 Quality of scientific research institutions ..... 134
3.06 Tertiary enrollment, 2005* ..... 75
3.07 Education expenditure, 2006* ..... 69

### Readiness component 116

**Individual readiness 102**

4.01 Quality of math and science education ..... 130
4.02 Quality of the educational system ..... 134
4.03 Internet access in schools ..... 134
4.04 Buyer sophistication ..... 122
4.05 Residential telephone connection charge, 2007* ..... 97
4.06 Residential monthly telephone subscription, 2007* ..... 88
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband, 2006* ..... 82
4.09 Cost of mobile telephone call, 2007* ..... 84

**Business readiness 117**

5.01 Extent of staff training ..... 129
5.02 Local availability of research and training services ..... 131
5.03 Quality of management schools ..... 127
5.04 Company spending on R&D ..... 131
5.05 University-industry research collaboration ..... 133
5.06 Business telephone connection charge, 2007* ..... 90
5.07 Business monthly telephone subscription, 2007* ..... 84
5.08 Local supplier quality ..... 107
5.09 Local supplier quantity ..... 112
5.10 Computer, comm., and other services imports, 2006* ..... 117

**Government readiness 131**

6.01 Government prioritization of ICT ..... 134
6.02 Gov't procurement of advanced tech products ..... 132
6.03 Importance of ICT to government vision of the future ..... 130
6.04 E-Government Readiness Index, 2008* ..... 80

### Usage component 128

**Individual usage 87**

7.01 Mobile telephone subscribers, 2007* ..... 79
7.02 Personal computers, 2005* ..... 67
7.03 Broadband Internet subscribers, 2007* ..... 85
7.04 Internet users, 2007* ..... 109
7.05 Internet bandwidth, 2007* ..... 68

**Business usage 130**

8.01 Prevalence of foreign technology licensing ..... 131
8.02 Firm-level technology absorption ..... 123
8.03 Capacity for innovation ..... 129
8.04 Availability of new telephone lines ..... 123
8.05 Extent of business Internet use ..... 128

**Government usage 132**

9.01 Government success in ICT promotion ..... 133
9.02 Availability of government online services ..... 98
9.03 ICT use and government efficiency ..... 124
9.04 Presence of ICT in government offices ..... 132
9.05 E-Participation Index, 2008* ..... 95

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Peru

## Key indicators

Population (millions), 2007 ..... 27.9
GDP (PPP) per capita (int'l $), 2007 ..... 7,809
Internet users per 100 population, 2007 ..... 27.4
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 3.6
Mobile telephone subscribers per 100 population, 2007 ..... 55.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **89** |
| 2007–2008 (127) | 84 |
| 2006–2007 (122) | 78 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 83 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Philippines

## Key indicators

Population (millions), 2007 ..... 87.9
GDP (PPP) per capita (int'l $), 2007 ..... 3,383
Internet users per 100 population, 2007 ..... 6.0
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 1.1
Mobile telephone subscribers per 100 population, 2007 ..... 58.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **85** |
| 2007–2008 (127) | 81 |
| 2006–2007 (122) | 69 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 71 |



## Environment component 84

### Market environment 52

1.01 Venture capital availability ..... 77
1.02 Financial market sophistication ..... 57
1.03 Availability of latest technologies ..... 52
1.04 State of cluster development ..... 56
1.05 Utility patents, 2007* ..... 69
1.06 High-tech exports, 2006* ..... 1
1.07 Burden of government regulation ..... 109
1.08 Extent and effect of taxation ..... 65
1.09 Total tax rate, 2007* ..... 94
1.10 Time required to start a business, 2008* ..... 114
1.11 No. of procedures required to start a business, 2008* ..... 121
1.12 Intensity of local competition ..... 74
1.13 Freedom of the press ..... 45
1.14 Accessibility of digital content ..... 64

### Political and regulatory environment 87

2.01 Effectiveness of law-making bodies ..... 109
2.02 Laws relating to ICT ..... 60
2.03 Judicial independence ..... 83
2.04 Intellectual property protection ..... 89
2.05 Efficiency of legal framework ..... 104
2.06 Property rights ..... 92
2.07 Quality of competition in the ISP sector ..... 38
2.08 Number of procedures to enforce a contract, 2008* ..... 63
2.09 Time to enforce a contract, 2008* ..... 111

### Infrastructure environment 106

3.01 Number of telephone lines, 2006* ..... 107
3.02 Secure Internet servers, 2007* ..... 85
3.03 Electricity production, 2005* ..... 101
3.04 Availability of scientists and engineers ..... 92
3.05 Quality of scientific research institutions ..... 86
3.06 Tertiary enrollment, 2006* ..... 72
3.07 Education expenditure, 2006* ..... 113

## Readiness component 86

### Individual readiness 83

4.01 Quality of math and science education ..... 100
4.02 Quality of the educational system ..... 46
4.03 Internet access in schools ..... 56
4.04 Buyer sophistication ..... 50
4.05 Residential telephone connection charge, 2007* ..... 91
4.06 Residential monthly telephone subscription, 2007* ..... 115
4.07 High-speed monthly broadband subscription, 2006* ..... 86
4.08 Lowest cost of broadband, 2006* ..... 58
4.09 Cost of mobile telephone call, 2006* ..... 92

### Business readiness 97

5.01 Extent of staff training ..... 30
5.02 Local availability of research and training services ..... 51
5.03 Quality of management schools ..... 31
5.04 Company spending on R&D ..... 47
5.05 University-industry research collaboration ..... 63
5.06 Business telephone connection charge, 2007* ..... 100
5.07 Business monthly telephone subscription, 2007* ..... 129
5.08 Local supplier quality ..... 64
5.09 Local supplier quantity ..... 77
5.10 Computer, comm., and other services imports, 2006* ..... 87

### Government readiness 88

6.01 Government prioritization of ICT ..... 92
6.02 Gov't procurement of advanced tech products ..... 110
6.03 Importance of ICT to government vision of the future ..... 94
6.04 E-Government Readiness Index, 2008* ..... 63

## Usage component 81

### Individual usage 91

7.01 Mobile telephone subscribers, 2007* ..... 85
7.02 Personal computers, 2006* ..... 68
7.03 Broadband Internet subscribers, 2007* ..... 80
7.04 Internet users, 2007* ..... 103
7.05 Internet bandwidth, 2007* ..... 76

### Business usage 61

8.01 Prevalence of foreign technology licensing ..... 55
8.02 Firm-level technology absorption ..... 49
8.03 Capacity for innovation ..... 63
8.04 Availability of new telephone lines ..... 74
8.05 Extent of business Internet use ..... 75

### Government usage 79

9.01 Government success in ICT promotion ..... 97
9.02 Availability of government online services ..... 80
9.03 ICT use and government efficiency ..... 79
9.04 Presence of ICT in government offices ..... 95
9.05 E-Participation Index, 2008* ..... 43

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Poland

## Key indicators

Population (millions), 2007 ..... 38.1
GDP (PPP) per capita (int'l $), 2007 ..... 16,316
Internet users per 100 population, 2007 ..... 42.0
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 5.5
Mobile telephone subscribers per 100 population, 2007 ..... 108.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **69** |
| 2007–2008 (127) | 62 |
| 2006–2007 (122) | 58 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 53 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Portugal

## Key indicators

Population (millions), 2007 ..... 10.6
GDP (PPP) per capita (int'l $), 2007 ..... 21,779
Internet users per 100 population, 2007 ..... 33.4
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 8.3
Mobile telephone subscribers per 100 population, 2007 ..... 126.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **30** |
| 2007–2008 (127) | 28 |
| 2006–2007 (122) | 28 |

Global Competitiveness Index 2008–2009 (134) 43



### Environment component 30

**Market environment 37**

1.01 Venture capital availability ..... 43
1.02 Financial market sophistication ..... 30
1.03 Availability of latest technologies ..... 28
1.04 State of cluster development ..... 68
1.05 Utility patents, 2007* ..... 42
1.06 High-tech exports, 2006* ..... 36
1.07 Burden of government regulation ..... 74
1.08 Extent and effect of taxation ..... 95
1.09 Total tax rate, 2007* ..... 71
1.10 Time required to start a business, 2008* ..... 9
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 41
1.13 Freedom of the press ..... 31
1.14 Accessibility of digital content ..... 26

**Political and regulatory environment 30**

2.01 Effectiveness of law-making bodies ..... 42
2.02 Laws relating to ICT ..... 23
2.03 Judicial independence ..... 32
2.04 Intellectual property protection ..... 29
2.05 Efficiency of legal framework ..... 65
2.06 Property rights ..... 35
2.07 Quality of competition in the ISP sector ..... 33
2.08 Number of procedures to enforce a contract, 2008* ..... 41
2.09 Time to enforce a contract, 2008* ..... 74

**Infrastructure environment 34**

3.01 Number of telephone lines, 2007* ..... 33
3.02 Secure Internet servers, 2007* ..... 34
3.03 Electricity production, 2005* ..... 50
3.04 Availability of scientists and engineers ..... 48
3.05 Quality of scientific research institutions ..... 33
3.06 Tertiary enrollment, 2006* ..... 33
3.07 Education expenditure, 2006* ..... 22

### Readiness component 32

**Individual readiness 48**

4.01 Quality of math and science education ..... 97
4.02 Quality of the educational system ..... 73
4.03 Internet access in schools ..... 29
4.04 Buyer sophistication ..... 57
4.05 Residential telephone connection charge, 2006* ..... 56
4.06 Residential monthly telephone subscription, 2006* ..... 68
4.07 High-speed monthly broadband subscription, 2006* ..... 37
4.08 Lowest cost of broadband, 2006* ..... 21
4.09 Cost of mobile telephone call, 2006* ..... 27

**Business readiness 41**

5.01 Extent of staff training ..... 70
5.02 Local availability of research and training services ..... 34
5.03 Quality of management schools ..... 38
5.04 Company spending on R&D ..... 53
5.05 University-industry research collaboration ..... 42
5.06 Business telephone connection charge, 2006* ..... 50
5.07 Business monthly telephone subscription, 2006* ..... 45
5.08 Local supplier quality ..... 50
5.09 Local supplier quantity ..... 54
5.10 Computer, comm., and other services imports, 2006* ..... 40

**Government readiness 13**

6.01 Government prioritization of ICT ..... 9
6.02 Gov't procurement of advanced tech products ..... 31
6.03 Importance of ICT to government vision of the future ..... 4
6.04 E-Government Readiness Index, 2008* ..... 31

### Usage component 28

**Individual usage 41**

7.01 Mobile telephone subscribers, 2007* ..... 13
7.02 Personal computers, 2006* ..... 45
7.03 Broadband Internet subscribers, 2007* ..... 31
7.04 Internet users, 2007* ..... 47
7.05 Internet bandwidth, 2005* ..... 42

**Business usage 28**

8.01 Prevalence of foreign technology licensing ..... 15
8.02 Firm-level technology absorption ..... 39
8.03 Capacity for innovation ..... 32
8.04 Availability of new telephone lines ..... 31
8.05 Extent of business Internet use ..... 38

**Government usage 18**

9.01 Government success in ICT promotion ..... 12
9.02 Availability of government online services ..... 9
9.03 ICT use and government efficiency ..... 9
9.04 Presence of ICT in government offices ..... 20
9.05 E-Participation Index, 2008* ..... 47

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Puerto Rico

## Key indicators

Population (millions), 2007 ..... 3.9
GDP (PPP) per capita (int'l $) ..... n/a
Internet users per 100 population, 2007 ..... 25.1
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 5.1
Mobile telephone subscribers per 100 population, 2005 ..... 84.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **42** |
| 2007–2008 (127) | 39 |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 41 |

## Environment component 33

### Market environment 31

1.01 Venture capital availability ..... 39
1.02 Financial market sophistication ..... 22
1.03 Availability of latest technologies ..... 27
1.04 State of cluster development ..... 30
1.05 Utility patents, 2007* ..... 27
1.06 High-tech exports, 2006* ..... 16
1.07 Burden of government regulation ..... 131
1.08 Extent and effect of taxation ..... 103
1.09 Total tax rate, 2007* ..... 116
1.10 Time required to start a business, 2008* ..... 15
1.11 No. of procedures required to start a business, 2008* ..... 46
1.12 Intensity of local competition ..... 8
1.13 Freedom of the press ..... 15
1.14 Accessibility of digital content ..... 33

### Political and regulatory environment 31

2.01 Effectiveness of law-making bodies ..... 120
2.02 Laws relating to ICT ..... 36
2.03 Judicial independence ..... 44
2.04 Intellectual property protection ..... 17
2.05 Efficiency of legal framework ..... 39
2.06 Property rights ..... 21
2.07 Quality of competition in the ISP sector ..... 19
2.08 Number of procedures to enforce a contract, 2008* ..... 78
2.09 Time to enforce a contract, 2008* ..... 87

### Infrastructure environment 42

3.01 Number of telephone lines, 2005* ..... 54
3.02 Secure Internet servers, 2007* ..... 46
3.03 Electricity production, 2005* ..... 34
3.04 Availability of scientists and engineers ..... 12
3.05 Quality of scientific research institutions ..... 35
3.06 Tertiary enrollment, 2005* ..... 52
3.07 Education expenditure* ..... n/a

## Readiness component 49

### Individual readiness 60

4.01 Quality of math and science education ..... 88
4.02 Quality of the educational system ..... 58
4.03 Internet access in schools ..... 52
4.04 Buyer sophistication ..... 32
4.05 Residential telephone connection charge, 2005* ..... 28
4.06 Residential monthly telephone subscription, 2007* ..... 24
4.07 High-speed monthly broadband subscription, 2006* ..... 12
4.08 Lowest cost of broadband* ..... n/a
4.09 Cost of mobile telephone call, 2005* ..... 23

### Business readiness 25

5.01 Extent of staff training ..... 23
5.02 Local availability of research and training services ..... 31
5.03 Quality of management schools ..... 44
5.04 Company spending on R&D ..... 41
5.05 University-industry research collaboration ..... 27
5.06 Business telephone connection charge, 2005* ..... 46
5.07 Business monthly telephone subscription, 2007* ..... 49
5.08 Local supplier quality ..... 16
5.09 Local supplier quantity ..... 35
5.10 Computer, comm., and other services imports* ..... n/a

### Government readiness 84

6.01 Government prioritization of ICT ..... 93
6.02 Gov't procurement of advanced tech products ..... 75
6.03 Importance of ICT to government vision of the future ..... 103
6.04 E-Government Readiness Index* ..... n/a

## Usage component 50

### Individual usage 65

7.01 Mobile telephone subscribers, 2005* ..... 58
7.02 Personal computers, 2005* ..... 116
7.03 Broadband Internet subscribers, 2005* ..... 58
7.04 Internet users, 2007* ..... 60
7.05 Internet bandwidth, 2005* ..... 55

### Business usage 34

8.01 Prevalence of foreign technology licensing ..... 39
8.02 Firm-level technology absorption ..... 22
8.03 Capacity for innovation ..... 48
8.04 Availability of new telephone lines ..... 63
8.05 Extent of business Internet use ..... 22

### Government usage 55

9.01 Government success in ICT promotion ..... 92
9.02 Availability of government online services ..... 61
9.03 ICT use and government efficiency ..... 92
9.04 Presence of ICT in government offices ..... 73
9.05 E-Participation Index* ..... n/a

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Qatar

## Key indicators

Population (millions), 2007 ..... 0.8
GDP (PPP) per capita (int'l $), 2007 ..... 85,638
Internet users per 100 population, 2007 ..... 41.8
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 27.7
Mobile telephone subscribers per 100 population, 2007 ..... 150.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **29** |
| 2007–2008 (127) | 32 |
| 2006–2007 (122) | 36 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 26 |



## Environment component 29

### Market environment 26

1.01 Venture capital availability ..... 24
1.02 Financial market sophistication ..... 38
1.03 Availability of latest technologies ..... 32
1.04 State of cluster development ..... 33
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 92
1.07 Burden of government regulation ..... 8
1.08 Extent and effect of taxation ..... 4
1.09 Total tax rate, 2007* ..... 1
1.10 Time required to start a business, 2008* ..... 9
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 53
1.13 Freedom of the press ..... 70
1.14 Accessibility of digital content ..... 28

### Political and regulatory environment 33

2.01 Effectiveness of law-making bodies ..... 37
2.02 Laws relating to ICT ..... 33
2.03 Judicial independence ..... 21
2.04 Intellectual property protection ..... 25
2.05 Efficiency of legal framework ..... 24
2.06 Property rights ..... 31
2.07 Quality of competition in the ISP sector ..... 116
2.08 Number of procedures to enforce a contract, 2008* ..... 107
2.09 Time to enforce a contract, 2008* ..... 71

### Infrastructure environment 35

3.01 Number of telephone lines, 2007* ..... 48
3.02 Secure Internet servers, 2007* ..... 45
3.03 Electricity production, 2005* ..... 4
3.04 Availability of scientists and engineers ..... 53
3.05 Quality of scientific research institutions ..... 30
3.06 Tertiary enrollment, 2007* ..... 92
3.07 Education expenditure* ..... n/a

## Readiness component 26

### Individual readiness 20

4.01 Quality of math and science education ..... 12
4.02 Quality of the educational system ..... 16
4.03 Internet access in schools ..... 28
4.04 Buyer sophistication ..... 39
4.05 Residential telephone connection charge, 2007* ..... 5
4.06 Residential monthly telephone subscription, 2007* ..... 2
4.07 High-speed monthly broadband subscription, 2006* ..... 23
4.08 Lowest cost of broadband, 2006* ..... 27
4.09 Cost of mobile telephone call, 2006* ..... 5

### Business readiness 30

5.01 Extent of staff training ..... 33
5.02 Local availability of research and training services ..... 45
5.03 Quality of management schools ..... 35
5.04 Company spending on R&D ..... 35
5.05 University-industry research collaboration ..... 25
5.06 Business telephone connection charge, 2007* ..... 6
5.07 Business monthly telephone subscription, 2007* ..... 14
5.08 Local supplier quality ..... 72
5.09 Local supplier quantity ..... 37
5.10 Computer, comm., and other services imports* ..... n/a

### Government readiness 22

6.01 Government prioritization of ICT ..... 15
6.02 Gov't procurement of advanced tech products ..... 9
6.03 Importance of ICT to government vision of the future ..... 6
6.04 E-Government Readiness Index, 2008* ..... 52

## Usage component 31

### Individual usage 38

7.01 Mobile telephone subscribers, 2007* ..... 2
7.02 Personal computers, 2006* ..... 40
7.03 Broadband Internet subscribers, 2007* ..... 39
7.04 Internet users, 2007* ..... 40
7.05 Internet bandwidth, 2007* ..... 28

### Business usage 41

8.01 Prevalence of foreign technology licensing ..... 32
8.02 Firm-level technology absorption ..... 40
8.03 Capacity for innovation ..... 60
8.04 Availability of new telephone lines ..... 48
8.05 Extent of business Internet use ..... 53

### Government usage 25

9.01 Government success in ICT promotion ..... 8
9.02 Availability of government online services ..... 25
9.03 ICT use and government efficiency ..... 15
9.04 Presence of ICT in government offices ..... 23
9.05 E-Participation Index, 2008* ..... 66

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Romania

## Key indicators



## Networked Readiness Index





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Russian Federation

## Key indicators

Population (millions), 2007 ..... 141.6
GDP (PPP) per capita (int'l $), 2007 ..... 14,705
Internet users per 100 population, 2007 ..... 21.1
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 1.0
Mobile telephone subscribers per 100 population, 2007 ..... 114.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **74** |
| 2007–2008 (127) | 72 |
| 2006–2007 (122) | 70 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 51 |





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Saudi Arabia

## Key indicators

Population (millions), 2007 ..... 24.2
GDP (PPP) per capita (int'l $), 2007 ..... 22,852
Internet users per 100 population, 2007 ..... 25.1
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 1.2
Mobile telephone subscribers per 100 population, 2007 ..... 114.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **40** |
| 2007–2008 (127) | 48 |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 27 |

## Environment component 38



## Readiness component 41



## Usage component 44



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Senegal

## Key indicators

Population (millions), 2007 ..... 12.4
GDP (PPP) per capita (int'l $), 2007 ..... 1,692
Internet users per 100 population, 2007 ..... 6.6
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 1.4
Mobile telephone subscribers per 100 population, 2007 ..... 33.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **80** |
| 2007–2008 (127) | 85 |
| 2006–2007 (122) | n/a |

Global Competitiveness Index 2008–2009 (134) 96



### Environment component 89

#### Market environment 62

1.01 Venture capital availability ..... 127
1.02 Financial market sophistication ..... 93
1.03 Availability of latest technologies ..... 39
1.04 State of cluster development ..... 69
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2004* ..... 65
1.07 Burden of government regulation ..... 80
1.08 Extent and effect of taxation ..... 87
1.09 Total tax rate, 2007* ..... 79
1.10 Time required to start a business, 2008* ..... 20
1.11 No. of procedures required to start a business, 2008* ..... 8
1.12 Intensity of local competition ..... 35
1.13 Freedom of the press ..... 71
1.14 Accessibility of digital content ..... 60

#### Political and regulatory environment 101

2.01 Effectiveness of law-making bodies ..... 112
2.02 Laws relating to ICT ..... 70
2.03 Judicial independence ..... 117
2.04 Intellectual property protection ..... 65
2.05 Efficiency of legal framework ..... 89
2.06 Property rights ..... 76
2.07 Quality of competition in the ISP sector ..... 56
2.08 Number of procedures to enforce a contract, 2008* ..... 109
2.09 Time to enforce a contract, 2008* ..... 103

#### Infrastructure environment 100

3.01 Number of telephone lines, 2007* ..... 113
3.02 Secure Internet servers, 2007* ..... 87
3.03 Electricity production, 2005* ..... 115
3.04 Availability of scientists and engineers ..... 37
3.05 Quality of scientific research institutions ..... 64
3.06 Tertiary enrollment, 2005* ..... 110
3.07 Education expenditure, 2006* ..... 50

### Readiness component 84

#### Individual readiness 99

4.01 Quality of math and science education ..... 50
4.02 Quality of the educational system ..... 59
4.03 Internet access in schools ..... 57
4.04 Buyer sophistication ..... 126
4.05 Residential telephone connection charge, 2007* ..... 88
4.06 Residential monthly telephone subscription, 2007* ..... 125
4.07 High-speed monthly broadband subscription, 2006* ..... 90
4.08 Lowest cost of broadband, 2006* ..... 95
4.09 Cost of mobile telephone call, 2006* ..... 109

#### Business readiness 66

5.01 Extent of staff training ..... 110
5.02 Local availability of research and training services ..... 30
5.03 Quality of management schools ..... 29
5.04 Company spending on R&D ..... 68
5.05 University-industry research collaboration ..... 71
5.06 Business telephone connection charge, 2007* ..... 81
5.07 Business monthly telephone subscription, 2006* ..... 113
5.08 Local supplier quality ..... 48
5.09 Local supplier quantity ..... 38
5.10 Computer, comm., and other services imports, 2004* ..... 62

#### Government readiness 71

6.01 Government prioritization of ICT ..... 36
6.02 Gov't procurement of advanced tech products ..... 24
6.03 Importance of ICT to government vision of the future ..... 49
6.04 E-Government Readiness Index, 2008* ..... 120

### Usage component 68

#### Individual usage 104

7.01 Mobile telephone subscribers, 2007* ..... 106
7.02 Personal computers, 2005* ..... 100
7.03 Broadband Internet subscribers, 2007* ..... 93
7.04 Internet users, 2007* ..... 101
7.05 Internet bandwidth, 2007* ..... 72

#### Business usage 52

8.01 Prevalence of foreign technology licensing ..... 80
8.02 Firm-level technology absorption ..... 19
8.03 Capacity for innovation ..... 78
8.04 Availability of new telephone lines ..... 55
8.05 Extent of business Internet use ..... 43

#### Government usage 46

9.01 Government success in ICT promotion ..... 24
9.02 Availability of government online services ..... 53
9.03 ICT use and government efficiency ..... 46
9.04 Presence of ICT in government offices ..... 33
9.05 E-Participation Index, 2008* ..... 58

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Serbia

## Key indicators

Population (millions), 2007 ..... 7.4
GDP (PPP) per capita (int'l $), 2007 ..... 10,071
Internet users per 100 population, 2007 ..... 15.2
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 21.4
Mobile telephone subscribers per 100 population, 2007 ..... 85.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **84** |
| 2007–2008 (127) | n/a |
| 2006–2007 (122) | n/a |

Global Competitiveness Index 2008–2009 (134) 85

## Environment component 79

### Market environment 114

1.01 Venture capital availability ..... 85
1.02 Financial market sophistication ..... 122
1.03 Availability of latest technologies ..... 120
1.04 State of cluster development ..... 104
1.05 Utility patents, 2007* ..... 50
1.06 High-tech exports, 2006* ..... 52
1.07 Burden of government regulation ..... 132
1.08 Extent and effect of taxation ..... 73
1.09 Total tax rate, 2007* ..... 37
1.10 Time required to start a business, 2008* ..... 66
1.11 No. of procedures required to start a business, 2008* ..... 100
1.12 Intensity of local competition ..... 128
1.13 Freedom of the press ..... 93
1.14 Accessibility of digital content ..... 95

### Political and regulatory environment 98

2.01 Effectiveness of law-making bodies ..... 93
2.02 Laws relating to ICT ..... 74
2.03 Judicial independence ..... 106
2.04 Intellectual property protection ..... 105
2.05 Efficiency of legal framework ..... 102
2.06 Property rights ..... 108
2.07 Quality of competition in the ISP sector ..... 84
2.08 Number of procedures to enforce a contract, 2008* ..... 55
2.09 Time to enforce a contract, 2008* ..... 89

### Infrastructure environment 53

3.01 Number of telephone lines, 2007* ..... 41
3.02 Secure Internet servers, 2007* ..... 80
3.03 Electricity production, 2004* ..... 48
3.04 Availability of scientists and engineers ..... 50
3.05 Quality of scientific research institutions ..... 49
3.06 Tertiary enrollment, 2005* ..... 57
3.07 Education expenditure, 2006* ..... 82

## Readiness component 73

### Individual readiness 59

4.01 Quality of math and science education ..... 31
4.02 Quality of the educational system ..... 49
4.03 Internet access in schools ..... 79
4.04 Buyer sophistication ..... 102
4.05 Residential telephone connection charge, 2007* ..... 80
4.06 Residential monthly telephone subscription, 2007* ..... 10
4.07 High-speed monthly broadband subscription, 2006* ..... 61
4.08 Lowest cost of broadband, 2006* ..... 77
4.09 Cost of mobile telephone call, 2006* ..... 65

### Business readiness 77

5.01 Extent of staff training ..... 121
5.02 Local availability of research and training services ..... 74
5.03 Quality of management schools ..... 87
5.04 Company spending on R&D ..... 97
5.05 University-industry research collaboration ..... 62
5.06 Business telephone connection charge, 2007* ..... 87
5.07 Business monthly telephone subscription, 2007* ..... 5
5.08 Local supplier quality ..... 109
5.09 Local supplier quantity ..... 91
5.10 Computer, comm., and other services imports* ..... n/a

### Government readiness 85

6.01 Government prioritization of ICT ..... 86
6.02 Gov't procurement of advanced tech products ..... 92
6.03 Importance of ICT to government vision of the future ..... 101
6.04 E-Government Readiness Index, 2008* ..... 71

## Usage component 93

### Individual usage 58

7.01 Mobile telephone subscribers, 2007* ..... 57
7.02 Personal computers, 2006* ..... 47
7.03 Broadband Internet subscribers, 2007* ..... 56
7.04 Internet users, 2007* ..... 80
7.05 Internet bandwidth, 2007* ..... 33

### Business usage 113

8.01 Prevalence of foreign technology licensing ..... 120
8.02 Firm-level technology absorption ..... 126
8.03 Capacity for innovation ..... 92
8.04 Availability of new telephone lines ..... 107
8.05 Extent of business Internet use ..... 109

### Government usage 98

9.01 Government success in ICT promotion ..... 107
9.02 Availability of government online services ..... 106
9.03 ICT use and government efficiency ..... 69
9.04 Presence of ICT in government offices ..... 90
9.05 E-Participation Index, 2008* ..... 95

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Singapore

## Key indicators

Population (millions), 2007 ..... 4.6
GDP (PPP) per capita (int'l $), 2007 ..... 49,754
Internet users per 100 population, 2007 ..... 70.0
Internet bandwidth (mB/s) per 10,000 population ..... n/a
Mobile telephone subscribers per 100 population, 2007 ..... 126.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **4** |
| 2007–2008 (127) | 5 |
| 2006–2007 (122) | 3 |

Global Competitiveness Index 2008–2009 (134) 5



## Environment component 9

### Market environment 3

1.01 Venture capital availability ..... 12
1.02 Financial market sophistication ..... 10
1.03 Availability of latest technologies ..... 14
1.04 State of cluster development ..... 3
1.05 Utility patents, 2007* ..... 11
1.06 High-tech exports, 2006* ..... 4
1.07 Burden of government regulation ..... 1
1.08 Extent and effect of taxation ..... 5
1.09 Total tax rate, 2007* ..... 18
1.10 Time required to start a business, 2008* ..... 4
1.11 No. of procedures required to start a business, 2008* ..... 8
1.12 Intensity of local competition ..... 30
1.13 Freedom of the press ..... 120
1.14 Accessibility of digital content ..... 13

### Political and regulatory environment 1

2.01 Effectiveness of law-making bodies ..... 1
2.02 Laws relating to ICT ..... 3
2.03 Judicial independence ..... 15
2.04 Intellectual property protection ..... 2
2.05 Efficiency of legal framework ..... 2
2.06 Property rights ..... 4
2.07 Quality of competition in the ISP sector ..... 12
2.08 Number of procedures to enforce a contract, 2008* ..... 2
2.09 Time to enforce a contract, 2008* ..... 1

### Infrastructure environment 23

3.01 Number of telephone lines, 2007* ..... 28
3.02 Secure Internet servers, 2007* ..... 21
3.03 Electricity production, 2005* ..... 15
3.04 Availability of scientists and engineers ..... 22
3.05 Quality of scientific research institutions ..... 13
3.06 Tertiary enrollment, 2005* ..... 31
3.07 Education expenditure, 2006* ..... 110

## Readiness component 1

### Individual readiness 2

4.01 Quality of math and science education ..... 2
4.02 Quality of the educational system ..... 2
4.03 Internet access in schools ..... 9
4.04 Buyer sophistication ..... 9
4.05 Residential telephone connection charge, 2007* ..... 8
4.06 Residential monthly telephone subscription, 2007* ..... 7
4.07 High-speed monthly broadband subscription, 2006* ..... 30
4.08 Lowest cost of broadband, 2006* ..... 3
4.09 Cost of mobile telephone call, 2006* ..... 13

### Business readiness 10

5.01 Extent of staff training ..... 3
5.02 Local availability of research and training services ..... 13
5.03 Quality of management schools ..... 7
5.04 Company spending on R&D ..... 10
5.05 University-industry research collaboration ..... 5
5.06 Business telephone connection charge, 2007* ..... 9
5.07 Business monthly telephone subscription, 2007* ..... 3
5.08 Local supplier quality ..... 22
5.09 Local supplier quantity ..... 44
5.10 Computer, comm., and other services imports, 2006* ..... 27

### Government readiness 1

6.01 Government prioritization of ICT ..... 1
6.02 Gov't procurement of advanced tech products ..... 1
6.03 Importance of ICT to government vision of the future ..... 1
6.04 E-Government Readiness Index, 2008* ..... 23

## Usage component 3

### Individual usage 7

7.01 Mobile telephone subscribers, 2007* ..... 12
7.02 Personal computers, 2006* ..... 9
7.03 Broadband Internet subscribers, 2007* ..... 24
7.04 Internet users, 2007* ..... 9
7.05 Internet bandwidth* ..... n/a

### Business usage 13

8.01 Prevalence of foreign technology licensing ..... 4
8.02 Firm-level technology absorption ..... 13
8.03 Capacity for innovation ..... 19
8.04 Availability of new telephone lines ..... 6
8.05 Extent of business Internet use ..... 18

### Government usage 2

9.01 Government success in ICT promotion ..... 1
9.02 Availability of government online services ..... 2
9.03 ICT use and government efficiency ..... 1
9.04 Presence of ICT in government offices ..... 1
9.05 E-Participation Index, 2008* ..... 10

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Slovak Republic

## Key indicators

Population (millions), 2007 ..... 5.4
GDP (PPP) per capita (int'l $), 2007 ..... 20,268
Internet users per 100 population, 2007 ..... 43.6
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 29.1
Mobile telephone subscribers per 100 population, 2007 ..... 112.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **43** |
| 2007–2008 (127) | 43 |
| 2006–2007 (122) | 41 |

Global Competitiveness Index 2008–2009 (134) 46

## Environment component 50

### Market environment 39

1.01 Venture capital availability ..... 40
1.02 Financial market sophistication ..... 41
1.03 Availability of latest technologies ..... 46
1.04 State of cluster development ..... 70
1.05 Utility patents, 2007* ..... 46
1.06 High-tech exports, 2006* ..... 35
1.07 Burden of government regulation ..... 102
1.08 Extent and effect of taxation ..... 17
1.09 Total tax rate, 2007* ..... 82
1.10 Time required to start a business, 2008* ..... 45
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 17
1.13 Freedom of the press ..... 73
1.14 Accessibility of digital content ..... 37

### Political and regulatory environment 60

2.01 Effectiveness of law-making bodies ..... 89
2.02 Laws relating to ICT ..... 62
2.03 Judicial independence ..... 76
2.04 Intellectual property protection ..... 59
2.05 Efficiency of legal framework ..... 103
2.06 Property rights ..... 55
2.07 Quality of competition in the ISP sector ..... 52
2.08 Number of procedures to enforce a contract, 2008* ..... 14
2.09 Time to enforce a contract, 2008* ..... 68

### Infrastructure environment 50

3.01 Number of telephone lines, 2007* ..... 60
3.02 Secure Internet servers, 2007* ..... 47
3.03 Electricity production, 2005* ..... 37
3.04 Availability of scientists and engineers ..... 29
3.05 Quality of scientific research institutions ..... 81
3.06 Tertiary enrollment, 2006* ..... 48
3.07 Education expenditure, 2006* ..... 70

## Readiness component 48

### Individual readiness 39

4.01 Quality of math and science education ..... 35
4.02 Quality of the educational system ..... 76
4.03 Internet access in schools ..... 35
4.04 Buyer sophistication ..... 77
4.05 Residential telephone connection charge, 2006* ..... 39
4.06 Residential monthly telephone subscription, 2007* ..... 36
4.07 High-speed monthly broadband subscription, 2006* ..... 60
4.08 Lowest cost of broadband, 2006* ..... 39
4.09 Cost of mobile telephone call, 2006* ..... 34

### Business readiness 40

5.01 Extent of staff training ..... 40
5.02 Local availability of research and training services ..... 59
5.03 Quality of management schools ..... 68
5.04 Company spending on R&D ..... 55
5.05 University-industry research collaboration ..... 56
5.06 Business telephone connection charge, 2006* ..... 36
5.07 Business monthly telephone subscription, 2006* ..... 59
5.08 Local supplier quality ..... 51
5.09 Local supplier quantity ..... 28
5.10 Computer, comm., and other services imports* ..... n/a

### Government readiness 66

6.01 Government prioritization of ICT ..... 82
6.02 Gov't procurement of advanced tech products ..... 97
6.03 Importance of ICT to government vision of the future ..... 99
6.04 E-Government Readiness Index, 2008* ..... 38

## Usage component 43

### Individual usage 36

7.01 Mobile telephone subscribers, 2007* ..... 26
7.02 Personal computers, 2006* ..... 24
7.03 Broadband Internet subscribers, 2007* ..... 40
7.04 Internet users, 2007* ..... 36
7.05 Internet bandwidth, 2006* ..... 26

### Business usage 38

8.01 Prevalence of foreign technology licensing ..... 38
8.02 Firm-level technology absorption ..... 37
8.03 Capacity for innovation ..... 56
8.04 Availability of new telephone lines ..... 24
8.05 Extent of business Internet use ..... 58

### Government usage 94

9.01 Government success in ICT promotion ..... 114
9.02 Availability of government online services ..... 88
9.03 ICT use and government efficiency ..... 86
9.04 Presence of ICT in government offices ..... 55
9.05 E-Participation Index, 2008* ..... 95

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Slovenia

## Key indicators

Population (millions), 2007 ..... 2.0
GDP (PPP) per capita (int'l $), 2007 ..... 27,227
Internet users per 100 population, 2007 ..... 65.0
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 12.8
Mobile telephone subscribers per 100 population, 2007 ..... 96.3

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **31** |
| 2007–2008 (127) | 30 |
| 2006–2007 (122) | 30 |

Global Competitiveness Index 2008–2009 (134) 42



### Environment component 34

**Market environment 43**

1.01 Venture capital availability ..... 42
1.02 Financial market sophistication ..... 53
1.03 Availability of latest technologies ..... 48
1.04 State of cluster development ..... 48
1.05 Utility patents, 2007* ..... 26
1.06 High-tech exports, 2006* ..... 49
1.07 Burden of government regulation ..... 41
1.08 Extent and effect of taxation ..... 96
1.09 Total tax rate, 2007* ..... 53
1.10 Time required to start a business, 2008* ..... 57
1.11 No. of procedures required to start a business, 2008* ..... 16
1.12 Intensity of local competition ..... 60
1.13 Freedom of the press ..... 103
1.14 Accessibility of digital content ..... 32

**Political and regulatory environment 51**

2.01 Effectiveness of law-making bodies ..... 56
2.02 Laws relating to ICT ..... 25
2.03 Judicial independence ..... 60
2.04 Intellectual property protection ..... 41
2.05 Efficiency of legal framework ..... 53
2.06 Property rights ..... 57
2.07 Quality of competition in the ISP sector ..... 31
2.08 Number of procedures to enforce a contract, 2008* ..... 31
2.09 Time to enforce a contract, 2008* ..... 125

**Infrastructure environment 22**

3.01 Number of telephone lines, 2007* ..... 25
3.02 Secure Internet servers, 2007* ..... 30
3.03 Electricity production, 2005* ..... 26
3.04 Availability of scientists and engineers ..... 85
3.05 Quality of scientific research institutions ..... 28
3.06 Tertiary enrollment, 2006* ..... 5
3.07 Education expenditure, 2006* ..... 24

### Readiness component 33

**Individual readiness 30**

4.01 Quality of math and science education ..... 28
4.02 Quality of the educational system ..... 35
4.03 Internet access in schools ..... 16
4.04 Buyer sophistication ..... 45
4.05 Residential telephone connection charge, 2006* ..... 53
4.06 Residential monthly telephone subscription, 2006* ..... 56
4.07 High-speed monthly broadband subscription, 2006* ..... 32
4.08 Lowest cost of broadband, 2006* ..... 25
4.09 Cost of mobile telephone call, 2006* ..... 12

**Business readiness 29**

5.01 Extent of staff training ..... 43
5.02 Local availability of research and training services ..... 33
5.03 Quality of management schools ..... 39
5.04 Company spending on R&D ..... 27
5.05 University-industry research collaboration ..... 31
5.06 Business telephone connection charge, 2006* ..... 47
5.07 Business monthly telephone subscription, 2006* ..... 39
5.08 Local supplier quality ..... 31
5.09 Local supplier quantity ..... 58
5.10 Computer, comm., and other services imports, 2007* ..... 15

**Government readiness 41**

6.01 Government prioritization of ICT ..... 63
6.02 Gov't procurement of advanced tech products ..... 89
6.03 Importance of ICT to government vision of the future ..... 36
6.04 E-Government Readiness Index, 2008* ..... 26

### Usage component 29

**Individual usage 27**

7.01 Mobile telephone subscribers, 2007* ..... 44
7.02 Personal computers, 2006* ..... 26
7.03 Broadband Internet subscribers, 2007* ..... 28
7.04 Internet users, 2007* ..... 14
7.05 Internet bandwidth, 2005* ..... 36

**Business usage 35**

8.01 Prevalence of foreign technology licensing ..... 53
8.02 Firm-level technology absorption ..... 60
8.03 Capacity for innovation ..... 20
8.04 Availability of new telephone lines ..... 45
8.05 Extent of business Internet use ..... 35

**Government usage 38**

9.01 Government success in ICT promotion ..... 62
9.02 Availability of government online services ..... 30
9.03 ICT use and government efficiency ..... 23
9.04 Presence of ICT in government offices ..... 31
9.05 E-Participation Index, 2008* ..... 53

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# South Africa

## Key indicators

Population (millions), 2007 ..... 47.6
GDP (PPP) per capita (int'l $), 2007 ..... 9,767
Internet users per 100 population, 2007 ..... 8.2
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.7
Mobile telephone subscribers per 100 population, 2007 ..... 87.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **52** |
| 2007–2008 (127) | 51 |
| 2006–2007 (122) | 47 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 45 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Spain

## Key indicators

Population (millions), 2007 ..... 44.9
GDP (PPP) per capita (int'l $), 2007 ..... 30,118
Internet users per 100 population, 2007 ..... 44.5
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 28.2
Mobile telephone subscribers per 100 population, 2007 ..... 110.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **34** |
| 2007–2008 (127) | 31 |
| 2006–2007 (122) | 32 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 29 |



## Environment component 35

### Market environment 46

1.01 Venture capital availability ..... 32
1.02 Financial market sophistication ..... 23
1.03 Availability of latest technologies ..... 40
1.04 State of cluster development ..... 37
1.05 Utility patents, 2007* ..... 28
1.06 High-tech exports, 2006* ..... 46
1.07 Burden of government regulation ..... 94
1.08 Extent and effect of taxation ..... 75
1.09 Total tax rate, 2007* ..... 110
1.10 Time required to start a business, 2008* ..... 109
1.11 No. of procedures required to start a business, 2008* ..... 86
1.12 Intensity of local competition ..... 15
1.13 Freedom of the press ..... 40
1.14 Accessibility of digital content ..... 30

### Political and regulatory environment 40

2.01 Effectiveness of law-making bodies ..... 38
2.02 Laws relating to ICT ..... 35
2.03 Judicial independence ..... 56
2.04 Intellectual property protection ..... 34
2.05 Efficiency of legal framework ..... 43
2.06 Property rights ..... 42
2.07 Quality of competition in the ISP sector ..... 77
2.08 Number of procedures to enforce a contract, 2008* ..... 78
2.09 Time to enforce a contract, 2008* ..... 60

### Infrastructure environment 31

3.01 Number of telephone lines, 2007* ..... 27
3.02 Secure Internet servers, 2007* ..... 28
3.03 Electricity production, 2005* ..... 31
3.04 Availability of scientists and engineers ..... 38
3.05 Quality of scientific research institutions ..... 55
3.06 Tertiary enrollment, 2006* ..... 18
3.07 Education expenditure, 2006* ..... 78

## Readiness component 34

### Individual readiness 37

4.01 Quality of math and science education ..... 78
4.02 Quality of the educational system ..... 52
4.03 Internet access in schools ..... 43
4.04 Buyer sophistication ..... 31
4.05 Residential telephone connection charge, 2006* ..... 33
4.06 Residential monthly telephone subscription, 2006* ..... 47
4.07 High-speed monthly broadband subscription, 2006* ..... 25
4.08 Lowest cost of broadband, 2006* ..... 34
4.09 Cost of mobile telephone call, 2005* ..... 38

### Business readiness 24

5.01 Extent of staff training ..... 63
5.02 Local availability of research and training services ..... 37
5.03 Quality of management schools ..... 6
5.04 Company spending on R&D ..... 39
5.05 University-industry research collaboration ..... 46
5.06 Business telephone connection charge, 2006* ..... 29
5.07 Business monthly telephone subscription, 2006* ..... 31
5.08 Local supplier quality ..... 25
5.09 Local supplier quantity ..... 10
5.10 Computer, comm., and other services imports, 2007* ..... 16

### Government readiness 37

6.01 Government prioritization of ICT ..... 84
6.02 Gov't procurement of advanced tech products ..... 55
6.03 Importance of ICT to government vision of the future ..... 54
6.04 E-Government Readiness Index, 2008* ..... 20

## Usage component 34

### Individual usage 30

7.01 Mobile telephone subscribers, 2007* ..... 30
7.02 Personal computers, 2006* ..... 29
7.03 Broadband Internet subscribers, 2007* ..... 27
7.04 Internet users, 2007* ..... 33
7.05 Internet bandwidth, 2005* ..... 27

### Business usage 42

8.01 Prevalence of foreign technology licensing ..... 35
8.02 Firm-level technology absorption ..... 57
8.03 Capacity for innovation ..... 30
8.04 Availability of new telephone lines ..... 57
8.05 Extent of business Internet use ..... 62

### Government usage 44

9.01 Government success in ICT promotion ..... 96
9.02 Availability of government online services ..... 40
9.03 ICT use and government efficiency ..... 40
9.04 Presence of ICT in government offices ..... 39
9.05 E-Participation Index, 2008* ..... 32

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Sri Lanka

## Key indicators

Population (millions), 2007 ..... 19.9
GDP (PPP) per capita (int'l $), 2007 ..... 4,265
Internet users per 100 population, 2007 ..... 4.0
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.5
Mobile telephone subscribers per 100 population, 2007 ..... 41.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **72** |
| 2007–2008 (127) | 79 |
| 2006–2007 (122) | 86 |

Global Competitiveness Index 2008–2009 (134) 77



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Suriname

## Key indicators

Population (millions), 2007 ..... 0.5
GDP (PPP) per capita (int'l $), 2007 ..... 7,762
Internet users per 100 population, 2007 ..... 9.6
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 4.4
Mobile telephone subscribers per 100 population, 2006 ..... 70.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **117** |
| 2007–2008 (127) | 117 |
| 2006–2007 (122) | 110 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 103 |



## Environment component 126

### Market environment 123

1.01 Venture capital availability ..... 129
1.02 Financial market sophistication ..... 105
1.03 Availability of latest technologies ..... 121
1.04 State of cluster development ..... 118
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports* ..... n/a
1.07 Burden of government regulation ..... 108
1.08 Extent and effect of taxation ..... 108
1.09 Total tax rate, 2007* ..... 18
1.10 Time required to start a business, 2008* ..... 130
1.11 No. of procedures required to start a business, 2008* ..... 112
1.12 Intensity of local competition ..... 94
1.13 Freedom of the press ..... 57
1.14 Accessibility of digital content ..... 124

### Political and regulatory environment 133

2.01 Effectiveness of law-making bodies ..... 130
2.02 Laws relating to ICT ..... 134
2.03 Judicial independence ..... 50
2.04 Intellectual property protection ..... 128
2.05 Efficiency of legal framework ..... 83
2.06 Property rights ..... 106
2.07 Quality of competition in the ISP sector ..... 134
2.08 Number of procedures to enforce a contract, 2008* ..... 109
2.09 Time to enforce a contract, 2008* ..... 129

### Infrastructure environment 99

3.01 Number of telephone lines, 2006* ..... 70
3.02 Secure Internet servers, 2007* ..... 62
3.03 Electricity production, 2005* ..... 59
3.04 Availability of scientists and engineers ..... 118
3.05 Quality of scientific research institutions ..... 111
3.06 Tertiary enrollment* ..... n/a
3.07 Education expenditure* ..... n/a

## Readiness component 99

### Individual readiness 84

4.01 Quality of math and science education ..... 87
4.02 Quality of the educational system ..... 101
4.03 Internet access in schools ..... 110
4.04 Buyer sophistication ..... 98
4.05 Residential telephone connection charge, 2005* ..... 100
4.06 Residential monthly telephone subscription, 2005* ..... 18
4.07 High-speed monthly broadband subscription, 2006* ..... 75
4.08 Lowest cost of broadband, 2006* ..... 94
4.09 Cost of mobile telephone call, 2006* ..... 83

### Business readiness 70

5.01 Extent of staff training ..... 108
5.02 Local availability of research and training services ..... 123
5.03 Quality of management schools ..... 99
5.04 Company spending on R&D ..... 89
5.05 University-industry research collaboration ..... 97
5.06 Business telephone connection charge, 2005* ..... 96
5.07 Business monthly telephone subscription, 2005* ..... 11
5.08 Local supplier quality ..... 96
5.09 Local supplier quantity ..... 119
5.10 Computer, comm., and other services imports, 2007* ..... 4

### Government readiness 133

6.01 Government prioritization of ICT ..... 130
6.02 Gov't procurement of advanced tech products ..... 128
6.03 Importance of ICT to government vision of the future ..... 132
6.04 E-Government Readiness Index, 2008* ..... 102

## Usage component 129

### Individual usage 84

7.01 Mobile telephone subscribers, 2006* ..... 78
7.02 Personal computers, 2005* ..... 86
7.03 Broadband Internet subscribers, 2006* ..... 88
7.04 Internet users, 2007* ..... 95
7.05 Internet bandwidth, 2006* ..... 58

### Business usage 127

8.01 Prevalence of foreign technology licensing ..... 128
8.02 Firm-level technology absorption ..... 122
8.03 Capacity for innovation ..... 104
8.04 Availability of new telephone lines ..... 124
8.05 Extent of business Internet use ..... 111

### Government usage 133

9.01 Government success in ICT promotion ..... 129
9.02 Availability of government online services ..... 134
9.03 ICT use and government efficiency ..... 133
9.04 Presence of ICT in government offices ..... 133
9.05 E-Participation Index, 2008* ..... 123

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Sweden

## Key indicators

Population (millions), 2007 ..... 9.1
GDP (PPP) per capita (int'l $), 2007 ..... 36,578
Internet users per 100 population, 2007 ..... 76.8
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 174.4
Mobile telephone subscribers per 100 population, 2007 ..... 113.7

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **2** |
| 2007–2008 (127) | 2 |
| 2006–2007 (122) | 2 |

Global Competitiveness Index 2008–2009 (134) 4

## Environment component 2

### Market environment 10

1.01 Venture capital availability ..... 5
1.02 Financial market sophistication ..... 5
1.03 Availability of latest technologies ..... 2
1.04 State of cluster development ..... 14
1.05 Utility patents, 2007* ..... 8
1.06 High-tech exports, 2006* ..... 27
1.07 Burden of government regulation ..... 43
1.08 Extent and effect of taxation ..... 126
1.09 Total tax rate, 2007* ..... 100
1.10 Time required to start a business, 2008* ..... 41
1.11 No. of procedures required to start a business, 2008* ..... 4
1.12 Intensity of local competition ..... 14
1.13 Freedom of the press ..... 2
1.14 Accessibility of digital content ..... 1

### Political and regulatory environment 5

2.01 Effectiveness of law-making bodies ..... 5
2.02 Laws relating to ICT ..... 5
2.03 Judicial independence ..... 3
2.04 Intellectual property protection ..... 9
2.05 Efficiency of legal framework ..... 7
2.06 Property rights ..... 7
2.07 Quality of competition in the ISP sector ..... 10
2.08 Number of procedures to enforce a contract, 2008* ..... 14
2.09 Time to enforce a contract, 2008* ..... 55

### Infrastructure environment 2

3.01 Number of telephone lines, 2007* ..... 5
3.02 Secure Internet servers, 2007* ..... 13
3.03 Electricity production, 2005* ..... 5
3.04 Availability of scientists and engineers ..... 4
3.05 Quality of scientific research institutions ..... 11
3.06 Tertiary enrollment, 2006* ..... 9
3.07 Education expenditure, 2006* ..... 6

## Readiness component 3

### Individual readiness 8

4.01 Quality of math and science education ..... 39
4.02 Quality of the educational system ..... 12
4.03 Internet access in schools ..... 4
4.04 Buyer sophistication ..... 6
4.05 Residential telephone connection charge, 2007* ..... 20
4.06 Residential monthly telephone subscription, 2007* ..... 21
4.07 High-speed monthly broadband subscription, 2006* ..... 18
4.08 Lowest cost of broadband, 2006* ..... 3
4.09 Cost of mobile telephone call, 2006* ..... 16

### Business readiness 2

5.01 Extent of staff training ..... 4
5.02 Local availability of research and training services ..... 7
5.03 Quality of management schools ..... 15
5.04 Company spending on R&D ..... 4
5.05 University-industry research collaboration ..... 3
5.06 Business telephone connection charge, 2007* ..... 30
5.07 Business monthly telephone subscription, 2007* ..... 20
5.08 Local supplier quality ..... 8
5.09 Local supplier quantity ..... 19
5.10 Computer, comm., and other services imports, 2006* ..... 11

### Government readiness 3

6.01 Government prioritization of ICT ..... 7
6.02 Gov't procurement of advanced tech products ..... 8
6.03 Importance of ICT to government vision of the future ..... 11
6.04 E-Government Readiness Index, 2008* ..... 1

## Usage component 2

### Individual usage 2

7.01 Mobile telephone subscribers, 2007* ..... 25
7.02 Personal computers, 2006* ..... 4
7.03 Broadband Internet subscribers, 2007* ..... 3
7.04 Internet users, 2007* ..... 5
7.05 Internet bandwidth, 2005* ..... 5

### Business usage 1

8.01 Prevalence of foreign technology licensing ..... 13
8.02 Firm-level technology absorption ..... 4
8.03 Capacity for innovation ..... 4
8.04 Availability of new telephone lines ..... 4
8.05 Extent of business Internet use ..... 2

### Government usage 6

9.01 Government success in ICT promotion ..... 7
9.02 Availability of government online services ..... 4
9.03 ICT use and government efficiency ..... 8
9.04 Presence of ICT in government offices ..... 3
9.05 E-Participation Index, 2008* ..... 9

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Switzerland

## Key indicators

Population (millions), 2007 ..... 7.6
GDP (PPP) per capita (int'l $), 2007 ..... 41,265
Internet users per 100 population, 2007 ..... 61.6
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 95.8
Mobile telephone subscribers per 100 population, 2007 ..... 108.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **5** |
| 2007–2008 (127) | 3 |
| 2006–2007 (122) | 5 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 2 |



## Environment component 6

### Market environment 4

1.01 Venture capital availability ..... 23
1.02 Financial market sophistication ..... 1
1.03 Availability of latest technologies ..... 7
1.04 State of cluster development ..... 9
1.05 Utility patents, 2007* ..... 6
1.06 High-tech exports, 2006* ..... 19
1.07 Burden of government regulation ..... 11
1.08 Extent and effect of taxation ..... 15
1.09 Total tax rate, 2007* ..... 22
1.10 Time required to start a business, 2008* ..... 61
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 20
1.13 Freedom of the press ..... 7
1.14 Accessibility of digital content ..... 3

### Political and regulatory environment 7

2.01 Effectiveness of law-making bodies ..... 12
2.02 Laws relating to ICT ..... 10
2.03 Judicial independence ..... 7
2.04 Intellectual property protection ..... 1
2.05 Efficiency of legal framework ..... 3
2.06 Property rights ..... 1
2.07 Quality of competition in the ISP sector ..... 15
2.08 Number of procedures to enforce a contract, 2008* ..... 31
2.09 Time to enforce a contract, 2008* ..... 39

### Infrastructure environment 9

3.01 Number of telephone lines, 2007* ..... 1
3.02 Secure Internet servers, 2007* ..... 4
3.03 Electricity production, 2005* ..... 22
3.04 Availability of scientists and engineers ..... 16
3.05 Quality of scientific research institutions ..... 2
3.06 Tertiary enrollment, 2006* ..... 46
3.07 Education expenditure, 2006* ..... 38

## Readiness component 5

### Individual readiness 3

4.01 Quality of math and science education ..... 5
4.02 Quality of the educational system ..... 3
4.03 Internet access in schools ..... 8
4.04 Buyer sophistication ..... 1
4.05 Residential telephone connection charge, 2007* ..... 4
4.06 Residential monthly telephone subscription, 2007* ..... 19
4.07 High-speed monthly broadband subscription, 2006* ..... 5
4.08 Lowest cost of broadband, 2006* ..... 13
4.09 Cost of mobile telephone call, 2006* ..... 18

### Business readiness 1

5.01 Extent of staff training ..... 2
5.02 Local availability of research and training services ..... 2
5.03 Quality of management schools ..... 2
5.04 Company spending on R&D ..... 1
5.05 University-industry research collaboration ..... 2
5.06 Business telephone connection charge, 2007* ..... 5
5.07 Business monthly telephone subscription, 2006* ..... 12
5.08 Local supplier quality ..... 3
5.09 Local supplier quantity ..... 5
5.10 Computer, comm., and other services imports, 2007* ..... 26

### Government readiness 17

6.01 Government prioritization of ICT ..... 27
6.02 Gov't procurement of advanced tech products ..... 26
6.03 Importance of ICT to government vision of the future ..... 24
6.04 E-Government Readiness Index, 2008* ..... 12

## Usage component 6

### Individual usage 6

7.01 Mobile telephone subscribers, 2007* ..... 33
7.02 Personal computers, 2006* ..... 3
7.03 Broadband Internet subscribers, 2007* ..... 5
7.04 Internet users, 2007* ..... 17
7.05 Internet bandwidth, 2005* ..... 9

### Business usage 3

8.01 Prevalence of foreign technology licensing ..... 10
8.02 Firm-level technology absorption ..... 5
8.03 Capacity for innovation ..... 3
8.04 Availability of new telephone lines ..... 1
8.05 Extent of business Internet use ..... 7

### Government usage 17

9.01 Government success in ICT promotion ..... 33
9.02 Availability of government online services ..... 21
9.03 ICT use and government efficiency ..... 19
9.04 Presence of ICT in government offices ..... 5
9.05 E-Participation Index, 2008* ..... 27

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Syria

## Key indicators

Population (millions), 2007 ..... 19.9
GDP (PPP) per capita (int'l $), 2007 ..... 4,492
Internet users per 100 population, 2007 ..... 17.4
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 0.3
Mobile telephone subscribers per 100 population, 2007 ..... 33.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **94** |
| 2007–2008 (127) | 110 |
| 2006–2007 (122) | n/a |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 78 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Taiwan, China

## Key indicators

Population (millions), 2007 ..... 23.0
GDP (PPP) per capita (int'l $), 2007 ..... 30,322
Internet users per 100 population, 2007 ..... 64.4
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 81.4
Mobile telephone subscribers per 100 population, 2007 ..... 106.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **13** |
| 2007–2008 (127) | 17 |
| 2006–2007 (122) | 13 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 17 |



## Environment component 19

### Market environment 5

1.01 Venture capital availability ..... 14
1.02 Financial market sophistication ..... 45
1.03 Availability of latest technologies ..... 23
1.04 State of cluster development ..... 1
1.05 Utility patents, 2007* ..... 1
1.06 High-tech exports, 2004* ..... 5
1.07 Burden of government regulation ..... 22
1.08 Extent and effect of taxation ..... 26
1.09 Total tax rate, 2007* ..... 63
1.10 Time required to start a business, 2008* ..... 105
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 5
1.13 Freedom of the press ..... 29
1.14 Accessibility of digital content ..... 20

### Political and regulatory environment 43

2.01 Effectiveness of law-making bodies ..... 96
2.02 Laws relating to ICT ..... 28
2.03 Judicial independence ..... 49
2.04 Intellectual property protection ..... 28
2.05 Efficiency of legal framework ..... 46
2.06 Property rights ..... 34
2.07 Quality of competition in the ISP sector ..... 25
2.08 Number of procedures to enforce a contract, 2008* ..... 119
2.09 Time to enforce a contract, 2008* ..... 56

### Infrastructure environment 11

3.01 Number of telephone lines, 2007* ..... 3
3.02 Secure Internet servers, 2007* ..... 22
3.03 Electricity production, 2007* ..... 12
3.04 Availability of scientists and engineers ..... 8
3.05 Quality of scientific research institutions ..... 21
3.06 Tertiary enrollment, 2007* ..... 4
3.07 Education expenditure, 2007* ..... 29

## Readiness component 10

### Individual readiness 12

4.01 Quality of math and science education ..... 9
4.02 Quality of the educational system ..... 25
4.03 Internet access in schools ..... 14
4.04 Buyer sophistication ..... 3
4.05 Residential telephone connection charge, 2005* ..... 55
4.06 Residential monthly telephone subscription, 2005* ..... 6
4.07 High-speed monthly broadband subscription, 2006* ..... 19
4.08 Lowest cost of broadband, 2006* ..... 10
4.09 Cost of mobile telephone call, 2005* ..... 42

### Business readiness 14

5.01 Extent of staff training ..... 16
5.02 Local availability of research and training services ..... 19
5.03 Quality of management schools ..... 33
5.04 Company spending on R&D ..... 16
5.05 University-industry research collaboration ..... 10
5.06 Business telephone connection charge, 2005* ..... 49
5.07 Business monthly telephone subscription, 2005* ..... 29
5.08 Local supplier quality ..... 15
5.09 Local supplier quantity ..... 26
5.10 Computer, comm., and other services imports* ..... n/a

### Government readiness 14

6.01 Government prioritization of ICT ..... 12
6.02 Gov't procurement of advanced tech products ..... 12
6.03 Importance of ICT to government vision of the future ..... 15
6.04 E-Government Readiness Index* ..... n/a

## Usage component 12

### Individual usage 15

7.01 Mobile telephone subscribers, 2007* ..... 36
7.02 Personal computers, 2006* ..... 11
7.03 Broadband Internet subscribers, 2007* ..... 21
7.04 Internet users, 2007* ..... 15
7.05 Internet bandwidth, 2007* ..... 11

### Business usage 15

8.01 Prevalence of foreign technology licensing ..... 6
8.02 Firm-level technology absorption ..... 10
8.03 Capacity for innovation ..... 16
8.04 Availability of new telephone lines ..... 29
8.05 Extent of business Internet use ..... 12

### Government usage 8

9.01 Government success in ICT promotion ..... 10
9.02 Availability of government online services ..... 23
9.03 ICT use and government efficiency ..... 11
9.04 Presence of ICT in government offices ..... 12
9.05 E-Participation Index* ..... n/a

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Tajikistan

## Key indicators

Population (millions), 2007 ..... 6.7
GDP (PPP) per capita (int'l $), 2007 ..... 1,843
Internet users per 100 population, 2005 ..... 0.3
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.0
Mobile telephone subscribers per 100 population, 2005 ..... 4.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **104** |
| 2007–2008 (127) | 98 |
| 2006–2007 (122) | n/a |

Global Competitiveness Index 2008–2009 (134) 116

### Environment component 96

**Market environment 125**

1.01 Venture capital availability ..... 110
1.02 Financial market sophistication ..... 118
1.03 Availability of latest technologies ..... 125
1.04 State of cluster development ..... 125
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports* ..... n/a
1.07 Burden of government regulation ..... 97
1.08 Extent and effect of taxation ..... 101
1.09 Total tax rate, 2007* ..... 126
1.10 Time required to start a business, 2008* ..... 110
1.11 No. of procedures required to start a business, 2008* ..... 112
1.12 Intensity of local competition ..... 110
1.13 Freedom of the press ..... 122
1.14 Accessibility of digital content ..... 90

**Political and regulatory environment 69**

2.01 Effectiveness of law-making bodies ..... 50
2.02 Laws relating to ICT ..... 104
2.03 Judicial independence ..... 81
2.04 Intellectual property protection ..... 97
2.05 Efficiency of legal framework ..... 63
2.06 Property rights ..... 88
2.07 Quality of competition in the ISP sector ..... 97
2.08 Number of procedures to enforce a contract, 2008* ..... 41
2.09 Time to enforce a contract, 2008* ..... 15

**Infrastructure environment 91**

3.01 Number of telephone lines, 2005* ..... 106
3.02 Secure Internet servers* ..... n/a
3.03 Electricity production, 2005* ..... 68
3.04 Availability of scientists and engineers ..... 98
3.05 Quality of scientific research institutions ..... 68
3.06 Tertiary enrollment, 2006* ..... 85
3.07 Education expenditure, 2006* ..... 95

### Readiness component 102

**Individual readiness 103**

4.01 Quality of math and science education ..... 113
4.02 Quality of the educational system ..... 96
4.03 Internet access in schools ..... 88
4.04 Buyer sophistication ..... 111
4.05 Residential telephone connection charge, 2005* ..... 71
4.06 Residential monthly telephone subscription, 2005* ..... 58
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband* ..... n/a
4.09 Cost of mobile telephone call, 2006* ..... 113

**Business readiness 107**

5.01 Extent of staff training ..... 105
5.02 Local availability of research and training services ..... 132
5.03 Quality of management schools ..... 125
5.04 Company spending on R&D ..... 107
5.05 University-industry research collaboration ..... 91
5.06 Business telephone connection charge, 2005* ..... 98
5.07 Business monthly telephone subscription, 2005* ..... 102
5.08 Local supplier quality ..... 122
5.09 Local supplier quantity ..... 118
5.10 Computer, comm., and other services imports, 2006* ..... 55

**Government readiness 90**

6.01 Government prioritization of ICT ..... 53
6.02 Gov't procurement of advanced tech products ..... 61
6.03 Importance of ICT to government vision of the future ..... 90
6.04 E-Government Readiness Index, 2008* ..... 106

### Usage component 112

**Individual usage 132**

7.01 Mobile telephone subscribers, 2005* ..... 132
7.02 Personal computers, 2005* ..... 110
7.03 Broadband Internet subscribers, 2005* ..... 125
7.04 Internet users, 2005* ..... 133
7.05 Internet bandwidth, 2005* ..... 128

**Business usage 102**

8.01 Prevalence of foreign technology licensing ..... 115
8.02 Firm-level technology absorption ..... 119
8.03 Capacity for innovation ..... 61
8.04 Availability of new telephone lines ..... 93
8.05 Extent of business Internet use ..... 93

**Government usage 102**

9.01 Government success in ICT promotion ..... 67
9.02 Availability of government online services ..... 103
9.03 ICT use and government efficiency ..... 88
9.04 Presence of ICT in government offices ..... 99
9.05 E-Participation Index, 2008* ..... 123

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Tanzania

## Key indicators

Population (millions), 2007 ..... 40.4
GDP (PPP) per capita (int'l $), 2007 ..... 1,256
Internet users per 100 population, 2007 ..... 1.0
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 20.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **119** |
| 2007–2008 (127) | 100 |
| 2006–2007 (122) | 91 |

Global Competitiveness Index 2008–2009 (134) 113





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Thailand

## Key indicators



## Networked Readiness Index





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Timor-Leste

## Key indicators

Population (millions), 2007 ..... 1.1
GDP (PPP) per capita (int'l $), 2007 ..... 2,506
Internet users per 100 population, 2006 ..... 0.1
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.1
Mobile telephone subscribers per 100 population, 2007 ..... 6.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **133** |
| 2007–2008 (127) | n/a |
| 2006–2007 (122) | n/a |

Global Competitiveness Index 2008–2009 (134) 129



### Environment component 133

**Market environment 121**

1.01 Venture capital availability ..... 96
1.02 Financial market sophistication ..... 131
1.03 Availability of latest technologies ..... 130
1.04 State of cluster development ..... 108
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports* ..... n/a
1.07 Burden of government regulation ..... 64
1.08 Extent and effect of taxation ..... 77
1.09 Total tax rate, 2007* ..... 20
1.10 Time required to start a business, 2008* ..... 124
1.11 No. of procedures required to start a business, 2008* ..... 86
1.12 Intensity of local competition ..... 134
1.13 Freedom of the press ..... 80
1.14 Accessibility of digital content ..... 131

**Political and regulatory environment 134**

2.01 Effectiveness of law-making bodies ..... 104
2.02 Laws relating to ICT ..... 124
2.03 Judicial independence ..... 104
2.04 Intellectual property protection ..... 118
2.05 Efficiency of legal framework ..... 92
2.06 Property rights ..... 131
2.07 Quality of competition in the ISP sector ..... 130
2.08 Number of procedures to enforce a contract, 2008* ..... 127
2.09 Time to enforce a contract, 2008* ..... 130

**Infrastructure environment 131**

3.01 Number of telephone lines, 2007* ..... 133
3.02 Secure Internet servers, 2005* ..... 98
3.03 Electricity production* ..... n/a
3.04 Availability of scientists and engineers ..... 133
3.05 Quality of scientific research institutions ..... 132
3.06 Tertiary enrollment* ..... n/a
3.07 Education expenditure* ..... n/a

### Readiness component 134

**Individual readiness 132**

4.01 Quality of math and science education ..... 134
4.02 Quality of the educational system ..... 127
4.03 Internet access in schools ..... 129
4.04 Buyer sophistication ..... 132
4.05 Residential telephone connection charge, 2007* ..... 116
4.06 Residential monthly telephone subscription, 2007* ..... 132
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband* ..... n/a
4.09 Cost of mobile telephone call, 2007* ..... 123

**Business readiness 134**

5.01 Extent of staff training ..... 116
5.02 Local availability of research and training services ..... 133
5.03 Quality of management schools ..... 134
5.04 Company spending on R&D ..... 120
5.05 University-industry research collaboration ..... 130
5.06 Business telephone connection charge, 2007* ..... 114
5.07 Business monthly telephone subscription, 2007* ..... 132
5.08 Local supplier quality ..... 134
5.09 Local supplier quantity ..... 132
5.10 Computer, comm., and other services imports* ..... n/a

**Government readiness 128**

6.01 Government prioritization of ICT ..... 121
6.02 Gov't procurement of advanced tech products ..... 109
6.03 Importance of ICT to government vision of the future ..... 122
6.04 E-Government Readiness Index, 2008* ..... 121

### Usage component 133

**Individual usage 130**

7.01 Mobile telephone subscribers, 2007* ..... 130
7.02 Personal computers* ..... n/a
7.03 Broadband Internet subscribers, 2007* ..... 122
7.04 Internet users, 2006* ..... 134
7.05 Internet bandwidth, 2007* ..... 110

**Business usage 133**

8.01 Prevalence of foreign technology licensing ..... 132
8.02 Firm-level technology absorption ..... 132
8.03 Capacity for innovation ..... 115
8.04 Availability of new telephone lines ..... 133
8.05 Extent of business Internet use ..... 124

**Government usage 118**

9.01 Government success in ICT promotion ..... 121
9.02 Availability of government online services ..... 83
9.03 ICT use and government efficiency ..... 122
9.04 Presence of ICT in government offices ..... 111
9.05 E-Participation Index, 2008* ..... 123

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Trinidad and Tobago

## Key indicators



## Networked Readiness Index









* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Tunisia

## Key indicators

Population (millions), 2007 ..... 10.2
GDP (PPP) per capita (int'l $), 2007 ..... 7,535
Internet users per 100 population, 2007 ..... 16.7
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 3.0
Mobile telephone subscribers per 100 population, 2007 ..... 75.9

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **38** |
| 2007–2008 (127) | 35 |
| 2006–2007 (122) | 35 |

Global Competitiveness Index 2008–2009 (134) 36





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Turkey

## Key indicators

Population (millions), 2007 ..... 73.9
GDP (PPP) per capita (int'l $), 2007 ..... 12,858
Internet users per 100 population, 2006 ..... 17.7
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 12.1
Mobile telephone subscribers per 100 population, 2007 ..... 82.8

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **61** |
| 2007–2008 (127) | 55 |
| 2006–2007 (122) | 52 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 63 |

### Environment component 56

**Market environment 66**

1.01 Venture capital availability ..... 97
1.02 Financial market sophistication ..... 39
1.03 Availability of latest technologies ..... 45
1.04 State of cluster development ..... 54
1.05 Utility patents, 2007* ..... 67
1.06 High-tech exports, 2006* ..... 93
1.07 Burden of government regulation ..... 104
1.08 Extent and effect of taxation ..... 123
1.09 Total tax rate, 2007* ..... 78
1.10 Time required to start a business, 2008* ..... 9
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 42
1.13 Freedom of the press ..... 106
1.14 Accessibility of digital content ..... 42

**Political and regulatory environment 56**

2.01 Effectiveness of law-making bodies ..... 35
2.02 Laws relating to ICT ..... 55
2.03 Judicial independence ..... 64
2.04 Intellectual property protection ..... 93
2.05 Efficiency of legal framework ..... 82
2.06 Property rights ..... 83
2.07 Quality of competition in the ISP sector ..... 62
2.08 Number of procedures to enforce a contract, 2008* ..... 48
2.09 Time to enforce a contract, 2008* ..... 40

**Infrastructure environment 62**

3.01 Number of telephone lines, 2007* ..... 55
3.02 Secure Internet servers, 2007* ..... 50
3.03 Electricity production, 2005* ..... 72
3.04 Availability of scientists and engineers ..... 59
3.05 Quality of scientific research institutions ..... 52
3.06 Tertiary enrollment, 2006* ..... 60
3.07 Education expenditure, 2006* ..... 90

### Readiness component 69

**Individual readiness 64**

4.01 Quality of math and science education ..... 73
4.02 Quality of the educational system ..... 77
4.03 Internet access in schools ..... 55
4.04 Buyer sophistication ..... 78
4.05 Residential telephone connection charge, 2006* ..... 3
4.06 Residential monthly telephone subscription, 2006* ..... 70
4.07 High-speed monthly broadband subscription, 2006* ..... 74
4.08 Lowest cost of broadband, 2006* ..... 68
4.09 Cost of mobile telephone call, 2006* ..... 82

**Business readiness 63**

5.01 Extent of staff training ..... 90
5.02 Local availability of research and training services ..... 68
5.03 Quality of management schools ..... 65
5.04 Company spending on R&D ..... 73
5.05 University-industry research collaboration ..... 57
5.06 Business telephone connection charge, 2006* ..... 4
5.07 Business monthly telephone subscription, 2006* ..... 86
5.08 Local supplier quality ..... 55
5.09 Local supplier quantity ..... 32
5.10 Computer, comm., and other services imports, 2006* ..... 94

**Government readiness 87**

6.01 Government prioritization of ICT ..... 101
6.02 Gov't procurement of advanced tech products ..... 106
6.03 Importance of ICT to government vision of the future ..... 85
6.04 E-Government Readiness Index, 2008* ..... 70

### Usage component 54

**Individual usage 61**

7.01 Mobile telephone subscribers, 2007* ..... 62
7.02 Personal computers, 2006* ..... 78
7.03 Broadband Internet subscribers, 2007* ..... 46
7.04 Internet users, 2006* ..... 74
7.05 Internet bandwidth, 2007* ..... 38

**Business usage 48**

8.01 Prevalence of foreign technology licensing ..... 45
8.02 Firm-level technology absorption ..... 48
8.03 Capacity for innovation ..... 55
8.04 Availability of new telephone lines ..... 62
8.05 Extent of business Internet use ..... 46

**Government usage 60**

9.01 Government success in ICT promotion ..... 84
9.02 Availability of government online services ..... 50
9.03 ICT use and government efficiency ..... 45
9.04 Presence of ICT in government offices ..... 66
9.05 E-Participation Index, 2008* ..... 70

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Uganda

## Key indicators

Population (millions), 2007 ..... 30.9
GDP (PPP) per capita (int'l $), 2007 ..... 1,059
Internet users per 100 population, 2007 ..... 6.5
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.1
Mobile telephone subscribers per 100 population, 2007 ..... 13.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **120** |
| 2007–2008 (127) | 109 |
| 2006–2007 (122) | 100 |

Global Competitiveness Index 2008–2009 (134) 128





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Ukraine

## Key indicators

Population (millions), 2007 ..... 46.4
GDP (PPP) per capita (int'l $), 2007 ..... 6,968
Internet users per 100 population, 2007 ..... 21.6
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.2
Mobile telephone subscribers per 100 population, 2007 ..... 119.6

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **62** |
| 2007–2008 (127) | 70 |
| 2006–2007 (122) | 75 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 72 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# United Arab Emirates

## Key indicators

Population (millions), 2007 ..... 4.4
GDP (PPP) per capita (int'l $), 2007 ..... 37,941
Internet users per 100 population, 2007 ..... 52.5
Internet bandwidth (mB/s) per 10,000 population, 2006 ..... 21.6
Mobile telephone subscribers per 100 population, 2007 ..... 173.4

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **27** |
| 2007–2008 (127) | 29 |
| 2006–2007 (122) | 29 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 31 |



## Environment component 32

### Market environment 24

1.01 Venture capital availability ..... 17
1.02 Financial market sophistication ..... 32
1.03 Availability of latest technologies ..... 17
1.04 State of cluster development ..... 21
1.05 Utility patents, 2007* ..... 59
1.06 High-tech exports, 2004* ..... 120
1.07 Burden of government regulation ..... 5
1.08 Extent and effect of taxation ..... 1
1.09 Total tax rate, 2007* ..... 2
1.10 Time required to start a business, 2008* ..... 50
1.11 No. of procedures required to start a business, 2008* ..... 60
1.12 Intensity of local competition ..... 28
1.13 Freedom of the press ..... 100
1.14 Accessibility of digital content ..... 34

### Political and regulatory environment 39

2.01 Effectiveness of law-making bodies ..... 34
2.02 Laws relating to ICT ..... 22
2.03 Judicial independence ..... 33
2.04 Intellectual property protection ..... 24
2.05 Efficiency of legal framework ..... 26
2.06 Property rights ..... 43
2.07 Quality of competition in the ISP sector ..... 91
2.08 Number of procedures to enforce a contract, 2008* ..... 125
2.09 Time to enforce a contract, 2008* ..... 84

### Infrastructure environment 40

3.01 Number of telephone lines, 2007* ..... 39
3.02 Secure Internet servers, 2007* ..... 32
3.03 Electricity production, 2005* ..... 7
3.04 Availability of scientists and engineers ..... 75
3.05 Quality of scientific research institutions ..... 74
3.06 Tertiary enrollment, 2007* ..... 79
3.07 Education expenditure* ..... n/a

## Readiness component 25

### Individual readiness 32

4.01 Quality of math and science education ..... 42
4.02 Quality of the educational system ..... 38
4.03 Internet access in schools ..... 27
4.04 Buyer sophistication ..... 34
4.05 Residential telephone connection charge, 2007* ..... 13
4.06 Residential monthly telephone subscription, 2007* ..... 1
4.07 High-speed monthly broadband subscription, 2006* ..... 29
4.08 Lowest cost of broadband, 2006* ..... 32
4.09 Cost of mobile telephone call, 2006* ..... 2

### Business readiness 33

5.01 Extent of staff training ..... 37
5.02 Local availability of research and training services ..... 44
5.03 Quality of management schools ..... 46
5.04 Company spending on R&D ..... 50
5.05 University-industry research collaboration ..... 58
5.06 Business telephone connection charge, 2007* ..... 13
5.07 Business monthly telephone subscription, 2007* ..... 2
5.08 Local supplier quality ..... 34
5.09 Local supplier quantity ..... 31
5.10 Computer, comm., and other services imports* ..... n/a

### Government readiness 9

6.01 Government prioritization of ICT ..... 5
6.02 Gov't procurement of advanced tech products ..... 11
6.03 Importance of ICT to government vision of the future ..... 3
6.04 E-Government Readiness Index, 2008* ..... 32

## Usage component 25

### Individual usage 31

7.01 Mobile telephone subscribers, 2007* ..... 1
7.02 Personal computers, 2006* ..... 32
7.03 Broadband Internet subscribers, 2006* ..... 48
7.04 Internet users, 2007* ..... 26
7.05 Internet bandwidth, 2006* ..... 32

### Business usage 27

8.01 Prevalence of foreign technology licensing ..... 9
8.02 Firm-level technology absorption ..... 14
8.03 Capacity for innovation ..... 74
8.04 Availability of new telephone lines ..... 18
8.05 Extent of business Internet use ..... 37

### Government usage 16

9.01 Government success in ICT promotion ..... 4
9.02 Availability of government online services ..... 27
9.03 ICT use and government efficiency ..... 4
9.04 Presence of ICT in government offices ..... 17
9.05 E-Participation Index, 2008* ..... 39

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# United Kingdom

## Key indicators

Population (millions), 2007 ..... 61.0
GDP (PPP) per capita (int'l $), 2007 ..... 35,634
Internet users per 100 population, 2007 ..... 66.2
Internet bandwidth (mB/s) per 10,000 population ..... n/a
Mobile telephone subscribers per 100 population, 2007 ..... 118.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **15** |
| 2007–2008 (127) | 12 |
| 2006–2007 (122) | 9 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 12 |

## Environment component 12



## Readiness component 24



## Usage component 13



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# United States

## Key indicators

Population (millions), 2007 ..... 301.6
GDP (PPP) per capita (int'l $), 2007 ..... 45,725
Internet users per 100 population, 2007 ..... 71.9
Internet bandwidth (mB/s) per 10,000 population ..... n/a
Mobile telephone subscribers per 100 population, 2007 ..... 83.5

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **3** |
| 2007–2008 (127) | 4 |
| 2006–2007 (122) | 7 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 1 |



## Environment component 3

### Market environment 2

1.01 Venture capital availability ..... 1
1.02 Financial market sophistication ..... 3
1.03 Availability of latest technologies ..... 5
1.04 State of cluster development ..... 2
1.05 Utility patents, 2007* ..... 2
1.06 High-tech exports, 2006* ..... 12
1.07 Burden of government regulation ..... 50
1.08 Extent and effect of taxation ..... 56
1.09 Total tax rate, 2007* ..... 68
1.10 Time required to start a business, 2008* ..... 9
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 4
1.13 Freedom of the press ..... 24
1.14 Accessibility of digital content ..... 7

### Political and regulatory environment 19

2.01 Effectiveness of law-making bodies ..... 33
2.02 Laws relating to ICT ..... 9
2.03 Judicial independence ..... 23
2.04 Intellectual property protection ..... 18
2.05 Efficiency of legal framework ..... 28
2.06 Property rights ..... 26
2.07 Quality of competition in the ISP sector ..... 6
2.08 Number of procedures to enforce a contract, 2008* ..... 31
2.09 Time to enforce a contract, 2008* ..... 17

### Infrastructure environment 3

3.01 Number of telephone lines, 2007* ..... 12
3.02 Secure Internet servers, 2007* ..... 2
3.03 Electricity production, 2005* ..... 8
3.04 Availability of scientists and engineers ..... 6
3.05 Quality of scientific research institutions ..... 1
3.06 Tertiary enrollment, 2006* ..... 6
3.07 Education expenditure, 2006* ..... 45

## Readiness component 6

### Individual readiness 14

4.01 Quality of math and science education ..... 48
4.02 Quality of the educational system ..... 19
4.03 Internet access in schools ..... 11
4.04 Buyer sophistication ..... 5
4.05 Residential telephone connection charge, 2006* ..... 9
4.06 Residential monthly telephone subscription, 2006* ..... 45
4.07 High-speed monthly broadband subscription, 2006* ..... 3
4.08 Lowest cost of broadband, 2006* ..... 3
4.09 Cost of mobile telephone call, 2005* ..... 39

### Business readiness 3

5.01 Extent of staff training ..... 6
5.02 Local availability of research and training services ..... 1
5.03 Quality of management schools ..... 3
5.04 Company spending on R&D ..... 3
5.05 University-industry research collaboration ..... 1
5.06 Business telephone connection charge, 2006* ..... 16
5.07 Business monthly telephone subscription, 2006* ..... 46
5.08 Local supplier quality ..... 7
5.09 Local supplier quantity ..... 6
5.10 Computer, comm., and other services imports, 2007* ..... 47

### Government readiness 6

6.01 Government prioritization of ICT ..... 18
6.02 Gov't procurement of advanced tech products ..... 4
6.03 Importance of ICT to government vision of the future ..... 28
6.04 E-Government Readiness Index, 2008* ..... 4

## Usage component 5

### Individual usage 10

7.01 Mobile telephone subscribers, 2007* ..... 61
7.02 Personal computers, 2006* ..... 6
7.03 Broadband Internet subscribers, 2007* ..... 20
7.04 Internet users, 2007* ..... 8
7.05 Internet bandwidth* ..... n/a

### Business usage 5

8.01 Prevalence of foreign technology licensing ..... 14
8.02 Firm-level technology absorption ..... 3
8.03 Capacity for innovation ..... 6
8.04 Availability of new telephone lines ..... 15
8.05 Extent of business Internet use ..... 1

### Government usage 5

9.01 Government success in ICT promotion ..... 21
9.02 Availability of government online services ..... 10
9.03 ICT use and government efficiency ..... 18
9.04 Presence of ICT in government offices ..... 16
9.05 E-Participation Index, 2008* ..... 1

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Uruguay

## Key indicators

Population (millions), 2007 ..... 3.3
GDP (PPP) per capita (int'l $), 2007 ..... 11,674
Internet users per 100 population, 2007 ..... 29.0
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 4.9
Mobile telephone subscribers per 100 population, 2007 ..... 90.0

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **65** |
| 2007–2008 (127) | 65 |
| 2006–2007 (122) | 60 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 75 |

## Environment component 73

### Market environment 102

1.01 Venture capital availability ..... 107
1.02 Financial market sophistication ..... 96
1.03 Availability of latest technologies ..... 77
1.04 State of cluster development ..... 100
1.05 Utility patents, 2007* ..... 47
1.06 High-tech exports, 2006* ..... 76
1.07 Burden of government regulation ..... 69
1.08 Extent and effect of taxation ..... 119
1.09 Total tax rate, 2007* ..... 108
1.10 Time required to start a business, 2008* ..... 108
1.11 No. of procedures required to start a business, 2008* ..... 100
1.12 Intensity of local competition ..... 115
1.13 Freedom of the press ..... 48
1.14 Accessibility of digital content ..... 36

### Political and regulatory environment 59

2.01 Effectiveness of law-making bodies ..... 73
2.02 Laws relating to ICT ..... 77
2.03 Judicial independence ..... 37
2.04 Intellectual property protection ..... 50
2.05 Efficiency of legal framework ..... 51
2.06 Property rights ..... 58
2.07 Quality of competition in the ISP sector ..... 81
2.08 Number of procedures to enforce a contract, 2008* ..... 93
2.09 Time to enforce a contract, 2008* ..... 97

### Infrastructure environment 67

3.01 Number of telephone lines, 2007* ..... 43
3.02 Secure Internet servers, 2007* ..... 51
3.03 Electricity production, 2005* ..... 70
3.04 Availability of scientists and engineers ..... 86
3.05 Quality of scientific research institutions ..... 91
3.06 Tertiary enrollment, 2006* ..... 43
3.07 Education expenditure, 2006* ..... 106

## Readiness component 61

### Individual readiness 65

4.01 Quality of math and science education ..... 91
4.02 Quality of the educational system ..... 62
4.03 Internet access in schools ..... 66
4.04 Buyer sophistication ..... 64
4.05 Residential telephone connection charge, 2007* ..... 57
4.06 Residential monthly telephone subscription, 2007* ..... 72
4.07 High-speed monthly broadband subscription, 2006* ..... 71
4.08 Lowest cost of broadband, 2006* ..... 63
4.09 Cost of mobile telephone call, 2006* ..... 71

### Business readiness 78

5.01 Extent of staff training ..... 98
5.02 Local availability of research and training services ..... 77
5.03 Quality of management schools ..... 54
5.04 Company spending on R&D ..... 87
5.05 University-industry research collaboration ..... 88
5.06 Business telephone connection charge, 2007* ..... 51
5.07 Business monthly telephone subscription, 2006* ..... 81
5.08 Local supplier quality ..... 81
5.09 Local supplier quantity ..... 100
5.10 Computer, comm., and other services imports, 2007* ..... 70

### Government readiness 54

6.01 Government prioritization of ICT ..... 40
6.02 Gov't procurement of advanced tech products ..... 78
6.03 Importance of ICT to government vision of the future ..... 95
6.04 E-Government Readiness Index, 2008* ..... 48

## Usage component 64

### Individual usage 55

7.01 Mobile telephone subscribers, 2007* ..... 50
7.02 Personal computers, 2005* ..... 54
7.03 Broadband Internet subscribers, 2007* ..... 51
7.04 Internet users, 2007* ..... 51
7.05 Internet bandwidth, 2005* ..... 56

### Business usage 74

8.01 Prevalence of foreign technology licensing ..... 88
8.02 Firm-level technology absorption ..... 103
8.03 Capacity for innovation ..... 76
8.04 Availability of new telephone lines ..... 34
8.05 Extent of business Internet use ..... 80

### Government usage 69

9.01 Government success in ICT promotion ..... 57
9.02 Availability of government online services ..... 54
9.03 ICT use and government efficiency ..... 57
9.04 Presence of ICT in government offices ..... 78
9.05 E-Participation Index, 2008* ..... 95

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Venezuela

## Key indicators

Population (millions), 2007 ..... 27.5
GDP (PPP) per capita (int'l $), 2007 ..... 12,176
Internet users per 100 population, 2007 ..... 20.7
Internet bandwidth (mB/s) per 10,000 population, 2005 ..... 0.5
Mobile telephone subscribers per 100 population, 2007 ..... 86.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **96** |
| 2007–2008 (127) | 86 |
| 2006–2007 (122) | 83 |

Global Competitiveness Index 2008–2009 (134) 105





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Vietnam

## Key indicators

Population (millions), 2007 ..... 85.1
GDP (PPP) per capita (int'l $), 2007 ..... 2,589
Internet users per 100 population, 2007 ..... 20.5
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 1.4
Mobile telephone subscribers per 100 population, 2007 ..... 27.2

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **70** |
| 2007–2008 (127) | 73 |
| 2006–2007 (122) | 82 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 70 |



* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Zambia

## Key indicators

Population (millions), 2007 ..... 11.9
GDP (PPP) per capita (int'l $), 2007 ..... 1,323
Internet users per 100 population, 2007 ..... 4.2
Internet bandwidth (mB/s) per 10,000 population, 2007 ..... 0.0
Mobile telephone subscribers per 100 population, 2007 ..... 22.1

## Networked Readiness Index

| Edition (number of economies) | Rank |
|---|---|
| **2008–2009 (134)** | **102** |
| 2007–2008 (127) | 112 |
| 2006–2007 (122) | 112 |

| | |
|---|---|
| Global Competitiveness Index 2008–2009 (134) | 112 |



## Environment component 83

### Market environment 76

1.01 Venture capital availability ..... 100
1.02 Financial market sophistication ..... 92
1.03 Availability of latest technologies ..... 91
1.04 State of cluster development ..... 65
1.05 Utility patents, 2007* ..... 89
1.06 High-tech exports, 2006* ..... 107
1.07 Burden of government regulation ..... 28
1.08 Extent and effect of taxation ..... 113
1.09 Total tax rate, 2007* ..... 6
1.10 Time required to start a business, 2008* ..... 54
1.11 No. of procedures required to start a business, 2008* ..... 26
1.12 Intensity of local competition ..... 103
1.13 Freedom of the press ..... 82
1.14 Accessibility of digital content ..... 102

### Political and regulatory environment 63

2.01 Effectiveness of law-making bodies ..... 67
2.02 Laws relating to ICT ..... 90
2.03 Judicial independence ..... 82
2.04 Intellectual property protection ..... 72
2.05 Efficiency of legal framework ..... 59
2.06 Property rights ..... 65
2.07 Quality of competition in the ISP sector ..... 74
2.08 Number of procedures to enforce a contract, 2008* ..... 48
2.09 Time to enforce a contract, 2008* ..... 50

### Infrastructure environment 110

3.01 Number of telephone lines, 2007* ..... 122
3.02 Secure Internet servers, 2007* ..... 127
3.03 Electricity production, 2005* ..... 98
3.04 Availability of scientists and engineers ..... 64
3.05 Quality of scientific research institutions ..... 72
3.06 Tertiary enrollment* ..... n/a
3.07 Education expenditure, 2006* ..... 115

## Readiness component 108

### Individual readiness 107

4.01 Quality of math and science education ..... 96
4.02 Quality of the educational system ..... 69
4.03 Internet access in schools ..... 119
4.04 Buyer sophistication ..... 97
4.05 Residential telephone connection charge, 2007* ..... 76
4.06 Residential monthly telephone subscription, 2007* ..... 111
4.07 High-speed monthly broadband subscription* ..... n/a
4.08 Lowest cost of broadband* ..... n/a
4.09 Cost of mobile telephone call* ..... n/a

### Business readiness 102

5.01 Extent of staff training ..... 106
5.02 Local availability of research and training services ..... 97
5.03 Quality of management schools ..... 81
5.04 Company spending on R&D ..... 99
5.05 University-industry research collaboration ..... 86
5.06 Business telephone connection charge, 2007* ..... 93
5.07 Business monthly telephone subscription, 2007* ..... 121
5.08 Local supplier quality ..... 99
5.09 Local supplier quantity ..... 106
5.10 Computer, comm., and other services imports, 2007* ..... 31

### Government readiness 115

6.01 Government prioritization of ICT ..... 97
6.02 Gov't procurement of advanced tech products ..... 107
6.03 Importance of ICT to government vision of the future ..... 79
6.04 E-Government Readiness Index, 2008* ..... 122

## Usage component 109

### Individual usage 116

7.01 Mobile telephone subscribers, 2007* ..... 115
7.02 Personal computers, 2005* ..... 112
7.03 Broadband Internet subscribers, 2006* ..... 115
7.04 Internet users, 2007* ..... 112
7.05 Internet bandwidth, 2007* ..... 120

### Business usage 100

8.01 Prevalence of foreign technology licensing ..... 85
8.02 Firm-level technology absorption ..... 102
8.03 Capacity for innovation ..... 105
8.04 Availability of new telephone lines ..... 115
8.05 Extent of business Internet use ..... 85

### Government usage 104

9.01 Government success in ICT promotion ..... 76
9.02 Availability of government online services ..... 102
9.03 ICT use and government efficiency ..... 98
9.04 Presence of ICT in government offices ..... 87
9.05 E-Participation Index, 2008* ..... 123

* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Zimbabwe

## Key indicators



## Networked Readiness Index





* Hard data

Note: For further details and explanation, please refer to the section "How to Read the Country/Economy Profiles" at the beginning of this chapter.

# Part 4

## Data Tables

# How to Read the Data Tables

The following pages present the data by variable and for all 134 economies included in *The Global Information Technology Report 2008–2009*.

The tables are organized in nine sections, which correspond to the nine pillars of the Networked Readiness Index (NRI).

**Environment**

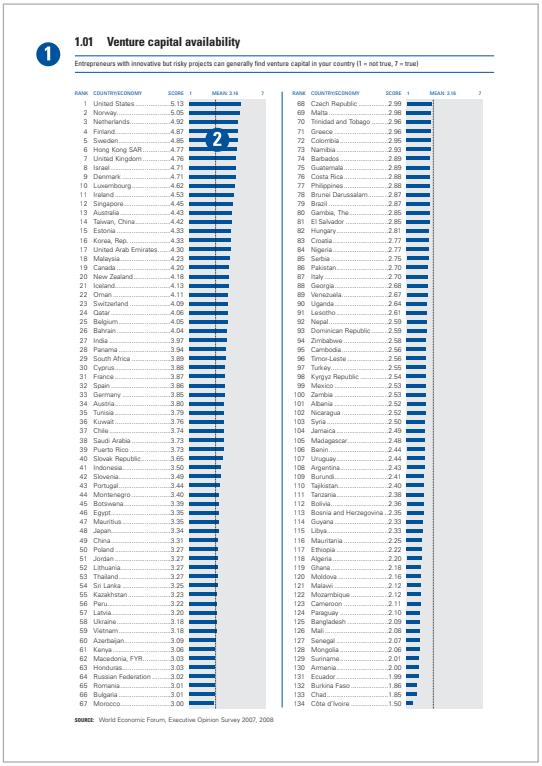
1. Market environment
2. Political and regulatory environment
3. Infrastructure environment

**Readiness**

4. Individual readiness
5. Business readiness
6. Government readiness

**Usage**

7. Individual usage
8. Business usage
9. Government usage




Two types of data are used in the NRI:

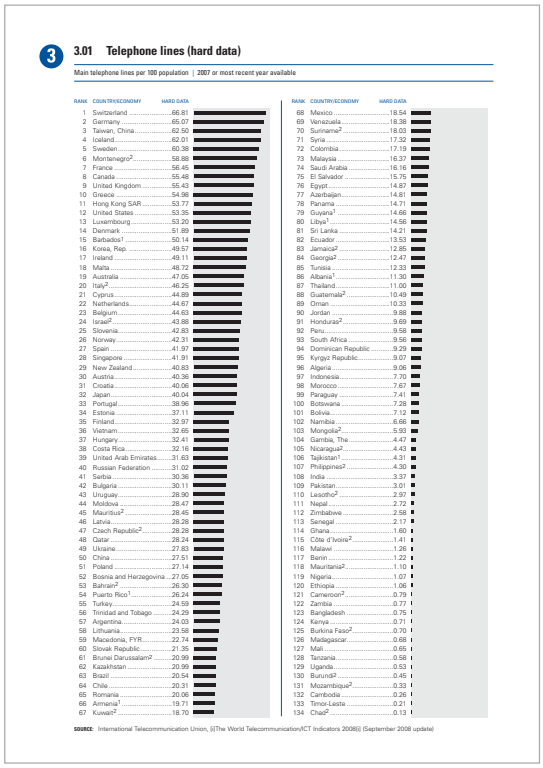
- **Survey data**: These data are the results drawn from the World Economic Forum's Executive Opinion Survey.
- **Hard data:** These data are indicators obtained from a variety of other sources.

## Survey data

1 Data yielded from the World Economic Forum's Executive Opinion Survey are presented in blue-colored bar graphs. Survey questions ask for responses on a scale of 1 to 7, where an answer of 1 corresponds to the lowest possible score and an answer of 7 corresponds to the highest possible score. For each Survey question, individual responses from the 2007 and 2008 editions of the Survey are combined and aggregated at country level in order to produce country scores. For more information on the Executive Opinion Survey, please refer to Box 1 of Chapter 1.1.

For each Survey variable, the corresponding question and the two extreme answers are shown. Scores are reported with a precision of two decimal points, although the exact figures are used to determine rankings. For example, in the case of variable 1.03 on the availability of latest technologies, although Norway, ranked 6th, and Switzerland, ranked 7th, are listed with the same rounded score of 6.42, their rankings are based on the exact figures (6.42036903 and 6.41685772, respectively).

2 A dotted line on the graph indicates the mean score across the sample of 134 economies.



3 **3.01 Telephone lines (hard data)**

Main telephone lines per 100 population | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Switzerland | 66.81 |
| 2 | Germany | 65.07 |
| 3 | Taiwan, China | 62.50 |
| 4 | Iceland | 62.01 |
| 5 | Sweden | 60.38 |
| 6 | Montenegro[2] | 58.88 |
| 7 | France | 56.45 |
| 8 | Canada | 55.48 |
| 9 | United Kingdom | 55.43 |
| 10 | Greece | 54.98 |
| 11 | Hong Kong SAR | 53.77 |
| 12 | United States | 53.35 |
| 13 | Luxembourg | 53.20 |
| 14 | Denmark | 51.89 |
| 15 | Barbados[1] | 50.14 |
| 16 | Korea, Rep. | 49.57 |
| 17 | Iceland | 49.11 |
| 18 | Malta | 48.72 |
| 19 | Australia | 47.05 |
| 20 | Italy[2] | 46.25 |
| 21 | Cyprus | 44.89 |
| 22 | Netherlands | 44.67 |
| 23 | Belgium | 44.63 |
| 24 | Israel[2] | 43.88 |
| 25 | Slovenia | 42.83 |
| 26 | Norway | 42.31 |
| 27 | Spain | 41.97 |
| 28 | Singapore | 41.91 |
| 29 | New Zealand | 40.83 |
| 30 | Austria | 40.36 |
| 31 | Croatia | 40.06 |
| 32 | Japan | 40.04 |
| 33 | Portugal | 38.96 |
| 34 | Estonia | 37.11 |
| 35 | Finland | 32.97 |
| 36 | Vietnam | 32.65 |
| 37 | Hungary | 32.41 |
| 38 | Costa Rica | 32.16 |
| 39 | United Arab Emirates | 31.63 |
| 40 | Russian Federation | 31.02 |
| 41 | Serbia | 30.36 |
| 42 | Bulgaria | 30.11 |
| 43 | Uruguay | 28.90 |
| 44 | Moldova | 28.47 |
| 45 | Mauritius[2] | 28.45 |
| 46 | Latvia | 28.28 |
| 47 | Czech Republic[2] | 28.28 |
| 48 | Qatar | 28.24 |
| 49 | Ukraine | 27.83 |
| 50 | China | 27.51 |
| 51 | Poland | 27.14 |
| 52 | Bosnia and Herzegovina | 27.05 |
| 53 | Bahrain[2] | 26.30 |
| 54 | Puerto Rico[1] | 26.24 |
| 55 | Turkey | 24.59 |
| 56 | Trinidad and Tobago | 24.29 |
| 57 | Argentina | 24.03 |
| 58 | Lithuania | 23.58 |
| 59 | Macedonia, FYR | 22.74 |
| 60 | Slovak Republic | 21.35 |
| 61 | Brunei Darussalam[2] | 20.99 |
| 62 | Kazakhstan | 20.99 |
| 63 | Brazil | 20.54 |
| 64 | Chile | 20.31 |
| 65 | Romania | 20.06 |
| 66 | Armenia[1] | 19.71 |
| 67 | Kuwait[2] | 18.70 |
| 68 | Mexico | 18.54 |
| 69 | Venezuela | 18.38 |
| 70 | Suriname[2] | 18.03 |
| 71 | Syria | 17.32 |
| 72 | Colombia | 17.19 |
| 73 | Malaysia | 16.37 |
| 74 | Saudi Arabia | 16.16 |
| 75 | El Salvador | 15.75 |
| 76 | Egypt | 14.87 |
| 77 | Azerbaijan | 14.81 |
| 78 | Panama | 14.71 |
| 79 | Guyana[1] | 14.65 |
| 80 | Libya[1] | 14.58 |
| 81 | Sri Lanka | 14.21 |
| 82 | Ecuador | 13.53 |
| 83 | Jamaica[2] | 12.85 |
| 84 | Georgia[2] | 12.47 |
| 85 | Tunisia | 12.38 |
| 86 | Albania[1] | 11.30 |
| 87 | Thailand | 11.00 |
| 88 | Guatemala[2] | 10.49 |
| 89 | Oman | 10.33 |
| 90 | Jordan | 9.88 |
| 91 | Honduras[2] | 9.69 |
| 92 | Peru | 9.58 |
| 93 | South Africa | 9.56 |
| 94 | Dominican Republic | 9.29 |
| 95 | Kyrgyz Republic | 9.01 |
| 96 | Algeria | 9.00 |
| 97 | Indonesia | 7.70 |
| 98 | Morocco | 7.67 |
| 99 | Paraguay | 7.41 |
| 100 | Botswana | 7.28 |
| 101 | Bolivia | 7.13 |
| 102 | Namibia | 6.66 |
| 103 | Mongolia[2] | 5.93 |
| 104 | Gambia, The | 4.47 |
| 105 | Nicaragua[2] | 4.43 |
| 106 | Tajikistan[1] | 4.31 |
| 107 | Philippines[2] | 4.30 |
| 108 | India | 3.33 |
| 109 | Pakistan | 3.01 |
| 110 | Lesotho[2] | 2.91 |
| 111 | Nepal | 2.72 |
| 112 | Zimbabwe | 2.58 |
| 113 | Senegal | 2.17 |
| 114 | Ghana | 1.60 |
| 115 | Côte d'Ivoire[2] | 1.41 |
| 116 | Malawi | 1.26 |
| 117 | Benin | 1.22 |
| 118 | Mauritania[2] | 1.10 |
| 119 | Nigeria | 1.07 |
| 120 | Ethiopia | 1.06 |
| 121 | Cameroon[2] | 0.79 |
| 122 | Zambia | 0.77 |
| 123 | Bangladesh | 0.75 |
| 124 | Kenya | 0.71 |
| 125 | Burkina Faso[2] | 0.70 |
| 126 | Madagascar | 0.68 |
| 127 | Mali | 0.65 |
| 128 | Tanzania | 0.58 |
| 129 | Uganda | 0.53 |
| 130 | Burundi[2] | 0.45 |
| 131 | Mozambique[2] | 0.33 |
| 132 | Cambodia | 0.26 |
| 133 | Timor-Leste | 0.21 |
| 134 | Chad[2] | 0.13 |

SOURCE: International Telecommunication Union, ICT Indicators 2008(c) (September 2008 update)

## Hard data

3 While Survey data provide qualitative information, hard data provide an objective measure of a quantity (for example, gross domestic product, cost of mobile telephone call, number of personal computers, number of procedures required to start a business, and so on). We use the latest data available from international organizations (such as the International Telecommunication Union, the World Bank, and various United Nations agencies), completed, if necessary, by national sources. In the following pages, hard data variables are presented in black-shaded bar graphs. A short description of the indicator appears at the top of the page. The base year (i.e., the year when a majority of the data was collected) follows the description. When for a particular country the year differs from the base year, this is indicated in a footnote. The section "Technical Notes and Sources" at the end of this *Report* provides further details on each indicator, including definition, method of computation, and full sources.

When data are not available or too outdated, "n/a" is used in lieu of the rank and the value.

In the case of hard data, true ties between two or more countries are possible. In such cases, shared rankings are indicated accordingly. For example, the time required to enforce a contract is the same—230 days—in Kazakhstan and Korea. Therefore, in Table 2.09 the two countries are shown sharing the sixth place.

# Index of Data Tables

## Subindex A **Environment component**



## Subindex B **Readiness component**



## Subindex C **Usage component**

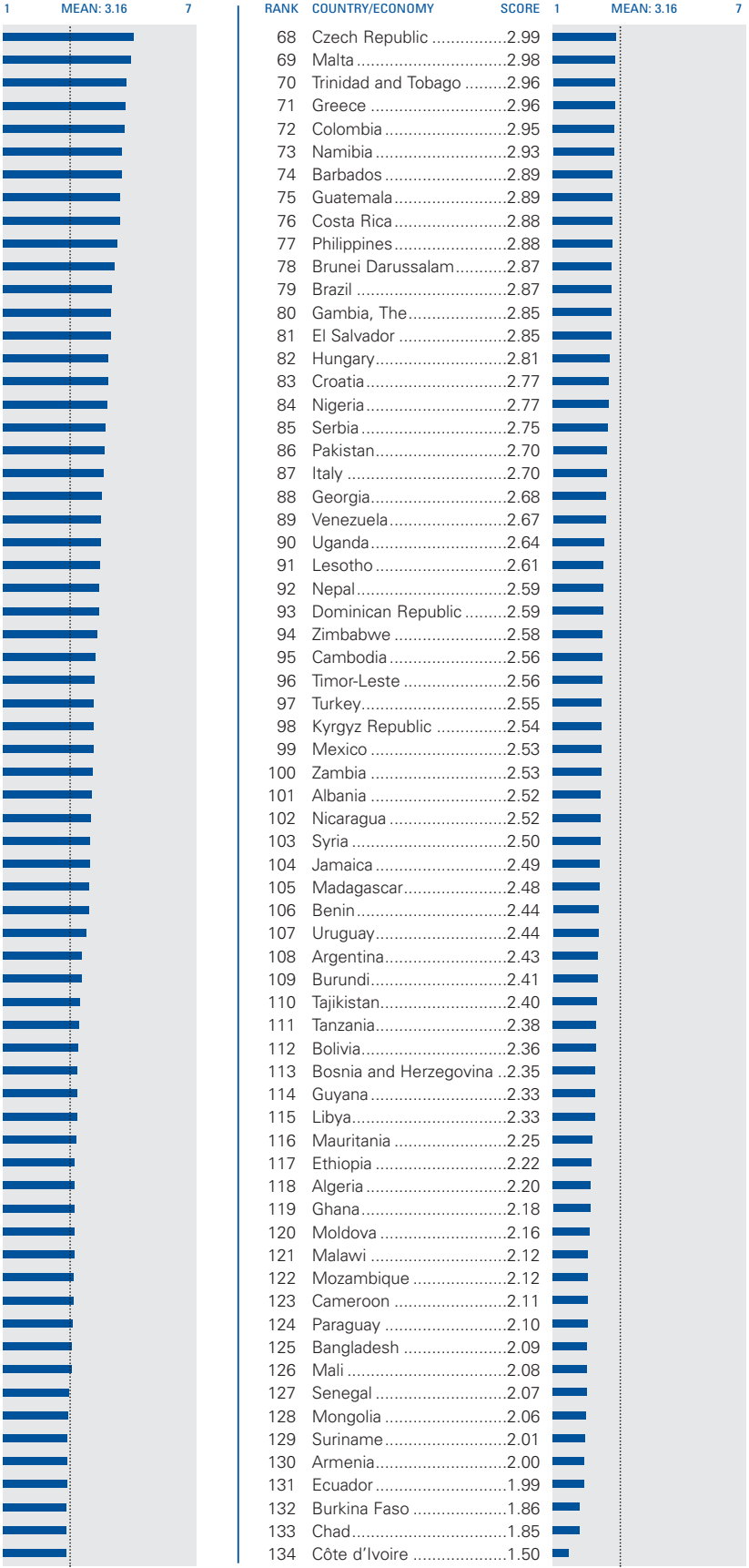
1st pillar

# Market environment

# 1.01 Venture capital availability

Entrepreneurs with innovative but risky projects can generally find venture capital in your country (1 = not true, 7 = true)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | United States | 5.13 |
| 2 | Norway | 5.05 |
| 3 | Netherlands | 4.92 |
| 4 | Finland | 4.87 |
| 5 | Sweden | 4.85 |
| 6 | Hong Kong SAR | 4.77 |
| 7 | United Kingdom | 4.76 |
| 8 | Israel | 4.71 |
| 9 | Denmark | 4.71 |
| 10 | Luxembourg | 4.62 |
| 11 | Ireland | 4.53 |
| 12 | Singapore | 4.45 |
| 13 | Australia | 4.43 |
| 14 | Taiwan, China | 4.42 |
| 15 | Estonia | 4.33 |
| 16 | Korea, Rep. | 4.33 |
| 17 | United Arab Emirates | 4.30 |
| 18 | Malaysia | 4.23 |
| 19 | Canada | 4.20 |
| 20 | New Zealand | 4.18 |
| 21 | Iceland | 4.13 |
| 22 | Oman | 4.11 |
| 23 | Switzerland | 4.09 |
| 24 | Qatar | 4.06 |
| 25 | Belgium | 4.05 |
| 26 | Bahrain | 4.04 |
| 27 | India | 3.97 |
| 28 | Panama | 3.94 |
| 29 | South Africa | 3.89 |
| 30 | Cyprus | 3.88 |
| 31 | France | 3.87 |
| 32 | Spain | 3.86 |
| 33 | Germany | 3.85 |
| 34 | Austria | 3.80 |
| 35 | Tunisia | 3.79 |
| 36 | Kuwait | 3.76 |
| 37 | Chile | 3.74 |
| 38 | Saudi Arabia | 3.73 |
| 39 | Puerto Rico | 3.73 |
| 40 | Slovak Republic | 3.65 |
| 41 | Indonesia | 3.50 |
| 42 | Slovenia | 3.49 |
| 43 | Portugal | 3.44 |
| 44 | Montenegro | 3.40 |
| 45 | Botswana | 3.39 |
| 46 | Egypt | 3.35 |
| 47 | Mauritius | 3.35 |
| 48 | Japan | 3.34 |
| 49 | China | 3.31 |
| 50 | Poland | 3.27 |
| 51 | Jordan | 3.27 |
| 52 | Lithuania | 3.27 |
| 53 | Thailand | 3.27 |
| 54 | Sri Lanka | 3.25 |
| 55 | Kazakhstan | 3.23 |
| 56 | Peru | 3.22 |
| 57 | Latvia | 3.20 |
| 58 | Ukraine | 3.18 |
| 59 | Vietnam | 3.18 |
| 60 | Azerbaijan | 3.09 |
| 61 | Kenya | 3.06 |
| 62 | Macedonia, FYR | 3.03 |
| 63 | Honduras | 3.03 |
| 64 | Russian Federation | 3.02 |
| 65 | Romania | 3.01 |
| 66 | Bulgaria | 3.01 |
| 67 | Morocco | 3.00 |
| 68 | Czech Republic | 2.99 |
| 69 | Malta | 2.98 |
| 70 | Trinidad and Tobago | 2.96 |
| 71 | Greece | 2.96 |
| 72 | Colombia | 2.95 |
| 73 | Namibia | 2.93 |
| 74 | Barbados | 2.89 |
| 75 | Guatemala | 2.89 |
| 76 | Costa Rica | 2.88 |
| 77 | Philippines | 2.88 |
| 78 | Brunei Darussalam | 2.87 |
| 79 | Brazil | 2.87 |
| 80 | Gambia, The | 2.85 |
| 81 | El Salvador | 2.85 |
| 82 | Hungary | 2.81 |
| 83 | Croatia | 2.77 |
| 84 | Nigeria | 2.77 |
| 85 | Serbia | 2.75 |
| 86 | Pakistan | 2.70 |
| 87 | Italy | 2.70 |
| 88 | Georgia | 2.68 |
| 89 | Venezuela | 2.67 |
| 90 | Uganda | 2.64 |
| 91 | Lesotho | 2.61 |
| 92 | Nepal | 2.59 |
| 93 | Dominican Republic | 2.59 |
| 94 | Zimbabwe | 2.58 |
| 95 | Cambodia | 2.56 |
| 96 | Timor-Leste | 2.56 |
| 97 | Turkey | 2.55 |
| 98 | Kyrgyz Republic | 2.54 |
| 99 | Mexico | 2.53 |
| 100 | Zambia | 2.53 |
| 101 | Albania | 2.52 |
| 102 | Nicaragua | 2.52 |
| 103 | Syria | 2.50 |
| 104 | Jamaica | 2.49 |
| 105 | Madagascar | 2.48 |
| 106 | Benin | 2.44 |
| 107 | Uruguay | 2.44 |
| 108 | Argentina | 2.43 |
| 109 | Burundi | 2.41 |
| 110 | Tajikistan | 2.40 |
| 111 | Tanzania | 2.38 |
| 112 | Bolivia | 2.36 |
| 113 | Bosnia and Herzegovina | 2.35 |
| 114 | Guyana | 2.33 |
| 115 | Libya | 2.33 |
| 116 | Mauritania | 2.25 |
| 117 | Ethiopia | 2.22 |
| 118 | Algeria | 2.20 |
| 119 | Ghana | 2.18 |
| 120 | Moldova | 2.16 |
| 121 | Malawi | 2.12 |
| 122 | Mozambique | 2.12 |
| 123 | Cameroon | 2.11 |
| 124 | Paraguay | 2.10 |
| 125 | Bangladesh | 2.09 |
| 126 | Mali | 2.08 |
| 127 | Senegal | 2.07 |
| 128 | Mongolia | 2.06 |
| 129 | Suriname | 2.01 |
| 130 | Armenia | 2.00 |
| 131 | Ecuador | 1.99 |
| 132 | Burkina Faso | 1.86 |
| 133 | Chad | 1.85 |
| 134 | Côte d'Ivoire | 1.50 |

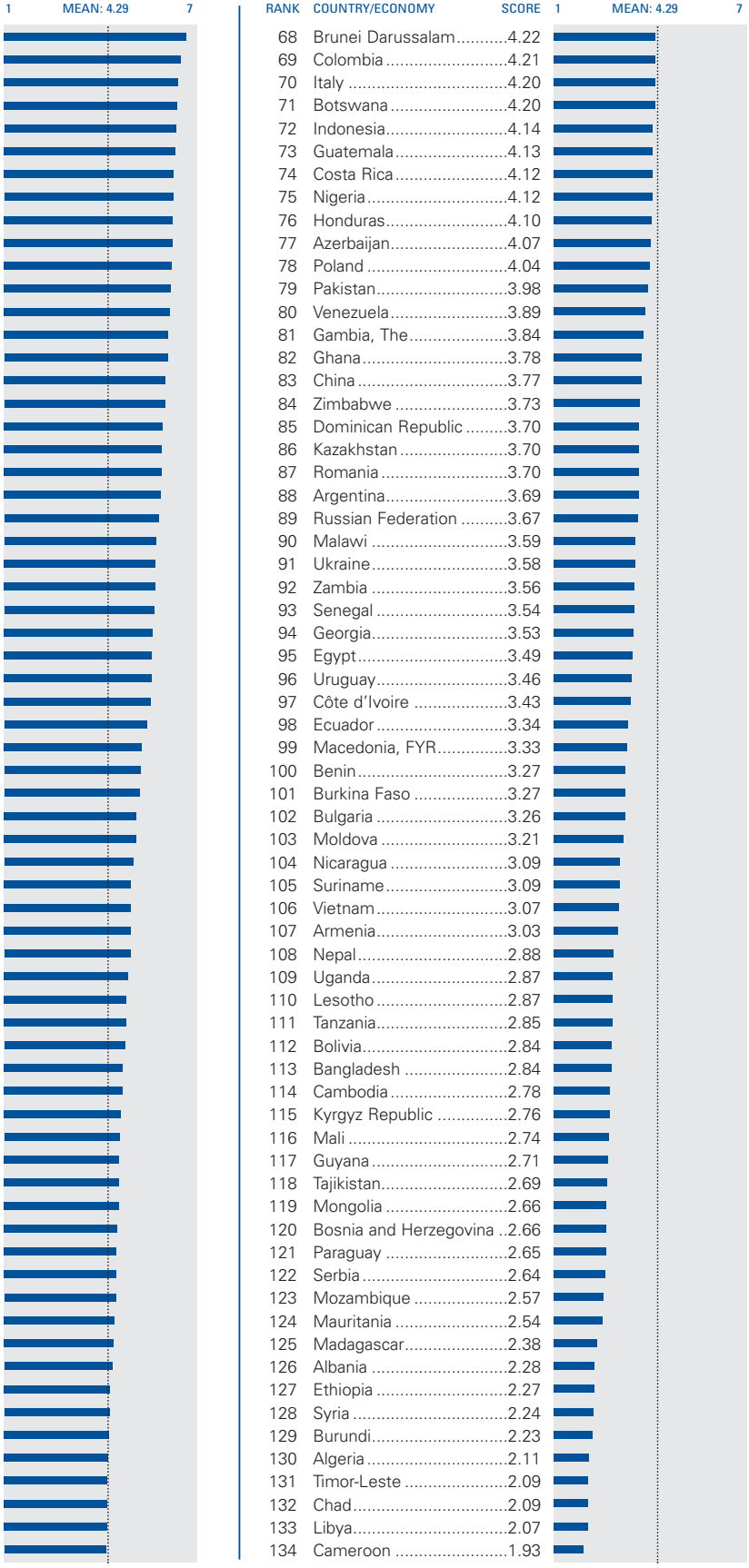



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 1.02 Financial market sophistication

The level of sophistication of financial markets in your country is (1 = lower than international norms, 7 = higher than international norms)

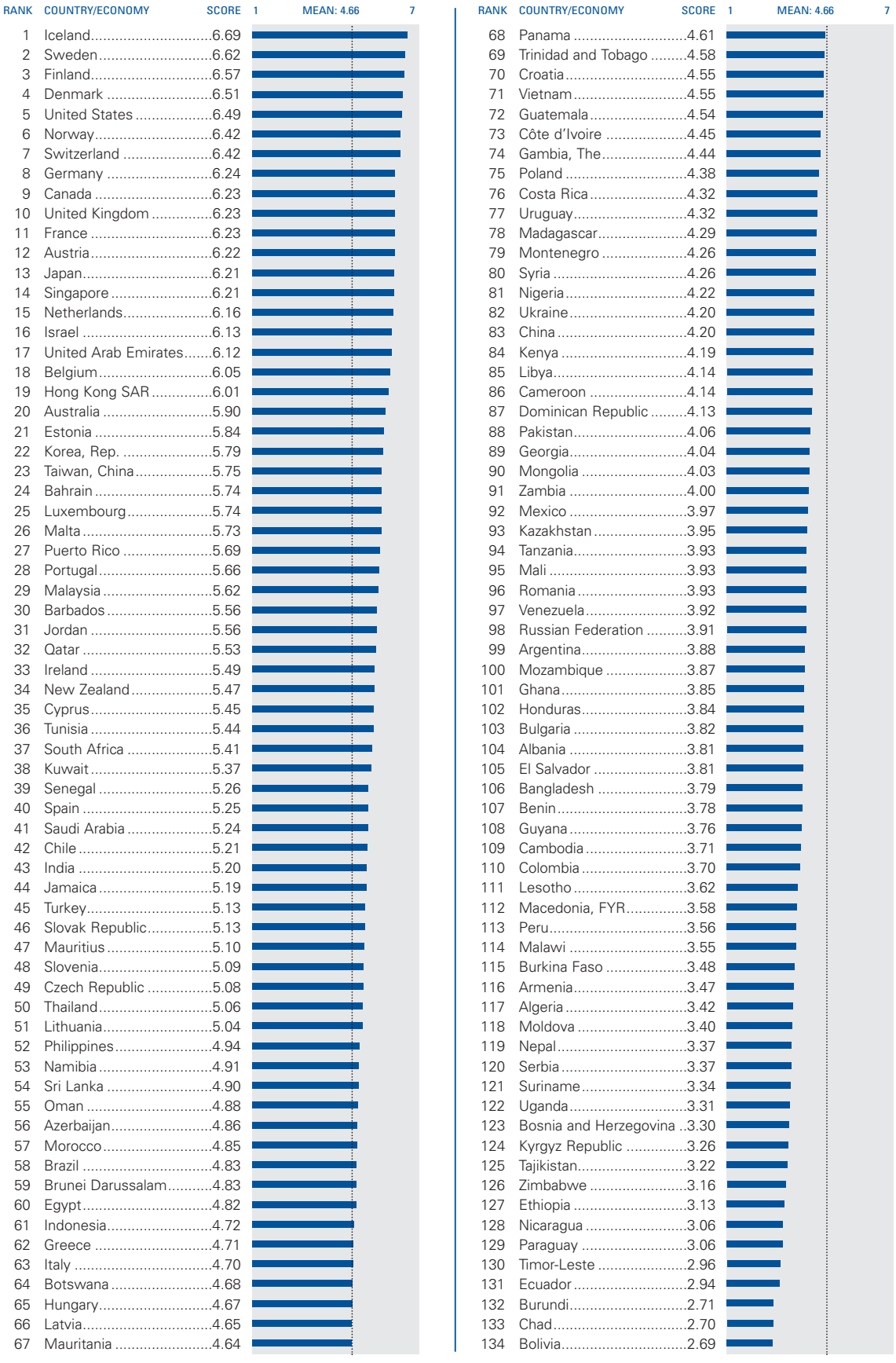
| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Switzerland | 6.77 |
| 2 | Hong Kong SAR | 6.60 |
| 3 | United States | 6.51 |
| 4 | Luxembourg | 6.49 |
| 5 | Sweden | 6.44 |
| 6 | Canada | 6.42 |
| 7 | Australia | 6.37 |
| 8 | Netherlands | 6.36 |
| 9 | United Kingdom | 6.34 |
| 10 | Singapore | 6.34 |
| 11 | Denmark | 6.32 |
| 12 | South Africa | 6.28 |
| 13 | Ireland | 6.25 |
| 14 | Germany | 6.19 |
| 15 | France | 6.18 |
| 16 | Belgium | 6.12 |
| 17 | Austria | 6.10 |
| 18 | Finland | 6.03 |
| 19 | Norway | 5.99 |
| 20 | Bahrain | 5.99 |
| 21 | Brazil | 5.97 |
| 22 | Puerto Rico | 5.90 |
| 23 | Spain | 5.81 |
| 24 | Israel | 5.80 |
| 25 | Estonia | 5.79 |
| 26 | Chile | 5.75 |
| 27 | Panama | 5.71 |
| 28 | Iceland | 5.67 |
| 29 | New Zealand | 5.67 |
| 30 | Portugal | 5.65 |
| 31 | Malaysia | 5.52 |
| 32 | United Arab Emirates | 5.36 |
| 33 | India | 5.32 |
| 34 | Malta | 5.29 |
| 35 | Korea, Rep. | 5.18 |
| 36 | Cyprus | 5.18 |
| 37 | Thailand | 5.09 |
| 38 | Qatar | 5.02 |
| 39 | Turkey | 5.02 |
| 40 | Jamaica | 5.01 |
| 41 | Slovak Republic | 5.00 |
| 42 | Namibia | 4.93 |
| 43 | El Salvador | 4.88 |
| 44 | Mauritius | 4.87 |
| 45 | Taiwan, China | 4.83 |
| 46 | Oman | 4.75 |
| 47 | Barbados | 4.75 |
| 48 | Japan | 4.70 |
| 49 | Czech Republic | 4.66 |
| 50 | Kuwait | 4.65 |
| 51 | Sri Lanka | 4.64 |
| 52 | Greece | 4.64 |
| 53 | Slovenia | 4.59 |
| 54 | Peru | 4.56 |
| 55 | Latvia | 4.55 |
| 56 | Mexico | 4.54 |
| 57 | Philippines | 4.50 |
| 58 | Jordan | 4.47 |
| 59 | Hungary | 4.43 |
| 60 | Trinidad and Tobago | 4.36 |
| 61 | Tunisia | 4.34 |
| 62 | Morocco | 4.33 |
| 63 | Saudi Arabia | 4.29 |
| 64 | Kenya | 4.27 |
| 65 | Croatia | 4.27 |
| 66 | Lithuania | 4.26 |
| 67 | Montenegro | 4.22 |
| 68 | Brunei Darussalam | 4.22 |
| 69 | Colombia | 4.21 |
| 70 | Italy | 4.20 |
| 71 | Botswana | 4.20 |
| 72 | Indonesia | 4.14 |
| 73 | Guatemala | 4.13 |
| 74 | Costa Rica | 4.12 |
| 75 | Nigeria | 4.12 |
| 76 | Honduras | 4.10 |
| 77 | Azerbaijan | 4.07 |
| 78 | Poland | 4.04 |
| 79 | Pakistan | 3.98 |
| 80 | Venezuela | 3.89 |
| 81 | Gambia, The | 3.84 |
| 82 | Ghana | 3.78 |
| 83 | China | 3.77 |
| 84 | Zimbabwe | 3.73 |
| 85 | Dominican Republic | 3.70 |
| 86 | Kazakhstan | 3.70 |
| 87 | Romania | 3.70 |
| 88 | Argentina | 3.69 |
| 89 | Russian Federation | 3.67 |
| 90 | Malawi | 3.59 |
| 91 | Ukraine | 3.58 |
| 92 | Zambia | 3.56 |
| 93 | Senegal | 3.54 |
| 94 | Georgia | 3.53 |
| 95 | Egypt | 3.49 |
| 96 | Uruguay | 3.46 |
| 97 | Côte d'Ivoire | 3.43 |
| 98 | Ecuador | 3.34 |
| 99 | Macedonia, FYR | 3.33 |
| 100 | Benin | 3.27 |
| 101 | Burkina Faso | 3.27 |
| 102 | Bulgaria | 3.26 |
| 103 | Moldova | 3.21 |
| 104 | Nicaragua | 3.09 |
| 105 | Suriname | 3.09 |
| 106 | Vietnam | 3.07 |
| 107 | Armenia | 3.03 |
| 108 | Nepal | 2.88 |
| 109 | Uganda | 2.87 |
| 110 | Lesotho | 2.87 |
| 111 | Tanzania | 2.85 |
| 112 | Bolivia | 2.84 |
| 113 | Bangladesh | 2.84 |
| 114 | Cambodia | 2.78 |
| 115 | Kyrgyz Republic | 2.76 |
| 116 | Mali | 2.74 |
| 117 | Guyana | 2.71 |
| 118 | Tajikistan | 2.69 |
| 119 | Mongolia | 2.66 |
| 120 | Bosnia and Herzegovina | 2.66 |
| 121 | Paraguay | 2.65 |
| 122 | Serbia | 2.64 |
| 123 | Mozambique | 2.57 |
| 124 | Mauritania | 2.54 |
| 125 | Madagascar | 2.38 |
| 126 | Albania | 2.28 |
| 127 | Ethiopia | 2.27 |
| 128 | Syria | 2.24 |
| 129 | Burundi | 2.23 |
| 130 | Algeria | 2.11 |
| 131 | Timor-Leste | 2.09 |
| 132 | Chad | 2.09 |
| 133 | Libya | 2.07 |
| 134 | Cameroon | 1.93 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 1.03 Availability of latest technologies

In your country, the latest technologies are (1 = not widely available and used, 7 = widely available and used)



| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Iceland | 6.69 |
| 2 | Sweden | 6.62 |
| 3 | Finland | 6.57 |
| 4 | Denmark | 6.51 |
| 5 | United States | 6.49 |
| 6 | Norway | 6.42 |
| 7 | Switzerland | 6.42 |
| 8 | Germany | 6.24 |
| 9 | Canada | 6.23 |
| 10 | United Kingdom | 6.23 |
| 11 | France | 6.23 |
| 12 | Austria | 6.22 |
| 13 | Japan | 6.21 |
| 14 | Singapore | 6.21 |
| 15 | Netherlands | 6.16 |
| 16 | Israel | 6.13 |
| 17 | United Arab Emirates | 6.12 |
| 18 | Belgium | 6.05 |
| 19 | Hong Kong SAR | 6.01 |
| 20 | Australia | 5.90 |
| 21 | Estonia | 5.84 |
| 22 | Korea, Rep. | 5.79 |
| 23 | Taiwan, China | 5.75 |
| 24 | Bahrain | 5.74 |
| 25 | Luxembourg | 5.74 |
| 26 | Malta | 5.73 |
| 27 | Puerto Rico | 5.69 |
| 28 | Portugal | 5.66 |
| 29 | Malaysia | 5.62 |
| 30 | Barbados | 5.56 |
| 31 | Jordan | 5.56 |
| 32 | Qatar | 5.53 |
| 33 | Ireland | 5.49 |
| 34 | New Zealand | 5.47 |
| 35 | Cyprus | 5.45 |
| 36 | Tunisia | 5.44 |
| 37 | South Africa | 5.41 |
| 38 | Kuwait | 5.37 |
| 39 | Senegal | 5.26 |
| 40 | Spain | 5.25 |
| 41 | Saudi Arabia | 5.24 |
| 42 | Chile | 5.21 |
| 43 | India | 5.20 |
| 44 | Jamaica | 5.19 |
| 45 | Turkey | 5.13 |
| 46 | Slovak Republic | 5.13 |
| 47 | Mauritius | 5.10 |
| 48 | Slovenia | 5.09 |
| 49 | Czech Republic | 5.08 |
| 50 | Thailand | 5.06 |
| 51 | Lithuania | 5.04 |
| 52 | Philippines | 4.94 |
| 53 | Namibia | 4.91 |
| 54 | Sri Lanka | 4.90 |
| 55 | Oman | 4.88 |
| 56 | Azerbaijan | 4.86 |
| 57 | Morocco | 4.85 |
| 58 | Brazil | 4.83 |
| 59 | Brunei Darussalam | 4.83 |
| 60 | Egypt | 4.82 |
| 61 | Indonesia | 4.72 |
| 62 | Greece | 4.71 |
| 63 | Italy | 4.70 |
| 64 | Botswana | 4.68 |
| 65 | Hungary | 4.67 |
| 66 | Latvia | 4.65 |
| 67 | Mauritania | 4.64 |
| 68 | Panama | 4.61 |
| 69 | Trinidad and Tobago | 4.58 |
| 70 | Croatia | 4.55 |
| 71 | Vietnam | 4.55 |
| 72 | Guatemala | 4.54 |
| 73 | Côte d'Ivoire | 4.45 |
| 74 | Gambia, The | 4.44 |
| 75 | Poland | 4.38 |
| 76 | Costa Rica | 4.32 |
| 77 | Uruguay | 4.32 |
| 78 | Madagascar | 4.29 |
| 79 | Montenegro | 4.26 |
| 80 | Syria | 4.26 |
| 81 | Nigeria | 4.22 |
| 82 | Ukraine | 4.20 |
| 83 | China | 4.20 |
| 84 | Kenya | 4.19 |
| 85 | Libya | 4.14 |
| 86 | Cameroon | 4.14 |
| 87 | Dominican Republic | 4.13 |
| 88 | Pakistan | 4.06 |
| 89 | Georgia | 4.04 |
| 90 | Mongolia | 4.03 |
| 91 | Zambia | 4.00 |
| 92 | Mexico | 3.97 |
| 93 | Kazakhstan | 3.95 |
| 94 | Tanzania | 3.93 |
| 95 | Mali | 3.93 |
| 96 | Romania | 3.93 |
| 97 | Venezuela | 3.92 |
| 98 | Russian Federation | 3.91 |
| 99 | Argentina | 3.88 |
| 100 | Mozambique | 3.87 |
| 101 | Ghana | 3.85 |
| 102 | Honduras | 3.84 |
| 103 | Bulgaria | 3.82 |
| 104 | Albania | 3.81 |
| 105 | El Salvador | 3.81 |
| 106 | Bangladesh | 3.79 |
| 107 | Benin | 3.78 |
| 108 | Guyana | 3.76 |
| 109 | Cambodia | 3.71 |
| 110 | Colombia | 3.70 |
| 111 | Lesotho | 3.62 |
| 112 | Macedonia, FYR | 3.58 |
| 113 | Peru | 3.56 |
| 114 | Malawi | 3.55 |
| 115 | Burkina Faso | 3.48 |
| 116 | Armenia | 3.47 |
| 117 | Algeria | 3.42 |
| 118 | Moldova | 3.40 |
| 119 | Nepal | 3.37 |
| 120 | Serbia | 3.37 |
| 121 | Suriname | 3.34 |
| 122 | Uganda | 3.31 |
| 123 | Bosnia and Herzegovina | 3.30 |
| 124 | Kyrgyz Republic | 3.26 |
| 125 | Tajikistan | 3.22 |
| 126 | Zimbabwe | 3.16 |
| 127 | Ethiopia | 3.13 |
| 128 | Nicaragua | 3.06 |
| 129 | Paraguay | 3.06 |
| 130 | Timor-Leste | 2.96 |
| 131 | Ecuador | 2.94 |
| 132 | Burundi | 2.71 |
| 133 | Chad | 2.70 |
| 134 | Bolivia | 2.69 |

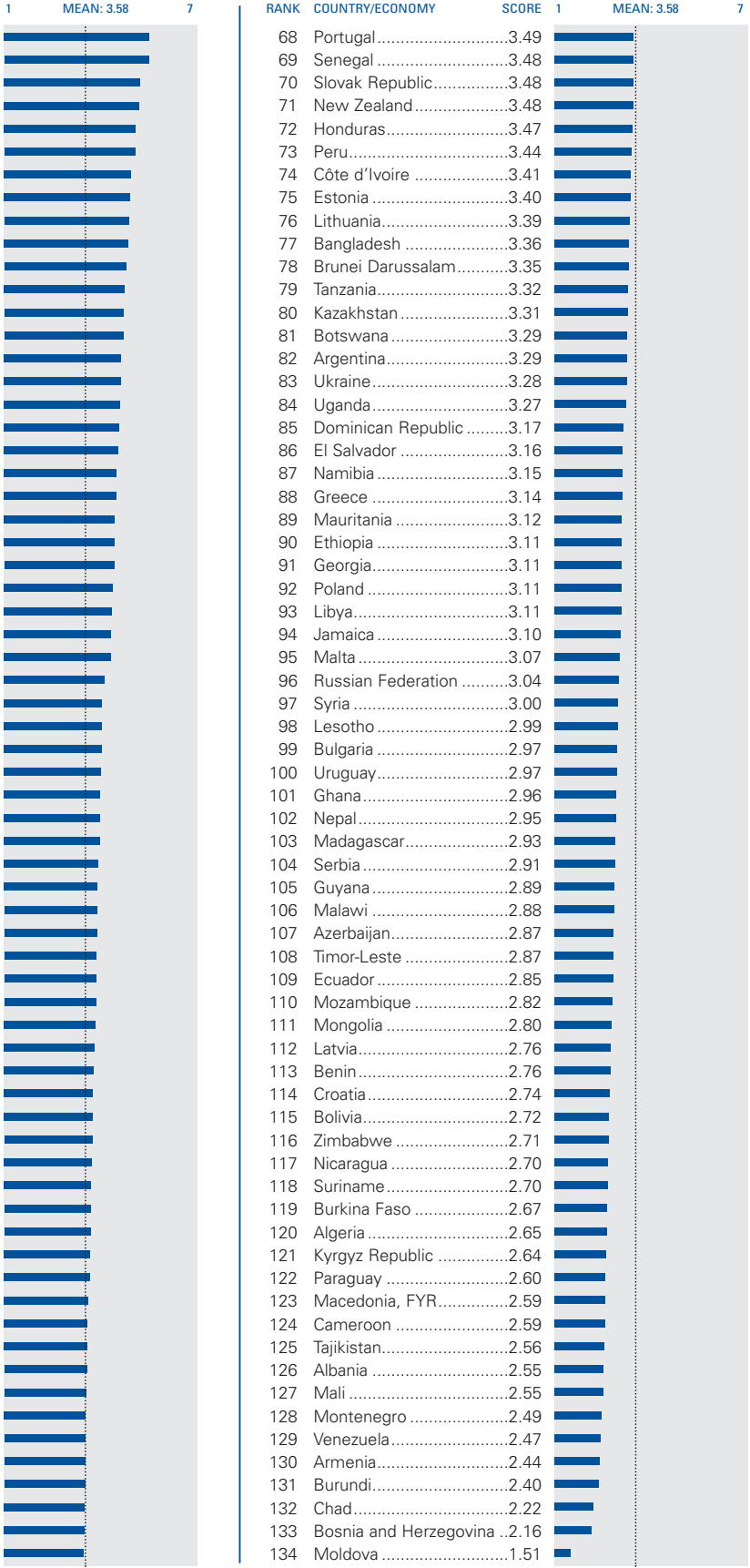


**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 1.04 State of cluster development

Strong and deep clusters are widespread throughout the economy (1 = strongly disagree, 7 = strongly agree)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Taiwan, China | 5.59 |
| 2 | United States | 5.58 |
| 3 | Singapore | 5.30 |
| 4 | Italy | 5.28 |
| 5 | Japan | 5.16 |
| 6 | Finland | 5.15 |
| 7 | Hong Kong SAR | 5.02 |
| 8 | Korea, Rep. | 4.98 |
| 9 | Switzerland | 4.94 |
| 10 | Germany | 4.93 |
| 11 | Denmark | 4.86 |
| 12 | Netherlands | 4.82 |
| 13 | Malaysia | 4.77 |
| 14 | Sweden | 4.77 |
| 15 | United Kingdom | 4.69 |
| 16 | Canada | 4.69 |
| 17 | Austria | 4.68 |
| 18 | Indonesia | 4.65 |
| 19 | China | 4.62 |
| 20 | Norway | 4.56 |
| 21 | United Arab Emirates | 4.56 |
| 22 | Luxembourg | 4.50 |
| 23 | France | 4.50 |
| 24 | India | 4.48 |
| 25 | Vietnam | 4.44 |
| 26 | Ireland | 4.42 |
| 27 | Belgium | 4.39 |
| 28 | Sri Lanka | 4.38 |
| 29 | Cyprus | 4.18 |
| 30 | Puerto Rico | 4.10 |
| 31 | Thailand | 4.10 |
| 32 | Israel | 4.10 |
| 33 | Qatar | 4.06 |
| 34 | Australia | 4.03 |
| 35 | Czech Republic | 4.03 |
| 36 | Saudi Arabia | 4.03 |
| 37 | Spain | 3.98 |
| 38 | Bahrain | 3.95 |
| 39 | Nigeria | 3.94 |
| 40 | South Africa | 3.94 |
| 41 | Jordan | 3.91 |
| 42 | Kuwait | 3.91 |
| 43 | Brazil | 3.91 |
| 44 | Iceland | 3.90 |
| 45 | Panama | 3.87 |
| 46 | Egypt | 3.83 |
| 47 | Kenya | 3.80 |
| 48 | Slovenia | 3.80 |
| 49 | Oman | 3.79 |
| 50 | Tunisia | 3.78 |
| 51 | Hungary | 3.74 |
| 52 | Morocco | 3.73 |
| 53 | Chile | 3.73 |
| 54 | Turkey | 3.72 |
| 55 | Mauritius | 3.71 |
| 56 | Philippines | 3.66 |
| 57 | Gambia, The | 3.64 |
| 58 | Mexico | 3.64 |
| 59 | Romania | 3.62 |
| 60 | Cambodia | 3.59 |
| 61 | Guatemala | 3.58 |
| 62 | Colombia | 3.56 |
| 63 | Trinidad and Tobago | 3.56 |
| 64 | Barbados | 3.56 |
| 65 | Zambia | 3.55 |
| 66 | Pakistan | 3.55 |
| 67 | Costa Rica | 3.52 |
| 68 | Portugal | 3.49 |
| 69 | Senegal | 3.48 |
| 70 | Slovak Republic | 3.48 |
| 71 | New Zealand | 3.48 |
| 72 | Honduras | 3.47 |
| 73 | Peru | 3.44 |
| 74 | Côte d'Ivoire | 3.41 |
| 75 | Estonia | 3.40 |
| 76 | Lithuania | 3.39 |
| 77 | Bangladesh | 3.36 |
| 78 | Brunei Darussalam | 3.35 |
| 79 | Tanzania | 3.32 |
| 80 | Kazakhstan | 3.31 |
| 81 | Botswana | 3.29 |
| 82 | Argentina | 3.29 |
| 83 | Ukraine | 3.28 |
| 84 | Uganda | 3.27 |
| 85 | Dominican Republic | 3.17 |
| 86 | El Salvador | 3.16 |
| 87 | Namibia | 3.15 |
| 88 | Greece | 3.14 |
| 89 | Mauritania | 3.12 |
| 90 | Ethiopia | 3.11 |
| 91 | Georgia | 3.11 |
| 92 | Poland | 3.11 |
| 93 | Libya | 3.11 |
| 94 | Jamaica | 3.10 |
| 95 | Malta | 3.07 |
| 96 | Russian Federation | 3.04 |
| 97 | Syria | 3.00 |
| 98 | Lesotho | 2.99 |
| 99 | Bulgaria | 2.97 |
| 100 | Uruguay | 2.97 |
| 101 | Ghana | 2.96 |
| 102 | Nepal | 2.95 |
| 103 | Madagascar | 2.93 |
| 104 | Serbia | 2.91 |
| 105 | Guyana | 2.89 |
| 106 | Malawi | 2.88 |
| 107 | Azerbaijan | 2.87 |
| 108 | Timor-Leste | 2.87 |
| 109 | Ecuador | 2.85 |
| 110 | Mozambique | 2.82 |
| 111 | Mongolia | 2.80 |
| 112 | Latvia | 2.76 |
| 113 | Benin | 2.76 |
| 114 | Croatia | 2.74 |
| 115 | Bolivia | 2.72 |
| 116 | Zimbabwe | 2.71 |
| 117 | Nicaragua | 2.70 |
| 118 | Suriname | 2.70 |
| 119 | Burkina Faso | 2.67 |
| 120 | Algeria | 2.65 |
| 121 | Kyrgyz Republic | 2.64 |
| 122 | Paraguay | 2.60 |
| 123 | Macedonia, FYR | 2.59 |
| 124 | Cameroon | 2.59 |
| 125 | Tajikistan | 2.56 |
| 126 | Albania | 2.55 |
| 127 | Mali | 2.55 |
| 128 | Montenegro | 2.49 |
| 129 | Venezuela | 2.47 |
| 130 | Armenia | 2.44 |
| 131 | Burundi | 2.40 |
| 132 | Chad | 2.22 |
| 133 | Bosnia and Herzegovina | 2.16 |
| 134 | Moldova | 1.51 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 1.05 Utility patents (hard data)

Number of utility patents (i.e., patents for invention) granted between January 1 and December 31, 2007, per million population | 2007

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Taiwan, China | 266.92 |
| 2 | United States | 263.67 |
| 3 | Japan | 261.05 |
| 4 | Finland | 160.72 |
| 5 | Israel | 154.34 |
| 6 | Switzerland | 137.08 |
| 7 | Korea, Rep. | 129.71 |
| 8 | Sweden | 115.98 |
| 9 | Germany | 110.02 |
| 10 | Canada | 100.62 |
| 11 | Singapore | 85.65 |
| 12 | Luxembourg | 79.17 |
| 13 | Netherlands | 76.31 |
| 14 | Denmark | 71.06 |
| 15 | Iceland | 61.09 |
| 16 | Australia | 60.24 |
| 17 | Austria | 54.84 |
| 18 | United Kingdom | 53.94 |
| 19 | Norway | 52.45 |
| 20 | France | 50.72 |
| 21 | Belgium | 48.94 |
| 22 | Hong Kong SAR | 48.80 |
| 23 | Ireland | 33.44 |
| 24 | New Zealand | 26.72 |
| 25 | Italy | 21.93 |
| 26 | Slovenia | 7.93 |
| 27 | Puerto Rico | 7.10 |
| 28 | Spain | 5.97 |
| 29 | Malaysia | 5.95 |
| 30 | Estonia | 5.22 |
| 31 | Hungary | 4.67 |
| 32 | Cyprus | 3.81 |
| 33 | Czech Republic | 3.58 |
| 34 | Barbados | 3.40 |
| 35 | Croatia | 3.38 |
| 36 | Malta | 2.44 |
| 37 | Kuwait | 2.25 |
| 38 | Greece | 1.79 |
| 39 | South Africa | 1.72 |
| 40 | Chile | 1.51 |
| 41 | Russian Federation | 1.33 |
| 42 | Portugal | 1.23 |
| 43 | Lithuania | 1.18 |
| 44 | Georgia | 1.14 |
| 45 | Argentina | 0.94 |
| 46 | Slovak Republic | 0.93 |
| 47 | Uruguay | 0.90 |
| 48 | Poland | 0.84 |
| 49 | Saudi Arabia | 0.83 |
| 50 | Serbia | 0.81 |
| 51 | Bulgaria | 0.79 |
| 52 | Trinidad and Tobago | 0.75 |
| 53 | Costa Rica | 0.67 |
| 54 | China | 0.58 |
| 55 | Mexico | 0.52 |
| 56 | Romania | 0.51 |
| 57 | India | 0.49 |
| 58 | Brazil | 0.47 |
| 59 | United Arab Emirates | 0.46 |
| 60 | Latvia | 0.44 |
| 61 | Venezuela | 0.40 |
| 62 | Ecuador | 0.37 |
| 63 | Jamaica | 0.37 |
| 64 | Jordan | 0.35 |
| 65 | Armenia | 0.33 |
| 66 | Ukraine | 0.26 |
| 67 | Turkey | 0.26 |
| 68 | Azerbaijan | 0.23 |
| 69 | Philippines | 0.23 |
| 70 | Thailand | 0.17 |
| 71 | Egypt | 0.16 |
| 72 | Sri Lanka | 0.15 |
| 73 | Honduras | 0.14 |
| 74 | Kazakhstan | 0.13 |
| 75 | Benin | 0.11 |
| 76 | Dominican Republic | 0.10 |
| 77 | Zimbabwe | 0.07 |
| 78 | Peru | 0.07 |
| 79 | Colombia | 0.07 |
| 80 | Cameroon | 0.05 |
| 81 | Syria | 0.05 |
| 82 | Ghana | 0.04 |
| 83 | Morocco | 0.03 |
| 84 | Kenya | 0.03 |
| 85 | Indonesia | 0.02 |
| 86 | Ethiopia | 0.01 |
| 87 | Bangladesh | 0.01 |
| 88 | Pakistan | 0.01 |
| 89 | Albania | 0.00 |
| 89 | Algeria | 0.00 |
| 89 | Bahrain | 0.00 |
| 89 | Bolivia | 0.00 |
| 89 | Bosnia and Herzegovina | 0.00 |
| 89 | Botswana | 0.00 |
| 89 | Brunei Darussalam | 0.00 |
| 89 | Burkina Faso | 0.00 |
| 89 | Burundi | 0.00 |
| 89 | Cambodia | 0.00 |
| 89 | Chad | 0.00 |
| 89 | Côte d'Ivoire | 0.00 |
| 89 | El Salvador | 0.00 |
| 89 | Gambia, The | 0.00 |
| 89 | Guatemala | 0.00 |
| 89 | Guyana | 0.00 |
| 89 | Kyrgyz Republic | 0.00 |
| 89 | Lesotho | 0.00 |
| 89 | Libya | 0.00 |
| 89 | Macedonia, FYR | 0.00 |
| 89 | Madagascar | 0.00 |
| 89 | Malawi | 0.00 |
| 89 | Mali | 0.00 |
| 89 | Mauritania | 0.00 |
| 89 | Mauritius | 0.00 |
| 89 | Moldova | 0.00 |
| 89 | Mongolia | 0.00 |
| 89 | Montenegro | 0.00 |
| 89 | Mozambique | 0.00 |
| 89 | Namibia | 0.00 |
| 89 | Nepal | 0.00 |
| 89 | Nicaragua | 0.00 |
| 89 | Nigeria | 0.00 |
| 89 | Oman | 0.00 |
| 89 | Panama | 0.00 |
| 89 | Paraguay | 0.00 |
| 89 | Qatar | 0.00 |
| 89 | Senegal | 0.00 |
| 89 | Suriname | 0.00 |
| 89 | Tajikistan | 0.00 |
| 89 | Tanzania | 0.00 |
| 89 | Timor-Leste | 0.00 |
| 89 | Tunisia | 0.00 |
| 89 | Uganda | 0.00 |
| 89 | Vietnam | 0.00 |
| 89 | Zambia | 0.00 |

**SOURCE:** US Patent and Trademark Office, *Patents By Country, State, and Year—Utility Patents* (December 2007); The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008); national sources

# 1.06 High-tech exports (hard data)

High-technology exports as a percentage of total goods exports | 2006 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Philippines | 59.38 |
| 2 | Hong Kong SAR | 49.68 |
| 3 | Malta | 49.44 |
| 4 | Singapore | 45.14 |
| 5 | Taiwan, China[1] | 44.60 |
| 6 | Malaysia | 39.42 |
| 7 | Ireland | 30.42 |
| 8 | Korea, Rep. | 28.01 |
| 9 | China | 27.96 |
| 10 | Costa Rica | 25.88 |
| 11 | United Kingdom | 25.80 |
| 12 | United States | 21.34 |
| 13 | Thailand | 21.07 |
| 14 | Japan | 20.56 |
| 15 | Hungary | 20.06 |
| 16 | Puerto Rico | 19.00 |
| 17 | Finland | 18.04 |
| 18 | Netherlands | 17.89 |
| 19 | Switzerland | 17.50 |
| 20 | France | 16.67 |
| 21 | Mauritius | 15.44 |
| 22 | Mexico | 14.29 |
| 23 | Germany | 13.68 |
| 24 | Israel | 12.73 |
| 25 | Denmark | 12.65 |
| 26 | Czech Republic | 12.51 |
| 27 | Sweden | 12.15 |
| 28 | Austria | 10.49 |
| 29 | Canada | 8.15 |
| 30 | Luxembourg | 8.08 |
| 31 | Belgium | 8.05 |
| 32 | Estonia | 8.00 |
| 33 | Iceland | 7.11 |
| 34 | Morocco | 6.96 |
| 35 | Slovak Republic | 6.90 |
| 36 | Portugal | 6.82 |
| 37 | Croatia | 6.49 |
| 38 | Côte d'Ivoire | 6.14 |
| 39 | Brazil | 6.11 |
| 40 | Italy | 5.99 |
| 41 | Indonesia | 5.70 |
| 42 | Greece | 5.61 |
| 43 | Barbados[2] | 5.18 |
| 44 | Uganda | 5.08 |
| 45 | Lithuania | 4.62 |
| 46 | Spain | 4.55 |
| 47 | Georgia | 4.45 |
| 48 | Cyprus | 4.40 |
| 49 | Slovenia | 4.40 |
| 50 | Latvia | 3.93 |
| 51 | Namibia | 3.84 |
| 52 | Serbia | 3.54 |
| 53 | Romania | 3.49 |
| 54 | India[2] | 3.44 |
| 55 | Tunisia[2] | 3.28 |
| 56 | Bulgaria | 3.22 |
| 57 | Norway | 2.91 |
| 58 | South Africa | 2.82 |
| 59 | Poland | 2.80 |
| 60 | Australia | 2.70 |
| 61 | Vietnam[2] | 2.68 |
| 62 | New Zealand | 2.60 |
| 63 | Kazakhstan | 2.55 |
| 64 | Ukraine | 2.38 |
| 65 | Senegal[1] | 2.17 |
| 66 | Argentina | 2.14 |
| 67 | Bosnia and Herzegovina | 1.85 |
| 68 | Malawi | 1.82 |
| 69 | Russian Federation | 1.57 |
| 70 | Sri Lanka[2] | 1.56 |
| 71 | Colombia | 1.39 |
| 72 | Pakistan | 1.16 |
| 73 | Albania | 1.03 |
| 74 | Moldova | 0.98 |
| 75 | Burkina Faso[1] | 0.95 |
| 76 | Uruguay | 0.82 |
| 77 | Macedonia, FYR | 0.76 |
| 78 | Ecuador | 0.73 |
| 79 | Kyrgyz Republic | 0.71 |
| 80 | Chile | 0.69 |
| 81 | Jordan | 0.67 |
| 82 | Botswana | 0.64 |
| 83 | El Salvador | 0.62 |
| 84 | Kenya[1] | 0.61 |
| 85 | Guatemala | 0.58 |
| 86 | Paraguay | 0.53 |
| 87 | Madagascar | 0.49 |
| 88 | Armenia | 0.49 |
| 89 | Zimbabwe[2] | 0.46 |
| 90 | Bolivia | 0.34 |
| 91 | Trinidad and Tobago | 0.31 |
| 92 | Qatar | 0.29 |
| 93 | Turkey | 0.28 |
| 94 | Burundi[2] | 0.28 |
| 95 | Syria | 0.28 |
| 96 | Bangladesh[1] | 0.26 |
| 97 | Peru | 0.24 |
| 98 | Nicaragua | 0.24 |
| 99 | Brunei Darussalam | 0.21 |
| 100 | Mali[1] | 0.21 |
| 101 | Mongolia | 0.17 |
| 102 | Cambodia[1] | 0.16 |
| 103 | Venezuela | 0.12 |
| 104 | Ethiopia | 0.12 |
| 105 | Mozambique | 0.11 |
| 106 | Honduras | 0.11 |
| 107 | Zambia | 0.10 |
| 108 | Cameroon | 0.09 |
| 109 | Egypt | 0.07 |
| 110 | Saudi Arabia | 0.07 |
| 111 | Azerbaijan | 0.06 |
| 112 | Jamaica | 0.06 |
| 113 | Tanzania | 0.05 |
| 114 | Guyana | 0.04 |
| 115 | Nigeria | 0.04 |
| 116 | Ghana | 0.04 |
| 117 | Algeria | 0.02 |
| 118 | Gambia, The | 0.02 |
| 119 | Oman | 0.02 |
| 120 | United Arab Emirates[1] | 0.02 |
| 121 | Benin[2] | 0.00 |
| 122 | Panama | 0.00 |
| 123 | Bahrain | 0.00 |
| n/a | Chad | n/a |
| n/a | Dominican Republic | n/a |
| n/a | Kuwait | n/a |
| n/a | Lesotho | n/a |
| n/a | Libya | n/a |
| n/a | Mauritania | n/a |
| n/a | Montenegro | n/a |
| n/a | Nepal | n/a |
| n/a | Suriname | n/a |
| n/a | Tajikistan | n/a |
| n/a | Timor-Leste | n/a |

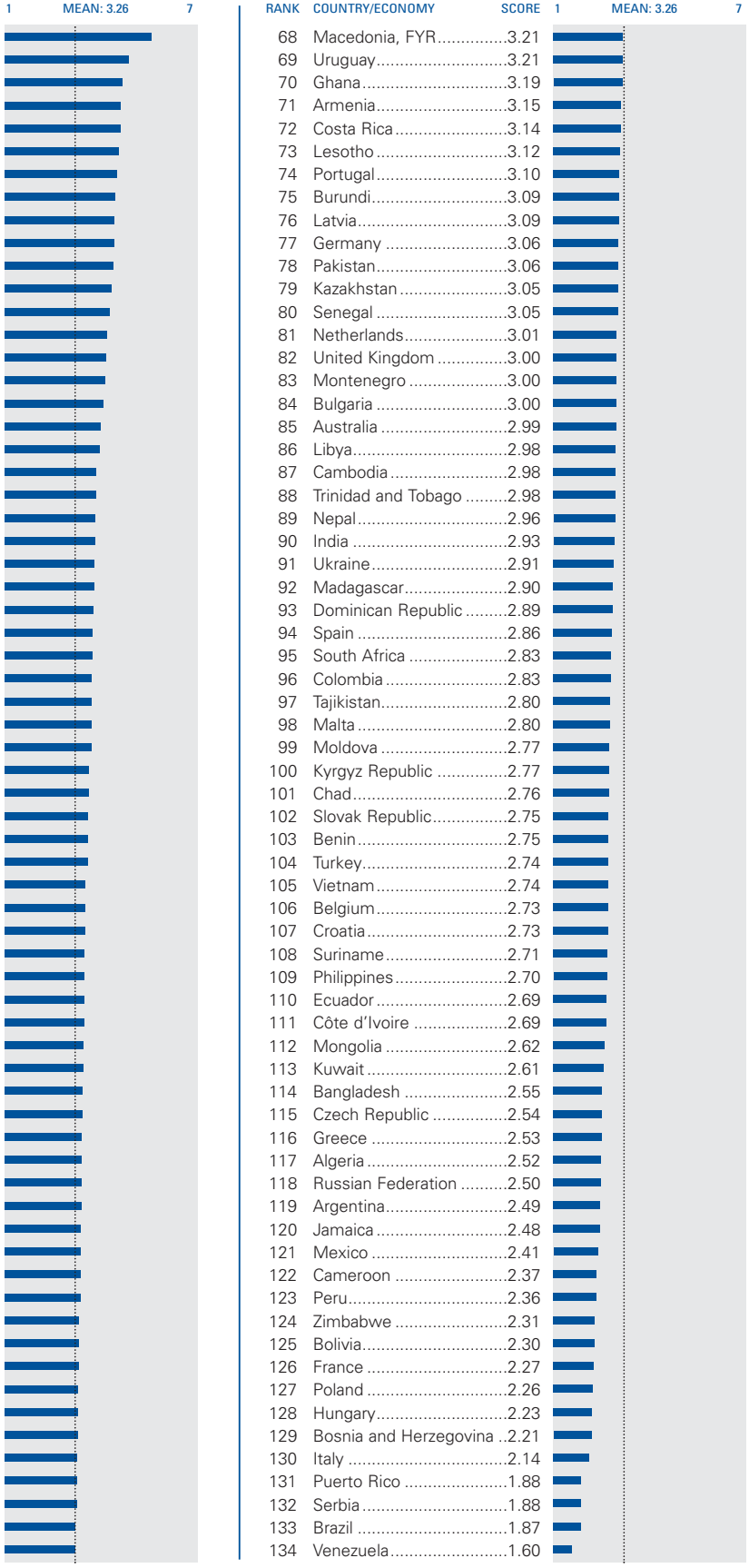
**SOURCE:** The World Bank, *World Development Indicators Online Database* (October 2008); Economist Intelligence Unit, *CountryData Database* (retrieved January 9, 2009); authors' estimates based on United Nations Statistics Division's COMTRADE database (retrieved January 9, 2009); national sources

[1] 2004 [2] 2005

# 1.07 Burden of government regulation

Complying with administrative requirements (permits, regulations, reporting) issued by the government in your country is (1 = burdensome, 7 = not burdensome)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Singapore | 5.66 |
| 2 | Hong Kong SAR | 4.93 |
| 3 | Iceland | 4.73 |
| 4 | Gambia, The | 4.68 |
| 5 | United Arab Emirates | 4.68 |
| 6 | Georgia | 4.62 |
| 7 | Oman | 4.57 |
| 8 | Qatar | 4.51 |
| 9 | Japan | 4.47 |
| 10 | Estonia | 4.47 |
| 11 | Switzerland | 4.45 |
| 12 | Finland | 4.39 |
| 13 | Malaysia | 4.33 |
| 14 | Saudi Arabia | 4.24 |
| 15 | Azerbaijan | 4.20 |
| 16 | Tunisia | 4.19 |
| 17 | Bahrain | 4.12 |
| 18 | Jordan | 4.05 |
| 19 | Mauritania | 4.00 |
| 20 | Honduras | 3.91 |
| 21 | Cyprus | 3.90 |
| 22 | Taiwan, China | 3.86 |
| 23 | China | 3.86 |
| 24 | Korea, Rep. | 3.83 |
| 25 | Denmark | 3.83 |
| 26 | Ethiopia | 3.81 |
| 27 | Luxembourg | 3.78 |
| 28 | Zambia | 3.77 |
| 29 | Barbados | 3.76 |
| 30 | Malawi | 3.76 |
| 31 | Mauritius | 3.76 |
| 32 | Guatemala | 3.76 |
| 33 | Uganda | 3.68 |
| 34 | Chile | 3.66 |
| 35 | Mali | 3.63 |
| 36 | Israel | 3.63 |
| 37 | Panama | 3.63 |
| 38 | Botswana | 3.55 |
| 39 | Austria | 3.55 |
| 40 | Canada | 3.54 |
| 41 | Slovenia | 3.53 |
| 42 | Burkina Faso | 3.53 |
| 43 | Sweden | 3.52 |
| 44 | Sri Lanka | 3.51 |
| 45 | Indonesia | 3.49 |
| 46 | Morocco | 3.48 |
| 47 | Thailand | 3.47 |
| 48 | Lithuania | 3.46 |
| 49 | Norway | 3.45 |
| 50 | United States | 3.44 |
| 51 | El Salvador | 3.44 |
| 52 | Namibia | 3.43 |
| 53 | Guyana | 3.41 |
| 54 | Romania | 3.41 |
| 55 | Egypt | 3.40 |
| 56 | Tanzania | 3.40 |
| 57 | Nigeria | 3.36 |
| 58 | Brunei Darussalam | 3.34 |
| 59 | Paraguay | 3.34 |
| 60 | Kenya | 3.33 |
| 61 | Ireland | 3.31 |
| 62 | Nicaragua | 3.31 |
| 63 | Syria | 3.30 |
| 64 | Timor-Leste | 3.29 |
| 65 | New Zealand | 3.28 |
| 66 | Mozambique | 3.23 |
| 67 | Albania | 3.22 |
| 68 | Macedonia, FYR | 3.21 |
| 69 | Uruguay | 3.21 |
| 70 | Ghana | 3.19 |
| 71 | Armenia | 3.15 |
| 72 | Costa Rica | 3.14 |
| 73 | Lesotho | 3.12 |
| 74 | Portugal | 3.10 |
| 75 | Burundi | 3.09 |
| 76 | Latvia | 3.09 |
| 77 | Germany | 3.06 |
| 78 | Pakistan | 3.06 |
| 79 | Kazakhstan | 3.05 |
| 80 | Senegal | 3.05 |
| 81 | Netherlands | 3.01 |
| 82 | United Kingdom | 3.00 |
| 83 | Montenegro | 3.00 |
| 84 | Bulgaria | 3.00 |
| 85 | Australia | 2.99 |
| 86 | Libya | 2.98 |
| 87 | Cambodia | 2.98 |
| 88 | Trinidad and Tobago | 2.98 |
| 89 | Nepal | 2.96 |
| 90 | India | 2.93 |
| 91 | Ukraine | 2.91 |
| 92 | Madagascar | 2.90 |
| 93 | Dominican Republic | 2.89 |
| 94 | Spain | 2.86 |
| 95 | South Africa | 2.83 |
| 96 | Colombia | 2.83 |
| 97 | Tajikistan | 2.80 |
| 98 | Malta | 2.80 |
| 99 | Moldova | 2.77 |
| 100 | Kyrgyz Republic | 2.77 |
| 101 | Chad | 2.76 |
| 102 | Slovak Republic | 2.75 |
| 103 | Benin | 2.75 |
| 104 | Turkey | 2.74 |
| 105 | Vietnam | 2.74 |
| 106 | Belgium | 2.73 |
| 107 | Croatia | 2.73 |
| 108 | Suriname | 2.71 |
| 109 | Philippines | 2.70 |
| 110 | Ecuador | 2.69 |
| 111 | Côte d'Ivoire | 2.69 |
| 112 | Mongolia | 2.62 |
| 113 | Kuwait | 2.61 |
| 114 | Bangladesh | 2.55 |
| 115 | Czech Republic | 2.54 |
| 116 | Greece | 2.53 |
| 117 | Algeria | 2.52 |
| 118 | Russian Federation | 2.50 |
| 119 | Argentina | 2.49 |
| 120 | Jamaica | 2.48 |
| 121 | Mexico | 2.41 |
| 122 | Cameroon | 2.37 |
| 123 | Peru | 2.36 |
| 124 | Zimbabwe | 2.31 |
| 125 | Bolivia | 2.30 |
| 126 | France | 2.27 |
| 127 | Poland | 2.26 |
| 128 | Hungary | 2.23 |
| 129 | Bosnia and Herzegovina | 2.21 |
| 130 | Italy | 2.14 |
| 131 | Puerto Rico | 1.88 |
| 132 | Serbia | 1.88 |
| 133 | Brazil | 1.87 |
| 134 | Venezuela | 1.60 |

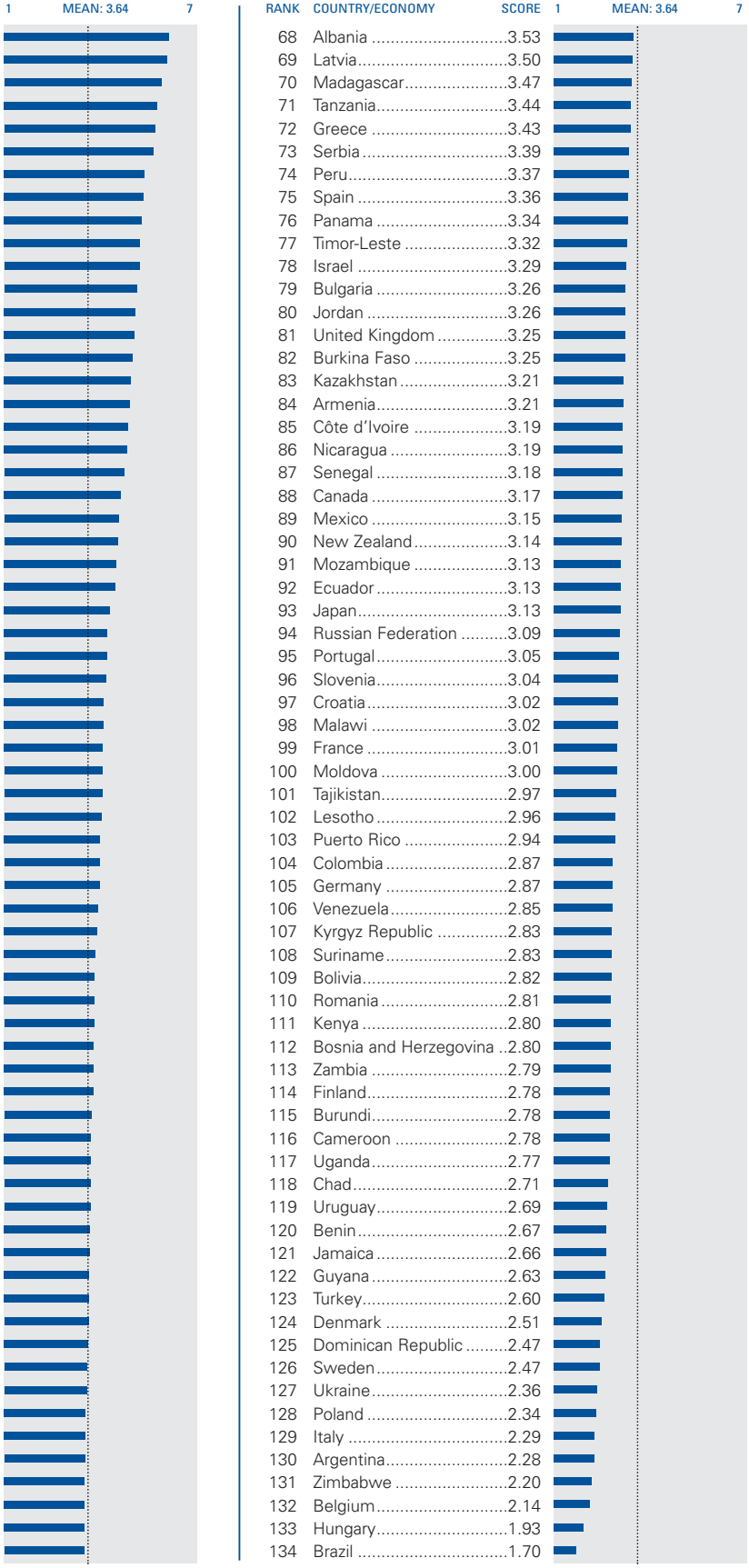



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 1.08 Extent and effect of taxation

The level of taxes in your country (1 = significantly limits the incentives to work or invest, 7 = has little impact on the incentives to work or invest)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | United Arab Emirates | 6.22 |
| 2 | Bahrain | 6.17 |
| 3 | Hong Kong SAR | 5.98 |
| 4 | Qatar | 5.85 |
| 5 | Singapore | 5.78 |
| 6 | Kuwait | 5.73 |
| 7 | Oman | 5.44 |
| 8 | Mauritius | 5.42 |
| 9 | Saudi Arabia | 5.37 |
| 10 | Brunei Darussalam | 5.30 |
| 11 | Iceland | 5.29 |
| 12 | Luxembourg | 5.20 |
| 13 | Estonia | 5.17 |
| 14 | Cyprus | 5.13 |
| 15 | Switzerland | 5.06 |
| 16 | Indonesia | 5.02 |
| 17 | Slovak Republic | 4.98 |
| 18 | Ireland | 4.93 |
| 19 | Botswana | 4.90 |
| 20 | Malaysia | 4.80 |
| 21 | Tunisia | 4.70 |
| 22 | Paraguay | 4.63 |
| 23 | Trinidad and Tobago | 4.60 |
| 24 | Georgia | 4.56 |
| 25 | South Africa | 4.53 |
| 26 | Taiwan, China | 4.35 |
| 27 | Thailand | 4.26 |
| 28 | India | 4.25 |
| 29 | Syria | 4.23 |
| 30 | Montenegro | 4.15 |
| 31 | Korea, Rep. | 4.15 |
| 32 | El Salvador | 4.13 |
| 33 | Barbados | 4.11 |
| 34 | Egypt | 4.11 |
| 35 | Gambia, The | 4.08 |
| 36 | China | 4.03 |
| 37 | Libya | 4.02 |
| 38 | Azerbaijan | 4.02 |
| 39 | Nigeria | 3.98 |
| 40 | Guatemala | 3.95 |
| 41 | Honduras | 3.89 |
| 42 | Pakistan | 3.87 |
| 43 | Mauritania | 3.86 |
| 44 | Cambodia | 3.85 |
| 45 | Chile | 3.84 |
| 46 | Costa Rica | 3.83 |
| 47 | Macedonia, FYR | 3.83 |
| 48 | Malta | 3.76 |
| 49 | Nepal | 3.75 |
| 50 | Bangladesh | 3.75 |
| 51 | Ghana | 3.73 |
| 52 | Namibia | 3.73 |
| 53 | Vietnam | 3.72 |
| 54 | Ethiopia | 3.71 |
| 55 | Norway | 3.69 |
| 56 | United States | 3.69 |
| 57 | Mali | 3.68 |
| 58 | Algeria | 3.66 |
| 59 | Sri Lanka | 3.62 |
| 60 | Netherlands | 3.62 |
| 61 | Czech Republic | 3.58 |
| 62 | Australia | 3.57 |
| 63 | Lithuania | 3.56 |
| 64 | Mongolia | 3.54 |
| 65 | Philippines | 3.54 |
| 66 | Morocco | 3.54 |
| 67 | Austria | 3.53 |
| 68 | Albania | 3.53 |
| 69 | Latvia | 3.50 |
| 70 | Madagascar | 3.47 |
| 71 | Tanzania | 3.44 |
| 72 | Greece | 3.43 |
| 73 | Serbia | 3.39 |
| 74 | Peru | 3.37 |
| 75 | Spain | 3.36 |
| 76 | Panama | 3.34 |
| 77 | Timor-Leste | 3.32 |
| 78 | Israel | 3.29 |
| 79 | Bulgaria | 3.26 |
| 80 | Jordan | 3.26 |
| 81 | United Kingdom | 3.25 |
| 82 | Burkina Faso | 3.25 |
| 83 | Kazakhstan | 3.21 |
| 84 | Armenia | 3.21 |
| 85 | Côte d'Ivoire | 3.19 |
| 86 | Nicaragua | 3.19 |
| 87 | Senegal | 3.18 |
| 88 | Canada | 3.17 |
| 89 | Mexico | 3.15 |
| 90 | New Zealand | 3.14 |
| 91 | Mozambique | 3.13 |
| 92 | Ecuador | 3.13 |
| 93 | Japan | 3.13 |
| 94 | Russian Federation | 3.09 |
| 95 | Portugal | 3.05 |
| 96 | Slovenia | 3.04 |
| 97 | Croatia | 3.02 |
| 98 | Malawi | 3.02 |
| 99 | France | 3.01 |
| 100 | Moldova | 3.00 |
| 101 | Tajikistan | 2.97 |
| 102 | Lesotho | 2.96 |
| 103 | Puerto Rico | 2.94 |
| 104 | Colombia | 2.87 |
| 105 | Germany | 2.87 |
| 106 | Venezuela | 2.85 |
| 107 | Kyrgyz Republic | 2.83 |
| 108 | Suriname | 2.83 |
| 109 | Bolivia | 2.82 |
| 110 | Romania | 2.81 |
| 111 | Kenya | 2.80 |
| 112 | Bosnia and Herzegovina | 2.80 |
| 113 | Zambia | 2.79 |
| 114 | Finland | 2.78 |
| 115 | Burundi | 2.78 |
| 116 | Cameroon | 2.78 |
| 117 | Uganda | 2.77 |
| 118 | Chad | 2.71 |
| 119 | Uruguay | 2.69 |
| 120 | Benin | 2.67 |
| 121 | Jamaica | 2.66 |
| 122 | Guyana | 2.63 |
| 123 | Turkey | 2.60 |
| 124 | Denmark | 2.51 |
| 125 | Dominican Republic | 2.47 |
| 126 | Sweden | 2.47 |
| 127 | Ukraine | 2.36 |
| 128 | Poland | 2.34 |
| 129 | Italy | 2.29 |
| 130 | Argentina | 2.28 |
| 131 | Zimbabwe | 2.20 |
| 132 | Belgium | 2.14 |
| 133 | Hungary | 1.93 |
| 134 | Brazil | 1.70 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 1.09 Total tax rate (hard data)

This variable is a combination of profit tax (percents of profits), labor tax and contribution (percents of profits), and other taxes (percents of profits) | 2007

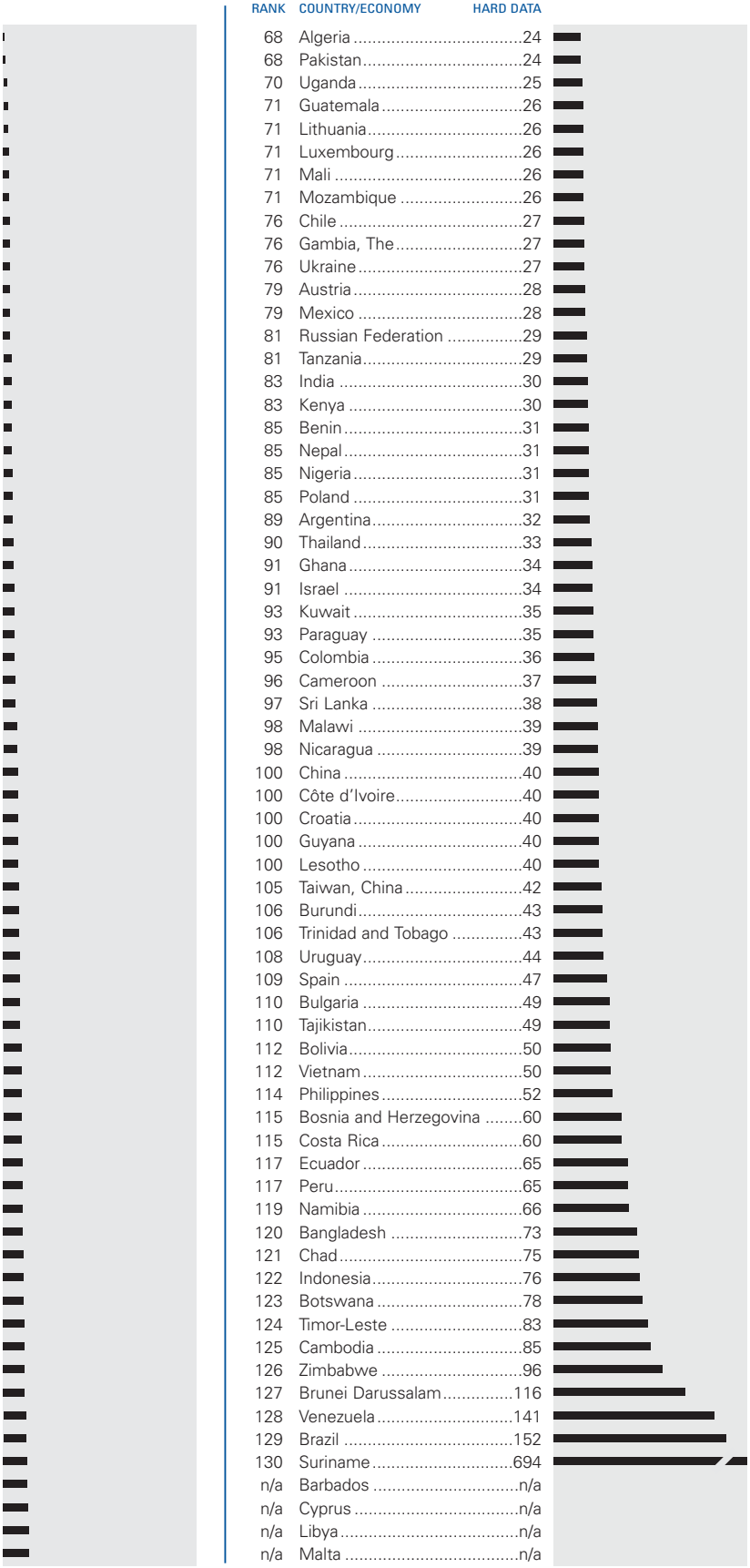
| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Qatar | 11.30 |
| 2 | Kuwait | 14.40 |
| 2 | United Arab Emirates | 14.40 |
| 4 | Saudi Arabia | 14.50 |
| 5 | Bahrain | 15.00 |
| 6 | Zambia | 16.10 |
| 7 | Botswana | 17.10 |
| 8 | Lesotho | 18.00 |
| 9 | Macedonia, FYR | 18.40 |
| 10 | Luxembourg | 21.00 |
| 11 | Oman | 21.60 |
| 12 | Mauritius | 22.20 |
| 13 | Cambodia | 22.60 |
| 14 | Hong Kong SAR | 24.20 |
| 15 | Namibia | 25.30 |
| 16 | Chile | 25.90 |
| 17 | Iceland | 26.80 |
| 18 | Singapore | 27.90 |
| 18 | Suriname | 27.90 |
| 20 | Timor-Leste | 28.30 |
| 21 | Ireland | 28.80 |
| 22 | Pakistan | 28.90 |
| 22 | Switzerland | 28.90 |
| 24 | Denmark | 29.90 |
| 25 | Mongolia | 30.30 |
| 26 | Ethiopia | 31.10 |
| 26 | Jordan | 31.10 |
| 28 | Malawi | 31.40 |
| 29 | Montenegro | 31.80 |
| 30 | Nigeria | 32.20 |
| 31 | Croatia | 32.50 |
| 32 | Ghana | 32.70 |
| 33 | Latvia | 33.00 |
| 34 | Trinidad and Tobago | 33.10 |
| 35 | Korea, Rep. | 33.70 |
| 36 | Israel | 33.90 |
| 37 | Serbia | 34.00 |
| 38 | Nepal | 34.10 |
| 39 | South Africa | 34.20 |
| 40 | Mozambique | 34.30 |
| 41 | Malaysia | 34.50 |
| 41 | Uganda | 34.50 |
| 43 | Bulgaria | 34.90 |
| 43 | Ecuador | 34.90 |
| 43 | El Salvador | 34.90 |
| 46 | Paraguay | 35.00 |
| 47 | United Kingdom | 35.30 |
| 48 | New Zealand | 35.60 |
| 49 | Dominican Republic | 35.70 |
| 50 | Kazakhstan | 36.40 |
| 51 | Guatemala | 36.50 |
| 52 | Armenia | 36.60 |
| 53 | Slovenia | 36.70 |
| 54 | Indonesia | 37.30 |
| 55 | Brunei Darussalam | 37.40 |
| 56 | Thailand | 37.80 |
| 57 | Georgia | 38.60 |
| 58 | Netherlands | 39.10 |
| 59 | Guyana | 39.40 |
| 60 | Bangladesh | 39.50 |
| 61 | Vietnam | 40.10 |
| 62 | Poland | 40.20 |
| 63 | Taiwan, China | 40.40 |
| 64 | Azerbaijan | 41.10 |
| 65 | Peru | 41.20 |
| 66 | Norway | 41.60 |
| 67 | Moldova | 42.10 |
| 68 | United States | 42.30 |
| 69 | Madagascar | 42.80 |
| 70 | Syria | 43.50 |
| 71 | Portugal | 43.60 |
| 72 | Bosnia and Herzegovina | 44.10 |
| 73 | Burkina Faso | 44.60 |
| 73 | Morocco | 44.60 |
| 75 | Tanzania | 45.10 |
| 76 | Canada | 45.40 |
| 76 | Côte d'Ivoire | 45.40 |
| 78 | Turkey | 45.50 |
| 79 | Senegal | 46.00 |
| 80 | Egypt | 46.10 |
| 81 | Lithuania | 46.40 |
| 82 | Greece | 47.40 |
| 82 | Slovak Republic | 47.40 |
| 84 | Finland | 47.80 |
| 85 | Romania | 48.00 |
| 86 | Czech Republic | 48.60 |
| 86 | Estonia | 48.60 |
| 88 | Russian Federation | 48.70 |
| 89 | Honduras | 49.30 |
| 90 | Australia | 50.30 |
| 91 | Albania | 50.50 |
| 91 | Germany | 50.50 |
| 93 | Panama | 50.60 |
| 94 | Philippines | 50.80 |
| 95 | Kenya | 50.90 |
| 96 | Jamaica | 51.30 |
| 97 | Cameroon | 51.40 |
| 97 | Mali | 51.40 |
| 99 | Mexico | 51.50 |
| 100 | Austria | 54.50 |
| 100 | Sweden | 54.50 |
| 102 | Japan | 55.40 |
| 103 | Costa Rica | 55.70 |
| 104 | Venezuela | 56.60 |
| 105 | Hungary | 57.50 |
| 106 | Belgium | 58.10 |
| 107 | Ukraine | 58.40 |
| 108 | Uruguay | 58.50 |
| 109 | Tunisia | 59.10 |
| 110 | Spain | 60.20 |
| 111 | Chad | 60.50 |
| 112 | Kyrgyz Republic | 61.40 |
| 113 | Nicaragua | 63.20 |
| 114 | Sri Lanka | 63.70 |
| 114 | Zimbabwe | 63.70 |
| 116 | Puerto Rico | 64.70 |
| 117 | France | 65.40 |
| 118 | Brazil | 69.40 |
| 119 | India | 71.50 |
| 120 | Benin | 73.20 |
| 121 | Italy | 73.30 |
| 122 | Algeria | 74.20 |
| 123 | Bolivia | 78.10 |
| 124 | Colombia | 78.40 |
| 125 | China | 79.90 |
| 126 | Tajikistan | 85.50 |
| 127 | Mauritania | 98.70 |
| 128 | Argentina | 108.10 |
| 129 | Burundi | 278.70 |
| 130 | Gambia, The | 292.40 |
| n/a | Barbados | n/a |
| n/a | Cyprus | n/a |
| n/a | Libya | n/a |
| n/a | Malta | n/a |

**SOURCE:** The World Bank Group, *Doing Business 2009*

# 1.10 Time required to start a business (hard data)

Number of days required to start a business | 2008

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | New Zealand | 1 |
| 2 | Australia | 2 |
| 3 | Georgia | 3 |
| 4 | Belgium | 4 |
| 4 | Singapore | 4 |
| 6 | Canada | 5 |
| 6 | Hungary | 5 |
| 6 | Iceland | 5 |
| 9 | Denmark | 6 |
| 9 | Mauritius | 6 |
| 9 | Portugal | 6 |
| 9 | Qatar | 6 |
| 9 | Turkey | 6 |
| 9 | United States | 6 |
| 15 | Egypt | 7 |
| 15 | Estonia | 7 |
| 15 | France | 7 |
| 15 | Madagascar | 7 |
| 15 | Puerto Rico | 7 |
| 20 | Albania | 8 |
| 20 | Jamaica | 8 |
| 20 | Senegal | 8 |
| 23 | Bahrain | 9 |
| 23 | Macedonia, FYR | 9 |
| 25 | Italy | 10 |
| 25 | Netherlands | 10 |
| 25 | Norway | 10 |
| 25 | Romania | 10 |
| 29 | Hong Kong SAR | 11 |
| 29 | Tunisia | 11 |
| 31 | Morocco | 12 |
| 31 | Saudi Arabia | 12 |
| 33 | Ireland | 13 |
| 33 | Malaysia | 13 |
| 33 | Mongolia | 13 |
| 33 | Panama | 13 |
| 33 | United Kingdom | 13 |
| 38 | Finland | 14 |
| 38 | Jordan | 14 |
| 38 | Oman | 14 |
| 41 | Czech Republic | 15 |
| 41 | Kyrgyz Republic | 15 |
| 41 | Moldova | 15 |
| 41 | Sweden | 15 |
| 45 | Azerbaijan | 16 |
| 45 | Burkina Faso | 16 |
| 45 | Ethiopia | 16 |
| 45 | Latvia | 16 |
| 45 | Slovak Republic | 16 |
| 50 | El Salvador | 17 |
| 50 | Korea, Rep. | 17 |
| 50 | Syria | 17 |
| 50 | United Arab Emirates | 17 |
| 54 | Armenia | 18 |
| 54 | Germany | 18 |
| 54 | Zambia | 18 |
| 57 | Dominican Republic | 19 |
| 57 | Greece | 19 |
| 57 | Mauritania | 19 |
| 57 | Slovenia | 19 |
| 61 | Honduras | 20 |
| 61 | Switzerland | 20 |
| 63 | Kazakhstan | 21 |
| 63 | Montenegro | 21 |
| 65 | South Africa | 22 |
| 66 | Japan | 23 |
| 66 | Serbia | 23 |
| 68 | Algeria | 24 |
| 68 | Pakistan | 24 |
| 70 | Uganda | 25 |
| 71 | Guatemala | 26 |
| 71 | Lithuania | 26 |
| 71 | Luxembourg | 26 |
| 71 | Mali | 26 |
| 71 | Mozambique | 26 |
| 76 | Chile | 27 |
| 76 | Gambia, The | 27 |
| 76 | Ukraine | 27 |
| 79 | Austria | 28 |
| 79 | Mexico | 28 |
| 81 | Russian Federation | 29 |
| 81 | Tanzania | 29 |
| 83 | India | 30 |
| 83 | Kenya | 30 |
| 85 | Benin | 31 |
| 85 | Nepal | 31 |
| 85 | Nigeria | 31 |
| 85 | Poland | 31 |
| 89 | Argentina | 32 |
| 90 | Thailand | 33 |
| 91 | Ghana | 34 |
| 91 | Israel | 34 |
| 93 | Kuwait | 35 |
| 93 | Paraguay | 35 |
| 95 | Colombia | 36 |
| 96 | Cameroon | 37 |
| 97 | Sri Lanka | 38 |
| 98 | Malawi | 39 |
| 98 | Nicaragua | 39 |
| 100 | China | 40 |
| 100 | Côte d'Ivoire | 40 |
| 100 | Croatia | 40 |
| 100 | Guyana | 40 |
| 100 | Lesotho | 40 |
| 105 | Taiwan, China | 42 |
| 106 | Burundi | 43 |
| 106 | Trinidad and Tobago | 43 |
| 108 | Uruguay | 44 |
| 109 | Spain | 47 |
| 110 | Bulgaria | 49 |
| 110 | Tajikistan | 49 |
| 112 | Bolivia | 50 |
| 112 | Vietnam | 50 |
| 114 | Philippines | 52 |
| 115 | Bosnia and Herzegovina | 60 |
| 115 | Costa Rica | 60 |
| 117 | Ecuador | 65 |
| 117 | Peru | 65 |
| 119 | Namibia | 66 |
| 120 | Bangladesh | 73 |
| 121 | Chad | 75 |
| 122 | Indonesia | 76 |
| 123 | Botswana | 78 |
| 124 | Timor-Leste | 83 |
| 125 | Cambodia | 85 |
| 126 | Zimbabwe | 96 |
| 127 | Brunei Darussalam | 116 |
| 128 | Venezuela | 141 |
| 129 | Brazil | 152 |
| 130 | Suriname | 694 |
| n/a | Barbados | n/a |
| n/a | Cyprus | n/a |
| n/a | Libya | n/a |
| n/a | Malta | n/a |



**SOURCE:** The World Bank Group, *Doing Business 2009*

# 1.11 Number of procedures required to start a business (hard data)

Number of procedures required to start a business | 2008

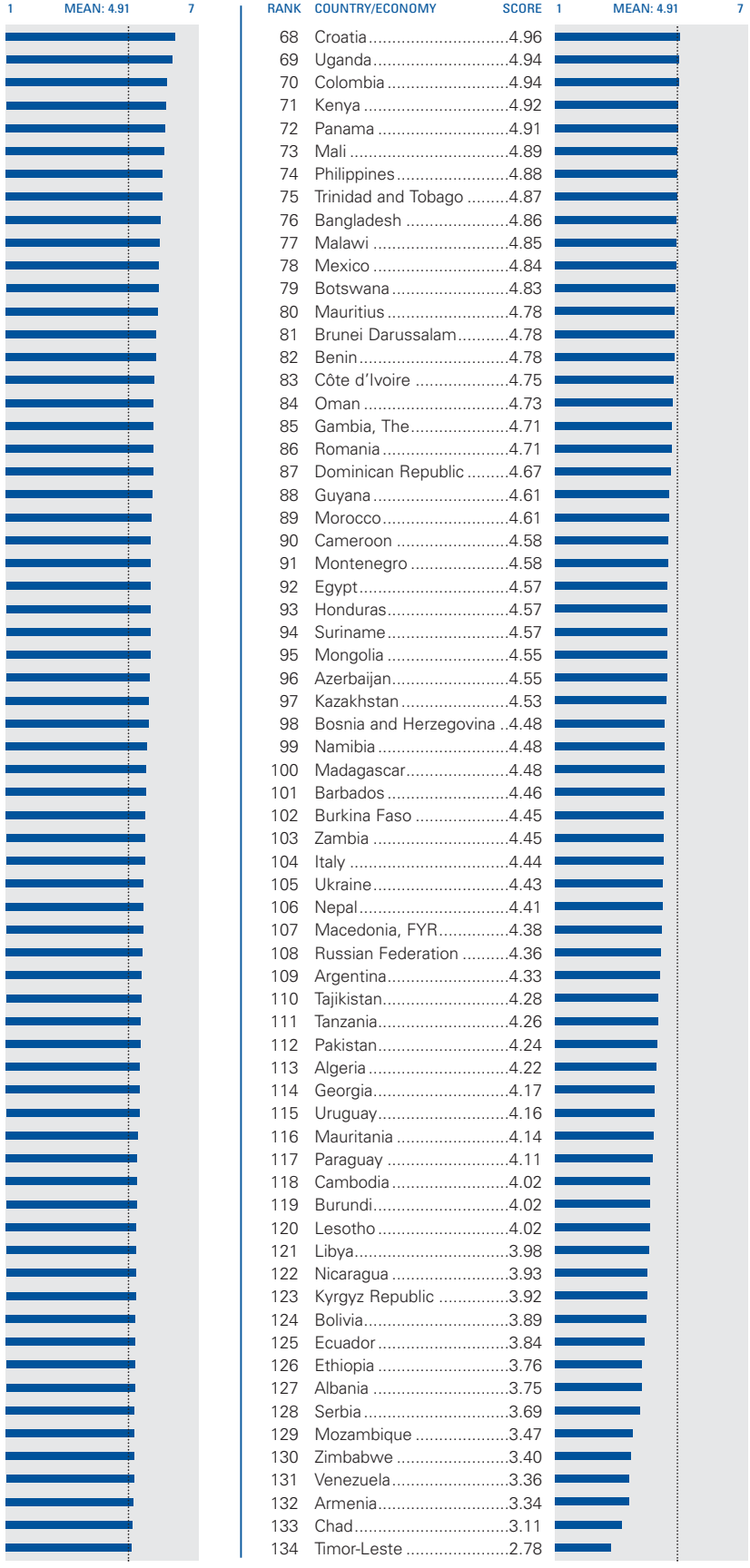
| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Canada | 1 |
| 1 | New Zealand | 1 |
| 3 | Australia | 2 |
| 4 | Belgium | 3 |
| 4 | Finland | 3 |
| 4 | Georgia | 3 |
| 4 | Sweden | 3 |
| 8 | Bulgaria | 4 |
| 8 | Denmark | 4 |
| 8 | Hungary | 4 |
| 8 | Ireland | 4 |
| 8 | Kyrgyz Republic | 4 |
| 8 | Senegal | 4 |
| 8 | Singapore | 4 |
| 8 | Sri Lanka | 4 |
| 16 | Burkina Faso | 5 |
| 16 | Estonia | 5 |
| 16 | France | 5 |
| 16 | Hong Kong SAR | 5 |
| 16 | Iceland | 5 |
| 16 | Israel | 5 |
| 16 | Latvia | 5 |
| 16 | Madagascar | 5 |
| 16 | Mauritius | 5 |
| 16 | Slovenia | 5 |
| 26 | Albania | 6 |
| 26 | Azerbaijan | 6 |
| 26 | Egypt | 6 |
| 26 | Italy | 6 |
| 26 | Jamaica | 6 |
| 26 | Luxembourg | 6 |
| 26 | Morocco | 6 |
| 26 | Netherlands | 6 |
| 26 | Nicaragua | 6 |
| 26 | Norway | 6 |
| 26 | Portugal | 6 |
| 26 | Qatar | 6 |
| 26 | Romania | 6 |
| 26 | Slovak Republic | 6 |
| 26 | South Africa | 6 |
| 26 | Switzerland | 6 |
| 26 | Turkey | 6 |
| 26 | United Kingdom | 6 |
| 26 | United States | 6 |
| 26 | Zambia | 6 |
| 46 | Bahrain | 7 |
| 46 | Bangladesh | 7 |
| 46 | Benin | 7 |
| 46 | Ethiopia | 7 |
| 46 | Lesotho | 7 |
| 46 | Lithuania | 7 |
| 46 | Macedonia, FYR | 7 |
| 46 | Mongolia | 7 |
| 46 | Nepal | 7 |
| 46 | Oman | 7 |
| 46 | Panama | 7 |
| 46 | Paraguay | 7 |
| 46 | Puerto Rico | 7 |
| 46 | Saudi Arabia | 7 |
| 60 | Austria | 8 |
| 60 | Croatia | 8 |
| 60 | Czech Republic | 8 |
| 60 | Dominican Republic | 8 |
| 60 | El Salvador | 8 |
| 60 | Gambia, The | 8 |
| 60 | Guyana | 8 |
| 60 | Japan | 8 |
| 60 | Kazakhstan | 8 |
| 60 | Nigeria | 8 |
| 60 | Russian Federation | 8 |
| 60 | Syria | 8 |
| 60 | Taiwan, China | 8 |
| 60 | Thailand | 8 |
| 60 | United Arab Emirates | 8 |
| 75 | Armenia | 9 |
| 75 | Cambodia | 9 |
| 75 | Chile | 9 |
| 75 | Colombia | 9 |
| 75 | Germany | 9 |
| 75 | Ghana | 9 |
| 75 | Malaysia | 9 |
| 75 | Mauritania | 9 |
| 75 | Mexico | 9 |
| 75 | Moldova | 9 |
| 75 | Trinidad and Tobago | 9 |
| 86 | Botswana | 10 |
| 86 | Côte d'Ivoire | 10 |
| 86 | Jordan | 10 |
| 86 | Korea, Rep. | 10 |
| 86 | Malawi | 10 |
| 86 | Mozambique | 10 |
| 86 | Namibia | 10 |
| 86 | Peru | 10 |
| 86 | Poland | 10 |
| 86 | Spain | 10 |
| 86 | Timor-Leste | 10 |
| 86 | Tunisia | 10 |
| 86 | Ukraine | 10 |
| 86 | Zimbabwe | 10 |
| 100 | Burundi | 11 |
| 100 | Guatemala | 11 |
| 100 | Indonesia | 11 |
| 100 | Mali | 11 |
| 100 | Pakistan | 11 |
| 100 | Serbia | 11 |
| 100 | Uruguay | 11 |
| 100 | Vietnam | 11 |
| 108 | Bosnia and Herzegovina | 12 |
| 108 | Costa Rica | 12 |
| 108 | Kenya | 12 |
| 108 | Tanzania | 12 |
| 112 | Cameroon | 13 |
| 112 | Honduras | 13 |
| 112 | India | 13 |
| 112 | Kuwait | 13 |
| 112 | Suriname | 13 |
| 112 | Tajikistan | 13 |
| 118 | Algeria | 14 |
| 118 | China | 14 |
| 118 | Ecuador | 14 |
| 121 | Argentina | 15 |
| 121 | Bolivia | 15 |
| 121 | Greece | 15 |
| 121 | Montenegro | 15 |
| 121 | Philippines | 15 |
| 126 | Venezuela | 16 |
| 127 | Brazil | 18 |
| 127 | Brunei Darussalam | 18 |
| 127 | Uganda | 18 |
| 130 | Chad | 19 |
| n/a | Barbados | n/a |
| n/a | Cyprus | n/a |
| n/a | Libya | n/a |
| n/a | Malta | n/a |

**SOURCE:** The World Bank Group, *Doing Business 2009*

# 1.12 Intensity of local competition

Competition in the local market is (1 = limited in most industries and price-cutting is rare, 7 = intense in most industries as market leadership changes over time)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Germany | 6.38 |
| 2 | Austria | 6.27 |
| 3 | Netherlands | 6.11 |
| 4 | United States | 6.07 |
| 5 | Taiwan, China | 6.06 |
| 6 | Belgium | 6.02 |
| 7 | Hong Kong SAR | 5.97 |
| 8 | Puerto Rico | 5.96 |
| 9 | Japan | 5.91 |
| 10 | United Kingdom | 5.89 |
| 11 | India | 5.86 |
| 12 | France | 5.84 |
| 13 | Czech Republic | 5.83 |
| 14 | Sweden | 5.76 |
| 15 | Spain | 5.76 |
| 16 | Finland | 5.70 |
| 17 | Slovak Republic | 5.68 |
| 18 | Australia | 5.67 |
| 19 | Chile | 5.67 |
| 20 | Switzerland | 5.67 |
| 21 | Norway | 5.66 |
| 22 | Estonia | 5.62 |
| 23 | Canada | 5.60 |
| 24 | Jordan | 5.60 |
| 25 | Denmark | 5.58 |
| 26 | Cyprus | 5.58 |
| 27 | China | 5.58 |
| 28 | United Arab Emirates | 5.58 |
| 29 | Malta | 5.55 |
| 30 | Singapore | 5.53 |
| 31 | Malaysia | 5.53 |
| 32 | Israel | 5.48 |
| 33 | Sri Lanka | 5.44 |
| 34 | Tunisia | 5.44 |
| 35 | Senegal | 5.42 |
| 36 | Nigeria | 5.41 |
| 37 | Lithuania | 5.41 |
| 38 | Hungary | 5.36 |
| 39 | Ireland | 5.36 |
| 40 | Poland | 5.35 |
| 41 | Portugal | 5.34 |
| 42 | Turkey | 5.31 |
| 43 | Brazil | 5.29 |
| 44 | Indonesia | 5.27 |
| 45 | Thailand | 5.27 |
| 46 | Bahrain | 5.25 |
| 47 | Peru | 5.24 |
| 48 | Costa Rica | 5.23 |
| 49 | Korea, Rep. | 5.19 |
| 50 | Saudi Arabia | 5.16 |
| 51 | Jamaica | 5.16 |
| 52 | Greece | 5.15 |
| 53 | Qatar | 5.13 |
| 54 | Kuwait | 5.12 |
| 55 | Guatemala | 5.12 |
| 56 | Vietnam | 5.12 |
| 57 | Iceland | 5.11 |
| 58 | New Zealand | 5.11 |
| 59 | South Africa | 5.09 |
| 60 | Slovenia | 5.09 |
| 61 | Ghana | 5.08 |
| 62 | Syria | 5.08 |
| 63 | Latvia | 5.08 |
| 64 | Luxembourg | 5.06 |
| 65 | Moldova | 5.05 |
| 66 | Bulgaria | 5.02 |
| 67 | El Salvador | 4.99 |
| 68 | Croatia | 4.96 |
| 69 | Uganda | 4.94 |
| 70 | Colombia | 4.94 |
| 71 | Kenya | 4.92 |
| 72 | Panama | 4.91 |
| 73 | Mali | 4.89 |
| 74 | Philippines | 4.88 |
| 75 | Trinidad and Tobago | 4.87 |
| 76 | Bangladesh | 4.86 |
| 77 | Malawi | 4.85 |
| 78 | Mexico | 4.84 |
| 79 | Botswana | 4.83 |
| 80 | Mauritius | 4.78 |
| 81 | Brunei Darussalam | 4.78 |
| 82 | Benin | 4.78 |
| 83 | Côte d'Ivoire | 4.75 |
| 84 | Oman | 4.73 |
| 85 | Gambia, The | 4.71 |
| 86 | Romania | 4.71 |
| 87 | Dominican Republic | 4.67 |
| 88 | Guyana | 4.61 |
| 89 | Morocco | 4.61 |
| 90 | Cameroon | 4.58 |
| 91 | Montenegro | 4.58 |
| 92 | Egypt | 4.57 |
| 93 | Honduras | 4.57 |
| 94 | Suriname | 4.57 |
| 95 | Mongolia | 4.55 |
| 96 | Azerbaijan | 4.55 |
| 97 | Kazakhstan | 4.53 |
| 98 | Bosnia and Herzegovina | 4.48 |
| 99 | Namibia | 4.48 |
| 100 | Madagascar | 4.48 |
| 101 | Barbados | 4.46 |
| 102 | Burkina Faso | 4.45 |
| 103 | Zambia | 4.45 |
| 104 | Italy | 4.44 |
| 105 | Ukraine | 4.43 |
| 106 | Nepal | 4.41 |
| 107 | Macedonia, FYR | 4.38 |
| 108 | Russian Federation | 4.36 |
| 109 | Argentina | 4.33 |
| 110 | Tajikistan | 4.28 |
| 111 | Tanzania | 4.26 |
| 112 | Pakistan | 4.24 |
| 113 | Algeria | 4.22 |
| 114 | Georgia | 4.17 |
| 115 | Uruguay | 4.16 |
| 116 | Mauritania | 4.14 |
| 117 | Paraguay | 4.11 |
| 118 | Cambodia | 4.02 |
| 119 | Burundi | 4.02 |
| 120 | Lesotho | 4.02 |
| 121 | Libya | 3.98 |
| 122 | Nicaragua | 3.93 |
| 123 | Kyrgyz Republic | 3.92 |
| 124 | Bolivia | 3.89 |
| 125 | Ecuador | 3.84 |
| 126 | Ethiopia | 3.76 |
| 127 | Albania | 3.75 |
| 128 | Serbia | 3.69 |
| 129 | Mozambique | 3.47 |
| 130 | Zimbabwe | 3.40 |
| 131 | Venezuela | 3.36 |
| 132 | Armenia | 3.34 |
| 133 | Chad | 3.11 |
| 134 | Timor-Leste | 2.78 |

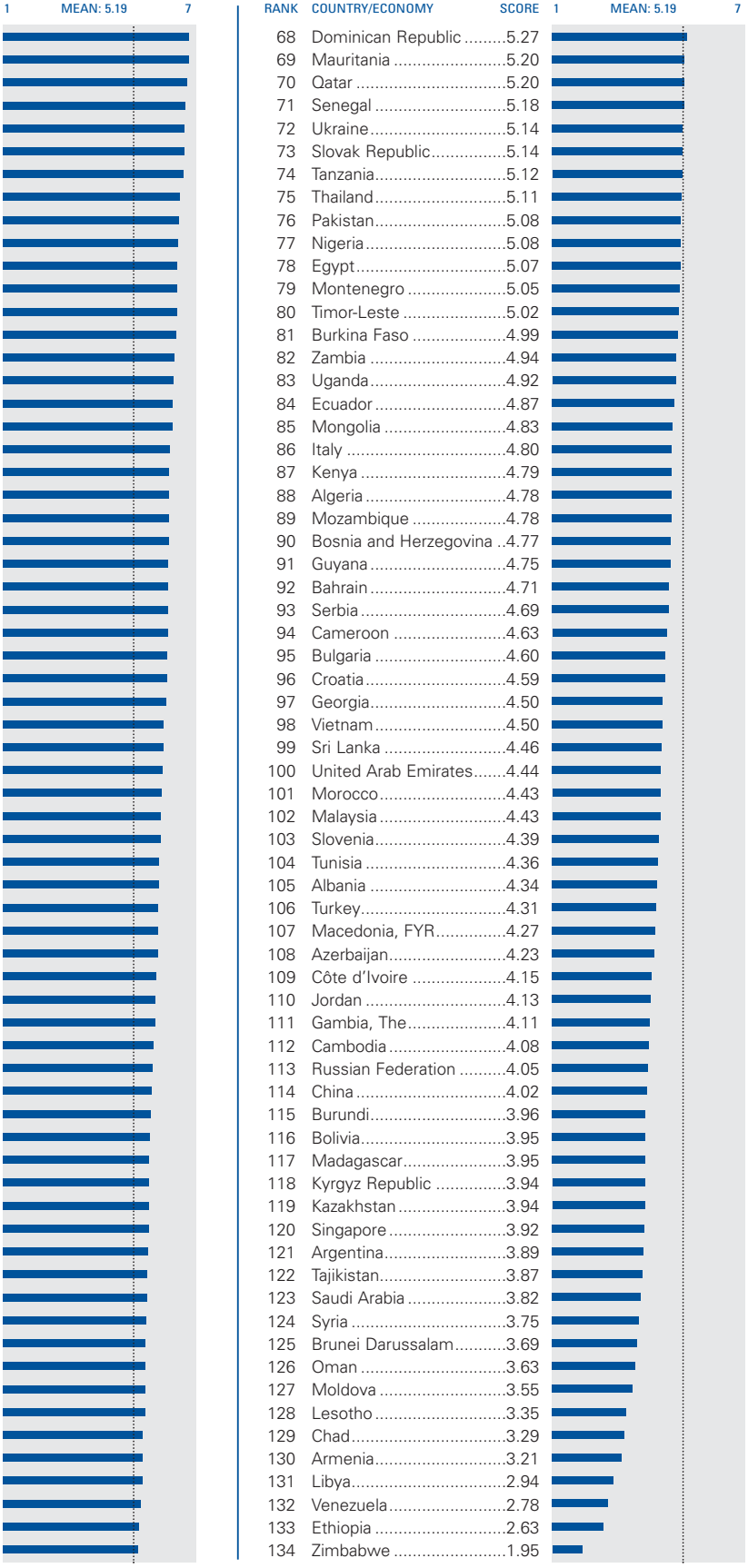



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 1.13 Freedom of the press

How free is the press in your country? (1 = totally restricted, 7 = completely free)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Denmark | 6.90 |
| 2 | Sweden | 6.90 |
| 3 | Netherlands | 6.85 |
| 4 | Germany | 6.78 |
| 5 | Norway | 6.76 |
| 6 | Finland | 6.74 |
| 7 | Switzerland | 6.73 |
| 8 | Israel | 6.60 |
| 9 | New Zealand | 6.57 |
| 10 | Canada | 6.56 |
| 11 | Iceland | 6.53 |
| 12 | Austria | 6.52 |
| 13 | Belgium | 6.51 |
| 14 | Ireland | 6.48 |
| 15 | Puerto Rico | 6.44 |
| 16 | Ghana | 6.40 |
| 17 | Australia | 6.38 |
| 18 | Luxembourg | 6.38 |
| 19 | Costa Rica | 6.28 |
| 20 | Malta | 6.26 |
| 21 | Chile | 6.26 |
| 22 | France | 6.26 |
| 23 | India | 6.25 |
| 24 | United States | 6.24 |
| 25 | Peru | 6.24 |
| 26 | Greece | 6.23 |
| 27 | Cyprus | 6.23 |
| 28 | Estonia | 6.21 |
| 29 | Taiwan, China | 6.21 |
| 30 | Guatemala | 6.16 |
| 31 | Portugal | 6.10 |
| 32 | United Kingdom | 6.08 |
| 33 | South Africa | 6.07 |
| 34 | Brazil | 6.02 |
| 35 | Japan | 6.01 |
| 36 | Honduras | 5.99 |
| 37 | Jamaica | 5.95 |
| 38 | Mauritius | 5.93 |
| 39 | Czech Republic | 5.91 |
| 40 | Spain | 5.91 |
| 41 | Namibia | 5.91 |
| 42 | Lithuania | 5.86 |
| 43 | El Salvador | 5.83 |
| 44 | Barbados | 5.82 |
| 45 | Philippines | 5.78 |
| 46 | Botswana | 5.75 |
| 47 | Hong Kong SAR | 5.70 |
| 48 | Uruguay | 5.67 |
| 49 | Mexico | 5.66 |
| 50 | Bangladesh | 5.64 |
| 51 | Malawi | 5.64 |
| 52 | Colombia | 5.64 |
| 53 | Korea, Rep. | 5.63 |
| 54 | Mali | 5.60 |
| 55 | Paraguay | 5.58 |
| 56 | Panama | 5.57 |
| 57 | Suriname | 5.55 |
| 58 | Latvia | 5.52 |
| 59 | Kuwait | 5.52 |
| 60 | Trinidad and Tobago | 5.51 |
| 61 | Nicaragua | 5.50 |
| 62 | Nepal | 5.43 |
| 63 | Indonesia | 5.43 |
| 64 | Hungary | 5.43 |
| 65 | Romania | 5.37 |
| 66 | Poland | 5.32 |
| 67 | Benin | 5.28 |
| 68 | Dominican Republic | 5.27 |
| 69 | Mauritania | 5.20 |
| 70 | Qatar | 5.20 |
| 71 | Senegal | 5.18 |
| 72 | Ukraine | 5.14 |
| 73 | Slovak Republic | 5.14 |
| 74 | Tanzania | 5.12 |
| 75 | Thailand | 5.11 |
| 76 | Pakistan | 5.08 |
| 77 | Nigeria | 5.08 |
| 78 | Egypt | 5.07 |
| 79 | Montenegro | 5.05 |
| 80 | Timor-Leste | 5.02 |
| 81 | Burkina Faso | 4.99 |
| 82 | Zambia | 4.94 |
| 83 | Uganda | 4.92 |
| 84 | Ecuador | 4.87 |
| 85 | Mongolia | 4.83 |
| 86 | Italy | 4.80 |
| 87 | Kenya | 4.79 |
| 88 | Algeria | 4.78 |
| 89 | Mozambique | 4.78 |
| 90 | Bosnia and Herzegovina | 4.77 |
| 91 | Guyana | 4.75 |
| 92 | Bahrain | 4.71 |
| 93 | Serbia | 4.69 |
| 94 | Cameroon | 4.63 |
| 95 | Bulgaria | 4.60 |
| 96 | Croatia | 4.59 |
| 97 | Georgia | 4.50 |
| 98 | Vietnam | 4.50 |
| 99 | Sri Lanka | 4.46 |
| 100 | United Arab Emirates | 4.44 |
| 101 | Morocco | 4.43 |
| 102 | Malaysia | 4.43 |
| 103 | Slovenia | 4.39 |
| 104 | Tunisia | 4.36 |
| 105 | Albania | 4.34 |
| 106 | Turkey | 4.31 |
| 107 | Macedonia, FYR | 4.27 |
| 108 | Azerbaijan | 4.23 |
| 109 | Côte d'Ivoire | 4.15 |
| 110 | Jordan | 4.13 |
| 111 | Gambia, The | 4.11 |
| 112 | Cambodia | 4.08 |
| 113 | Russian Federation | 4.05 |
| 114 | China | 4.02 |
| 115 | Burundi | 3.96 |
| 116 | Bolivia | 3.95 |
| 117 | Madagascar | 3.95 |
| 118 | Kyrgyz Republic | 3.94 |
| 119 | Kazakhstan | 3.94 |
| 120 | Singapore | 3.92 |
| 121 | Argentina | 3.89 |
| 122 | Tajikistan | 3.87 |
| 123 | Saudi Arabia | 3.82 |
| 124 | Syria | 3.75 |
| 125 | Brunei Darussalam | 3.69 |
| 126 | Oman | 3.63 |
| 127 | Moldova | 3.55 |
| 128 | Lesotho | 3.35 |
| 129 | Chad | 3.29 |
| 130 | Armenia | 3.21 |
| 131 | Libya | 2.94 |
| 132 | Venezuela | 2.78 |
| 133 | Ethiopia | 2.63 |
| 134 | Zimbabwe | 1.95 |

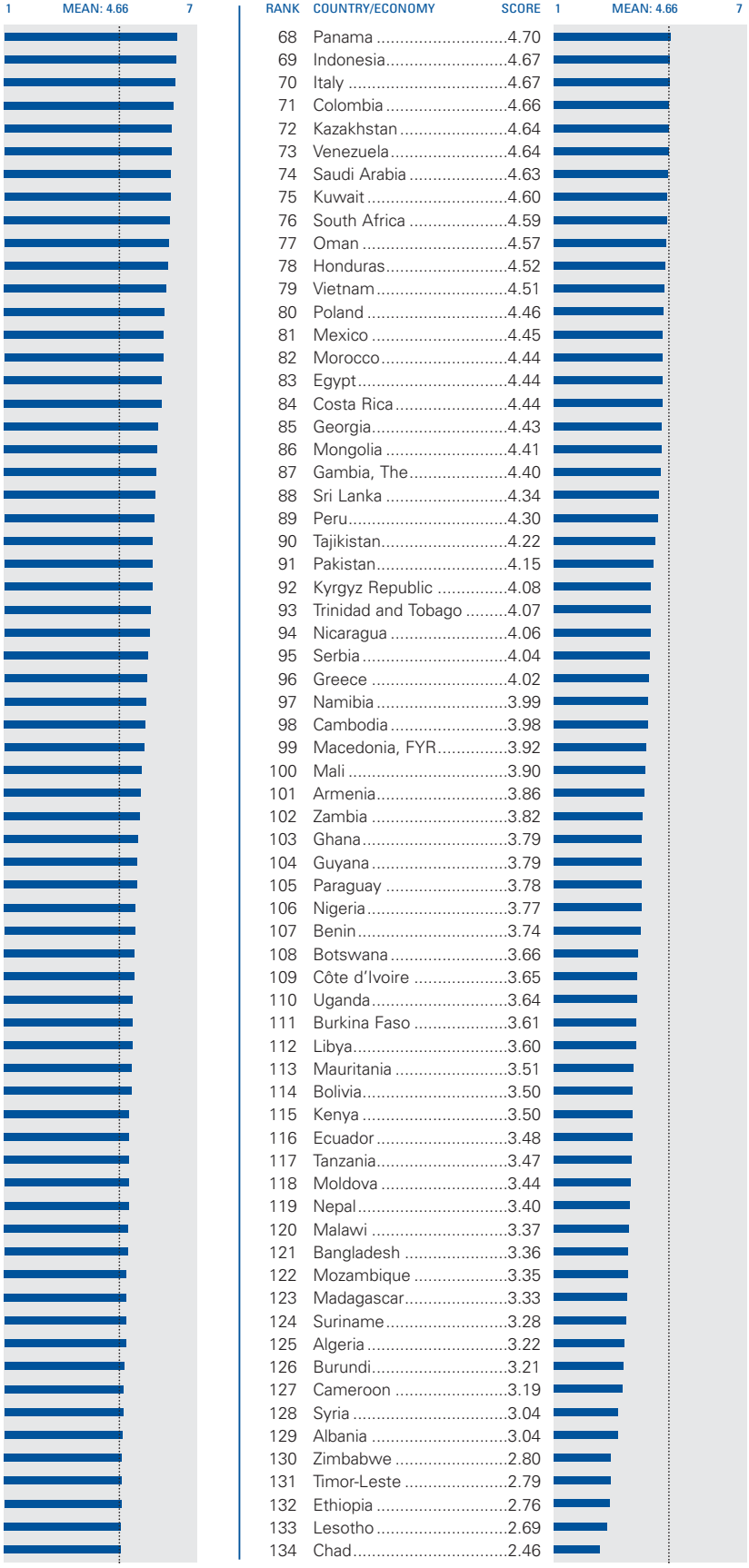



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 1.14 Accessibility of digital content

In your country, is digital content (text and audiovisual content, software products) widely accessible via multiple platforms (fixed-line Internet, wireless Internet, mobile network, satellite, etc.)? (1 = no, digital content is not accessible, 7 = yes, digital content is accessible via a wide range of platforms)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Sweden | 6.47 |
| 2 | Estonia | 6.44 |
| 3 | Switzerland | 6.42 |
| 4 | Finland | 6.37 |
| 5 | Denmark | 6.30 |
| 6 | Korea, Rep. | 6.30 |
| 7 | United States | 6.29 |
| 8 | Iceland | 6.27 |
| 9 | Austria | 6.26 |
| 10 | Norway | 6.21 |
| 11 | Netherlands | 6.18 |
| 12 | Canada | 6.14 |
| 13 | Singapore | 6.09 |
| 14 | United Kingdom | 6.05 |
| 15 | Germany | 6.04 |
| 16 | Hong Kong SAR | 6.00 |
| 17 | Japan | 6.00 |
| 18 | Belgium | 5.89 |
| 19 | France | 5.86 |
| 20 | Taiwan, China | 5.83 |
| 21 | Czech Republic | 5.80 |
| 22 | Chile | 5.75 |
| 23 | Malta | 5.71 |
| 24 | Israel | 5.69 |
| 25 | Australia | 5.69 |
| 26 | Portugal | 5.64 |
| 27 | Luxembourg | 5.61 |
| 28 | Qatar | 5.57 |
| 29 | Bahrain | 5.52 |
| 30 | Spain | 5.49 |
| 31 | Guatemala | 5.48 |
| 32 | Slovenia | 5.43 |
| 33 | Puerto Rico | 5.37 |
| 34 | United Arab Emirates | 5.34 |
| 35 | Dominican Republic | 5.31 |
| 36 | Uruguay | 5.24 |
| 37 | Slovak Republic | 5.21 |
| 38 | Hungary | 5.21 |
| 39 | Malaysia | 5.16 |
| 40 | Lithuania | 5.15 |
| 41 | China | 5.14 |
| 42 | Turkey | 5.13 |
| 43 | Ireland | 5.08 |
| 44 | Barbados | 5.07 |
| 45 | Brunei Darussalam | 5.07 |
| 46 | Jordan | 5.05 |
| 47 | Cyprus | 5.04 |
| 48 | Tunisia | 4.96 |
| 49 | Russian Federation | 4.95 |
| 50 | Latvia | 4.95 |
| 51 | Croatia | 4.94 |
| 52 | Jamaica | 4.94 |
| 53 | Thailand | 4.93 |
| 54 | Ukraine | 4.92 |
| 55 | Argentina | 4.87 |
| 56 | El Salvador | 4.87 |
| 57 | New Zealand | 4.86 |
| 58 | Azerbaijan | 4.86 |
| 59 | Bulgaria | 4.80 |
| 60 | Senegal | 4.77 |
| 61 | India | 4.77 |
| 62 | Romania | 4.74 |
| 63 | Brazil | 4.72 |
| 64 | Philippines | 4.72 |
| 65 | Bosnia and Herzegovina | 4.71 |
| 66 | Montenegro | 4.70 |
| 67 | Mauritius | 4.70 |
| 68 | Panama | 4.70 |
| 69 | Indonesia | 4.67 |
| 70 | Italy | 4.67 |
| 71 | Colombia | 4.66 |
| 72 | Kazakhstan | 4.64 |
| 73 | Venezuela | 4.64 |
| 74 | Saudi Arabia | 4.63 |
| 75 | Kuwait | 4.60 |
| 76 | South Africa | 4.59 |
| 77 | Oman | 4.57 |
| 78 | Honduras | 4.52 |
| 79 | Vietnam | 4.51 |
| 80 | Poland | 4.46 |
| 81 | Mexico | 4.45 |
| 82 | Morocco | 4.44 |
| 83 | Egypt | 4.44 |
| 84 | Costa Rica | 4.44 |
| 85 | Georgia | 4.43 |
| 86 | Mongolia | 4.41 |
| 87 | Gambia, The | 4.40 |
| 88 | Sri Lanka | 4.34 |
| 89 | Peru | 4.30 |
| 90 | Tajikistan | 4.22 |
| 91 | Pakistan | 4.15 |
| 92 | Kyrgyz Republic | 4.08 |
| 93 | Trinidad and Tobago | 4.07 |
| 94 | Nicaragua | 4.06 |
| 95 | Serbia | 4.04 |
| 96 | Greece | 4.02 |
| 97 | Namibia | 3.99 |
| 98 | Cambodia | 3.98 |
| 99 | Macedonia, FYR | 3.92 |
| 100 | Mali | 3.90 |
| 101 | Armenia | 3.86 |
| 102 | Zambia | 3.82 |
| 103 | Ghana | 3.79 |
| 104 | Guyana | 3.79 |
| 105 | Paraguay | 3.78 |
| 106 | Nigeria | 3.77 |
| 107 | Benin | 3.74 |
| 108 | Botswana | 3.66 |
| 109 | Côte d'Ivoire | 3.65 |
| 110 | Uganda | 3.64 |
| 111 | Burkina Faso | 3.61 |
| 112 | Libya | 3.60 |
| 113 | Mauritania | 3.51 |
| 114 | Bolivia | 3.50 |
| 115 | Kenya | 3.50 |
| 116 | Ecuador | 3.48 |
| 117 | Tanzania | 3.47 |
| 118 | Moldova | 3.44 |
| 119 | Nepal | 3.40 |
| 120 | Malawi | 3.37 |
| 121 | Bangladesh | 3.36 |
| 122 | Mozambique | 3.35 |
| 123 | Madagascar | 3.33 |
| 124 | Suriname | 3.28 |
| 125 | Algeria | 3.22 |
| 126 | Burundi | 3.21 |
| 127 | Cameroon | 3.19 |
| 128 | Syria | 3.04 |
| 129 | Albania | 3.04 |
| 130 | Zimbabwe | 2.80 |
| 131 | Timor-Leste | 2.79 |
| 132 | Ethiopia | 2.76 |
| 133 | Lesotho | 2.69 |
| 134 | Chad | 2.46 |



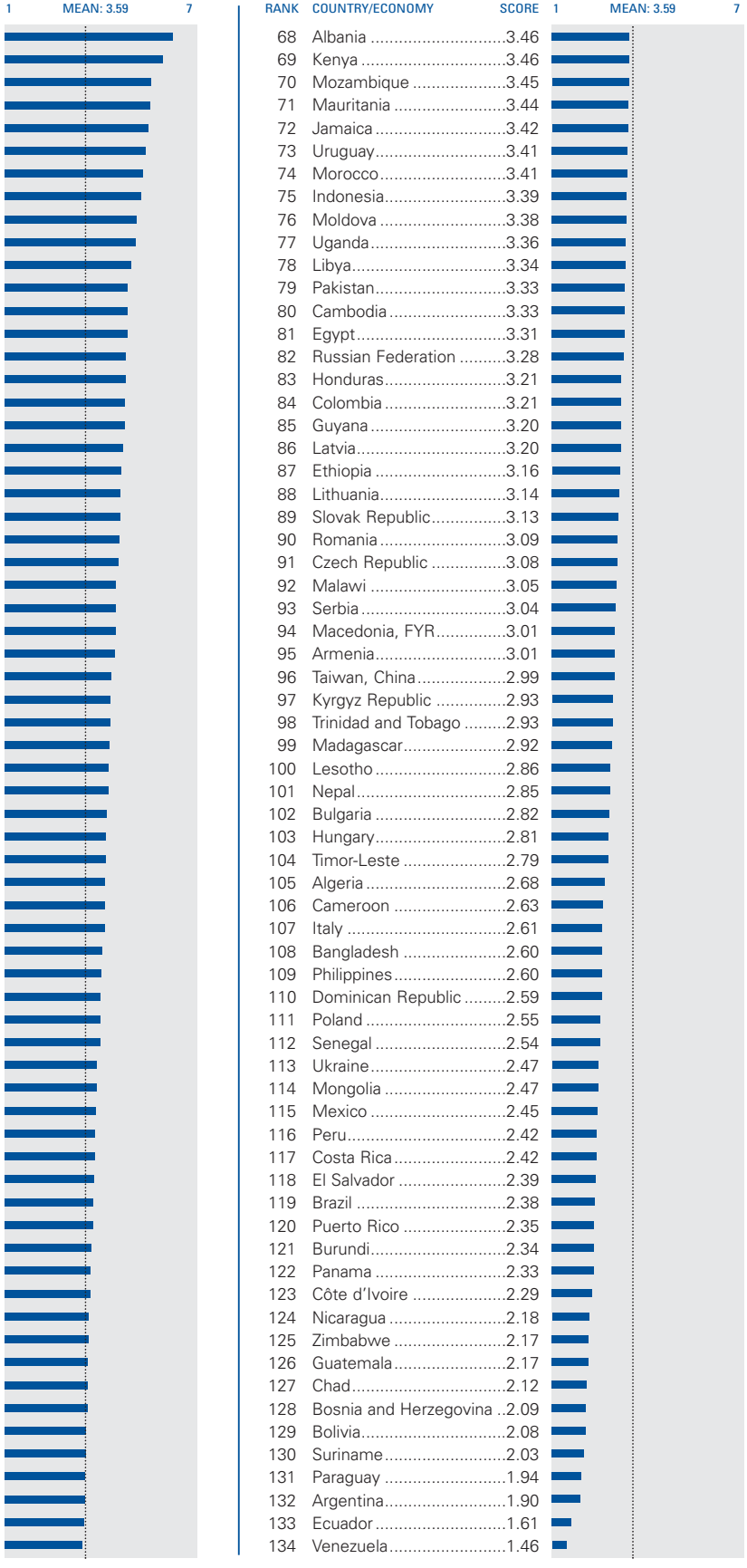

**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 2nd pillar
# Political and regulatory environment

# 2.01 Effectiveness of law-making bodies

How effective is your national parliament/congress as a law-making institution? (1 = very ineffective, 7 = very effective, among the best in the world)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Singapore | 6.35 |
| 2 | Denmark | 6.02 |
| 3 | Australia | 5.66 |
| 4 | Norway | 5.63 |
| 5 | Sweden | 5.57 |
| 6 | Barbados | 5.48 |
| 7 | Finland | 5.39 |
| 8 | Malaysia | 5.35 |
| 9 | Canada | 5.18 |
| 10 | Iceland | 5.17 |
| 11 | Luxembourg | 5.03 |
| 12 | Switzerland | 4.92 |
| 13 | Botswana | 4.92 |
| 14 | United Kingdom | 4.91 |
| 15 | Malta | 4.86 |
| 16 | New Zealand | 4.84 |
| 17 | Mauritius | 4.83 |
| 18 | Tunisia | 4.81 |
| 19 | Cyprus | 4.75 |
| 20 | Ireland | 4.70 |
| 21 | Netherlands | 4.68 |
| 22 | Oman | 4.67 |
| 23 | France | 4.64 |
| 24 | Japan | 4.61 |
| 25 | India | 4.53 |
| 26 | Germany | 4.52 |
| 27 | Brunei Darussalam | 4.52 |
| 28 | South Africa | 4.51 |
| 29 | China | 4.40 |
| 30 | Austria | 4.37 |
| 31 | Gambia, The | 4.36 |
| 32 | Ghana | 4.32 |
| 33 | United States | 4.30 |
| 34 | United Arab Emirates | 4.30 |
| 35 | Turkey | 4.24 |
| 36 | Tanzania | 4.22 |
| 37 | Qatar | 4.21 |
| 38 | Spain | 4.19 |
| 39 | Estonia | 4.18 |
| 40 | Hong Kong SAR | 4.18 |
| 41 | Mali | 4.10 |
| 42 | Portugal | 4.08 |
| 43 | Namibia | 4.05 |
| 44 | Vietnam | 4.03 |
| 45 | Saudi Arabia | 4.03 |
| 46 | Benin | 3.94 |
| 47 | Azerbaijan | 3.92 |
| 48 | Kazakhstan | 3.90 |
| 49 | Korea, Rep. | 3.88 |
| 50 | Tajikistan | 3.87 |
| 51 | Israel | 3.85 |
| 52 | Sri Lanka | 3.82 |
| 53 | Greece | 3.80 |
| 54 | Croatia | 3.75 |
| 55 | Burkina Faso | 3.72 |
| 56 | Slovenia | 3.71 |
| 57 | Montenegro | 3.66 |
| 58 | Belgium | 3.66 |
| 59 | Chile | 3.65 |
| 60 | Kuwait | 3.65 |
| 61 | Thailand | 3.64 |
| 62 | Nigeria | 3.59 |
| 63 | Syria | 3.59 |
| 64 | Jordan | 3.56 |
| 65 | Georgia | 3.55 |
| 66 | Bahrain | 3.52 |
| 67 | Zambia | 3.47 |
| 68 | Albania | 3.46 |
| 69 | Kenya | 3.46 |
| 70 | Mozambique | 3.45 |
| 71 | Mauritania | 3.44 |
| 72 | Jamaica | 3.42 |
| 73 | Uruguay | 3.41 |
| 74 | Morocco | 3.41 |
| 75 | Indonesia | 3.39 |
| 76 | Moldova | 3.38 |
| 77 | Uganda | 3.36 |
| 78 | Libya | 3.34 |
| 79 | Pakistan | 3.33 |
| 80 | Cambodia | 3.33 |
| 81 | Egypt | 3.31 |
| 82 | Russian Federation | 3.28 |
| 83 | Honduras | 3.21 |
| 84 | Colombia | 3.21 |
| 85 | Guyana | 3.20 |
| 86 | Latvia | 3.20 |
| 87 | Ethiopia | 3.16 |
| 88 | Lithuania | 3.14 |
| 89 | Slovak Republic | 3.13 |
| 90 | Romania | 3.09 |
| 91 | Czech Republic | 3.08 |
| 92 | Malawi | 3.05 |
| 93 | Serbia | 3.04 |
| 94 | Macedonia, FYR | 3.01 |
| 95 | Armenia | 3.01 |
| 96 | Taiwan, China | 2.99 |
| 97 | Kyrgyz Republic | 2.93 |
| 98 | Trinidad and Tobago | 2.93 |
| 99 | Madagascar | 2.92 |
| 100 | Lesotho | 2.86 |
| 101 | Nepal | 2.85 |
| 102 | Bulgaria | 2.82 |
| 103 | Hungary | 2.81 |
| 104 | Timor-Leste | 2.79 |
| 105 | Algeria | 2.68 |
| 106 | Cameroon | 2.63 |
| 107 | Italy | 2.61 |
| 108 | Bangladesh | 2.60 |
| 109 | Philippines | 2.60 |
| 110 | Dominican Republic | 2.59 |
| 111 | Poland | 2.55 |
| 112 | Senegal | 2.54 |
| 113 | Ukraine | 2.47 |
| 114 | Mongolia | 2.47 |
| 115 | Mexico | 2.45 |
| 116 | Peru | 2.42 |
| 117 | Costa Rica | 2.42 |
| 118 | El Salvador | 2.39 |
| 119 | Brazil | 2.38 |
| 120 | Puerto Rico | 2.35 |
| 121 | Burundi | 2.34 |
| 122 | Panama | 2.33 |
| 123 | Côte d'Ivoire | 2.29 |
| 124 | Nicaragua | 2.18 |
| 125 | Zimbabwe | 2.17 |
| 126 | Guatemala | 2.17 |
| 127 | Chad | 2.12 |
| 128 | Bosnia and Herzegovina | 2.09 |
| 129 | Bolivia | 2.08 |
| 130 | Suriname | 2.03 |
| 131 | Paraguay | 1.94 |
| 132 | Argentina | 1.90 |
| 133 | Ecuador | 1.61 |
| 134 | Venezuela | 1.46 |

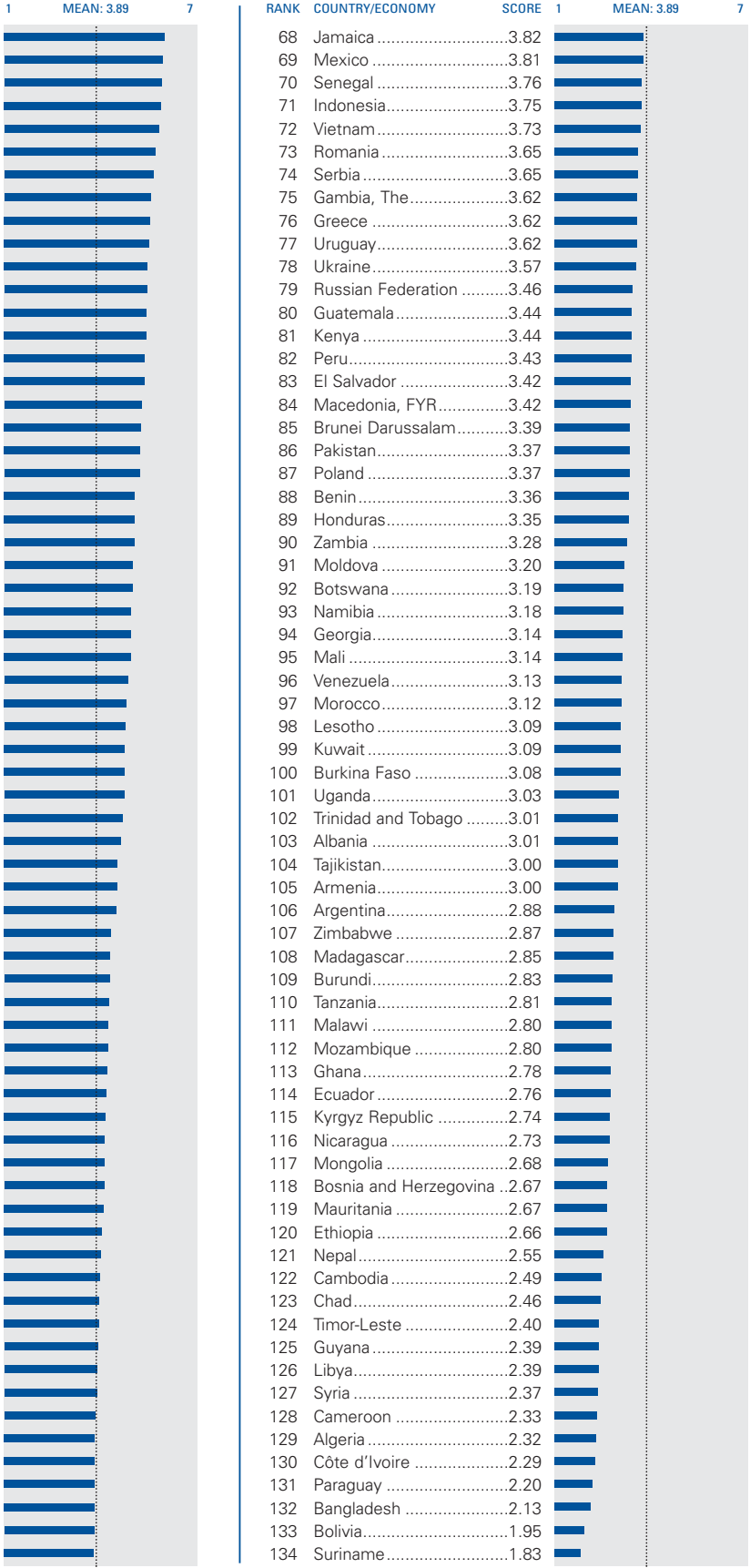



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 2.02 Laws relating to ICT

Laws relating to the use of information and communication technologies (electronic commerce, digital signatures, consumer protection) are (1 = nonexistent, 7 = well developed and enforced)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Denmark | 6.08 |
| 2 | Korea, Rep. | 6.01 |
| 3 | Singapore | 5.98 |
| 4 | Estonia | 5.97 |
| 5 | Sweden | 5.90 |
| 6 | Austria | 5.79 |
| 7 | Norway | 5.72 |
| 8 | Finland | 5.64 |
| 9 | United States | 5.63 |
| 10 | Switzerland | 5.59 |
| 11 | Iceland | 5.54 |
| 12 | Hong Kong SAR | 5.52 |
| 13 | Germany | 5.51 |
| 14 | Canada | 5.50 |
| 15 | Australia | 5.45 |
| 16 | France | 5.44 |
| 17 | United Kingdom | 5.35 |
| 18 | New Zealand | 5.33 |
| 19 | Malaysia | 5.31 |
| 20 | Netherlands | 5.29 |
| 21 | Luxembourg | 5.14 |
| 22 | United Arab Emirates | 5.13 |
| 23 | Portugal | 5.12 |
| 24 | Malta | 5.06 |
| 25 | Slovenia | 5.06 |
| 26 | Chile | 5.02 |
| 27 | Ireland | 5.02 |
| 28 | Taiwan, China | 5.01 |
| 29 | Belgium | 4.92 |
| 30 | Tunisia | 4.87 |
| 31 | Israel | 4.83 |
| 32 | Japan | 4.82 |
| 33 | Qatar | 4.82 |
| 34 | South Africa | 4.80 |
| 35 | Spain | 4.76 |
| 36 | Puerto Rico | 4.70 |
| 37 | Bahrain | 4.59 |
| 38 | India | 4.58 |
| 39 | Czech Republic | 4.56 |
| 40 | Cyprus | 4.38 |
| 41 | Lithuania | 4.35 |
| 42 | Oman | 4.34 |
| 43 | Saudi Arabia | 4.31 |
| 44 | Bulgaria | 4.30 |
| 45 | Azerbaijan | 4.28 |
| 46 | Barbados | 4.25 |
| 47 | China | 4.24 |
| 48 | Mauritius | 4.21 |
| 49 | Brazil | 4.18 |
| 50 | Panama | 4.18 |
| 51 | Croatia | 4.17 |
| 52 | Italy | 4.16 |
| 53 | Colombia | 4.09 |
| 54 | Jordan | 4.05 |
| 55 | Turkey | 4.03 |
| 56 | Hungary | 4.01 |
| 57 | Kazakhstan | 4.00 |
| 58 | Dominican Republic | 3.96 |
| 59 | Sri Lanka | 3.94 |
| 60 | Philippines | 3.94 |
| 61 | Thailand | 3.88 |
| 62 | Slovak Republic | 3.87 |
| 63 | Latvia | 3.87 |
| 64 | Egypt | 3.86 |
| 65 | Nigeria | 3.86 |
| 66 | Montenegro | 3.85 |
| 67 | Costa Rica | 3.83 |
| 68 | Jamaica | 3.82 |
| 69 | Mexico | 3.81 |
| 70 | Senegal | 3.76 |
| 71 | Indonesia | 3.75 |
| 72 | Vietnam | 3.73 |
| 73 | Romania | 3.65 |
| 74 | Serbia | 3.65 |
| 75 | Gambia, The | 3.62 |
| 76 | Greece | 3.62 |
| 77 | Uruguay | 3.62 |
| 78 | Ukraine | 3.57 |
| 79 | Russian Federation | 3.46 |
| 80 | Guatemala | 3.44 |
| 81 | Kenya | 3.44 |
| 82 | Peru | 3.43 |
| 83 | El Salvador | 3.42 |
| 84 | Macedonia, FYR | 3.42 |
| 85 | Brunei Darussalam | 3.39 |
| 86 | Pakistan | 3.37 |
| 87 | Poland | 3.37 |
| 88 | Benin | 3.36 |
| 89 | Honduras | 3.35 |
| 90 | Zambia | 3.28 |
| 91 | Moldova | 3.20 |
| 92 | Botswana | 3.19 |
| 93 | Namibia | 3.18 |
| 94 | Georgia | 3.14 |
| 95 | Mali | 3.14 |
| 96 | Venezuela | 3.13 |
| 97 | Morocco | 3.12 |
| 98 | Lesotho | 3.09 |
| 99 | Kuwait | 3.09 |
| 100 | Burkina Faso | 3.08 |
| 101 | Uganda | 3.03 |
| 102 | Trinidad and Tobago | 3.01 |
| 103 | Albania | 3.01 |
| 104 | Tajikistan | 3.00 |
| 105 | Armenia | 3.00 |
| 106 | Argentina | 2.88 |
| 107 | Zimbabwe | 2.87 |
| 108 | Madagascar | 2.85 |
| 109 | Burundi | 2.83 |
| 110 | Tanzania | 2.81 |
| 111 | Malawi | 2.80 |
| 112 | Mozambique | 2.80 |
| 113 | Ghana | 2.78 |
| 114 | Ecuador | 2.76 |
| 115 | Kyrgyz Republic | 2.74 |
| 116 | Nicaragua | 2.73 |
| 117 | Mongolia | 2.68 |
| 118 | Bosnia and Herzegovina | 2.67 |
| 119 | Mauritania | 2.67 |
| 120 | Ethiopia | 2.66 |
| 121 | Nepal | 2.55 |
| 122 | Cambodia | 2.49 |
| 123 | Chad | 2.46 |
| 124 | Timor-Leste | 2.40 |
| 125 | Guyana | 2.39 |
| 126 | Libya | 2.39 |
| 127 | Syria | 2.37 |
| 128 | Cameroon | 2.33 |
| 129 | Algeria | 2.32 |
| 130 | Côte d'Ivoire | 2.29 |
| 131 | Paraguay | 2.20 |
| 132 | Bangladesh | 2.13 |
| 133 | Bolivia | 1.95 |
| 134 | Suriname | 1.83 |

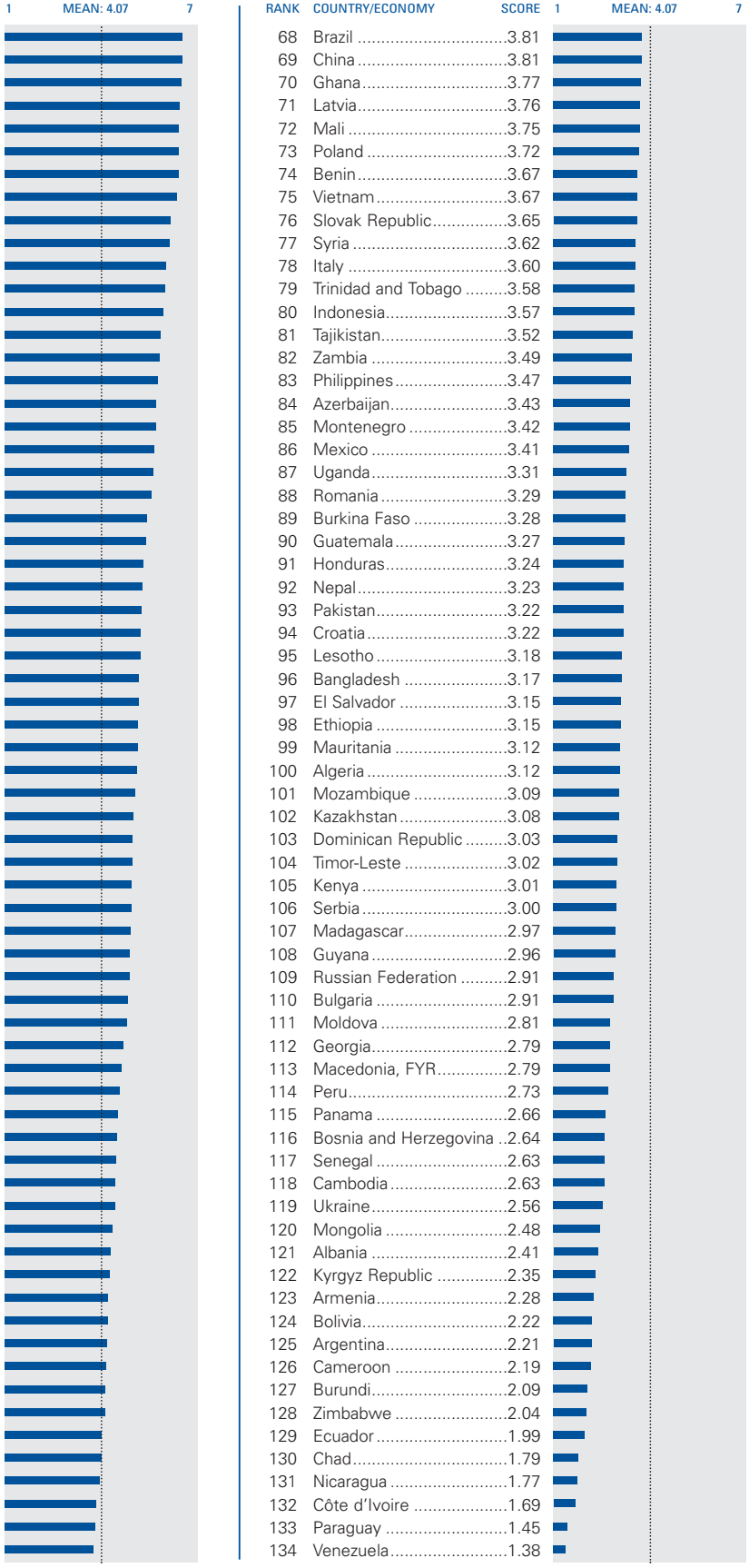



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 2.03 Judicial independence

Is the judiciary in your country independent from political influences of members of government, citizens, or firms? (1 = no, heavily influenced, 7 = yes, entirely independent)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | New Zealand | 6.63 |
| 2 | Finland | 6.63 |
| 3 | Sweden | 6.60 |
| 4 | Germany | 6.54 |
| 5 | Denmark | 6.52 |
| 6 | Netherlands | 6.51 |
| 7 | Switzerland | 6.51 |
| 8 | Australia | 6.45 |
| 9 | Canada | 6.27 |
| 10 | Ireland | 6.23 |
| 11 | Austria | 6.11 |
| 12 | Norway | 6.09 |
| 13 | Hong Kong SAR | 6.02 |
| 14 | Iceland | 5.94 |
| 15 | Singapore | 5.91 |
| 16 | Luxembourg | 5.86 |
| 17 | Barbados | 5.80 |
| 18 | United Kingdom | 5.79 |
| 19 | Belgium | 5.74 |
| 20 | Israel | 5.72 |
| 21 | Qatar | 5.66 |
| 22 | Namibia | 5.52 |
| 23 | United States | 5.47 |
| 24 | Cyprus | 5.40 |
| 25 | Japan | 5.38 |
| 26 | Botswana | 5.34 |
| 27 | Estonia | 5.32 |
| 28 | Malta | 5.32 |
| 29 | France | 5.26 |
| 30 | South Africa | 5.25 |
| 31 | Costa Rica | 5.22 |
| 32 | Portugal | 5.21 |
| 33 | United Arab Emirates | 5.20 |
| 34 | Oman | 5.15 |
| 35 | Malawi | 5.09 |
| 36 | Kuwait | 5.04 |
| 37 | Uruguay | 5.04 |
| 38 | Mauritius | 5.02 |
| 39 | Tunisia | 5.02 |
| 40 | Saudi Arabia | 4.98 |
| 41 | Jordan | 4.96 |
| 42 | Egypt | 4.95 |
| 43 | India | 4.91 |
| 44 | Puerto Rico | 4.89 |
| 45 | Korea, Rep. | 4.77 |
| 46 | Gambia, The | 4.69 |
| 47 | Malaysia | 4.66 |
| 48 | Bahrain | 4.60 |
| 49 | Taiwan, China | 4.57 |
| 50 | Suriname | 4.53 |
| 51 | Jamaica | 4.51 |
| 52 | Chile | 4.50 |
| 53 | Thailand | 4.43 |
| 54 | Brunei Darussalam | 4.36 |
| 55 | Hungary | 4.34 |
| 56 | Spain | 4.26 |
| 57 | Nigeria | 4.26 |
| 58 | Sri Lanka | 4.24 |
| 59 | Libya | 4.20 |
| 60 | Slovenia | 4.18 |
| 61 | Czech Republic | 4.18 |
| 62 | Greece | 4.08 |
| 63 | Colombia | 4.08 |
| 64 | Turkey | 4.00 |
| 65 | Morocco | 3.90 |
| 66 | Tanzania | 3.88 |
| 67 | Lithuania | 3.82 |
| 68 | Brazil | 3.81 |
| 69 | China | 3.81 |
| 70 | Ghana | 3.77 |
| 71 | Latvia | 3.76 |
| 72 | Mali | 3.75 |
| 73 | Poland | 3.72 |
| 74 | Benin | 3.67 |
| 75 | Vietnam | 3.67 |
| 76 | Slovak Republic | 3.65 |
| 77 | Syria | 3.62 |
| 78 | Italy | 3.60 |
| 79 | Trinidad and Tobago | 3.58 |
| 80 | Indonesia | 3.57 |
| 81 | Tajikistan | 3.52 |
| 82 | Zambia | 3.49 |
| 83 | Philippines | 3.47 |
| 84 | Azerbaijan | 3.43 |
| 85 | Montenegro | 3.42 |
| 86 | Mexico | 3.41 |
| 87 | Uganda | 3.31 |
| 88 | Romania | 3.29 |
| 89 | Burkina Faso | 3.28 |
| 90 | Guatemala | 3.27 |
| 91 | Honduras | 3.24 |
| 92 | Nepal | 3.23 |
| 93 | Pakistan | 3.22 |
| 94 | Croatia | 3.22 |
| 95 | Lesotho | 3.18 |
| 96 | Bangladesh | 3.17 |
| 97 | El Salvador | 3.15 |
| 98 | Ethiopia | 3.15 |
| 99 | Mauritania | 3.12 |
| 100 | Algeria | 3.12 |
| 101 | Mozambique | 3.09 |
| 102 | Kazakhstan | 3.08 |
| 103 | Dominican Republic | 3.03 |
| 104 | Timor-Leste | 3.02 |
| 105 | Kenya | 3.01 |
| 106 | Serbia | 3.00 |
| 107 | Madagascar | 2.97 |
| 108 | Guyana | 2.96 |
| 109 | Russian Federation | 2.91 |
| 110 | Bulgaria | 2.91 |
| 111 | Moldova | 2.81 |
| 112 | Georgia | 2.79 |
| 113 | Macedonia, FYR | 2.79 |
| 114 | Peru | 2.73 |
| 115 | Panama | 2.66 |
| 116 | Bosnia and Herzegovina | 2.64 |
| 117 | Senegal | 2.63 |
| 118 | Cambodia | 2.63 |
| 119 | Ukraine | 2.56 |
| 120 | Mongolia | 2.48 |
| 121 | Albania | 2.41 |
| 122 | Kyrgyz Republic | 2.35 |
| 123 | Armenia | 2.28 |
| 124 | Bolivia | 2.22 |
| 125 | Argentina | 2.21 |
| 126 | Cameroon | 2.19 |
| 127 | Burundi | 2.09 |
| 128 | Zimbabwe | 2.04 |
| 129 | Ecuador | 1.99 |
| 130 | Chad | 1.79 |
| 131 | Nicaragua | 1.77 |
| 132 | Côte d'Ivoire | 1.69 |
| 133 | Paraguay | 1.45 |
| 134 | Venezuela | 1.38 |

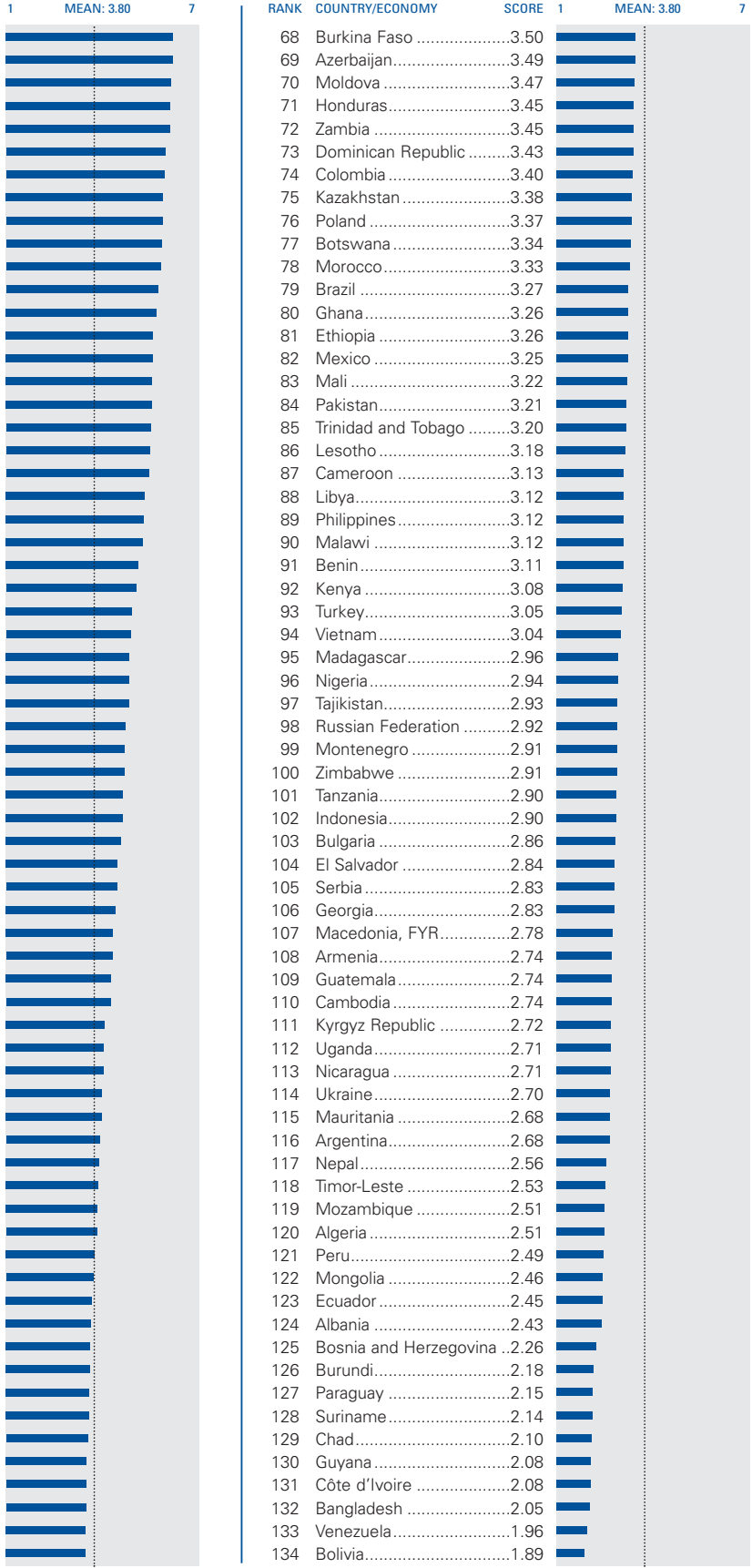



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 2.04 Intellectual property protection

Intellectual property protection in your country (1 = is weak and not enforced; 7 = is strong and enforced)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Switzerland | 6.28 |
| 2 | Singapore | 6.28 |
| 3 | Denmark | 6.22 |
| 4 | Finland | 6.20 |
| 5 | Austria | 6.19 |
| 6 | Germany | 6.04 |
| 7 | France | 6.01 |
| 8 | Iceland | 5.96 |
| 9 | Sweden | 5.95 |
| 10 | Australia | 5.92 |
| 11 | Netherlands | 5.90 |
| 12 | Norway | 5.81 |
| 13 | New Zealand | 5.76 |
| 14 | Japan | 5.65 |
| 15 | Luxembourg | 5.65 |
| 16 | Ireland | 5.63 |
| 17 | Puerto Rico | 5.62 |
| 18 | United States | 5.58 |
| 19 | Canada | 5.55 |
| 20 | Belgium | 5.52 |
| 21 | Hong Kong SAR | 5.39 |
| 22 | United Kingdom | 5.36 |
| 23 | South Africa | 5.34 |
| 24 | United Arab Emirates | 5.18 |
| 25 | Qatar | 5.12 |
| 26 | Korea, Rep. | 4.98 |
| 27 | Bahrain | 4.94 |
| 28 | Taiwan, China | 4.90 |
| 29 | Portugal | 4.90 |
| 30 | Oman | 4.90 |
| 31 | Barbados | 4.78 |
| 32 | Estonia | 4.76 |
| 33 | Malaysia | 4.76 |
| 34 | Spain | 4.70 |
| 35 | Cyprus | 4.69 |
| 36 | Jordan | 4.65 |
| 37 | Namibia | 4.53 |
| 38 | Saudi Arabia | 4.51 |
| 39 | Israel | 4.46 |
| 40 | Tunisia | 4.38 |
| 41 | Slovenia | 4.37 |
| 42 | Italy | 4.33 |
| 43 | Malta | 4.31 |
| 44 | Greece | 4.12 |
| 45 | Hungary | 4.09 |
| 46 | Mauritius | 4.09 |
| 47 | Lithuania | 4.04 |
| 48 | Panama | 4.03 |
| 49 | Gambia, The | 3.96 |
| 50 | Uruguay | 3.95 |
| 51 | Czech Republic | 3.93 |
| 52 | Brunei Darussalam | 3.89 |
| 53 | China | 3.88 |
| 54 | Syria | 3.81 |
| 55 | Thailand | 3.76 |
| 56 | Sri Lanka | 3.71 |
| 57 | India | 3.70 |
| 58 | Croatia | 3.67 |
| 59 | Slovak Republic | 3.66 |
| 60 | Egypt | 3.64 |
| 61 | Latvia | 3.63 |
| 62 | Kuwait | 3.59 |
| 63 | Chile | 3.55 |
| 64 | Romania | 3.53 |
| 65 | Senegal | 3.53 |
| 66 | Costa Rica | 3.51 |
| 67 | Jamaica | 3.51 |
| 68 | Burkina Faso | 3.50 |
| 69 | Azerbaijan | 3.49 |
| 70 | Moldova | 3.47 |
| 71 | Honduras | 3.45 |
| 72 | Zambia | 3.45 |
| 73 | Dominican Republic | 3.43 |
| 74 | Colombia | 3.40 |
| 75 | Kazakhstan | 3.38 |
| 76 | Poland | 3.37 |
| 77 | Botswana | 3.34 |
| 78 | Morocco | 3.33 |
| 79 | Brazil | 3.27 |
| 80 | Ghana | 3.26 |
| 81 | Ethiopia | 3.26 |
| 82 | Mexico | 3.25 |
| 83 | Mali | 3.22 |
| 84 | Pakistan | 3.21 |
| 85 | Trinidad and Tobago | 3.20 |
| 86 | Lesotho | 3.18 |
| 87 | Cameroon | 3.13 |
| 88 | Libya | 3.12 |
| 89 | Philippines | 3.12 |
| 90 | Malawi | 3.12 |
| 91 | Benin | 3.11 |
| 92 | Kenya | 3.08 |
| 93 | Turkey | 3.05 |
| 94 | Vietnam | 3.04 |
| 95 | Madagascar | 2.96 |
| 96 | Nigeria | 2.94 |
| 97 | Tajikistan | 2.93 |
| 98 | Russian Federation | 2.92 |
| 99 | Montenegro | 2.91 |
| 100 | Zimbabwe | 2.91 |
| 101 | Tanzania | 2.90 |
| 102 | Indonesia | 2.90 |
| 103 | Bulgaria | 2.86 |
| 104 | El Salvador | 2.84 |
| 105 | Serbia | 2.83 |
| 106 | Georgia | 2.83 |
| 107 | Macedonia, FYR | 2.78 |
| 108 | Armenia | 2.74 |
| 109 | Guatemala | 2.74 |
| 110 | Cambodia | 2.74 |
| 111 | Kyrgyz Republic | 2.72 |
| 112 | Uganda | 2.71 |
| 113 | Nicaragua | 2.71 |
| 114 | Ukraine | 2.70 |
| 115 | Mauritania | 2.68 |
| 116 | Argentina | 2.68 |
| 117 | Nepal | 2.56 |
| 118 | Timor-Leste | 2.53 |
| 119 | Mozambique | 2.51 |
| 120 | Algeria | 2.51 |
| 121 | Peru | 2.49 |
| 122 | Mongolia | 2.46 |
| 123 | Ecuador | 2.45 |
| 124 | Albania | 2.43 |
| 125 | Bosnia and Herzegovina | 2.26 |
| 126 | Burundi | 2.18 |
| 127 | Paraguay | 2.15 |
| 128 | Suriname | 2.14 |
| 129 | Chad | 2.10 |
| 130 | Guyana | 2.08 |
| 131 | Côte d'Ivoire | 2.08 |
| 132 | Bangladesh | 2.05 |
| 133 | Venezuela | 1.96 |
| 134 | Bolivia | 1.89 |

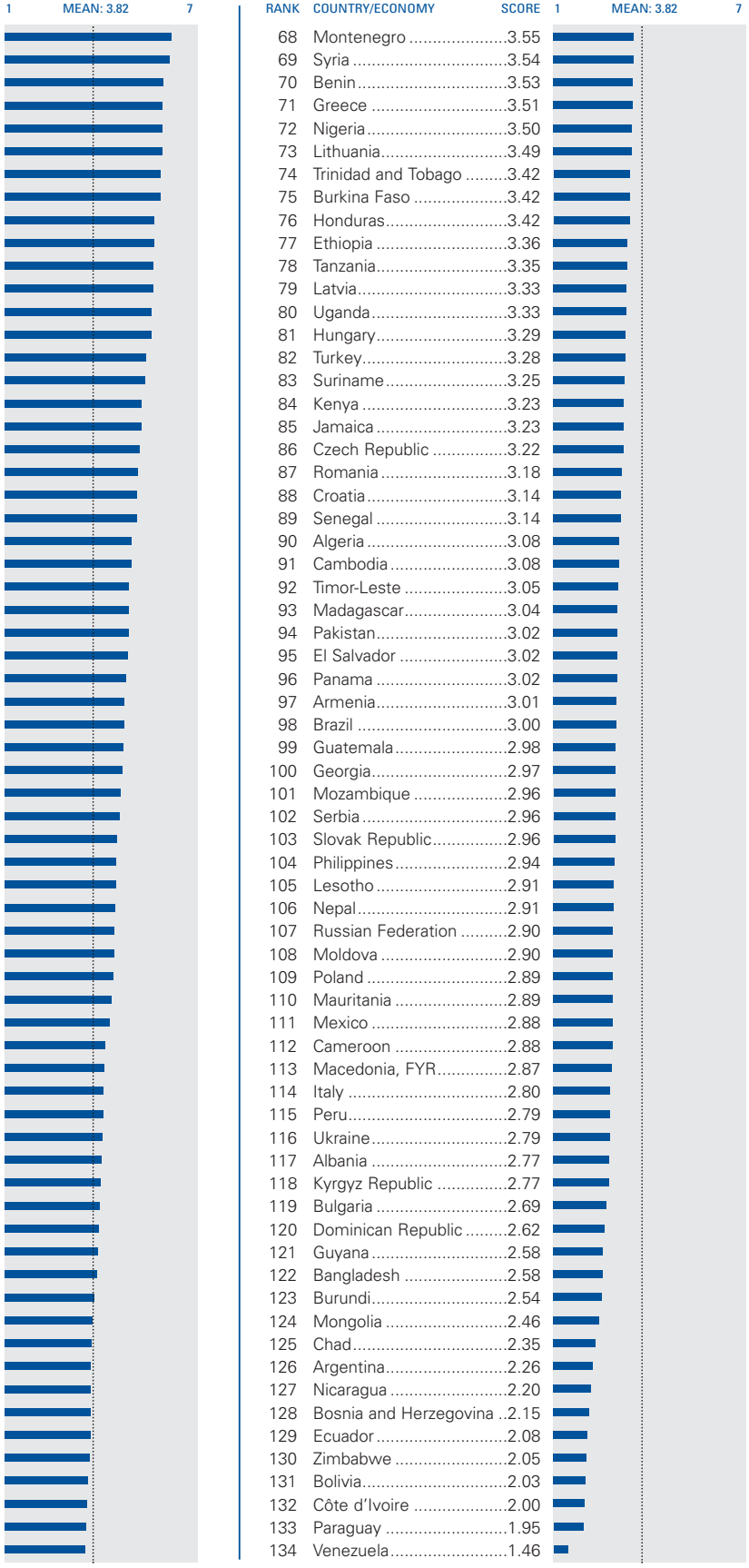



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 2.05 Efficiency of legal framework for disputes

The legal framework in your country for private businesses to settle disputes and challenge the legality of government actions and/or regulations (1 = is inefficient and subject to manipulation, 7 = is efficient and follows a clear, neutral process)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Denmark | 6.30 |
| 2 | Singapore | 6.23 |
| 3 | Switzerland | 6.04 |
| 4 | Germany | 6.01 |
| 5 | Finland | 6.01 |
| 6 | Norway | 6.00 |
| 7 | Sweden | 5.95 |
| 8 | Austria | 5.94 |
| 9 | Netherlands | 5.73 |
| 10 | Australia | 5.73 |
| 11 | Hong Kong SAR | 5.72 |
| 12 | New Zealand | 5.71 |
| 13 | Iceland | 5.66 |
| 14 | Canada | 5.65 |
| 15 | Luxembourg | 5.48 |
| 16 | France | 5.46 |
| 17 | Japan | 5.34 |
| 18 | United Kingdom | 5.34 |
| 19 | Barbados | 5.27 |
| 20 | South Africa | 5.22 |
| 21 | Malaysia | 5.19 |
| 22 | Ireland | 5.18 |
| 23 | Cyprus | 5.03 |
| 24 | Qatar | 5.02 |
| 25 | Tunisia | 4.94 |
| 26 | United Arab Emirates | 4.93 |
| 27 | Oman | 4.93 |
| 28 | United States | 4.91 |
| 29 | Jordan | 4.85 |
| 30 | Chile | 4.79 |
| 31 | Estonia | 4.78 |
| 32 | Namibia | 4.76 |
| 33 | Botswana | 4.72 |
| 34 | Mauritius | 4.68 |
| 35 | Belgium | 4.66 |
| 36 | Kuwait | 4.57 |
| 37 | Malta | 4.54 |
| 38 | Korea, Rep. | 4.52 |
| 39 | Puerto Rico | 4.51 |
| 40 | Gambia, The | 4.48 |
| 41 | Saudi Arabia | 4.46 |
| 42 | India | 4.44 |
| 43 | Spain | 4.39 |
| 44 | Ghana | 4.33 |
| 45 | Costa Rica | 4.19 |
| 46 | Taiwan, China | 4.17 |
| 47 | Brunei Darussalam | 4.14 |
| 48 | Israel | 4.13 |
| 49 | Thailand | 4.11 |
| 50 | Bahrain | 4.06 |
| 51 | Uruguay | 4.04 |
| 52 | Malawi | 4.01 |
| 53 | Slovenia | 3.99 |
| 54 | China | 3.95 |
| 55 | Egypt | 3.92 |
| 56 | Vietnam | 3.84 |
| 57 | Sri Lanka | 3.77 |
| 58 | Mali | 3.74 |
| 59 | Zambia | 3.73 |
| 60 | Colombia | 3.72 |
| 61 | Libya | 3.71 |
| 62 | Morocco | 3.71 |
| 63 | Tajikistan | 3.69 |
| 64 | Azerbaijan | 3.64 |
| 65 | Portugal | 3.61 |
| 66 | Indonesia | 3.57 |
| 67 | Kazakhstan | 3.56 |
| 68 | Montenegro | 3.55 |
| 69 | Syria | 3.54 |
| 70 | Benin | 3.53 |
| 71 | Greece | 3.51 |
| 72 | Nigeria | 3.50 |
| 73 | Lithuania | 3.49 |
| 74 | Trinidad and Tobago | 3.42 |
| 75 | Burkina Faso | 3.42 |
| 76 | Honduras | 3.42 |
| 77 | Ethiopia | 3.36 |
| 78 | Tanzania | 3.35 |
| 79 | Latvia | 3.33 |
| 80 | Uganda | 3.33 |
| 81 | Hungary | 3.29 |
| 82 | Turkey | 3.28 |
| 83 | Suriname | 3.25 |
| 84 | Kenya | 3.23 |
| 85 | Jamaica | 3.23 |
| 86 | Czech Republic | 3.22 |
| 87 | Romania | 3.18 |
| 88 | Croatia | 3.14 |
| 89 | Senegal | 3.14 |
| 90 | Algeria | 3.08 |
| 91 | Cambodia | 3.08 |
| 92 | Timor-Leste | 3.05 |
| 93 | Madagascar | 3.04 |
| 94 | Pakistan | 3.02 |
| 95 | El Salvador | 3.02 |
| 96 | Panama | 3.02 |
| 97 | Armenia | 3.01 |
| 98 | Brazil | 3.00 |
| 99 | Guatemala | 2.98 |
| 100 | Georgia | 2.97 |
| 101 | Mozambique | 2.96 |
| 102 | Serbia | 2.96 |
| 103 | Slovak Republic | 2.96 |
| 104 | Philippines | 2.94 |
| 105 | Lesotho | 2.91 |
| 106 | Nepal | 2.91 |
| 107 | Russian Federation | 2.90 |
| 108 | Moldova | 2.90 |
| 109 | Poland | 2.89 |
| 110 | Mauritania | 2.89 |
| 111 | Mexico | 2.88 |
| 112 | Cameroon | 2.88 |
| 113 | Macedonia, FYR | 2.87 |
| 114 | Italy | 2.80 |
| 115 | Peru | 2.79 |
| 116 | Ukraine | 2.79 |
| 117 | Albania | 2.77 |
| 118 | Kyrgyz Republic | 2.77 |
| 119 | Bulgaria | 2.69 |
| 120 | Dominican Republic | 2.62 |
| 121 | Guyana | 2.58 |
| 122 | Bangladesh | 2.58 |
| 123 | Burundi | 2.54 |
| 124 | Mongolia | 2.46 |
| 125 | Chad | 2.35 |
| 126 | Argentina | 2.26 |
| 127 | Nicaragua | 2.20 |
| 128 | Bosnia and Herzegovina | 2.15 |
| 129 | Ecuador | 2.08 |
| 130 | Zimbabwe | 2.05 |
| 131 | Bolivia | 2.03 |
| 132 | Côte d'Ivoire | 2.00 |
| 133 | Paraguay | 1.95 |
| 134 | Venezuela | 1.46 |

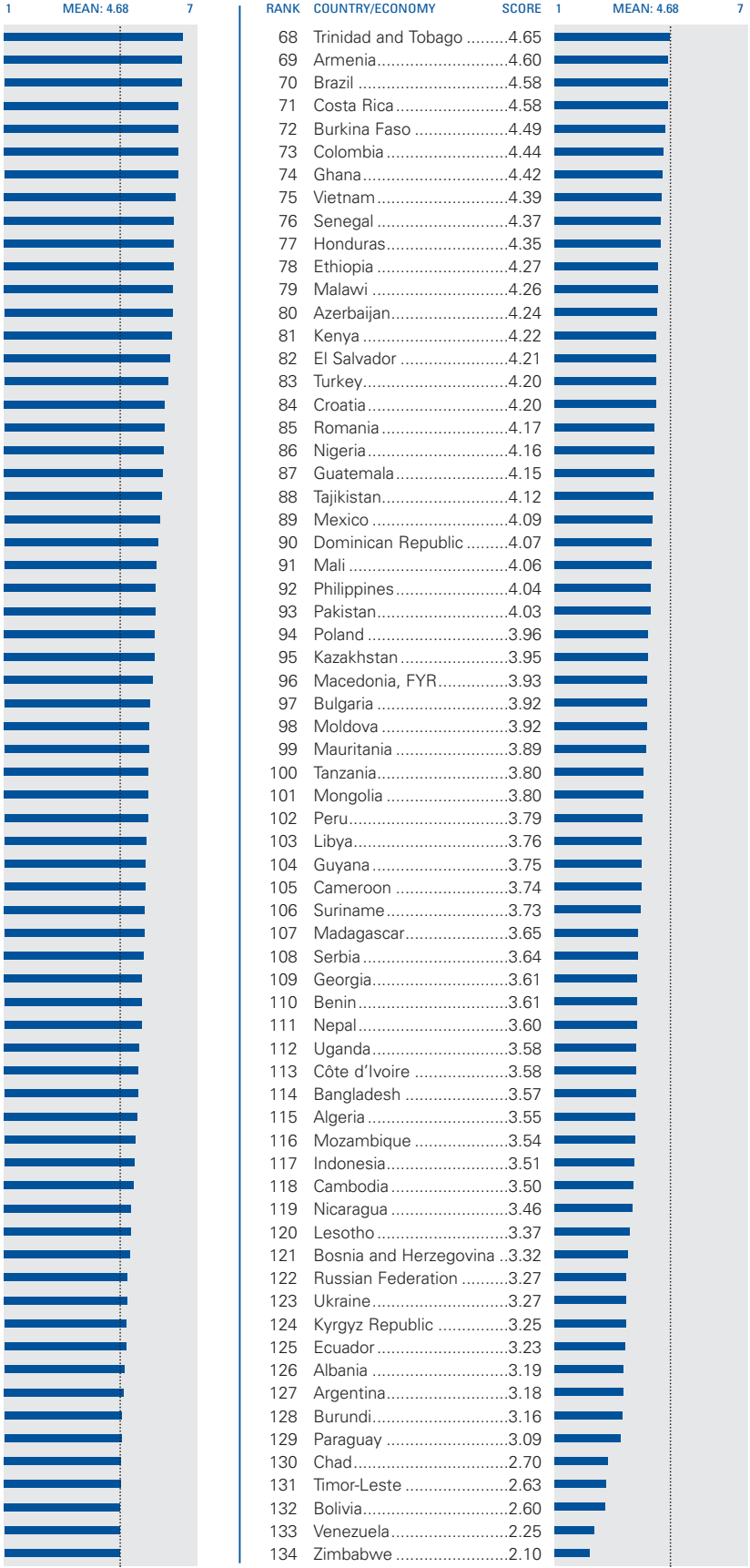



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 2.06 Property rights

Property rights, including over financial assets (1 = are poorly defined and not protected by law, 7 = are clearly defined and well protected by law)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Switzerland | 6.66 |
| 2 | Denmark | 6.64 |
| 3 | Austria | 6.62 |
| 4 | Singapore | 6.52 |
| 5 | Finland | 6.51 |
| 6 | Germany | 6.51 |
| 7 | Sweden | 6.50 |
| 8 | Canada | 6.43 |
| 9 | Norway | 6.37 |
| 10 | Iceland | 6.37 |
| 11 | Ireland | 6.37 |
| 12 | Hong Kong SAR | 6.34 |
| 13 | Australia | 6.33 |
| 14 | Netherlands | 6.32 |
| 15 | Japan | 6.26 |
| 16 | New Zealand | 6.18 |
| 17 | Luxembourg | 6.09 |
| 18 | France | 6.07 |
| 19 | Belgium | 6.05 |
| 20 | South Africa | 6.02 |
| 21 | Puerto Rico | 5.98 |
| 22 | Mauritius | 5.92 |
| 23 | Jordan | 5.87 |
| 24 | Barbados | 5.81 |
| 25 | Namibia | 5.79 |
| 26 | United States | 5.79 |
| 27 | Kuwait | 5.77 |
| 28 | Estonia | 5.77 |
| 29 | Cyprus | 5.70 |
| 30 | Syria | 5.61 |
| 31 | Qatar | 5.59 |
| 32 | Malta | 5.58 |
| 33 | Tunisia | 5.57 |
| 34 | Taiwan, China | 5.56 |
| 35 | Portugal | 5.55 |
| 36 | United Kingdom | 5.49 |
| 37 | Bahrain | 5.46 |
| 38 | Malaysia | 5.46 |
| 39 | Korea, Rep. | 5.44 |
| 40 | Chile | 5.43 |
| 41 | Oman | 5.42 |
| 42 | Spain | 5.37 |
| 43 | United Arab Emirates | 5.35 |
| 44 | Saudi Arabia | 5.35 |
| 45 | Latvia | 5.28 |
| 46 | Hungary | 5.24 |
| 47 | Panama | 5.23 |
| 48 | Botswana | 5.21 |
| 49 | Israel | 5.15 |
| 50 | Lithuania | 5.12 |
| 51 | Greece | 5.10 |
| 52 | India | 5.02 |
| 53 | Jamaica | 5.02 |
| 54 | China | 4.98 |
| 55 | Slovak Republic | 4.91 |
| 56 | Gambia, The | 4.90 |
| 57 | Slovenia | 4.86 |
| 58 | Uruguay | 4.86 |
| 59 | Italy | 4.80 |
| 60 | Sri Lanka | 4.79 |
| 61 | Thailand | 4.71 |
| 62 | Brunei Darussalam | 4.71 |
| 63 | Czech Republic | 4.70 |
| 64 | Montenegro | 4.69 |
| 65 | Zambia | 4.68 |
| 66 | Morocco | 4.66 |
| 67 | Egypt | 4.66 |
| 68 | Trinidad and Tobago | 4.65 |
| 69 | Armenia | 4.60 |
| 70 | Brazil | 4.58 |
| 71 | Costa Rica | 4.58 |
| 72 | Burkina Faso | 4.49 |
| 73 | Colombia | 4.44 |
| 74 | Ghana | 4.42 |
| 75 | Vietnam | 4.39 |
| 76 | Senegal | 4.37 |
| 77 | Honduras | 4.35 |
| 78 | Ethiopia | 4.27 |
| 79 | Malawi | 4.26 |
| 80 | Azerbaijan | 4.24 |
| 81 | Kenya | 4.22 |
| 82 | El Salvador | 4.21 |
| 83 | Turkey | 4.20 |
| 84 | Croatia | 4.20 |
| 85 | Romania | 4.17 |
| 86 | Nigeria | 4.16 |
| 87 | Guatemala | 4.15 |
| 88 | Tajikistan | 4.12 |
| 89 | Mexico | 4.09 |
| 90 | Dominican Republic | 4.07 |
| 91 | Mali | 4.06 |
| 92 | Philippines | 4.04 |
| 93 | Pakistan | 4.03 |
| 94 | Poland | 3.96 |
| 95 | Kazakhstan | 3.95 |
| 96 | Macedonia, FYR | 3.93 |
| 97 | Bulgaria | 3.92 |
| 98 | Moldova | 3.92 |
| 99 | Mauritania | 3.89 |
| 100 | Tanzania | 3.80 |
| 101 | Mongolia | 3.80 |
| 102 | Peru | 3.79 |
| 103 | Libya | 3.76 |
| 104 | Guyana | 3.75 |
| 105 | Cameroon | 3.74 |
| 106 | Suriname | 3.73 |
| 107 | Madagascar | 3.65 |
| 108 | Serbia | 3.64 |
| 109 | Georgia | 3.61 |
| 110 | Benin | 3.61 |
| 111 | Nepal | 3.60 |
| 112 | Uganda | 3.58 |
| 113 | Côte d'Ivoire | 3.58 |
| 114 | Bangladesh | 3.57 |
| 115 | Algeria | 3.55 |
| 116 | Mozambique | 3.54 |
| 117 | Indonesia | 3.51 |
| 118 | Cambodia | 3.50 |
| 119 | Nicaragua | 3.46 |
| 120 | Lesotho | 3.37 |
| 121 | Bosnia and Herzegovina | 3.32 |
| 122 | Russian Federation | 3.27 |
| 123 | Ukraine | 3.27 |
| 124 | Kyrgyz Republic | 3.25 |
| 125 | Ecuador | 3.23 |
| 126 | Albania | 3.19 |
| 127 | Argentina | 3.18 |
| 128 | Burundi | 3.16 |
| 129 | Paraguay | 3.09 |
| 130 | Chad | 2.70 |
| 131 | Timor-Leste | 2.63 |
| 132 | Bolivia | 2.60 |
| 133 | Venezuela | 2.25 |
| 134 | Zimbabwe | 2.10 |

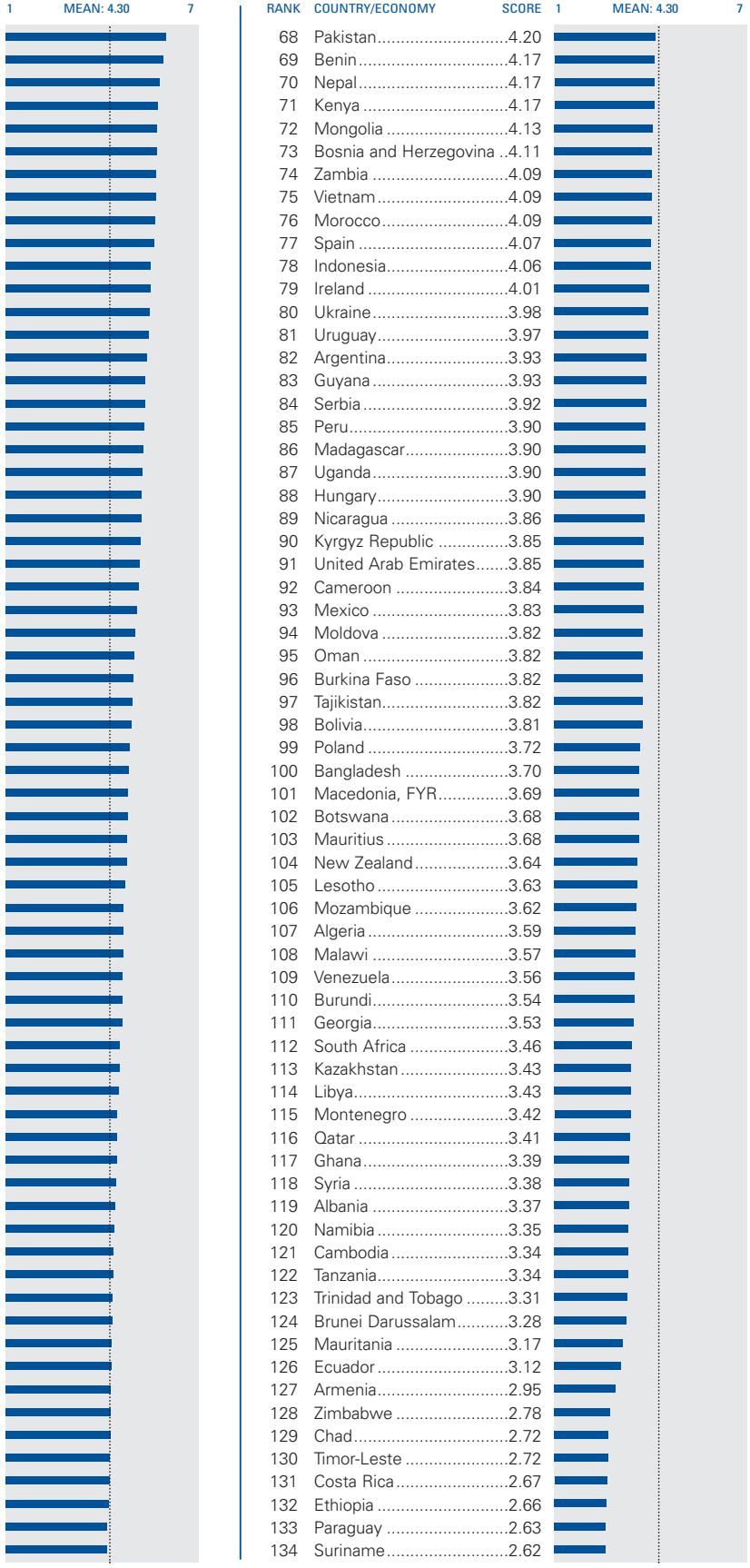



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 2.07 Quality of competition in the ISP sector

Is there sufficient competition among Internet service providers in your country to ensure high quality, infrequent interruptions, and low prices? (1 = no, 7 = yes, equal to the best in the world)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Estonia | 6.10 |
| 2 | Austria | 6.00 |
| 3 | Korea, Rep. | 5.90 |
| 4 | Japan | 5.82 |
| 5 | Norway | 5.81 |
| 6 | United States | 5.81 |
| 7 | Germany | 5.78 |
| 8 | Hong Kong SAR | 5.76 |
| 9 | Netherlands | 5.73 |
| 10 | Sweden | 5.71 |
| 11 | Finland | 5.60 |
| 12 | Singapore | 5.59 |
| 13 | Israel | 5.58 |
| 14 | Denmark | 5.55 |
| 15 | Switzerland | 5.49 |
| 16 | Chile | 5.43 |
| 17 | Guatemala | 5.43 |
| 18 | Iceland | 5.41 |
| 19 | Puerto Rico | 5.38 |
| 20 | Egypt | 5.34 |
| 21 | United Kingdom | 5.31 |
| 22 | Jordan | 5.30 |
| 23 | India | 5.29 |
| 24 | Malta | 5.25 |
| 25 | Taiwan, China | 5.21 |
| 26 | Canada | 5.17 |
| 27 | Sri Lanka | 5.12 |
| 28 | France | 5.08 |
| 29 | Malaysia | 5.04 |
| 30 | Cyprus | 5.01 |
| 31 | Slovenia | 4.98 |
| 32 | Lithuania | 4.93 |
| 33 | Portugal | 4.91 |
| 34 | Thailand | 4.89 |
| 35 | Australia | 4.87 |
| 36 | Saudi Arabia | 4.86 |
| 37 | Tunisia | 4.84 |
| 38 | Philippines | 4.79 |
| 39 | Gambia, The | 4.74 |
| 40 | Dominican Republic | 4.72 |
| 41 | Belgium | 4.72 |
| 42 | Honduras | 4.71 |
| 43 | Panama | 4.70 |
| 44 | Brazil | 4.69 |
| 45 | Luxembourg | 4.62 |
| 46 | El Salvador | 4.61 |
| 47 | Jamaica | 4.59 |
| 48 | Croatia | 4.54 |
| 49 | Latvia | 4.54 |
| 50 | Czech Republic | 4.53 |
| 51 | Mali | 4.49 |
| 52 | Slovak Republic | 4.47 |
| 53 | Romania | 4.45 |
| 54 | Côte d'Ivoire | 4.41 |
| 55 | Colombia | 4.41 |
| 56 | Senegal | 4.39 |
| 57 | Nigeria | 4.38 |
| 58 | Bahrain | 4.37 |
| 59 | China | 4.37 |
| 60 | Azerbaijan | 4.33 |
| 61 | Greece | 4.33 |
| 62 | Turkey | 4.32 |
| 63 | Russian Federation | 4.30 |
| 64 | Italy | 4.29 |
| 65 | Kuwait | 4.27 |
| 66 | Barbados | 4.22 |
| 67 | Bulgaria | 4.22 |
| 68 | Pakistan | 4.20 |
| 69 | Benin | 4.17 |
| 70 | Nepal | 4.17 |
| 71 | Kenya | 4.17 |
| 72 | Mongolia | 4.13 |
| 73 | Bosnia and Herzegovina | 4.11 |
| 74 | Zambia | 4.09 |
| 75 | Vietnam | 4.09 |
| 76 | Morocco | 4.09 |
| 77 | Spain | 4.07 |
| 78 | Indonesia | 4.06 |
| 79 | Ireland | 4.01 |
| 80 | Ukraine | 3.98 |
| 81 | Uruguay | 3.97 |
| 82 | Argentina | 3.93 |
| 83 | Guyana | 3.93 |
| 84 | Serbia | 3.92 |
| 85 | Peru | 3.90 |
| 86 | Madagascar | 3.90 |
| 87 | Uganda | 3.90 |
| 88 | Hungary | 3.90 |
| 89 | Nicaragua | 3.86 |
| 90 | Kyrgyz Republic | 3.85 |
| 91 | United Arab Emirates | 3.85 |
| 92 | Cameroon | 3.84 |
| 93 | Mexico | 3.83 |
| 94 | Moldova | 3.82 |
| 95 | Oman | 3.82 |
| 96 | Burkina Faso | 3.82 |
| 97 | Tajikistan | 3.82 |
| 98 | Bolivia | 3.81 |
| 99 | Poland | 3.72 |
| 100 | Bangladesh | 3.70 |
| 101 | Macedonia, FYR | 3.69 |
| 102 | Botswana | 3.68 |
| 103 | Mauritius | 3.68 |
| 104 | New Zealand | 3.64 |
| 105 | Lesotho | 3.63 |
| 106 | Mozambique | 3.62 |
| 107 | Algeria | 3.59 |
| 108 | Malawi | 3.57 |
| 109 | Venezuela | 3.56 |
| 110 | Burundi | 3.54 |
| 111 | Georgia | 3.53 |
| 112 | South Africa | 3.46 |
| 113 | Kazakhstan | 3.43 |
| 114 | Libya | 3.43 |
| 115 | Montenegro | 3.42 |
| 116 | Qatar | 3.41 |
| 117 | Ghana | 3.39 |
| 118 | Syria | 3.38 |
| 119 | Albania | 3.37 |
| 120 | Namibia | 3.35 |
| 121 | Cambodia | 3.34 |
| 122 | Tanzania | 3.34 |
| 123 | Trinidad and Tobago | 3.31 |
| 124 | Brunei Darussalam | 3.28 |
| 125 | Mauritania | 3.17 |
| 126 | Ecuador | 3.12 |
| 127 | Armenia | 2.95 |
| 128 | Zimbabwe | 2.78 |
| 129 | Chad | 2.72 |
| 130 | Timor-Leste | 2.72 |
| 131 | Costa Rica | 2.67 |
| 132 | Ethiopia | 2.66 |
| 133 | Paraguay | 2.63 |
| 134 | Suriname | 2.62 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 2.08 Number of procedures to enforce a contract (hard data)

Number of procedures from the moment the plaintiff files a lawsuit in court until the moment of payment | 2008

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Ireland | 20 |
| 2 | Singapore | 21 |
| 3 | Hong Kong SAR | 24 |
| 4 | Austria | 25 |
| 4 | Belgium | 25 |
| 4 | Netherlands | 25 |
| 7 | Iceland | 26 |
| 7 | Luxembourg | 26 |
| 9 | Czech Republic | 27 |
| 9 | Latvia | 27 |
| 11 | Australia | 28 |
| 12 | Botswana | 29 |
| 12 | Venezuela | 29 |
| 14 | El Salvador | 30 |
| 14 | France | 30 |
| 14 | Germany | 30 |
| 14 | Japan | 30 |
| 14 | Lithuania | 30 |
| 14 | Malaysia | 30 |
| 14 | Mozambique | 30 |
| 14 | New Zealand | 30 |
| 14 | Slovak Republic | 30 |
| 14 | South Africa | 30 |
| 14 | Sweden | 30 |
| 14 | Ukraine | 30 |
| 14 | United Kingdom | 30 |
| 27 | Guatemala | 31 |
| 27 | Moldova | 31 |
| 27 | Panama | 31 |
| 27 | Romania | 31 |
| 31 | Finland | 32 |
| 31 | Gambia, The | 32 |
| 31 | Mongolia | 32 |
| 31 | Slovenia | 32 |
| 31 | Switzerland | 32 |
| 31 | United States | 32 |
| 37 | Côte d'Ivoire | 33 |
| 37 | Hungary | 33 |
| 37 | Namibia | 33 |
| 37 | Norway | 33 |
| 41 | China | 34 |
| 41 | Colombia | 34 |
| 41 | Denmark | 34 |
| 41 | Dominican Republic | 34 |
| 41 | Portugal | 34 |
| 41 | Tajikistan | 34 |
| 41 | Vietnam | 34 |
| 48 | Israel | 35 |
| 48 | Jamaica | 35 |
| 48 | Korea, Rep. | 35 |
| 48 | Nicaragua | 35 |
| 48 | Thailand | 35 |
| 48 | Turkey | 35 |
| 48 | Zambia | 35 |
| 55 | Argentina | 36 |
| 55 | Canada | 36 |
| 55 | Chile | 36 |
| 55 | Estonia | 36 |
| 55 | Georgia | 36 |
| 55 | Ghana | 36 |
| 55 | Guyana | 36 |
| 55 | Serbia | 36 |
| 63 | Burkina Faso | 37 |
| 63 | Mauritius | 37 |
| 63 | Philippines | 37 |
| 63 | Russian Federation | 37 |
| 67 | Bosnia and Herzegovina | 38 |
| 67 | Croatia | 38 |
| 67 | Kazakhstan | 38 |
| 67 | Macedonia, FYR | 38 |
| 67 | Madagascar | 38 |
| 67 | Mexico | 38 |
| 67 | Paraguay | 38 |
| 67 | Poland | 38 |
| 67 | Tanzania | 38 |
| 67 | Uganda | 38 |
| 67 | Zimbabwe | 38 |
| 78 | Albania | 39 |
| 78 | Azerbaijan | 39 |
| 78 | Bulgaria | 39 |
| 78 | Ecuador | 39 |
| 78 | Ethiopia | 39 |
| 78 | Greece | 39 |
| 78 | Indonesia | 39 |
| 78 | Jordan | 39 |
| 78 | Kyrgyz Republic | 39 |
| 78 | Mali | 39 |
| 78 | Nepal | 39 |
| 78 | Nigeria | 39 |
| 78 | Puerto Rico | 39 |
| 78 | Spain | 39 |
| 78 | Tunisia | 39 |
| 93 | Bolivia | 40 |
| 93 | Costa Rica | 40 |
| 93 | Morocco | 40 |
| 93 | Sri Lanka | 40 |
| 93 | Uruguay | 40 |
| 98 | Bangladesh | 41 |
| 98 | Chad | 41 |
| 98 | Italy | 41 |
| 98 | Lesotho | 41 |
| 98 | Peru | 41 |
| 103 | Benin | 42 |
| 103 | Egypt | 42 |
| 103 | Malawi | 42 |
| 103 | Trinidad and Tobago | 42 |
| 107 | Cameroon | 43 |
| 107 | Qatar | 43 |
| 109 | Burundi | 44 |
| 109 | Cambodia | 44 |
| 109 | Kenya | 44 |
| 109 | Saudi Arabia | 44 |
| 109 | Senegal | 44 |
| 109 | Suriname | 44 |
| 115 | Brazil | 45 |
| 115 | Honduras | 45 |
| 117 | India | 46 |
| 117 | Mauritania | 46 |
| 119 | Algeria | 47 |
| 119 | Pakistan | 47 |
| 119 | Taiwan, China | 47 |
| 122 | Bahrain | 48 |
| 123 | Armenia | 49 |
| 123 | Montenegro | 49 |
| 125 | Kuwait | 50 |
| 125 | United Arab Emirates | 50 |
| 127 | Oman | 51 |
| 127 | Timor-Leste | 51 |
| 129 | Syria | 55 |
| 130 | Brunei Darussalam | 58 |
| n/a | Barbados | n/a |
| n/a | Cyprus | n/a |
| n/a | Libya | n/a |
| n/a | Malta | n/a |

**SOURCE:** The World Bank Group, *Doing Business 2009*

# 2.09 Time to enforce a contract (hard data)

Number of days required to resolve a dispute | 2008

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Singapore | 150 |
| 2 | Kyrgyz Republic | 177 |
| 3 | Lithuania | 210 |
| 4 | Hong Kong SAR | 211 |
| 5 | New Zealand | 216 |
| 6 | Kazakhstan | 230 |
| 6 | Korea, Rep. | 230 |
| 8 | Finland | 235 |
| 9 | Azerbaijan | 237 |
| 10 | Namibia | 270 |
| 11 | Latvia | 279 |
| 12 | Russian Federation | 281 |
| 13 | Armenia | 285 |
| 13 | Georgia | 285 |
| 15 | Tajikistan | 295 |
| 15 | Vietnam | 295 |
| 17 | United States | 300 |
| 18 | Norway | 310 |
| 19 | Mongolia | 314 |
| 20 | Japan | 316 |
| 21 | Luxembourg | 321 |
| 22 | France | 331 |
| 23 | Hungary | 335 |
| 24 | Ukraine | 354 |
| 25 | Moldova | 365 |
| 26 | Mauritania | 370 |
| 27 | Denmark | 380 |
| 28 | Macedonia, FYR | 385 |
| 29 | Albania | 390 |
| 30 | Iceland | 393 |
| 31 | Germany | 394 |
| 32 | Australia | 395 |
| 33 | Austria | 397 |
| 34 | Cambodia | 401 |
| 35 | United Kingdom | 404 |
| 36 | China | 406 |
| 37 | Zimbabwe | 410 |
| 38 | Mexico | 415 |
| 39 | Switzerland | 417 |
| 40 | Turkey | 420 |
| 41 | Estonia | 425 |
| 42 | Malawi | 432 |
| 43 | Gambia, The | 434 |
| 44 | Burkina Faso | 446 |
| 45 | Nigeria | 457 |
| 46 | Dominican Republic | 460 |
| 47 | Tanzania | 462 |
| 48 | Kenya | 465 |
| 49 | Peru | 468 |
| 50 | Zambia | 471 |
| 51 | Thailand | 479 |
| 52 | Chile | 480 |
| 53 | Ghana | 487 |
| 54 | Belgium | 505 |
| 55 | Sweden | 508 |
| 56 | Taiwan, China | 510 |
| 56 | Venezuela | 510 |
| 58 | Romania | 512 |
| 59 | Netherlands | 514 |
| 60 | Ireland | 515 |
| 60 | Spain | 515 |
| 62 | Uganda | 535 |
| 63 | Brunei Darussalam | 540 |
| 63 | Nicaragua | 540 |
| 65 | Montenegro | 545 |
| 66 | Croatia | 561 |
| 67 | Bulgaria | 564 |
| 68 | Slovak Republic | 565 |
| 68 | Tunisia | 565 |
| 70 | Kuwait | 566 |
| 71 | Canada | 570 |
| 71 | Indonesia | 570 |
| 71 | Qatar | 570 |
| 74 | Portugal | 577 |
| 75 | Guyana | 581 |
| 76 | Ecuador | 588 |
| 77 | Argentina | 590 |
| 78 | Bolivia | 591 |
| 78 | Paraguay | 591 |
| 80 | Bosnia and Herzegovina | 595 |
| 81 | Oman | 598 |
| 82 | Malaysia | 600 |
| 82 | South Africa | 600 |
| 84 | United Arab Emirates | 607 |
| 85 | Morocco | 615 |
| 86 | Brazil | 616 |
| 87 | Puerto Rico | 620 |
| 88 | Algeria | 630 |
| 89 | Bahrain | 635 |
| 89 | Saudi Arabia | 635 |
| 89 | Serbia | 635 |
| 92 | Jamaica | 655 |
| 93 | Panama | 686 |
| 94 | Jordan | 689 |
| 95 | Ethiopia | 690 |
| 96 | Lesotho | 695 |
| 97 | Uruguay | 720 |
| 98 | Mozambique | 730 |
| 99 | Nepal | 735 |
| 100 | Chad | 743 |
| 101 | Mauritius | 750 |
| 102 | Côte d'Ivoire | 770 |
| 103 | Senegal | 780 |
| 104 | El Salvador | 786 |
| 105 | Cameroon | 800 |
| 106 | Greece | 819 |
| 107 | Czech Republic | 820 |
| 108 | Benin | 825 |
| 109 | Poland | 830 |
| 110 | Burundi | 832 |
| 111 | Philippines | 842 |
| 112 | Mali | 860 |
| 113 | Madagascar | 871 |
| 114 | Syria | 872 |
| 115 | Costa Rica | 877 |
| 116 | Israel | 890 |
| 117 | Honduras | 900 |
| 118 | Pakistan | 976 |
| 119 | Botswana | 987 |
| 120 | Egypt | 1,010 |
| 121 | Italy | 1,210 |
| 122 | Sri Lanka | 1,318 |
| 123 | Trinidad and Tobago | 1,340 |
| 124 | Colombia | 1,346 |
| 125 | Slovenia | 1,350 |
| 126 | India | 1,420 |
| 127 | Bangladesh | 1,442 |
| 128 | Guatemala | 1,459 |
| 129 | Suriname | 1,715 |
| 130 | Timor-Leste | 1,800 |
| n/a | Barbados | n/a |
| n/a | Cyprus | n/a |
| n/a | Libya | n/a |
| n/a | Malta | n/a |

**SOURCE:** The World Bank Group, *Doing Business 2009*

# 3rd pillar
# Infrastructure environment

# 3.01 Telephone lines (hard data)

Main telephone lines per 100 population | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Switzerland | 66.81 |
| 2 | Germany | 65.07 |
| 3 | Taiwan, China | 62.50 |
| 4 | Iceland | 62.01 |
| 5 | Sweden | 60.38 |
| 6 | Montenegro[2] | 58.88 |
| 7 | France | 56.45 |
| 8 | Canada | 55.48 |
| 9 | United Kingdom | 55.43 |
| 10 | Greece | 54.98 |
| 11 | Hong Kong SAR | 53.77 |
| 12 | United States | 53.35 |
| 13 | Luxembourg | 53.20 |
| 14 | Denmark | 51.89 |
| 15 | Barbados[1] | 50.14 |
| 16 | Korea, Rep. | 49.57 |
| 17 | Ireland | 49.11 |
| 18 | Malta | 48.72 |
| 19 | Australia | 47.05 |
| 20 | Italy[2] | 46.25 |
| 21 | Cyprus | 44.89 |
| 22 | Netherlands | 44.67 |
| 23 | Belgium | 44.63 |
| 24 | Israel[2] | 43.88 |
| 25 | Slovenia | 42.83 |
| 26 | Norway | 42.31 |
| 27 | Spain | 41.97 |
| 28 | Singapore | 41.91 |
| 29 | New Zealand | 40.83 |
| 30 | Austria | 40.36 |
| 31 | Croatia | 40.06 |
| 32 | Japan | 40.04 |
| 33 | Portugal | 38.96 |
| 34 | Estonia | 37.11 |
| 35 | Finland | 32.97 |
| 36 | Vietnam | 32.65 |
| 37 | Hungary | 32.41 |
| 38 | Costa Rica | 32.16 |
| 39 | United Arab Emirates | 31.63 |
| 40 | Russian Federation | 31.02 |
| 41 | Serbia | 30.36 |
| 42 | Bulgaria | 30.11 |
| 43 | Uruguay | 28.90 |
| 44 | Moldova | 28.47 |
| 45 | Mauritius[2] | 28.45 |
| 46 | Latvia | 28.28 |
| 47 | Czech Republic[2] | 28.28 |
| 48 | Qatar | 28.24 |
| 49 | Ukraine | 27.83 |
| 50 | China | 27.51 |
| 51 | Poland | 27.14 |
| 52 | Bosnia and Herzegovina | 27.05 |
| 53 | Bahrain[2] | 26.30 |
| 54 | Puerto Rico[1] | 26.24 |
| 55 | Turkey | 24.59 |
| 56 | Trinidad and Tobago | 24.29 |
| 57 | Argentina | 24.03 |
| 58 | Lithuania | 23.58 |
| 59 | Macedonia, FYR | 22.74 |
| 60 | Slovak Republic | 21.35 |
| 61 | Brunei Darussalam[2] | 20.99 |
| 62 | Kazakhstan | 20.99 |
| 63 | Brazil | 20.54 |
| 64 | Chile | 20.31 |
| 65 | Romania | 20.06 |
| 66 | Armenia[1] | 19.71 |
| 67 | Kuwait[2] | 18.70 |
| 68 | Mexico | 18.54 |
| 69 | Venezuela | 18.38 |
| 70 | Suriname[2] | 18.03 |
| 71 | Syria | 17.32 |
| 72 | Colombia | 17.19 |
| 73 | Malaysia | 16.37 |
| 74 | Saudi Arabia | 16.16 |
| 75 | El Salvador | 15.75 |
| 76 | Egypt | 14.87 |
| 77 | Azerbaijan | 14.81 |
| 78 | Panama | 14.71 |
| 79 | Guyana[1] | 14.66 |
| 80 | Libya[1] | 14.56 |
| 81 | Sri Lanka | 14.21 |
| 82 | Ecuador | 13.53 |
| 83 | Jamaica[2] | 12.85 |
| 84 | Georgia[2] | 12.47 |
| 85 | Tunisia | 12.33 |
| 86 | Albania[1] | 11.30 |
| 87 | Thailand | 11.00 |
| 88 | Guatemala[2] | 10.49 |
| 89 | Oman | 10.33 |
| 90 | Jordan | 9.88 |
| 91 | Honduras[2] | 9.69 |
| 92 | Peru | 9.58 |
| 93 | South Africa | 9.56 |
| 94 | Dominican Republic | 9.29 |
| 95 | Kyrgyz Republic | 9.07 |
| 96 | Algeria | 9.06 |
| 97 | Indonesia | 7.70 |
| 98 | Morocco | 7.67 |
| 99 | Paraguay | 7.41 |
| 100 | Botswana | 7.28 |
| 101 | Bolivia | 7.12 |
| 102 | Namibia | 6.66 |
| 103 | Mongolia[2] | 5.93 |
| 104 | Gambia, The | 4.47 |
| 105 | Nicaragua[2] | 4.43 |
| 106 | Tajikistan[1] | 4.31 |
| 107 | Philippines[2] | 4.30 |
| 108 | India | 3.37 |
| 109 | Pakistan | 3.01 |
| 110 | Lesotho[2] | 2.97 |
| 111 | Nepal | 2.72 |
| 112 | Zimbabwe | 2.58 |
| 113 | Senegal | 2.17 |
| 114 | Ghana | 1.60 |
| 115 | Côte d'Ivoire[2] | 1.41 |
| 116 | Malawi | 1.26 |
| 117 | Benin | 1.22 |
| 118 | Mauritania[2] | 1.10 |
| 119 | Nigeria | 1.07 |
| 120 | Ethiopia | 1.06 |
| 121 | Cameroon[2] | 0.79 |
| 122 | Zambia | 0.77 |
| 123 | Bangladesh | 0.75 |
| 124 | Kenya | 0.71 |
| 125 | Burkina Faso[2] | 0.70 |
| 126 | Madagascar | 0.68 |
| 127 | Mali | 0.65 |
| 128 | Tanzania | 0.58 |
| 129 | Uganda | 0.53 |
| 130 | Burundi[2] | 0.45 |
| 131 | Mozambique[2] | 0.33 |
| 132 | Cambodia | 0.26 |
| 133 | Timor-Leste | 0.21 |
| 134 | Chad[2] | 0.13 |

**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

[1] 2005 [2] 2006

# 3.02 Secure Internet servers (hard data)

Secure Internet servers per million population | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Iceland | 1,421.24 |
| 2 | United States | 1,060.39 |
| 3 | New Zealand | 828.47 |
| 4 | Switzerland | 812.84 |
| 5 | Canada | 812.38 |
| 6 | Australia | 807.48 |
| 7 | Denmark | 805.31 |
| 8 | Netherlands | 780.53 |
| 9 | United Kingdom | 753.85 |
| 10 | Luxembourg | 737.51 |
| 11 | Malta | 698.93 |
| 12 | Norway | 621.98 |
| 13 | Sweden | 600.67 |
| 14 | Ireland | 551.51 |
| 15 | Finland | 542.85 |
| 16 | Korea, Rep. | 498.18 |
| 17 | Germany | 459.51 |
| 18 | Austria | 399.38 |
| 19 | Japan | 399.25 |
| 20 | Cyprus | 396.63 |
| 21 | Singapore | 359.59 |
| 22 | Taiwan, China | 298.00 |
| 23 | Hong Kong SAR | 240.98 |
| 24 | Barbados | 234.74 |
| 25 | Israel | 228.24 |
| 26 | Estonia | 214.66 |
| 27 | Belgium | 192.08 |
| 28 | Spain | 142.72 |
| 29 | France | 140.60 |
| 30 | Slovenia | 139.24 |
| 31 | Czech Republic | 104.60 |
| 32 | United Arab Emirates | 95.54 |
| 33 | Costa Rica | 90.54 |
| 34 | Portugal | 86.54 |
| 35 | Panama | 77.23 |
| 36 | Croatia | 75.25 |
| 37 | Italy | 72.93 |
| 38 | Latvia | 66.78 |
| 39 | Hungary | 58.97 |
| 40 | Bahrain | 55.79 |
| 41 | Poland | 55.28 |
| 42 | Greece | 52.62 |
| 43 | Lithuania | 51.55 |
| 44 | Kuwait | 50.70 |
| 45 | Qatar | 49.04 |
| 46 | Puerto Rico | 46.16 |
| 47 | Slovak Republic | 42.25 |
| 48 | Mauritius | 41.97 |
| 49 | Trinidad and Tobago | 41.26 |
| 50 | Turkey | 38.14 |
| 51 | Uruguay | 37.67 |
| 52 | South Africa | 31.04 |
| 53 | Chile | 29.05 |
| 54 | Jamaica | 28.39 |
| 55 | Brunei Darussalam | 28.26 |
| 56 | Malaysia | 22.07 |
| 57 | Brazil | 20.13 |
| 58 | Bulgaria | 17.40 |
| 59 | Argentina | 15.57 |
| 60 | Mexico | 13.34 |
| 61 | Romania | 11.32 |
| 62 | Suriname | 10.92 |
| 63 | Dominican Republic | 9.95 |
| 64 | Namibia | 9.64 |
| 65 | Peru | 8.71 |
| 66 | Georgia | 7.73 |
| 67 | El Salvador | 7.73 |
| 68 | Colombia | 7.68 |
| 69 | Thailand | 7.41 |
| 70 | Mongolia | 7.27 |
| 71 | Ecuador | 7.27 |
| 72 | Guatemala | 6.89 |
| 73 | Saudi Arabia | 6.61 |
| 74 | Nicaragua | 6.24 |
| 75 | Venezuela | 6.23 |
| 76 | Bosnia and Herzegovina | 6.10 |
| 77 | Jordan | 5.95 |
| 78 | Macedonia, FYR | 5.89 |
| 79 | Oman | 5.77 |
| 80 | Serbia | 5.14 |
| 81 | Honduras | 4.79 |
| 82 | Russian Federation | 4.48 |
| 83 | Armenia | 4.33 |
| 84 | Moldova | 4.22 |
| 85 | Philippines | 3.98 |
| 86 | Bolivia | 3.78 |
| 87 | Senegal | 3.06 |
| 88 | Paraguay | 2.94 |
| 89 | Ukraine | 2.85 |
| 90 | Guyana | 2.71 |
| 91 | Sri Lanka | 2.56 |
| 92 | Albania | 2.51 |
| 93 | Mauritania | 1.92 |
| 94 | Botswana | 1.59 |
| 95 | Gambia, The | 1.17 |
| 96 | Morocco | 1.07 |
| 97 | Kazakhstan | 1.03 |
| 98 | Timor-Leste[1] | 1.03 |
| 99 | India | 1.00 |
| 100 | Tunisia | 0.98 |
| 101 | Kyrgyz Republic | 0.95 |
| 102 | Nepal | 0.93 |
| 103 | Egypt | 0.85 |
| 104 | Kenya | 0.83 |
| 105 | Indonesia | 0.75 |
| 106 | China | 0.68 |
| 107 | Vietnam | 0.60 |
| 108 | Azerbaijan | 0.58 |
| 109 | Côte d'Ivoire | 0.52 |
| 110 | Lesotho | 0.50 |
| 111 | Nigeria | 0.49 |
| 112 | Cambodia | 0.48 |
| 113 | Ghana | 0.43 |
| 114 | Pakistan | 0.41 |
| 115 | Cameroon | 0.38 |
| 116 | Mali | 0.32 |
| 117 | Zimbabwe | 0.30 |
| 118 | Algeria | 0.24 |
| 119 | Burundi | 0.24 |
| 120 | Mozambique | 0.23 |
| 121 | Madagascar | 0.20 |
| 122 | Libya | 0.16 |
| 123 | Malawi | 0.14 |
| 124 | Burkina Faso | 0.14 |
| 125 | Benin | 0.11 |
| 126 | Syria | 0.10 |
| 127 | Zambia | 0.08 |
| 128 | Tanzania | 0.07 |
| 129 | Uganda | 0.06 |
| 130 | Bangladesh | 0.04 |
| 131 | Ethiopia | 0.01 |
| n/a | Chad | n/a |
| n/a | Montenegro | n/a |
| n/a | Tajikistan | n/a |

**SOURCE:** The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008)

[1] 2005

# 3.03 Electricity production (hard data)

Electricity production (kWh) per capita | 2005 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Norway | 29,704.32 |
| 2 | Iceland | 29,270.43 |
| 3 | Canada | 19,438.07 |
| 4 | Qatar | 18,081.20 |
| 5 | Sweden | 17,549.01 |
| 6 | Kuwait | 17,249.04 |
| 7 | United Arab Emirates | 14,788.91 |
| 8 | United States | 14,395.55 |
| 9 | Finland | 13,448.09 |
| 10 | Australia | 12,300.10 |
| 11 | Bahrain | 12,000.75 |
| 12 | Taiwan, China[3] | 10,589.62 |
| 13 | New Zealand | 10,391.16 |
| 14 | France | 9,374.37 |
| 15 | Singapore | 8,957.99 |
| 16 | Paraguay | 8,674.19 |
| 17 | Japan | 8,563.55 |
| 18 | Belgium | 8,179.39 |
| 19 | Korea, Rep. | 8,031.49 |
| 20 | Czech Republic | 8,005.69 |
| 21 | Brunei Darussalam | 7,792.29 |
| 22 | Switzerland | 7,765.39 |
| 23 | Austria | 7,649.42 |
| 24 | Saudi Arabia | 7,618.15 |
| 25 | Estonia | 7,581.16 |
| 26 | Slovenia | 7,556.61 |
| 27 | Germany | 7,435.05 |
| 28 | Luxembourg | 7,337.27 |
| 29 | Israel | 7,199.00 |
| 30 | Denmark | 6,697.77 |
| 31 | Spain | 6,696.30 |
| 32 | Russian Federation | 6,644.49 |
| 33 | United Kingdom | 6,601.65 |
| 34 | Puerto Rico | 6,380.28 |
| 35 | Ireland | 6,161.43 |
| 36 | Netherlands | 6,140.93 |
| 37 | Slovak Republic | 5,819.94 |
| 38 | Cyprus | 5,775.93 |
| 39 | Bulgaria | 5,680.75 |
| 40 | Hong Kong SAR | 5,643.60 |
| 41 | Malta | 5,551.43 |
| 42 | Greece | 5,351.86 |
| 43 | Trinidad and Tobago | 5,331.94 |
| 44 | South Africa | 5,180.45 |
| 45 | Oman | 5,044.99 |
| 46 | Italy | 5,022.95 |
| 47 | Montenegro | 4,710.77 |
| 48 | Serbia[1] | 4,538.29 |
| 49 | Kazakhstan | 4,483.78 |
| 50 | Portugal | 4,378.24 |
| 51 | Lithuania | 4,221.95 |
| 52 | Poland | 4,070.67 |
| 53 | Ukraine | 3,946.91 |
| 54 | Venezuela | 3,820.75 |
| 55 | Libya | 3,801.82 |
| 56 | Hungary | 3,544.74 |
| 57 | Macedonia, FYR | 3,413.56 |
| 58 | Malaysia | 3,403.35 |
| 59 | Suriname | 3,381.45 |
| 60 | Bosnia and Herzegovina | 3,363.42 |
| 61 | Barbados | 3,264.45 |
| 62 | Kyrgyz Republic | 3,191.41 |
| 63 | Chile | 3,064.79 |
| 64 | Jamaica | 2,796.01 |
| 65 | Croatia | 2,780.33 |
| 66 | Romania | 2,746.23 |
| 67 | Argentina | 2,729.62 |
| 68 | Tajikistan | 2,608.46 |
| 69 | Azerbaijan | 2,528.41 |
| 70 | Uruguay | 2,324.45 |
| 71 | Mexico | 2,278.56 |
| 72 | Turkey | 2,247.36 |
| 73 | Brazil | 2,157.20 |
| 74 | Latvia | 2,132.15 |
| 75 | Thailand | 2,098.27 |
| 76 | Armenia | 2,093.34 |
| 77 | China | 1,914.48 |
| 78 | Costa Rica | 1,906.99 |
| 79 | Mauritius[2] | 1,874.85 |
| 80 | Syria | 1,849.01 |
| 81 | Panama | 1,803.19 |
| 82 | Jordan | 1,783.42 |
| 83 | Albania | 1,725.89 |
| 84 | Georgia | 1,624.49 |
| 85 | Egypt | 1,491.97 |
| 86 | Dominican Republic | 1,362.15 |
| 87 | Tunisia | 1,361.55 |
| 88 | Mongolia[2] | 1,327.06 |
| 89 | Colombia | 1,147.29 |
| 90 | Guyana | 1,091.72 |
| 91 | Algeria | 1,032.29 |
| 92 | Ecuador | 1,026.26 |
| 93 | Moldova | 996.99 |
| 94 | Peru | 934.91 |
| 95 | Namibia | 846.17 |
| 96 | Honduras | 816.35 |
| 97 | Zimbabwe | 782.72 |
| 98 | Zambia | 778.69 |
| 99 | Morocco | 751.23 |
| 100 | El Salvador | 715.17 |
| 101 | Philippines | 668.68 |
| 102 | Mozambique | 647.02 |
| 103 | Vietnam | 643.32 |
| 104 | India | 638.64 |
| 105 | Pakistan | 602.37 |
| 106 | Guatemala | 594.43 |
| 107 | Indonesia | 577.45 |
| 108 | Bolivia | 569.59 |
| 109 | Botswana | 528.88 |
| 110 | Nicaragua | 524.66 |
| 111 | Sri Lanka | 445.85 |
| 112 | Ghana | 301.22 |
| 113 | Côte d'Ivoire | 299.71 |
| 114 | Cameroon | 232.93 |
| 115 | Senegal | 216.14 |
| 116 | Lesotho | 176.69 |
| 117 | Kenya | 168.63 |
| 118 | Nigeria | 166.52 |
| 119 | Bangladesh | 147.72 |
| 120 | Malawi | 105.62 |
| 121 | Gambia, The | 89.67 |
| 122 | Nepal | 89.14 |
| 123 | Mauritania | 83.70 |
| 124 | Tanzania | 78.90 |
| 125 | Uganda | 68.50 |
| 126 | Mali[2] | 67.18 |
| 127 | Cambodia | 64.85 |
| 128 | Madagascar | 56.11 |
| 129 | Ethiopia | 38.21 |
| 130 | Burkina Faso | 37.05 |
| 131 | Burundi | 17.43 |
| 132 | Benin | 12.60 |
| 133 | Chad | 9.36 |
| n/a | Timor-Leste | n/a |

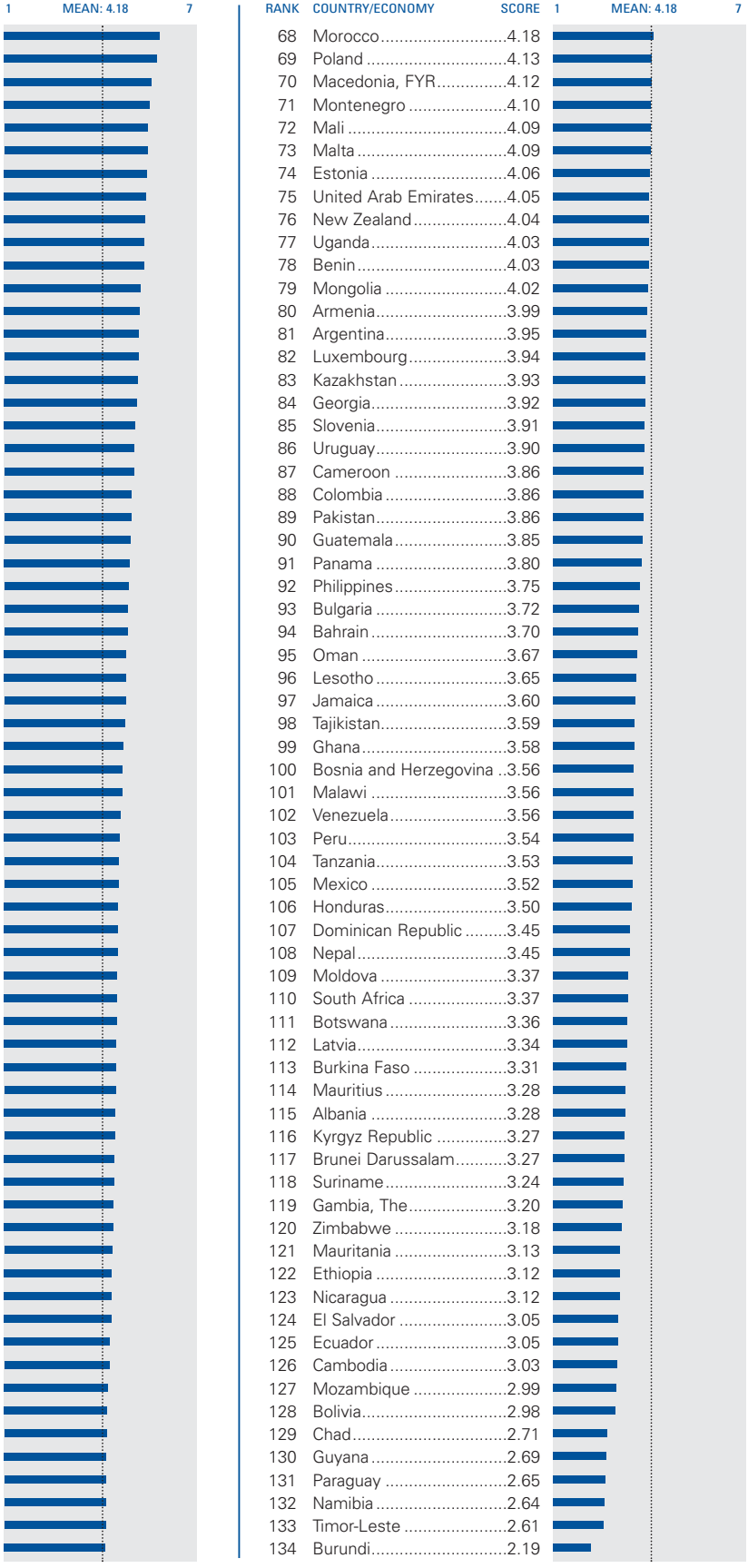
**SOURCE:** The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008); US Central Intelligence Agency, *The World Factbook* (retrieved October 23, 2008); national sources

[1] 2004 [2] 2006 [3] 2007

# 3.04 Availability of scientists and engineers

Scientists and engineers in your country are (1 = nonexistent or rare, 7 = widely available)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Finland | 5.93 |
| 2 | Japan | 5.86 |
| 3 | India | 5.67 |
| 4 | Sweden | 5.62 |
| 5 | France | 5.55 |
| 6 | United States | 5.55 |
| 7 | Canada | 5.53 |
| 8 | Taiwan, China | 5.50 |
| 9 | Israel | 5.48 |
| 10 | Tunisia | 5.45 |
| 11 | Czech Republic | 5.44 |
| 12 | Puerto Rico | 5.33 |
| 13 | Denmark | 5.31 |
| 14 | Ireland | 5.28 |
| 15 | Iceland | 5.26 |
| 16 | Switzerland | 5.23 |
| 17 | Greece | 5.22 |
| 18 | Norway | 5.16 |
| 19 | Korea, Rep. | 5.12 |
| 20 | Belgium | 5.12 |
| 21 | Austria | 5.04 |
| 22 | Singapore | 5.03 |
| 23 | Cyprus | 5.00 |
| 24 | Malaysia | 4.98 |
| 25 | Netherlands | 4.94 |
| 26 | Germany | 4.92 |
| 27 | Côte d'Ivoire | 4.92 |
| 28 | Azerbaijan | 4.88 |
| 29 | Slovak Republic | 4.87 |
| 30 | Sri Lanka | 4.86 |
| 31 | Indonesia | 4.85 |
| 32 | United Kingdom | 4.78 |
| 33 | Australia | 4.76 |
| 34 | Russian Federation | 4.76 |
| 35 | Chile | 4.69 |
| 36 | Nigeria | 4.67 |
| 37 | Senegal | 4.63 |
| 38 | Spain | 4.63 |
| 39 | Jordan | 4.62 |
| 40 | Syria | 4.62 |
| 41 | Algeria | 4.62 |
| 42 | Kenya | 4.59 |
| 43 | Saudi Arabia | 4.59 |
| 44 | Libya | 4.58 |
| 45 | Italy | 4.55 |
| 46 | Costa Rica | 4.55 |
| 47 | Egypt | 4.54 |
| 48 | Portugal | 4.53 |
| 49 | Hungary | 4.51 |
| 50 | Serbia | 4.50 |
| 51 | Vietnam | 4.49 |
| 52 | China | 4.47 |
| 53 | Qatar | 4.46 |
| 54 | Ukraine | 4.43 |
| 55 | Trinidad and Tobago | 4.42 |
| 56 | Thailand | 4.42 |
| 57 | Brazil | 4.41 |
| 58 | Croatia | 4.36 |
| 59 | Turkey | 4.34 |
| 60 | Romania | 4.30 |
| 61 | Barbados | 4.26 |
| 62 | Kuwait | 4.25 |
| 63 | Madagascar | 4.24 |
| 64 | Zambia | 4.22 |
| 65 | Lithuania | 4.22 |
| 66 | Bangladesh | 4.22 |
| 67 | Hong Kong SAR | 4.20 |
| 68 | Morocco | 4.18 |
| 69 | Poland | 4.13 |
| 70 | Macedonia, FYR | 4.12 |
| 71 | Montenegro | 4.10 |
| 72 | Mali | 4.09 |
| 73 | Malta | 4.09 |
| 74 | Estonia | 4.06 |
| 75 | United Arab Emirates | 4.05 |
| 76 | New Zealand | 4.04 |
| 77 | Uganda | 4.03 |
| 78 | Benin | 4.03 |
| 79 | Mongolia | 4.02 |
| 80 | Armenia | 3.99 |
| 81 | Argentina | 3.95 |
| 82 | Luxembourg | 3.94 |
| 83 | Kazakhstan | 3.93 |
| 84 | Georgia | 3.92 |
| 85 | Slovenia | 3.91 |
| 86 | Uruguay | 3.90 |
| 87 | Cameroon | 3.86 |
| 88 | Colombia | 3.86 |
| 89 | Pakistan | 3.86 |
| 90 | Guatemala | 3.85 |
| 91 | Panama | 3.80 |
| 92 | Philippines | 3.75 |
| 93 | Bulgaria | 3.72 |
| 94 | Bahrain | 3.70 |
| 95 | Oman | 3.67 |
| 96 | Lesotho | 3.65 |
| 97 | Jamaica | 3.60 |
| 98 | Tajikistan | 3.59 |
| 99 | Ghana | 3.58 |
| 100 | Bosnia and Herzegovina | 3.56 |
| 101 | Malawi | 3.56 |
| 102 | Venezuela | 3.56 |
| 103 | Peru | 3.54 |
| 104 | Tanzania | 3.53 |
| 105 | Mexico | 3.52 |
| 106 | Honduras | 3.50 |
| 107 | Dominican Republic | 3.45 |
| 108 | Nepal | 3.45 |
| 109 | Moldova | 3.37 |
| 110 | South Africa | 3.37 |
| 111 | Botswana | 3.36 |
| 112 | Latvia | 3.34 |
| 113 | Burkina Faso | 3.31 |
| 114 | Mauritius | 3.28 |
| 115 | Albania | 3.28 |
| 116 | Kyrgyz Republic | 3.27 |
| 117 | Brunei Darussalam | 3.27 |
| 118 | Suriname | 3.24 |
| 119 | Gambia, The | 3.20 |
| 120 | Zimbabwe | 3.18 |
| 121 | Mauritania | 3.13 |
| 122 | Ethiopia | 3.12 |
| 123 | Nicaragua | 3.12 |
| 124 | El Salvador | 3.05 |
| 125 | Ecuador | 3.05 |
| 126 | Cambodia | 3.03 |
| 127 | Mozambique | 2.99 |
| 128 | Bolivia | 2.98 |
| 129 | Chad | 2.71 |
| 130 | Guyana | 2.69 |
| 131 | Paraguay | 2.65 |
| 132 | Namibia | 2.64 |
| 133 | Timor-Leste | 2.61 |
| 134 | Burundi | 2.19 |

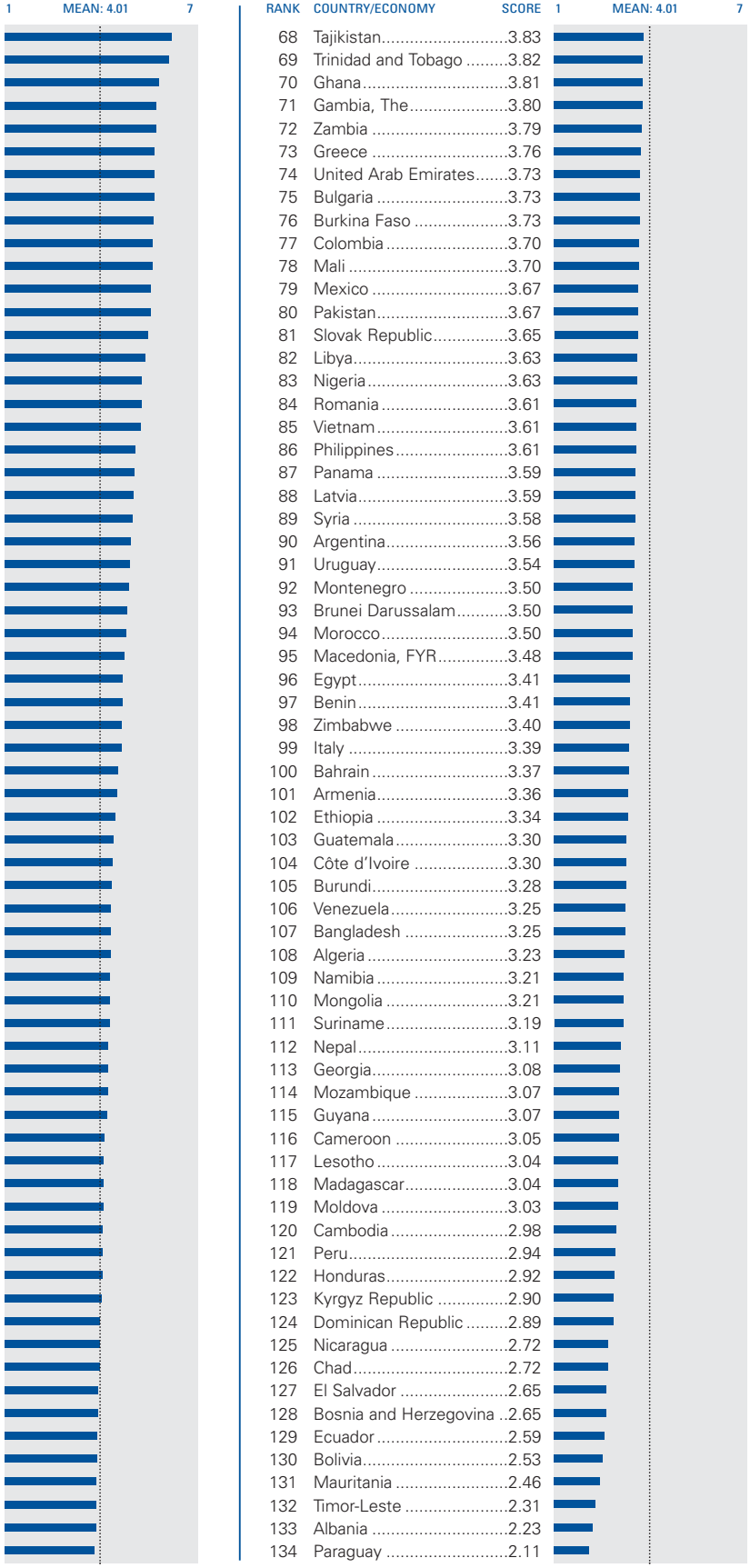



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 3.05 Quality of scientific research institutions

Scientific research institutions in your country (e.g., university laboratories, government laboratories) are (1 = nonexistent, 7 = the best in their fields internationally)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | United States | 6.30 |
| 2 | Switzerland | 6.21 |
| 3 | Israel | 5.88 |
| 4 | Canada | 5.81 |
| 5 | Belgium | 5.80 |
| 6 | Germany | 5.75 |
| 7 | United Kingdom | 5.73 |
| 8 | Australia | 5.73 |
| 9 | Finland | 5.72 |
| 10 | Netherlands | 5.69 |
| 11 | Sweden | 5.67 |
| 12 | Denmark | 5.64 |
| 13 | Singapore | 5.63 |
| 14 | Korea, Rep. | 5.54 |
| 15 | Japan | 5.44 |
| 16 | France | 5.35 |
| 17 | Ireland | 5.34 |
| 18 | Austria | 5.32 |
| 19 | New Zealand | 5.13 |
| 20 | Malaysia | 5.10 |
| 21 | Taiwan, China | 5.08 |
| 22 | Norway | 5.04 |
| 23 | Iceland | 4.98 |
| 24 | Hungary | 4.96 |
| 25 | Estonia | 4.94 |
| 26 | Czech Republic | 4.87 |
| 27 | India | 4.84 |
| 28 | Slovenia | 4.80 |
| 29 | Hong Kong SAR | 4.74 |
| 30 | Qatar | 4.73 |
| 31 | South Africa | 4.70 |
| 32 | Kenya | 4.69 |
| 33 | Portugal | 4.60 |
| 34 | Costa Rica | 4.57 |
| 35 | Puerto Rico | 4.49 |
| 36 | Sri Lanka | 4.45 |
| 37 | China | 4.43 |
| 38 | Jamaica | 4.38 |
| 39 | Indonesia | 4.36 |
| 40 | Azerbaijan | 4.36 |
| 41 | Uganda | 4.35 |
| 42 | Tunisia | 4.34 |
| 43 | Brazil | 4.33 |
| 44 | Barbados | 4.32 |
| 45 | Russian Federation | 4.28 |
| 46 | Lithuania | 4.27 |
| 47 | Saudi Arabia | 4.27 |
| 48 | Ukraine | 4.24 |
| 49 | Serbia | 4.16 |
| 50 | Croatia | 4.13 |
| 51 | Jordan | 4.13 |
| 52 | Turkey | 4.12 |
| 53 | Luxembourg | 4.10 |
| 54 | Kuwait | 4.09 |
| 55 | Spain | 4.09 |
| 56 | Poland | 4.07 |
| 57 | Thailand | 4.01 |
| 58 | Kazakhstan | 4.01 |
| 59 | Oman | 4.00 |
| 60 | Tanzania | 3.96 |
| 61 | Mauritius | 3.96 |
| 62 | Chile | 3.93 |
| 63 | Cyprus | 3.93 |
| 64 | Senegal | 3.90 |
| 65 | Malawi | 3.89 |
| 66 | Botswana | 3.89 |
| 67 | Malta | 3.84 |
| 68 | Tajikistan | 3.83 |
| 69 | Trinidad and Tobago | 3.82 |
| 70 | Ghana | 3.81 |
| 71 | Gambia, The | 3.80 |
| 72 | Zambia | 3.79 |
| 73 | Greece | 3.76 |
| 74 | United Arab Emirates | 3.73 |
| 75 | Bulgaria | 3.73 |
| 76 | Burkina Faso | 3.73 |
| 77 | Colombia | 3.70 |
| 78 | Mali | 3.70 |
| 79 | Mexico | 3.67 |
| 80 | Pakistan | 3.67 |
| 81 | Slovak Republic | 3.65 |
| 82 | Libya | 3.63 |
| 83 | Nigeria | 3.63 |
| 84 | Romania | 3.61 |
| 85 | Vietnam | 3.61 |
| 86 | Philippines | 3.61 |
| 87 | Panama | 3.59 |
| 88 | Latvia | 3.59 |
| 89 | Syria | 3.58 |
| 90 | Argentina | 3.56 |
| 91 | Uruguay | 3.54 |
| 92 | Montenegro | 3.50 |
| 93 | Brunei Darussalam | 3.50 |
| 94 | Morocco | 3.50 |
| 95 | Macedonia, FYR | 3.48 |
| 96 | Egypt | 3.41 |
| 97 | Benin | 3.41 |
| 98 | Zimbabwe | 3.40 |
| 99 | Italy | 3.39 |
| 100 | Bahrain | 3.37 |
| 101 | Armenia | 3.36 |
| 102 | Ethiopia | 3.34 |
| 103 | Guatemala | 3.30 |
| 104 | Côte d'Ivoire | 3.30 |
| 105 | Burundi | 3.28 |
| 106 | Venezuela | 3.25 |
| 107 | Bangladesh | 3.25 |
| 108 | Algeria | 3.23 |
| 109 | Namibia | 3.21 |
| 110 | Mongolia | 3.21 |
| 111 | Suriname | 3.19 |
| 112 | Nepal | 3.11 |
| 113 | Georgia | 3.08 |
| 114 | Mozambique | 3.07 |
| 115 | Guyana | 3.07 |
| 116 | Cameroon | 3.05 |
| 117 | Lesotho | 3.04 |
| 118 | Madagascar | 3.04 |
| 119 | Moldova | 3.03 |
| 120 | Cambodia | 2.98 |
| 121 | Peru | 2.94 |
| 122 | Honduras | 2.92 |
| 123 | Kyrgyz Republic | 2.90 |
| 124 | Dominican Republic | 2.89 |
| 125 | Nicaragua | 2.72 |
| 126 | Chad | 2.72 |
| 127 | El Salvador | 2.65 |
| 128 | Bosnia and Herzegovina | 2.65 |
| 129 | Ecuador | 2.59 |
| 130 | Bolivia | 2.53 |
| 131 | Mauritania | 2.46 |
| 132 | Timor-Leste | 2.31 |
| 133 | Albania | 2.23 |
| 134 | Paraguay | 2.11 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 3.06 Tertiary education enrollment (hard data)

Gross tertiary education enrollment rate | 2006 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Greece | 94.87 |
| 2 | Finland | 93.22 |
| 3 | Korea, Rep. | 92.60 |
| 4 | Taiwan, China[4] | 85.31 |
| 5 | Slovenia | 82.99 |
| 6 | United States | 81.77 |
| 7 | Denmark | 79.94 |
| 8 | New Zealand | 79.71 |
| 9 | Sweden | 78.99 |
| 10 | Norway | 77.51 |
| 11 | Lithuania | 76.36 |
| 12 | Latvia | 73.59 |
| 13 | Iceland | 72.91 |
| 14 | Ukraine | 72.78 |
| 15 | Australia | 72.70 |
| 16 | Russian Federation | 72.28 |
| 17 | Hungary | 68.60 |
| 18 | Spain | 67.36 |
| 19 | Italy | 66.99 |
| 20 | Poland | 65.58 |
| 21 | Estonia | 65.47 |
| 22 | Argentina[3] | 63.77 |
| 23 | Belgium | 62.84 |
| 24 | Canada[2] | 62.36 |
| 25 | Netherlands | 59.81 |
| 26 | United Kingdom | 59.34 |
| 27 | Ireland | 58.77 |
| 28 | Israel | 57.57 |
| 29 | Japan | 57.31 |
| 30 | France | 56.16 |
| 31 | Singapore[3] | 55.90 |
| 32 | Libya[1] | 55.75 |
| 33 | Portugal | 54.54 |
| 34 | Barbados[4] | 53.13 |
| 35 | Kazakhstan | 52.68 |
| 36 | Romania | 52.24 |
| 37 | Venezuela | 51.96 |
| 38 | Austria | 49.89 |
| 39 | Czech Republic | 49.85 |
| 40 | Mongolia | 47.20 |
| 41 | Montenegro[3] | 47.10 |
| 42 | Chile | 46.57 |
| 43 | Uruguay | 46.35 |
| 44 | Germany | 46.34 |
| 45 | Thailand | 45.90 |
| 46 | Switzerland | 45.80 |
| 47 | Bulgaria | 45.64 |
| 48 | Slovak Republic | 45.32 |
| 49 | Panama | 44.93 |
| 50 | Croatia | 44.04 |
| 51 | Kyrgyz Republic | 42.71 |
| 52 | Puerto Rico[3] | 42.20 |
| 53 | Bolivia[2] | 40.62 |
| 54 | Moldova | 39.40 |
| 55 | Jordan | 39.05 |
| 56 | Georgia | 38.20 |
| 57 | Serbia[3] | 37.80 |
| 58 | Peru | 35.06 |
| 59 | Egypt[3] | 34.75 |
| 60 | Turkey | 34.62 |
| 61 | Dominican Republic[2] | 34.51 |
| 62 | Cyprus | 33.42 |
| 63 | Hong Kong SAR | 32.97 |
| 64 | Bahrain | 32.05 |
| 65 | Armenia | 31.73 |
| 66 | Malta[3] | 31.60 |
| 67 | Tunisia | 31.03 |
| 68 | Colombia | 30.83 |
| 69 | Saudi Arabia | 30.24 |
| 70 | Macedonia, FYR[3] | 29.78 |
| 71 | Malaysia[3] | 28.58 |
| 72 | Philippines | 28.47 |
| 73 | Bosnia and Herzegovina[2] | 27.00 |
| 74 | Mexico | 26.08 |
| 75 | Paraguay[3] | 25.50 |
| 76 | Brazil[3] | 25.48 |
| 77 | Oman | 25.48 |
| 78 | Costa Rica[3] | 25.34 |
| 79 | United Arab Emirates[4] | 22.90 |
| 80 | Algeria | 21.83 |
| 81 | China | 21.58 |
| 82 | El Salvador | 20.58 |
| 83 | Albania[2] | 19.09 |
| 84 | Jamaica[1] | 18.99 |
| 85 | Tajikistan | 18.59 |
| 86 | Nicaragua[1] | 18.09 |
| 87 | Kuwait | 17.56 |
| 88 | Honduras[2] | 17.15 |
| 89 | Mauritius | 17.15 |
| 90 | Indonesia | 16.98 |
| 91 | Vietnam[3] | 16.00 |
| 92 | Qatar[4] | 15.93 |
| 93 | Ecuador[5] | 15.90 |
| 94 | South Africa | 15.41 |
| 95 | Brunei Darussalam | 15.05 |
| 96 | Azerbaijan | 14.81 |
| 97 | Syria[3] | 13.55 |
| 98 | India | 11.85 |
| 99 | Morocco | 11.83 |
| 100 | Guyana | 11.53 |
| 101 | Trinidad and Tobago[3] | 11.39 |
| 102 | Luxembourg | 10.21 |
| 103 | Nigeria[3] | 10.15 |
| 104 | Guatemala | 8.70 |
| 105 | Bangladesh | 6.78 |
| 106 | Cameroon | 6.68 |
| 107 | Namibia | 6.37 |
| 108 | Ghana[4] | 5.84 |
| 109 | Nepal[2] | 5.64 |
| 110 | Senegal[3] | 5.51 |
| 111 | Botswana[3] | 5.12 |
| 112 | Benin | 5.11 |
| 113 | Cambodia | 4.53 |
| 114 | Pakistan | 4.52 |
| 115 | Zimbabwe[1] | 3.64 |
| 116 | Lesotho | 3.63 |
| 117 | Mauritania | 3.50 |
| 118 | Uganda[2] | 3.47 |
| 119 | Mali[3] | 3.02 |
| 120 | Madagascar | 2.80 |
| 121 | Ethiopia[4] | 2.75 |
| 122 | Kenya[2] | 2.75 |
| 123 | Burkina Faso | 2.34 |
| 124 | Burundi | 2.20 |
| 125 | Mozambique[3] | 1.46 |
| 126 | Tanzania[3] | 1.45 |
| 127 | Chad[3] | 1.16 |
| 128 | Gambia, The[2] | 1.15 |
| 129 | Malawi[2] | 0.41 |
| n/a | Côte d'Ivoire | n/a |
| n/a | Sri Lanka | n/a |
| n/a | Suriname | n/a |
| n/a | Timor-Leste | n/a |
| n/a | Zambia | n/a |

**SOURCE:** UNESCO, Institute for Statistics (retrieved January 12, 2008); UNESCO, *Education for All Global Monitoring Report 2008—Education for All by 2015: Will We Make It?*; national sources

[1] 2003 [2] 2004 [3] 2005 [4] 2007 [5] 2008

# 3.07 Education expenditure (hard data)

Education expenditure as a percentage of GNI | 2006 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Lesotho | 9.26 |
| 2 | Botswana | 8.58 |
| 3 | Guyana | 8.15 |
| 4 | Denmark | 8.14 |
| 5 | Iceland | 7.44 |
| 6 | Sweden | 7.32 |
| 7 | Namibia | 7.28 |
| 8 | Saudi Arabia | 7.19 |
| 9 | Norway | 7.05 |
| 10 | Barbados | 6.97 |
| 11 | New Zealand | 6.97 |
| 12 | Zimbabwe | 6.87 |
| 13 | Israel | 6.69 |
| 14 | Tunisia | 6.67 |
| 15 | Morocco | 6.47 |
| 16 | Bolivia | 6.32 |
| 17 | Kenya | 6.28 |
| 18 | Finland | 6.02 |
| 19 | Belgium | 5.90 |
| 20 | Malaysia | 5.83 |
| 21 | Cyprus | 5.82 |
| 22 | Portugal | 5.66 |
| 23 | Jordan | 5.61 |
| 24 | Slovenia | 5.58 |
| 25 | Latvia | 5.57 |
| 26 | Hungary | 5.51 |
| 27 | Poland | 5.39 |
| 28 | Austria | 5.34 |
| 29 | Taiwan, China[1] | 5.34 |
| 30 | United Kingdom | 5.33 |
| 31 | Mexico | 5.33 |
| 32 | South Africa | 5.31 |
| 33 | Ireland | 5.29 |
| 34 | France | 5.27 |
| 35 | Canada | 5.23 |
| 36 | Netherlands | 5.15 |
| 37 | Lithuania | 5.11 |
| 38 | Switzerland | 5.11 |
| 39 | Burundi | 5.10 |
| 40 | Estonia | 5.10 |
| 41 | Mongolia | 5.08 |
| 42 | Colombia | 4.96 |
| 43 | Macedonia, FYR | 4.90 |
| 44 | Malawi | 4.87 |
| 45 | United States | 4.79 |
| 46 | Thailand | 4.75 |
| 47 | Ghana | 4.73 |
| 48 | Australia | 4.73 |
| 49 | Côte d'Ivoire | 4.67 |
| 50 | Senegal | 4.56 |
| 51 | Jamaica | 4.54 |
| 52 | Germany | 4.52 |
| 53 | Burkina Faso | 4.51 |
| 54 | Croatia | 4.51 |
| 55 | Italy | 4.48 |
| 56 | Algeria | 4.47 |
| 57 | Panama | 4.42 |
| 58 | Kazakhstan | 4.41 |
| 59 | Egypt | 4.41 |
| 60 | Ukraine | 4.41 |
| 61 | Kyrgyz Republic | 4.40 |
| 62 | Bahrain | 4.36 |
| 63 | Venezuela | 4.35 |
| 64 | Brazil | 4.29 |
| 65 | Malta | 4.27 |
| 66 | Bulgaria | 4.24 |
| 67 | Czech Republic | 4.21 |
| 68 | Kuwait | 4.18 |
| 69 | Paraguay | 4.13 |
| 70 | Slovak Republic | 4.09 |
| 71 | Korea, Rep. | 4.04 |
| 72 | Costa Rica | 4.02 |
| 73 | Trinidad and Tobago | 4.01 |
| 74 | Uganda | 4.00 |
| 75 | Ethiopia | 3.99 |
| 76 | Argentina | 3.99 |
| 77 | India | 3.95 |
| 78 | Spain | 3.94 |
| 79 | Mauritius | 3.77 |
| 80 | Luxembourg | 3.72 |
| 81 | Oman | 3.72 |
| 82 | Serbia | 3.70 |
| 83 | Mozambique | 3.67 |
| 84 | Chile | 3.65 |
| 85 | Mali | 3.65 |
| 86 | Benin | 3.63 |
| 87 | Moldova | 3.55 |
| 88 | Honduras | 3.55 |
| 89 | Russian Federation | 3.54 |
| 90 | Turkey | 3.49 |
| 91 | Hong Kong SAR | 3.42 |
| 92 | Greece | 3.41 |
| 93 | Montenegro[1] | 3.30 |
| 94 | Romania | 3.27 |
| 95 | Tajikistan | 3.20 |
| 96 | Japan | 3.12 |
| 97 | Armenia | 3.05 |
| 98 | Nicaragua | 2.96 |
| 99 | Albania | 2.84 |
| 100 | Vietnam | 2.81 |
| 101 | Brunei Darussalam | 2.81 |
| 102 | El Salvador | 2.79 |
| 103 | Azerbaijan | 2.77 |
| 104 | Georgia | 2.76 |
| 105 | Madagascar | 2.74 |
| 106 | Uruguay | 2.65 |
| 107 | Nepal | 2.60 |
| 108 | Syria | 2.60 |
| 109 | Sri Lanka | 2.55 |
| 110 | Singapore | 2.48 |
| 111 | Peru | 2.48 |
| 112 | Tanzania | 2.39 |
| 113 | Philippines | 2.39 |
| 114 | Mauritania | 2.36 |
| 115 | Zambia | 2.16 |
| 116 | Gambia, The | 2.04 |
| 117 | Dominican Republic | 1.92 |
| 118 | Bangladesh | 1.86 |
| 119 | Pakistan | 1.82 |
| 120 | China | 1.81 |
| 121 | Cambodia | 1.79 |
| 122 | Guatemala | 1.57 |
| 123 | Cameroon | 1.55 |
| 124 | Ecuador | 1.38 |
| 125 | Chad | 1.28 |
| 126 | Indonesia | 0.87 |
| 127 | Nigeria | 0.85 |
| n/a | Bosnia and Herzegovina | n/a |
| n/a | Libya | n/a |
| n/a | Puerto Rico | n/a |
| n/a | Qatar | n/a |
| n/a | Suriname | n/a |
| n/a | Timor-Leste | n/a |
| n/a | United Arab Emirates | n/a |

**SOURCE:** The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008)

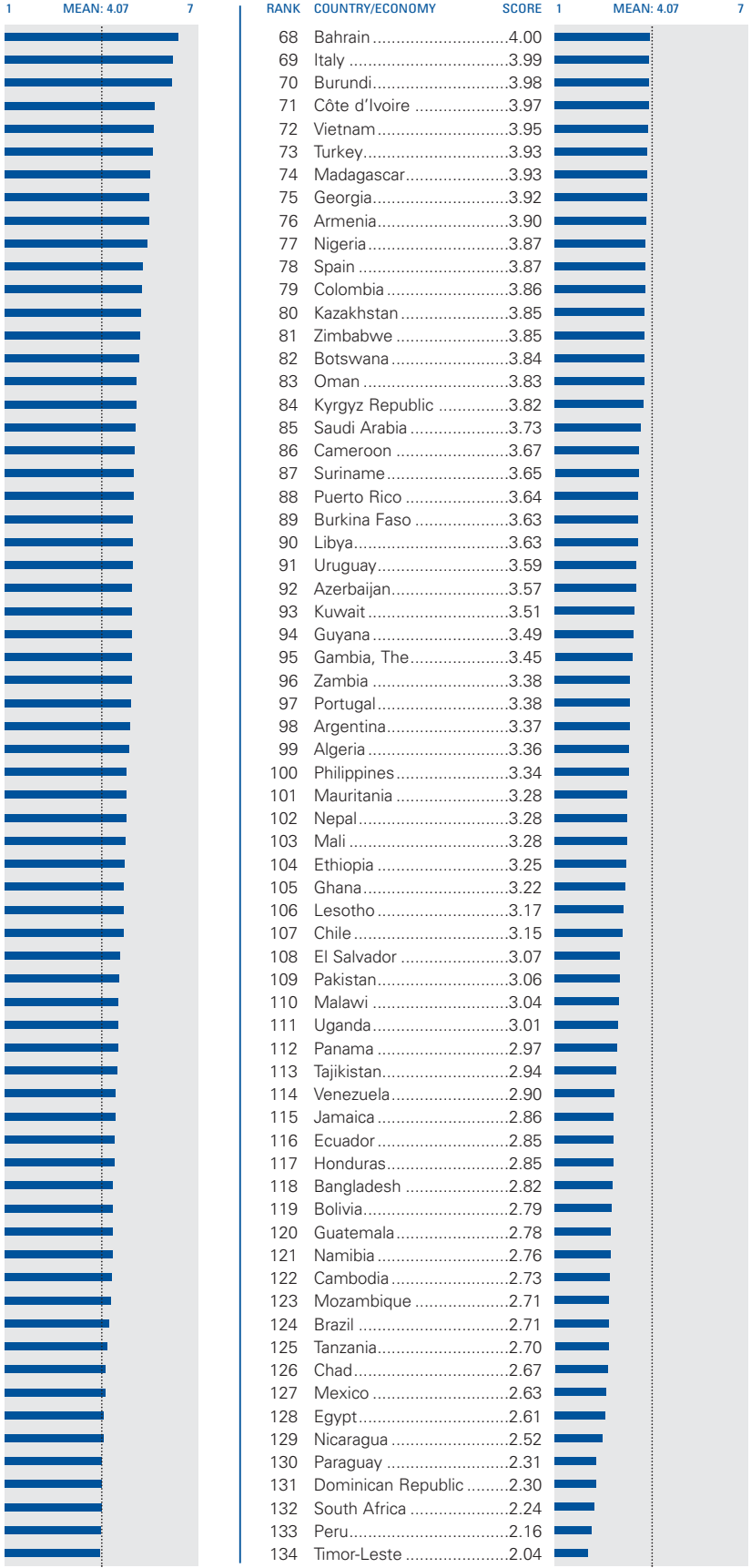
[1] 2007

# 4th pillar
# Individual readiness

# 4.01 Quality of math and science education

Math and science education in your country's schools (1 = lag far behind most other countries' schools, 7 = are among the best in the world)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Finland | 6.48 |
| 2 | Singapore | 6.32 |
| 3 | Belgium | 6.28 |
| 4 | France | 5.74 |
| 5 | Switzerland | 5.71 |
| 6 | Hong Kong SAR | 5.67 |
| 7 | Tunisia | 5.59 |
| 8 | Czech Republic | 5.57 |
| 9 | Taiwan, China | 5.57 |
| 10 | Cyprus | 5.51 |
| 11 | Korea, Rep. | 5.38 |
| 12 | Qatar | 5.33 |
| 13 | Canada | 5.32 |
| 14 | Estonia | 5.28 |
| 15 | Barbados | 5.25 |
| 16 | Netherlands | 5.17 |
| 17 | India | 5.16 |
| 18 | Romania | 5.15 |
| 19 | Australia | 5.12 |
| 20 | Denmark | 5.09 |
| 21 | Malaysia | 5.07 |
| 22 | Lithuania | 5.06 |
| 23 | Ireland | 5.06 |
| 24 | Russian Federation | 5.05 |
| 25 | Austria | 5.03 |
| 26 | Iceland | 5.01 |
| 27 | New Zealand | 5.01 |
| 28 | Slovenia | 5.01 |
| 29 | Malta | 5.01 |
| 30 | Croatia | 4.98 |
| 31 | Serbia | 4.97 |
| 32 | Ukraine | 4.94 |
| 33 | Japan | 4.85 |
| 34 | Montenegro | 4.84 |
| 35 | Slovak Republic | 4.84 |
| 36 | Hungary | 4.82 |
| 37 | Jordan | 4.79 |
| 38 | China | 4.77 |
| 39 | Sweden | 4.76 |
| 40 | Poland | 4.75 |
| 41 | Sri Lanka | 4.66 |
| 42 | United Arab Emirates | 4.63 |
| 43 | Trinidad and Tobago | 4.60 |
| 44 | Germany | 4.59 |
| 45 | Bosnia and Herzegovina | 4.59 |
| 46 | Indonesia | 4.57 |
| 47 | United Kingdom | 4.51 |
| 48 | United States | 4.49 |
| 49 | Greece | 4.48 |
| 50 | Senegal | 4.47 |
| 51 | Bulgaria | 4.43 |
| 52 | Macedonia, FYR | 4.42 |
| 53 | Brunei Darussalam | 4.41 |
| 54 | Luxembourg | 4.41 |
| 55 | Thailand | 4.39 |
| 56 | Norway | 4.35 |
| 57 | Latvia | 4.29 |
| 58 | Mauritius | 4.24 |
| 59 | Mongolia | 4.19 |
| 60 | Syria | 4.19 |
| 61 | Benin | 4.14 |
| 62 | Albania | 4.13 |
| 63 | Moldova | 4.08 |
| 64 | Costa Rica | 4.08 |
| 65 | Kenya | 4.06 |
| 66 | Israel | 4.03 |
| 67 | Morocco | 4.01 |
| 68 | Bahrain | 4.00 |
| 69 | Italy | 3.99 |
| 70 | Burundi | 3.98 |
| 71 | Côte d'Ivoire | 3.97 |
| 72 | Vietnam | 3.95 |
| 73 | Turkey | 3.93 |
| 74 | Madagascar | 3.93 |
| 75 | Georgia | 3.92 |
| 76 | Armenia | 3.90 |
| 77 | Nigeria | 3.87 |
| 78 | Spain | 3.87 |
| 79 | Colombia | 3.86 |
| 80 | Kazakhstan | 3.85 |
| 81 | Zimbabwe | 3.85 |
| 82 | Botswana | 3.84 |
| 83 | Oman | 3.83 |
| 84 | Kyrgyz Republic | 3.82 |
| 85 | Saudi Arabia | 3.73 |
| 86 | Cameroon | 3.67 |
| 87 | Suriname | 3.65 |
| 88 | Puerto Rico | 3.64 |
| 89 | Burkina Faso | 3.63 |
| 90 | Libya | 3.63 |
| 91 | Uruguay | 3.59 |
| 92 | Azerbaijan | 3.57 |
| 93 | Kuwait | 3.51 |
| 94 | Guyana | 3.49 |
| 95 | Gambia, The | 3.45 |
| 96 | Zambia | 3.38 |
| 97 | Portugal | 3.38 |
| 98 | Argentina | 3.37 |
| 99 | Algeria | 3.36 |
| 100 | Philippines | 3.34 |
| 101 | Mauritania | 3.28 |
| 102 | Nepal | 3.28 |
| 103 | Mali | 3.28 |
| 104 | Ethiopia | 3.25 |
| 105 | Ghana | 3.22 |
| 106 | Lesotho | 3.17 |
| 107 | Chile | 3.15 |
| 108 | El Salvador | 3.07 |
| 109 | Pakistan | 3.06 |
| 110 | Malawi | 3.04 |
| 111 | Uganda | 3.01 |
| 112 | Panama | 2.97 |
| 113 | Tajikistan | 2.94 |
| 114 | Venezuela | 2.90 |
| 115 | Jamaica | 2.86 |
| 116 | Ecuador | 2.85 |
| 117 | Honduras | 2.85 |
| 118 | Bangladesh | 2.82 |
| 119 | Bolivia | 2.79 |
| 120 | Guatemala | 2.78 |
| 121 | Namibia | 2.76 |
| 122 | Cambodia | 2.73 |
| 123 | Mozambique | 2.71 |
| 124 | Brazil | 2.71 |
| 125 | Tanzania | 2.70 |
| 126 | Chad | 2.67 |
| 127 | Mexico | 2.63 |
| 128 | Egypt | 2.61 |
| 129 | Nicaragua | 2.52 |
| 130 | Paraguay | 2.31 |
| 131 | Dominican Republic | 2.30 |
| 132 | South Africa | 2.24 |
| 133 | Peru | 2.16 |
| 134 | Timor-Leste | 2.04 |

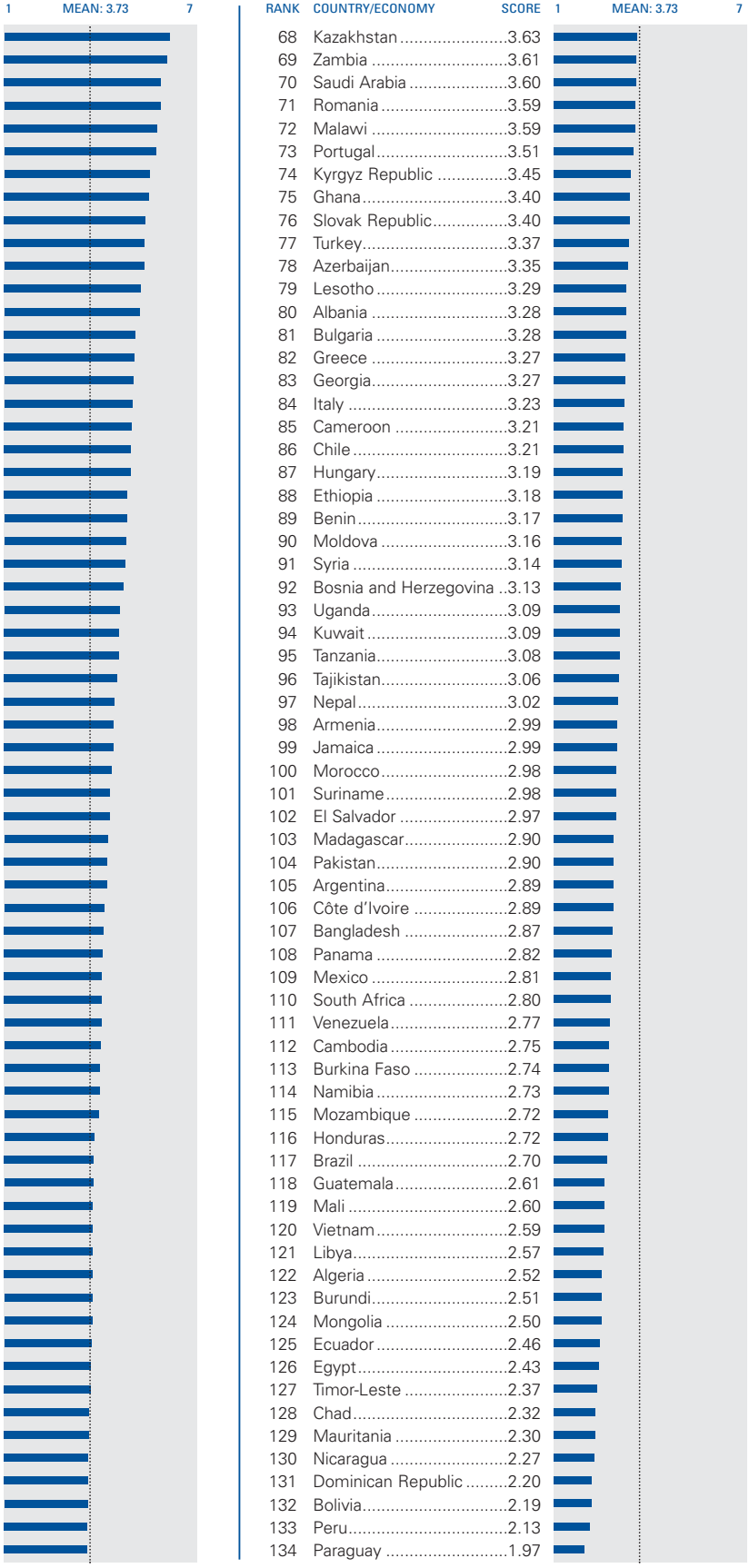



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 4.02 Quality of the educational system

The educational system in your country (1 = does not meet the needs of a competitive economy, 7 = meets the needs of a competitive economy)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Finland | 6.24 |
| 2 | Singapore | 6.17 |
| 3 | Switzerland | 5.96 |
| 4 | Belgium | 5.95 |
| 5 | Iceland | 5.86 |
| 6 | Denmark | 5.81 |
| 7 | Ireland | 5.61 |
| 8 | Canada | 5.59 |
| 9 | Australia | 5.48 |
| 10 | Cyprus | 5.45 |
| 11 | Norway | 5.43 |
| 12 | Sweden | 5.34 |
| 13 | Netherlands | 5.29 |
| 14 | Austria | 5.17 |
| 15 | Barbados | 5.13 |
| 16 | Qatar | 5.09 |
| 17 | Tunisia | 5.06 |
| 18 | Malaysia | 5.04 |
| 19 | United States | 5.02 |
| 20 | France | 5.02 |
| 21 | New Zealand | 4.90 |
| 22 | Hong Kong SAR | 4.89 |
| 23 | Germany | 4.86 |
| 24 | Malta | 4.85 |
| 25 | Taiwan, China | 4.78 |
| 26 | Czech Republic | 4.66 |
| 27 | Jordan | 4.65 |
| 28 | United Kingdom | 4.64 |
| 29 | Korea, Rep. | 4.59 |
| 30 | Estonia | 4.50 |
| 31 | Japan | 4.47 |
| 32 | Costa Rica | 4.46 |
| 33 | Kenya | 4.42 |
| 34 | Gambia, The | 4.36 |
| 35 | Slovenia | 4.36 |
| 36 | Russian Federation | 4.28 |
| 37 | India | 4.27 |
| 38 | United Arab Emirates | 4.25 |
| 39 | Indonesia | 4.17 |
| 40 | Ukraine | 4.16 |
| 41 | Luxembourg | 4.13 |
| 42 | Trinidad and Tobago | 4.09 |
| 43 | Zimbabwe | 4.09 |
| 44 | Sri Lanka | 4.08 |
| 45 | Israel | 4.05 |
| 46 | Philippines | 4.02 |
| 47 | Mauritius | 4.02 |
| 48 | Brunei Darussalam | 3.99 |
| 49 | Serbia | 3.85 |
| 50 | Botswana | 3.83 |
| 51 | Oman | 3.82 |
| 52 | Spain | 3.81 |
| 53 | Thailand | 3.81 |
| 54 | Poland | 3.80 |
| 55 | China | 3.80 |
| 56 | Bahrain | 3.79 |
| 57 | Montenegro | 3.79 |
| 58 | Puerto Rico | 3.76 |
| 59 | Senegal | 3.75 |
| 60 | Nigeria | 3.75 |
| 61 | Colombia | 3.70 |
| 62 | Uruguay | 3.69 |
| 63 | Latvia | 3.67 |
| 64 | Lithuania | 3.66 |
| 65 | Macedonia, FYR | 3.65 |
| 66 | Croatia | 3.64 |
| 67 | Guyana | 3.64 |
| 68 | Kazakhstan | 3.63 |
| 69 | Zambia | 3.61 |
| 70 | Saudi Arabia | 3.60 |
| 71 | Romania | 3.59 |
| 72 | Malawi | 3.59 |
| 73 | Portugal | 3.51 |
| 74 | Kyrgyz Republic | 3.45 |
| 75 | Ghana | 3.40 |
| 76 | Slovak Republic | 3.40 |
| 77 | Turkey | 3.37 |
| 78 | Azerbaijan | 3.35 |
| 79 | Lesotho | 3.29 |
| 80 | Albania | 3.28 |
| 81 | Bulgaria | 3.28 |
| 82 | Greece | 3.27 |
| 83 | Georgia | 3.27 |
| 84 | Italy | 3.23 |
| 85 | Cameroon | 3.21 |
| 86 | Chile | 3.21 |
| 87 | Hungary | 3.19 |
| 88 | Ethiopia | 3.18 |
| 89 | Benin | 3.17 |
| 90 | Moldova | 3.16 |
| 91 | Syria | 3.14 |
| 92 | Bosnia and Herzegovina | 3.13 |
| 93 | Uganda | 3.09 |
| 94 | Kuwait | 3.09 |
| 95 | Tanzania | 3.08 |
| 96 | Tajikistan | 3.06 |
| 97 | Nepal | 3.02 |
| 98 | Armenia | 2.99 |
| 99 | Jamaica | 2.99 |
| 100 | Morocco | 2.98 |
| 101 | Suriname | 2.98 |
| 102 | El Salvador | 2.97 |
| 103 | Madagascar | 2.90 |
| 104 | Pakistan | 2.90 |
| 105 | Argentina | 2.89 |
| 106 | Côte d'Ivoire | 2.89 |
| 107 | Bangladesh | 2.87 |
| 108 | Panama | 2.82 |
| 109 | Mexico | 2.81 |
| 110 | South Africa | 2.80 |
| 111 | Venezuela | 2.77 |
| 112 | Cambodia | 2.75 |
| 113 | Burkina Faso | 2.74 |
| 114 | Namibia | 2.73 |
| 115 | Mozambique | 2.72 |
| 116 | Honduras | 2.72 |
| 117 | Brazil | 2.70 |
| 118 | Guatemala | 2.61 |
| 119 | Mali | 2.60 |
| 120 | Vietnam | 2.59 |
| 121 | Libya | 2.57 |
| 122 | Algeria | 2.52 |
| 123 | Burundi | 2.51 |
| 124 | Mongolia | 2.50 |
| 125 | Ecuador | 2.46 |
| 126 | Egypt | 2.43 |
| 127 | Timor-Leste | 2.37 |
| 128 | Chad | 2.32 |
| 129 | Mauritania | 2.30 |
| 130 | Nicaragua | 2.27 |
| 131 | Dominican Republic | 2.20 |
| 132 | Bolivia | 2.19 |
| 133 | Peru | 2.13 |
| 134 | Paraguay | 1.97 |

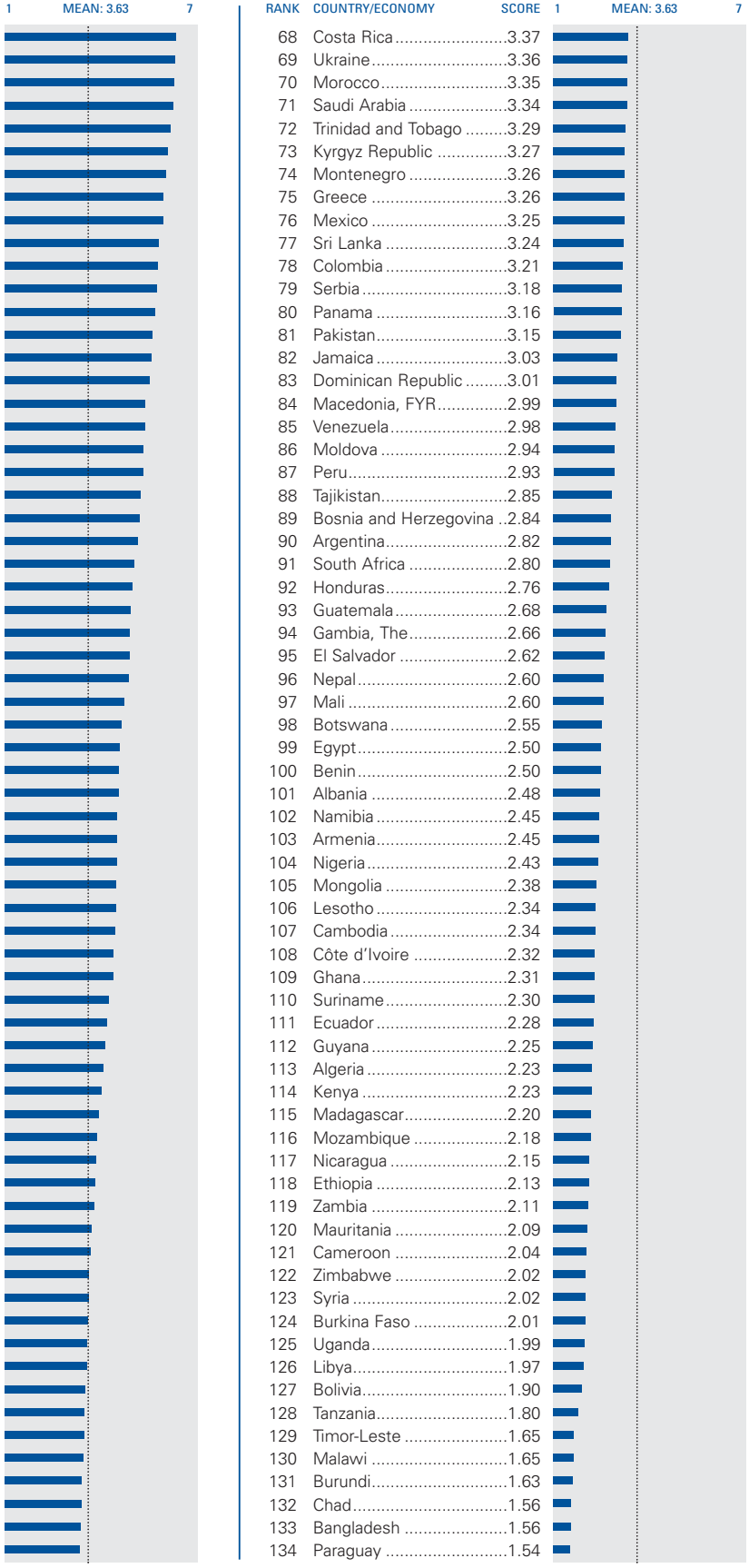



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 4.03 Internet access in schools

Internet access in schools is (1 = very limited; 7 = extensive, most children have frequent access)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Finland | 6.44 |
| 2 | Estonia | 6.41 |
| 3 | Iceland | 6.39 |
| 4 | Sweden | 6.36 |
| 5 | Korea, Rep. | 6.27 |
| 6 | Denmark | 6.16 |
| 7 | Austria | 6.11 |
| 8 | Switzerland | 6.04 |
| 9 | Singapore | 6.04 |
| 10 | Hong Kong SAR | 5.90 |
| 11 | United States | 5.85 |
| 12 | Netherlands | 5.84 |
| 13 | Canada | 5.77 |
| 14 | Taiwan, China | 5.67 |
| 15 | United Kingdom | 5.66 |
| 16 | Slovenia | 5.59 |
| 17 | Malta | 5.46 |
| 18 | Australia | 5.45 |
| 19 | Czech Republic | 5.41 |
| 20 | Norway | 5.39 |
| 21 | New Zealand | 5.30 |
| 22 | Luxembourg | 5.27 |
| 23 | Israel | 5.23 |
| 24 | Belgium | 5.12 |
| 25 | Japan | 5.05 |
| 26 | Hungary | 4.99 |
| 27 | United Arab Emirates | 4.96 |
| 28 | Qatar | 4.95 |
| 29 | Portugal | 4.94 |
| 30 | Germany | 4.79 |
| 31 | France | 4.69 |
| 32 | Latvia | 4.66 |
| 33 | China | 4.62 |
| 34 | Tunisia | 4.62 |
| 35 | Slovak Republic | 4.57 |
| 36 | Brunei Darussalam | 4.56 |
| 37 | Bahrain | 4.55 |
| 38 | Cyprus | 4.54 |
| 39 | Lithuania | 4.52 |
| 40 | Malaysia | 4.49 |
| 41 | Chile | 4.45 |
| 42 | Thailand | 4.44 |
| 43 | Spain | 4.29 |
| 44 | Ireland | 4.24 |
| 45 | Barbados | 4.19 |
| 46 | Croatia | 4.12 |
| 47 | Poland | 4.06 |
| 48 | Romania | 3.99 |
| 49 | Azerbaijan | 3.92 |
| 50 | Oman | 3.89 |
| 51 | Jordan | 3.87 |
| 52 | Puerto Rico | 3.84 |
| 53 | Bulgaria | 3.74 |
| 54 | Kazakhstan | 3.71 |
| 55 | Turkey | 3.67 |
| 56 | Philippines | 3.66 |
| 57 | Senegal | 3.63 |
| 58 | Indonesia | 3.62 |
| 59 | Russian Federation | 3.60 |
| 60 | India | 3.54 |
| 61 | Georgia | 3.52 |
| 62 | Vietnam | 3.51 |
| 63 | Mauritius | 3.48 |
| 64 | Kuwait | 3.43 |
| 65 | Italy | 3.43 |
| 66 | Uruguay | 3.42 |
| 67 | Brazil | 3.39 |
| 68 | Costa Rica | 3.37 |
| 69 | Ukraine | 3.36 |
| 70 | Morocco | 3.35 |
| 71 | Saudi Arabia | 3.34 |
| 72 | Trinidad and Tobago | 3.29 |
| 73 | Kyrgyz Republic | 3.27 |
| 74 | Montenegro | 3.26 |
| 75 | Greece | 3.26 |
| 76 | Mexico | 3.25 |
| 77 | Sri Lanka | 3.24 |
| 78 | Colombia | 3.21 |
| 79 | Serbia | 3.18 |
| 80 | Panama | 3.16 |
| 81 | Pakistan | 3.15 |
| 82 | Jamaica | 3.03 |
| 83 | Dominican Republic | 3.01 |
| 84 | Macedonia, FYR | 2.99 |
| 85 | Venezuela | 2.98 |
| 86 | Moldova | 2.94 |
| 87 | Peru | 2.93 |
| 88 | Tajikistan | 2.85 |
| 89 | Bosnia and Herzegovina | 2.84 |
| 90 | Argentina | 2.82 |
| 91 | South Africa | 2.80 |
| 92 | Honduras | 2.76 |
| 93 | Guatemala | 2.68 |
| 94 | Gambia, The | 2.66 |
| 95 | El Salvador | 2.62 |
| 96 | Nepal | 2.60 |
| 97 | Mali | 2.60 |
| 98 | Botswana | 2.55 |
| 99 | Egypt | 2.50 |
| 100 | Benin | 2.50 |
| 101 | Albania | 2.48 |
| 102 | Namibia | 2.45 |
| 103 | Armenia | 2.45 |
| 104 | Nigeria | 2.43 |
| 105 | Mongolia | 2.38 |
| 106 | Lesotho | 2.34 |
| 107 | Cambodia | 2.34 |
| 108 | Côte d'Ivoire | 2.32 |
| 109 | Ghana | 2.31 |
| 110 | Suriname | 2.30 |
| 111 | Ecuador | 2.28 |
| 112 | Guyana | 2.25 |
| 113 | Algeria | 2.23 |
| 114 | Kenya | 2.23 |
| 115 | Madagascar | 2.20 |
| 116 | Mozambique | 2.18 |
| 117 | Nicaragua | 2.15 |
| 118 | Ethiopia | 2.13 |
| 119 | Zambia | 2.11 |
| 120 | Mauritania | 2.09 |
| 121 | Cameroon | 2.04 |
| 122 | Zimbabwe | 2.02 |
| 123 | Syria | 2.02 |
| 124 | Burkina Faso | 2.01 |
| 125 | Uganda | 1.99 |
| 126 | Libya | 1.97 |
| 127 | Bolivia | 1.90 |
| 128 | Tanzania | 1.80 |
| 129 | Timor-Leste | 1.65 |
| 130 | Malawi | 1.65 |
| 131 | Burundi | 1.63 |
| 132 | Chad | 1.56 |
| 133 | Bangladesh | 1.56 |
| 134 | Paraguay | 1.54 |

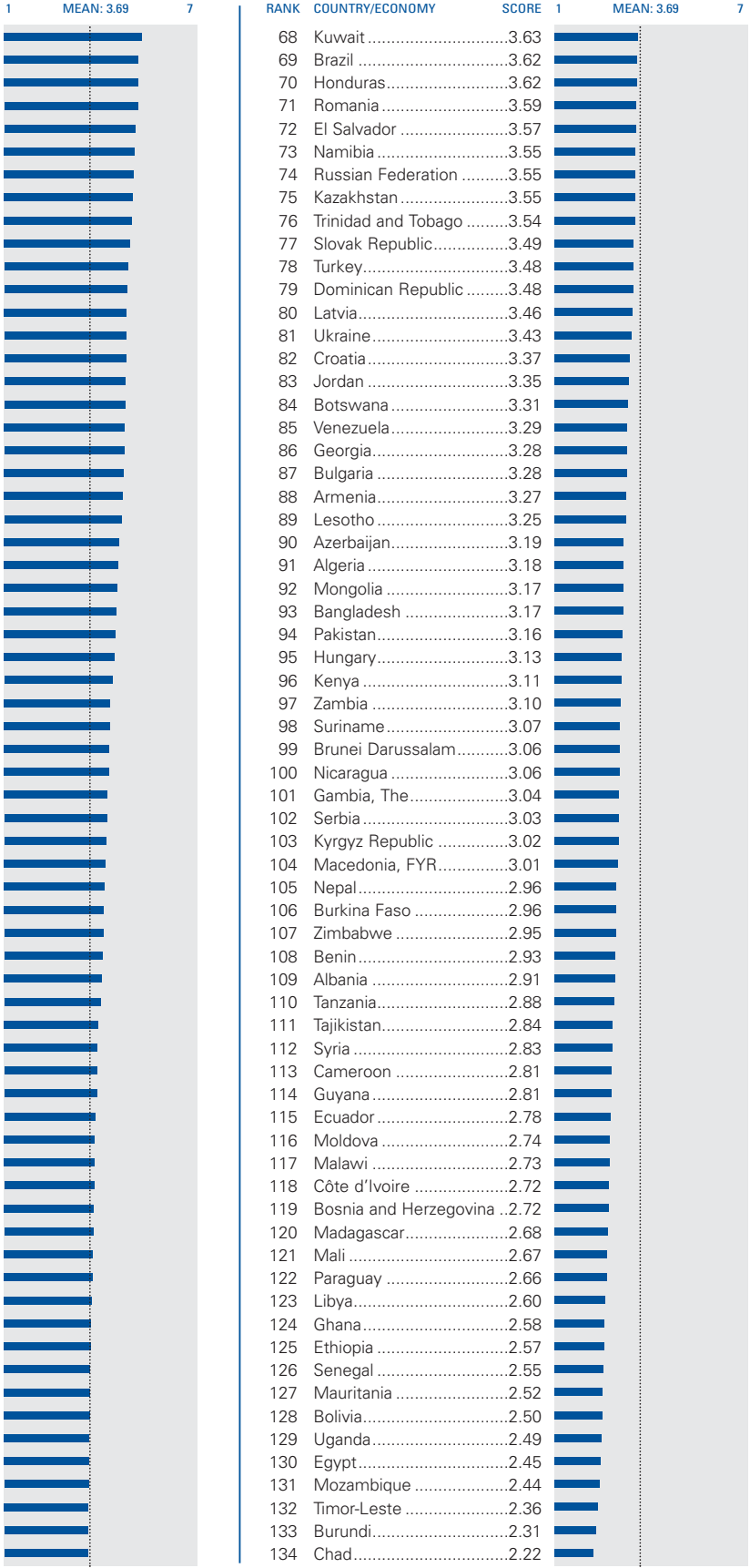



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 4.04 Buyer sophistication

Buyers in your country make purchasing decisions (1 = based solely on the lowest price, 7 = based on a sophisticated analysis of performance attributes)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Switzerland | 5.36 |
| 2 | Japan | 5.25 |
| 3 | Taiwan, China | 5.24 |
| 4 | Hong Kong SAR | 5.23 |
| 5 | United States | 5.15 |
| 6 | Sweden | 5.13 |
| 7 | Austria | 5.10 |
| 8 | Denmark | 5.07 |
| 9 | Singapore | 5.05 |
| 10 | Korea, Rep. | 4.98 |
| 11 | Finland | 4.92 |
| 12 | Luxembourg | 4.89 |
| 13 | Netherlands | 4.88 |
| 14 | Canada | 4.86 |
| 15 | Norway | 4.86 |
| 16 | Germany | 4.83 |
| 17 | Belgium | 4.83 |
| 18 | France | 4.82 |
| 19 | Australia | 4.80 |
| 20 | Ireland | 4.78 |
| 21 | China | 4.75 |
| 22 | United Kingdom | 4.71 |
| 23 | Malaysia | 4.64 |
| 24 | Iceland | 4.62 |
| 25 | Indonesia | 4.59 |
| 26 | Cyprus | 4.56 |
| 27 | New Zealand | 4.53 |
| 28 | South Africa | 4.50 |
| 29 | Chile | 4.43 |
| 30 | Tunisia | 4.36 |
| 31 | Spain | 4.36 |
| 32 | Puerto Rico | 4.33 |
| 33 | Sri Lanka | 4.33 |
| 34 | United Arab Emirates | 4.27 |
| 35 | Costa Rica | 4.25 |
| 36 | Bahrain | 4.22 |
| 37 | Israel | 4.21 |
| 38 | India | 4.19 |
| 39 | Qatar | 4.15 |
| 40 | Italy | 4.14 |
| 41 | Czech Republic | 4.11 |
| 42 | Barbados | 4.09 |
| 43 | Oman | 4.05 |
| 44 | Thailand | 3.97 |
| 45 | Slovenia | 3.95 |
| 46 | Morocco | 3.94 |
| 47 | Vietnam | 3.94 |
| 48 | Argentina | 3.88 |
| 49 | Peru | 3.86 |
| 50 | Philippines | 3.86 |
| 51 | Greece | 3.85 |
| 52 | Mexico | 3.83 |
| 53 | Panama | 3.82 |
| 54 | Malta | 3.81 |
| 55 | Mauritius | 3.80 |
| 56 | Estonia | 3.77 |
| 57 | Portugal | 3.75 |
| 58 | Saudi Arabia | 3.75 |
| 59 | Guatemala | 3.71 |
| 60 | Poland | 3.71 |
| 61 | Nigeria | 3.71 |
| 62 | Colombia | 3.69 |
| 63 | Montenegro | 3.69 |
| 64 | Uruguay | 3.68 |
| 65 | Cambodia | 3.67 |
| 66 | Jamaica | 3.65 |
| 67 | Lithuania | 3.65 |
| 68 | Kuwait | 3.63 |
| 69 | Brazil | 3.62 |
| 70 | Honduras | 3.62 |
| 71 | Romania | 3.59 |
| 72 | El Salvador | 3.57 |
| 73 | Namibia | 3.55 |
| 74 | Russian Federation | 3.55 |
| 75 | Kazakhstan | 3.55 |
| 76 | Trinidad and Tobago | 3.54 |
| 77 | Slovak Republic | 3.49 |
| 78 | Turkey | 3.48 |
| 79 | Dominican Republic | 3.48 |
| 80 | Latvia | 3.46 |
| 81 | Ukraine | 3.43 |
| 82 | Croatia | 3.37 |
| 83 | Jordan | 3.35 |
| 84 | Botswana | 3.31 |
| 85 | Venezuela | 3.29 |
| 86 | Georgia | 3.28 |
| 87 | Bulgaria | 3.28 |
| 88 | Armenia | 3.27 |
| 89 | Lesotho | 3.25 |
| 90 | Azerbaijan | 3.19 |
| 91 | Algeria | 3.18 |
| 92 | Mongolia | 3.17 |
| 93 | Bangladesh | 3.17 |
| 94 | Pakistan | 3.16 |
| 95 | Hungary | 3.13 |
| 96 | Kenya | 3.11 |
| 97 | Zambia | 3.10 |
| 98 | Suriname | 3.07 |
| 99 | Brunei Darussalam | 3.06 |
| 100 | Nicaragua | 3.06 |
| 101 | Gambia, The | 3.04 |
| 102 | Serbia | 3.03 |
| 103 | Kyrgyz Republic | 3.02 |
| 104 | Macedonia, FYR | 3.01 |
| 105 | Nepal | 2.96 |
| 106 | Burkina Faso | 2.96 |
| 107 | Zimbabwe | 2.95 |
| 108 | Benin | 2.93 |
| 109 | Albania | 2.91 |
| 110 | Tanzania | 2.88 |
| 111 | Tajikistan | 2.84 |
| 112 | Syria | 2.83 |
| 113 | Cameroon | 2.81 |
| 114 | Guyana | 2.81 |
| 115 | Ecuador | 2.78 |
| 116 | Moldova | 2.74 |
| 117 | Malawi | 2.73 |
| 118 | Côte d'Ivoire | 2.72 |
| 119 | Bosnia and Herzegovina | 2.72 |
| 120 | Madagascar | 2.68 |
| 121 | Mali | 2.67 |
| 122 | Paraguay | 2.66 |
| 123 | Libya | 2.60 |
| 124 | Ghana | 2.58 |
| 125 | Ethiopia | 2.57 |
| 126 | Senegal | 2.55 |
| 127 | Mauritania | 2.52 |
| 128 | Bolivia | 2.50 |
| 129 | Uganda | 2.49 |
| 130 | Egypt | 2.45 |
| 131 | Mozambique | 2.44 |
| 132 | Timor-Leste | 2.36 |
| 133 | Burundi | 2.31 |
| 134 | Chad | 2.22 |

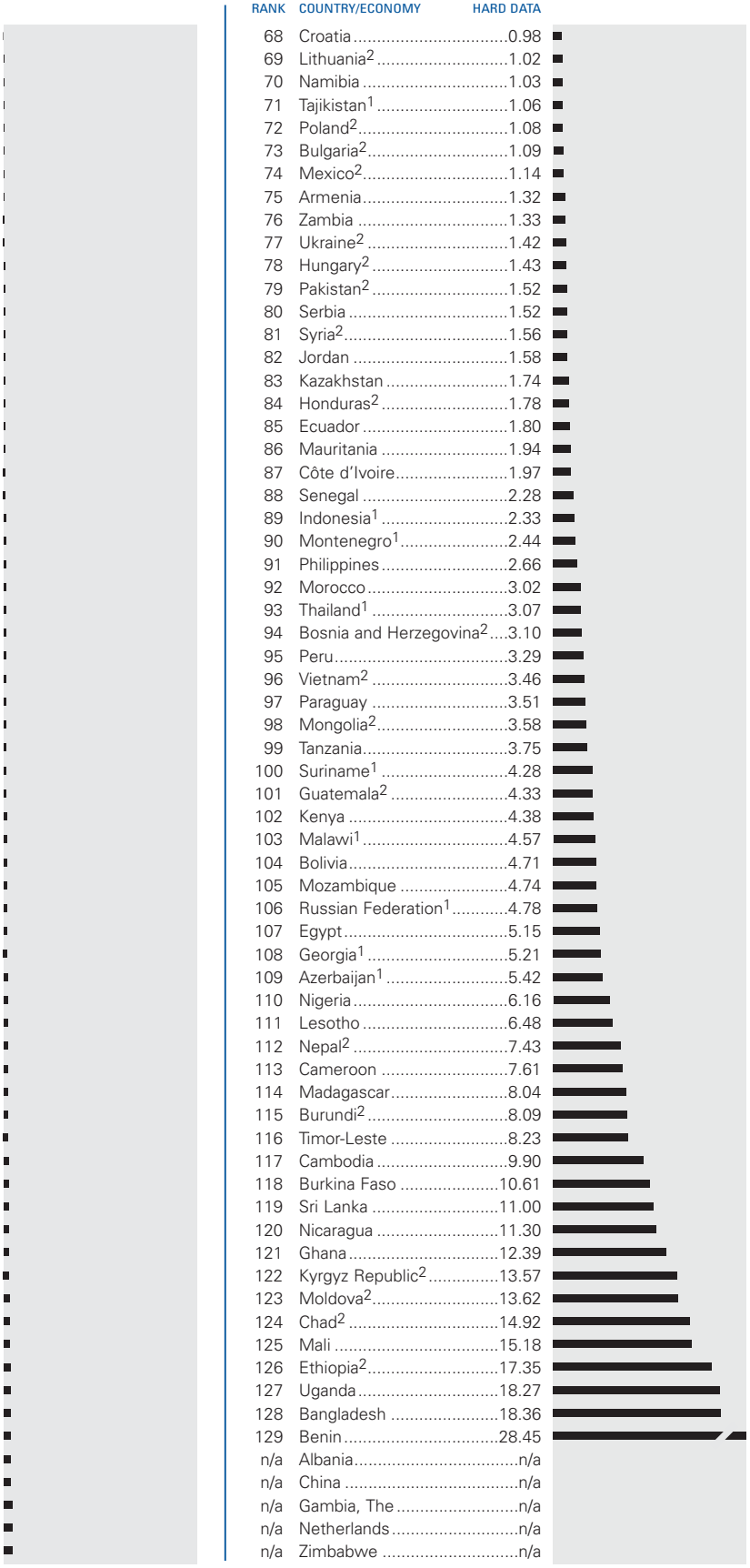



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 4.05 Residential telephone connection charge (hard data)

One-time residential telephone connection charge (US$) as a percentage of GDP per capita | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Algeria | 0.00 |
| 2 | Czech Republic | 0.06 |
| 3 | Turkey[2] | 0.06 |
| 4 | Switzerland | 0.06 |
| 5 | Qatar | 0.07 |
| 6 | Iceland | 0.07 |
| 7 | Luxembourg[2] | 0.08 |
| 8 | Singapore | 0.09 |
| 9 | United States[2] | 0.10 |
| 10 | Brunei Darussalam[2] | 0.10 |
| 11 | Trinidad and Tobago | 0.11 |
| 12 | Australia | 0.11 |
| 13 | United Arab Emirates | 0.12 |
| 14 | New Zealand | 0.12 |
| 15 | Canada[1] | 0.13 |
| 16 | Greece[2] | 0.15 |
| 17 | Guyana | 0.18 |
| 18 | Oman[2] | 0.19 |
| 19 | France[2] | 0.19 |
| 20 | Sweden | 0.20 |
| 21 | Hong Kong SAR | 0.20 |
| 22 | Malaysia | 0.21 |
| 23 | El Salvador | 0.21 |
| 24 | Norway[2] | 0.21 |
| 25 | Germany[2] | 0.21 |
| 26 | Belgium[2] | 0.22 |
| 27 | Bahrain | 0.23 |
| 28 | Puerto Rico[1] | 0.24 |
| 29 | Romania[1] | 0.25 |
| 30 | Jamaica[2] | 0.26 |
| 31 | Austria | 0.26 |
| 32 | Israel[2] | 0.27 |
| 33 | Spain[2] | 0.27 |
| 34 | Ireland[2] | 0.29 |
| 35 | Finland[2] | 0.31 |
| 36 | Korea, Rep. | 0.32 |
| 37 | Denmark[1] | 0.33 |
| 38 | Venezuela | 0.37 |
| 39 | Slovak Republic[2] | 0.39 |
| 40 | Kuwait[2] | 0.39 |
| 41 | Barbados | 0.40 |
| 42 | Libya[2] | 0.41 |
| 43 | Cyprus | 0.43 |
| 44 | Malta[2] | 0.44 |
| 45 | Tunisia | 0.46 |
| 46 | Estonia | 0.46 |
| 47 | Botswana | 0.47 |
| 48 | Chile[1] | 0.49 |
| 49 | Brazil[1] | 0.50 |
| 50 | Saudi Arabia[2] | 0.53 |
| 51 | United Kingdom | 0.54 |
| 52 | Mauritius | 0.58 |
| 53 | Slovenia[2] | 0.59 |
| 54 | Italy[2] | 0.59 |
| 55 | Taiwan, China[1] | 0.60 |
| 56 | Portugal[2] | 0.62 |
| 57 | Uruguay | 0.64 |
| 58 | Costa Rica | 0.69 |
| 59 | Latvia[2] | 0.72 |
| 60 | Argentina | 0.73 |
| 61 | Dominican Republic[2] | 0.73 |
| 62 | Macedonia, FYR | 0.74 |
| 63 | Panama[2] | 0.77 |
| 64 | India | 0.77 |
| 65 | Colombia[2] | 0.91 |
| 66 | South Africa | 0.92 |
| 67 | Japan[2] | 0.92 |
| 68 | Croatia | 0.98 |
| 69 | Lithuania[2] | 1.02 |
| 70 | Namibia | 1.03 |
| 71 | Tajikistan[1] | 1.06 |
| 72 | Poland[2] | 1.08 |
| 73 | Bulgaria[2] | 1.09 |
| 74 | Mexico[2] | 1.14 |
| 75 | Armenia | 1.32 |
| 76 | Zambia | 1.33 |
| 77 | Ukraine[2] | 1.42 |
| 78 | Hungary[2] | 1.43 |
| 79 | Pakistan[2] | 1.52 |
| 80 | Serbia | 1.52 |
| 81 | Syria[2] | 1.56 |
| 82 | Jordan | 1.58 |
| 83 | Kazakhstan | 1.74 |
| 84 | Honduras[2] | 1.78 |
| 85 | Ecuador | 1.80 |
| 86 | Mauritania | 1.94 |
| 87 | Côte d'Ivoire | 1.97 |
| 88 | Senegal | 2.28 |
| 89 | Indonesia[1] | 2.33 |
| 90 | Montenegro[1] | 2.44 |
| 91 | Philippines | 2.66 |
| 92 | Morocco | 3.02 |
| 93 | Thailand[1] | 3.07 |
| 94 | Bosnia and Herzegovina[2] | 3.10 |
| 95 | Peru | 3.29 |
| 96 | Vietnam[2] | 3.46 |
| 97 | Paraguay | 3.51 |
| 98 | Mongolia[2] | 3.58 |
| 99 | Tanzania | 3.75 |
| 100 | Suriname[1] | 4.28 |
| 101 | Guatemala[2] | 4.33 |
| 102 | Kenya | 4.38 |
| 103 | Malawi[1] | 4.57 |
| 104 | Bolivia | 4.71 |
| 105 | Mozambique | 4.74 |
| 106 | Russian Federation[1] | 4.78 |
| 107 | Egypt | 5.15 |
| 108 | Georgia[1] | 5.21 |
| 109 | Azerbaijan[1] | 5.42 |
| 110 | Nigeria | 6.16 |
| 111 | Lesotho | 6.48 |
| 112 | Nepal[2] | 7.43 |
| 113 | Cameroon | 7.61 |
| 114 | Madagascar | 8.04 |
| 115 | Burundi[2] | 8.09 |
| 116 | Timor-Leste | 8.23 |
| 117 | Cambodia | 9.90 |
| 118 | Burkina Faso | 10.61 |
| 119 | Sri Lanka | 11.00 |
| 120 | Nicaragua | 11.30 |
| 121 | Ghana | 12.39 |
| 122 | Kyrgyz Republic[2] | 13.57 |
| 123 | Moldova[2] | 13.62 |
| 124 | Chad[2] | 14.92 |
| 125 | Mali | 15.18 |
| 126 | Ethiopia[2] | 17.35 |
| 127 | Uganda | 18.27 |
| 128 | Bangladesh | 18.36 |
| 129 | Benin | 28.45 |
| n/a | Albania | n/a |
| n/a | China | n/a |
| n/a | Gambia, The | n/a |
| n/a | Netherlands | n/a |
| n/a | Zimbabwe | n/a |



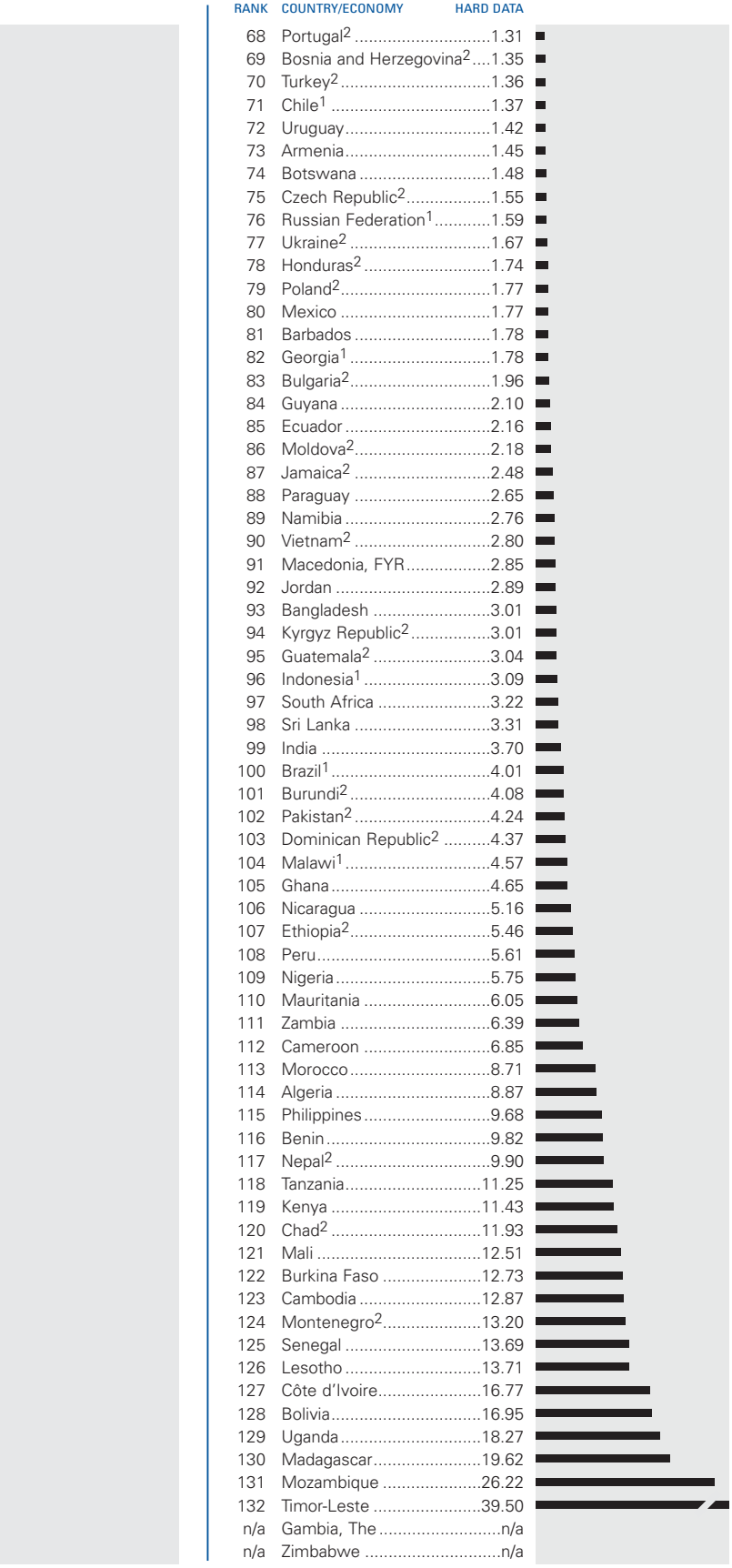
**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2008 edition); national sources

[1] 2005 [2] 2006

# 4.06 Residential monthly telephone subscription (hard data)

Residential monthly telephone subscription (US$) as a percentage of monthly GDP per capita | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | United Arab Emirates | 0.12 |
| 2 | Qatar | 0.14 |
| 3 | Bahrain | 0.16 |
| 4 | Croatia | 0.16 |
| 5 | Libya[2] | 0.17 |
| 6 | Taiwan, China[1] | 0.17 |
| 7 | Singapore | 0.19 |
| 8 | Romania | 0.19 |
| 9 | Albania[1] | 0.23 |
| 10 | Serbia | 0.29 |
| 11 | Kazakhstan | 0.31 |
| 12 | Luxembourg[2] | 0.32 |
| 13 | Brunei Darussalam[2] | 0.32 |
| 14 | Kuwait[2] | 0.33 |
| 15 | Korea, Rep. | 0.34 |
| 16 | El Salvador | 0.40 |
| 17 | Norway[2] | 0.41 |
| 18 | Suriname[1] | 0.43 |
| 19 | Switzerland | 0.43 |
| 20 | Iceland | 0.43 |
| 21 | Sweden | 0.45 |
| 22 | Australia | 0.46 |
| 23 | Finland[2] | 0.47 |
| 24 | Puerto Rico | 0.47 |
| 25 | Syria[2] | 0.50 |
| 26 | Denmark[1] | 0.50 |
| 27 | Japan[2] | 0.51 |
| 28 | Azerbaijan[1] | 0.54 |
| 29 | Israel[2] | 0.54 |
| 30 | Austria | 0.54 |
| 31 | United Kingdom | 0.55 |
| 32 | Mongolia[2] | 0.55 |
| 33 | Canada[1] | 0.56 |
| 34 | Hong Kong SAR | 0.57 |
| 35 | Malta[2] | 0.57 |
| 36 | Slovak Republic | 0.59 |
| 37 | France[2] | 0.61 |
| 38 | Mauritius | 0.63 |
| 39 | Saudi Arabia[2] | 0.64 |
| 40 | Estonia | 0.66 |
| 41 | Oman[2] | 0.67 |
| 42 | Germany[2] | 0.68 |
| 43 | Netherlands[2] | 0.69 |
| 44 | Belgium[2] | 0.69 |
| 45 | United States[2] | 0.69 |
| 46 | Ireland[2] | 0.69 |
| 47 | Spain[2] | 0.72 |
| 48 | Tunisia | 0.73 |
| 49 | Italy[2] | 0.74 |
| 50 | Greece[2] | 0.77 |
| 51 | Argentina | 0.78 |
| 52 | Venezuela | 0.80 |
| 53 | Costa Rica | 0.82 |
| 54 | Cyprus | 0.85 |
| 55 | Latvia[2] | 0.87 |
| 56 | Slovenia[2] | 0.92 |
| 57 | Panama[2] | 0.93 |
| 58 | Tajikistan[1] | 0.95 |
| 59 | Egypt | 0.99 |
| 60 | New Zealand | 1.04 |
| 61 | Hungary | 1.05 |
| 62 | Colombia[2] | 1.10 |
| 63 | Thailand[1] | 1.10 |
| 64 | Lithuania[2] | 1.13 |
| 65 | Trinidad and Tobago | 1.18 |
| 66 | Malaysia | 1.25 |
| 67 | China | 1.27 |
| 68 | Portugal[2] | 1.31 |
| 69 | Bosnia and Herzegovina[2] | 1.35 |
| 70 | Turkey[2] | 1.36 |
| 71 | Chile[1] | 1.37 |
| 72 | Uruguay | 1.42 |
| 73 | Armenia | 1.45 |
| 74 | Botswana | 1.48 |
| 75 | Czech Republic[2] | 1.55 |
| 76 | Russian Federation[1] | 1.59 |
| 77 | Ukraine[2] | 1.67 |
| 78 | Honduras[2] | 1.74 |
| 79 | Poland[2] | 1.77 |
| 80 | Mexico | 1.77 |
| 81 | Barbados | 1.78 |
| 82 | Georgia[1] | 1.78 |
| 83 | Bulgaria[2] | 1.96 |
| 84 | Guyana | 2.10 |
| 85 | Ecuador | 2.16 |
| 86 | Moldova[2] | 2.18 |
| 87 | Jamaica[2] | 2.48 |
| 88 | Paraguay | 2.65 |
| 89 | Namibia | 2.76 |
| 90 | Vietnam[2] | 2.80 |
| 91 | Macedonia, FYR | 2.85 |
| 92 | Jordan | 2.89 |
| 93 | Bangladesh | 3.01 |
| 94 | Kyrgyz Republic[2] | 3.01 |
| 95 | Guatemala[2] | 3.04 |
| 96 | Indonesia[1] | 3.09 |
| 97 | South Africa | 3.22 |
| 98 | Sri Lanka | 3.31 |
| 99 | India | 3.70 |
| 100 | Brazil[1] | 4.01 |
| 101 | Burundi[2] | 4.08 |
| 102 | Pakistan[2] | 4.24 |
| 103 | Dominican Republic[2] | 4.37 |
| 104 | Malawi[1] | 4.57 |
| 105 | Ghana | 4.65 |
| 106 | Nicaragua | 5.16 |
| 107 | Ethiopia[2] | 5.46 |
| 108 | Peru | 5.61 |
| 109 | Nigeria | 5.75 |
| 110 | Mauritania | 6.05 |
| 111 | Zambia | 6.39 |
| 112 | Cameroon | 6.85 |
| 113 | Morocco | 8.71 |
| 114 | Algeria | 8.87 |
| 115 | Philippines | 9.68 |
| 116 | Benin | 9.82 |
| 117 | Nepal[2] | 9.90 |
| 118 | Tanzania | 11.25 |
| 119 | Kenya | 11.43 |
| 120 | Chad[2] | 11.93 |
| 121 | Mali | 12.51 |
| 122 | Burkina Faso | 12.73 |
| 123 | Cambodia | 12.87 |
| 124 | Montenegro[2] | 13.20 |
| 125 | Senegal | 13.69 |
| 126 | Lesotho | 13.71 |
| 127 | Côte d'Ivoire | 16.77 |
| 128 | Bolivia | 16.95 |
| 129 | Uganda | 18.27 |
| 130 | Madagascar | 19.62 |
| 131 | Mozambique | 26.22 |
| 132 | Timor-Leste | 39.50 |
| n/a | Gambia, The | n/a |
| n/a | Zimbabwe | n/a |



**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2008 edition); national sources

[1] 2005 [2] 2006

# 4.07 High-speed monthly broadband subscription (hard data)

High-speed monthly broadband subscription charge (US$) as a percentage of monthly GDP per capita | 2006 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Malta | 0.12 |
| 2 | Syria[1] | 0.31 |
| 3 | United States | 0.55 |
| 4 | Netherlands | 0.83 |
| 5 | Switzerland | 0.88 |
| 6 | Japan | 1.04 |
| 7 | Germany | 1.06 |
| 8 | Luxembourg | 1.19 |
| 9 | Norway | 1.21 |
| 10 | France | 1.23 |
| 11 | Canada | 1.35 |
| 12 | Puerto Rico | 1.36 |
| 13 | Italy | 1.42 |
| 14 | United Kingdom | 1.56 |
| 15 | Denmark | 1.58 |
| 16 | Ireland | 1.58 |
| 17 | Belgium | 1.61 |
| 18 | Sweden | 1.62 |
| 19 | Taiwan, China | 1.69 |
| 20 | Australia | 1.73 |
| 21 | New Zealand | 1.85 |
| 22 | Iceland | 1.86 |
| 23 | Qatar | 2.09 |
| 24 | Austria | 2.11 |
| 25 | Spain | 2.15 |
| 26 | Hong Kong SAR | 2.24 |
| 27 | Finland | 2.59 |
| 28 | Korea, Rep. | 2.81 |
| 29 | United Arab Emirates | 2.95 |
| 30 | Singapore | 3.07 |
| 31 | Israel | 3.51 |
| 32 | Slovenia | 3.57 |
| 33 | Estonia | 3.85 |
| 34 | Lithuania | 3.93 |
| 35 | Greece | 4.73 |
| 36 | Cyprus | 4.96 |
| 37 | Portugal | 4.99 |
| 38 | Argentina | 5.55 |
| 39 | Malaysia | 5.72 |
| 40 | Brunei Darussalam | 5.79 |
| 41 | Hungary | 6.04 |
| 42 | Czech Republic | 6.15 |
| 43 | Trinidad and Tobago | 6.27 |
| 44 | Romania | 7.02 |
| 45 | Bahrain | 7.71 |
| 46 | Jordan | 7.95 |
| 47 | Croatia | 8.27 |
| 48 | China | 8.96 |
| 49 | Kuwait | 9.30 |
| 50 | Chile | 9.72 |
| 51 | Thailand | 10.07 |
| 52 | Poland | 10.49 |
| 53 | Botswana | 11.40 |
| 54 | Bosnia and Herzegovina | 15.47 |
| 55 | Ukraine | 15.47 |
| 56 | Barbados | 17.48 |
| 57 | Bulgaria | 18.51 |
| 58 | Brazil | 20.21 |
| 59 | Jamaica | 21.65 |
| 60 | Slovak Republic | 21.81 |
| 61 | Serbia | 22.27 |
| 62 | Dominican Republic | 22.59 |
| 63 | Peru | 24.27 |
| 64 | Georgia | 24.28 |
| 65 | Colombia | 25.56 |
| 66 | South Africa | 26.30 |
| 67 | Panama | 27.64 |
| 68 | India | 27.82 |
| 69 | Venezuela | 29.09 |
| 70 | Ecuador | 31.36 |
| 71 | Uruguay | 38.53 |
| 72 | Indonesia | 39.83 |
| 73 | Latvia | 42.69 |
| 74 | Turkey | 43.75 |
| 75 | Suriname | 43.89 |
| 76 | Mauritius | 47.95 |
| 77 | Morocco | 50.08 |
| 78 | Russian Federation | 50.11 |
| 79 | Oman | 56.11 |
| 80 | Sri Lanka | 56.96 |
| 81 | Tunisia | 61.18 |
| 82 | Mexico | 62.68 |
| 83 | Azerbaijan | 67.44 |
| 84 | Guatemala | 74.05 |
| 85 | Costa Rica | 80.64 |
| 86 | Philippines | 86.34 |
| 87 | Macedonia, FYR | 94.93 |
| 88 | Nicaragua | 100.35 |
| 89 | Egypt | 100.46 |
| 90 | Senegal | 160.95 |
| 91 | Albania | 200.82 |
| 92 | Bolivia | 205.91 |
| 93 | Vietnam | 242.46 |
| 94 | Kyrgyz Republic | 265.69 |
| 95 | Mongolia | 294.74 |
| 96 | Algeria | 309.84 |
| 97 | Côte d'Ivoire | 384.47 |
| 98 | Moldova | 449.06 |
| 99 | Ghana | 488.48 |
| 100 | Kenya | 885.46 |
| 101 | Gambia, The | 920.35 |
| 102 | Kazakhstan | 965.63 |
| 103 | Cameroon | 1,446.75 |
| 104 | Pakistan | 1,608.59 |
| 105 | Cambodia | 1,633.66 |
| 106 | Zimbabwe | 2,955.74 |
| 107 | Armenia | 3,248.37 |
| 108 | Benin | 3,678.97 |
| 109 | Burkina Faso | 4,090.85 |
| 110 | Mozambique | 5,757.37 |
| 111 | Bangladesh | 5,959.18 |
| 112 | Mauritania | 8,904.40 |
| 113 | Uganda | 21,852.81 |
| 114 | Ethiopia | 31,103.21 |
| n/a | Burundi | n/a |
| n/a | Chad | n/a |
| n/a | El Salvador | n/a |
| n/a | Guyana | n/a |
| n/a | Honduras | n/a |
| n/a | Lesotho | n/a |
| n/a | Libya | n/a |
| n/a | Madagascar | n/a |
| n/a | Malawi | n/a |
| n/a | Mali | n/a |
| n/a | Montenegro | n/a |
| n/a | Namibia | n/a |
| n/a | Nepal | n/a |
| n/a | Nigeria | n/a |
| n/a | Paraguay | n/a |
| n/a | Saudi Arabia | n/a |
| n/a | Tajikistan | n/a |
| n/a | Tanzania | n/a |
| n/a | Timor-Leste | n/a |
| n/a | Zambia | n/a |

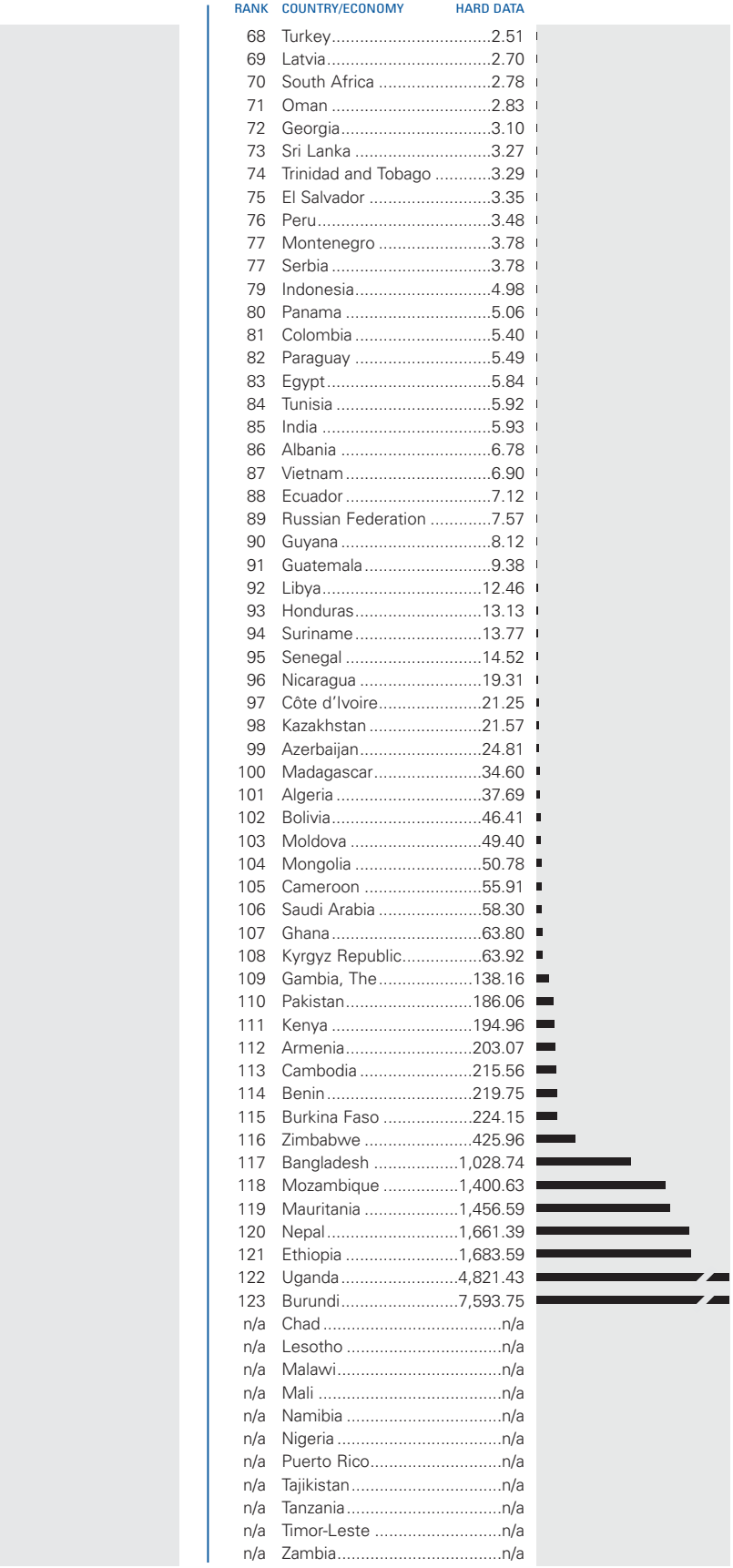
**SOURCE:** International Telecommunication Union, *World Information Society Report 2007*; International Monetary Fund, *World Economic Outlook Database* (October 2007 edition); national sources

[1] 2007

# 4.08 Lowest cost of broadband (hard data)

Lowest sampled cost (US$) per 100 kb/s as a percentage of monthly GNI | 2006 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Japan | 0.00 |
| 1 | Netherlands | 0.00 |
| 3 | Finland | 0.01 |
| 3 | France | 0.01 |
| 3 | Italy | 0.01 |
| 3 | Korea, Rep. | 0.01 |
| 3 | Singapore | 0.01 |
| 3 | Sweden | 0.01 |
| 3 | United States | 0.01 |
| 10 | Germany | 0.02 |
| 10 | Taiwan, China | 0.02 |
| 10 | United Kingdom | 0.02 |
| 13 | Iceland | 0.03 |
| 13 | Malta | 0.03 |
| 13 | Switzerland | 0.03 |
| 16 | Belgium | 0.04 |
| 16 | Canada | 0.04 |
| 16 | Hong Kong SAR | 0.04 |
| 16 | Norway | 0.04 |
| 20 | Luxembourg | 0.05 |
| 21 | Portugal | 0.07 |
| 22 | Denmark | 0.08 |
| 23 | Ireland | 0.09 |
| 23 | New Zealand | 0.09 |
| 25 | Slovenia | 0.10 |
| 26 | Austria | 0.11 |
| 27 | Lithuania | 0.12 |
| 27 | Qatar | 0.12 |
| 29 | Australia | 0.13 |
| 30 | Czech Republic | 0.16 |
| 31 | Israel | 0.19 |
| 32 | United Arab Emirates | 0.20 |
| 33 | Poland | 0.21 |
| 34 | Spain | 0.23 |
| 35 | Hungary | 0.33 |
| 36 | Cyprus | 0.35 |
| 37 | Syria[1] | 0.37 |
| 38 | Brazil | 0.42 |
| 39 | Slovak Republic | 0.43 |
| 40 | Bosnia and Herzegovina | 0.45 |
| 41 | Croatia | 0.48 |
| 42 | Estonia | 0.52 |
| 43 | Malaysia | 0.64 |
| 44 | Greece | 0.65 |
| 45 | Argentina | 0.66 |
| 46 | Romania | 0.67 |
| 47 | Chile | 0.72 |
| 48 | Jordan | 0.78 |
| 49 | Kuwait | 0.91 |
| 50 | Barbados | 1.00 |
| 51 | China | 1.01 |
| 52 | Mexico | 1.03 |
| 53 | Bulgaria | 1.07 |
| 54 | Thailand | 1.12 |
| 55 | Ukraine | 1.13 |
| 56 | Morocco | 1.52 |
| 57 | Bahrain | 1.69 |
| 58 | Philippines | 1.75 |
| 59 | Venezuela | 1.78 |
| 60 | Brunei Darussalam | 1.85 |
| 61 | Botswana | 1.94 |
| 62 | Costa Rica | 2.09 |
| 63 | Uruguay | 2.11 |
| 64 | Macedonia, FYR | 2.14 |
| 65 | Mauritius | 2.15 |
| 66 | Dominican Republic | 2.28 |
| 67 | Jamaica | 2.41 |
| 68 | Turkey | 2.51 |
| 69 | Latvia | 2.70 |
| 70 | South Africa | 2.78 |
| 71 | Oman | 2.83 |
| 72 | Georgia | 3.10 |
| 73 | Sri Lanka | 3.27 |
| 74 | Trinidad and Tobago | 3.29 |
| 75 | El Salvador | 3.35 |
| 76 | Peru | 3.48 |
| 77 | Montenegro | 3.78 |
| 77 | Serbia | 3.78 |
| 79 | Indonesia | 4.98 |
| 80 | Panama | 5.06 |
| 81 | Colombia | 5.40 |
| 82 | Paraguay | 5.49 |
| 83 | Egypt | 5.84 |
| 84 | Tunisia | 5.92 |
| 85 | India | 5.93 |
| 86 | Albania | 6.78 |
| 87 | Vietnam | 6.90 |
| 88 | Ecuador | 7.12 |
| 89 | Russian Federation | 7.57 |
| 90 | Guyana | 8.12 |
| 91 | Guatemala | 9.38 |
| 92 | Libya | 12.46 |
| 93 | Honduras | 13.13 |
| 94 | Suriname | 13.77 |
| 95 | Senegal | 14.52 |
| 96 | Nicaragua | 19.31 |
| 97 | Côte d'Ivoire | 21.25 |
| 98 | Kazakhstan | 21.57 |
| 99 | Azerbaijan | 24.81 |
| 100 | Madagascar | 34.60 |
| 101 | Algeria | 37.69 |
| 102 | Bolivia | 46.41 |
| 103 | Moldova | 49.40 |
| 104 | Mongolia | 50.78 |
| 105 | Cameroon | 55.91 |
| 106 | Saudi Arabia | 58.30 |
| 107 | Ghana | 63.80 |
| 108 | Kyrgyz Republic | 63.92 |
| 109 | Gambia, The | 138.16 |
| 110 | Pakistan | 186.06 |
| 111 | Kenya | 194.96 |
| 112 | Armenia | 203.07 |
| 113 | Cambodia | 215.56 |
| 114 | Benin | 219.75 |
| 115 | Burkina Faso | 224.15 |
| 116 | Zimbabwe | 425.96 |
| 117 | Bangladesh | 1,028.74 |
| 118 | Mozambique | 1,400.63 |
| 119 | Mauritania | 1,456.59 |
| 120 | Nepal | 1,661.39 |
| 121 | Ethiopia | 1,683.59 |
| 122 | Uganda | 4,821.43 |
| 123 | Burundi | 7,593.75 |
| n/a | Chad | n/a |
| n/a | Lesotho | n/a |
| n/a | Malawi | n/a |
| n/a | Mali | n/a |
| n/a | Namibia | n/a |
| n/a | Nigeria | n/a |
| n/a | Puerto Rico | n/a |
| n/a | Tajikistan | n/a |
| n/a | Tanzania | n/a |
| n/a | Timor-Leste | n/a |
| n/a | Zambia | n/a |



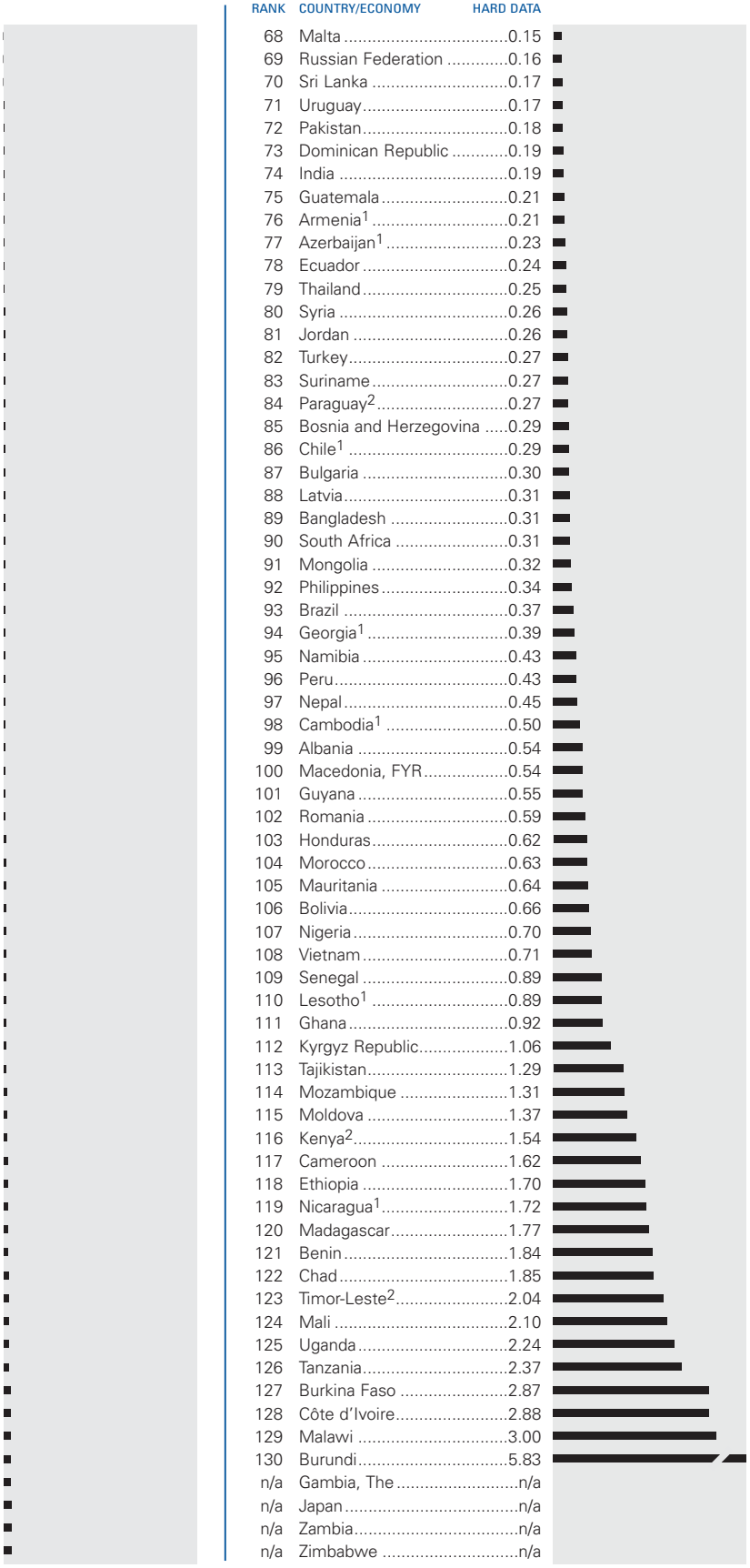
**SOURCE:** International Telecommunication Union, *World Information Society Report 2007*

[1] 2007

# 4.09 Cost of mobile telephone call (hard data)

Cost of 3-minute local call during peak hours (US$) as a percentage of monthly GDP per capita | 2006 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Hong Kong SAR | 0.00 |
| 2 | United Arab Emirates | 0.00 |
| 3 | Denmark | 0.00 |
| 4 | Luxembourg | 0.01 |
| 5 | Qatar | 0.01 |
| 6 | Norway[1] | 0.01 |
| 7 | Austria | 0.01 |
| 8 | Finland | 0.01 |
| 9 | Iceland | 0.01 |
| 10 | El Salvador | 0.01 |
| 11 | Cyprus | 0.01 |
| 12 | Slovenia | 0.01 |
| 13 | Singapore | 0.02 |
| 14 | Kuwait | 0.02 |
| 15 | United Kingdom[1] | 0.02 |
| 16 | Sweden | 0.02 |
| 17 | Estonia | 0.02 |
| 18 | Switzerland | 0.02 |
| 19 | Brunei Darussalam | 0.02 |
| 20 | Bahrain | 0.02 |
| 21 | Korea, Rep.[1] | 0.02 |
| 22 | Australia | 0.02 |
| 23 | Puerto Rico[1] | 0.03 |
| 24 | Ireland | 0.03 |
| 25 | Mauritius | 0.03 |
| 26 | Canada | 0.03 |
| 27 | Portugal | 0.03 |
| 28 | Trinidad and Tobago | 0.03 |
| 29 | Malaysia | 0.03 |
| 30 | Botswana | 0.03 |
| 31 | Oman | 0.03 |
| 32 | Israel | 0.03 |
| 33 | Czech Republic | 0.03 |
| 34 | Slovak Republic | 0.03 |
| 35 | Belgium | 0.03 |
| 36 | Saudi Arabia | 0.04 |
| 37 | Costa Rica[2] | 0.04 |
| 38 | Spain[1] | 0.04 |
| 39 | United States[1] | 0.04 |
| 40 | New Zealand[2] | 0.04 |
| 41 | France | 0.04 |
| 42 | Taiwan, China[1] | 0.04 |
| 43 | Libya | 0.04 |
| 44 | Netherlands | 0.05 |
| 45 | Germany | 0.05 |
| 46 | Ukraine | 0.05 |
| 47 | Greece | 0.06 |
| 48 | Montenegro | 0.06 |
| 49 | Lithuania | 0.06 |
| 50 | Hungary | 0.07 |
| 51 | Croatia | 0.08 |
| 52 | Algeria | 0.08 |
| 53 | Italy | 0.08 |
| 54 | Mexico | 0.08 |
| 55 | Kazakhstan[2] | 0.09 |
| 56 | Argentina | 0.09 |
| 57 | Venezuela | 0.09 |
| 58 | Indonesia[1] | 0.09 |
| 59 | Poland | 0.10 |
| 60 | China | 0.12 |
| 61 | Panama | 0.12 |
| 62 | Colombia | 0.13 |
| 63 | Egypt | 0.13 |
| 64 | Tunisia | 0.13 |
| 65 | Serbia | 0.14 |
| 66 | Barbados | 0.14 |
| 67 | Jamaica | 0.14 |
| 68 | Malta | 0.15 |
| 69 | Russian Federation | 0.16 |
| 70 | Sri Lanka | 0.17 |
| 71 | Uruguay | 0.17 |
| 72 | Pakistan | 0.18 |
| 73 | Dominican Republic | 0.19 |
| 74 | India | 0.19 |
| 75 | Guatemala | 0.21 |
| 76 | Armenia[1] | 0.21 |
| 77 | Azerbaijan[1] | 0.23 |
| 78 | Ecuador | 0.24 |
| 79 | Thailand | 0.25 |
| 80 | Syria | 0.26 |
| 81 | Jordan | 0.26 |
| 82 | Turkey | 0.27 |
| 83 | Suriname | 0.27 |
| 84 | Paraguay[2] | 0.27 |
| 85 | Bosnia and Herzegovina | 0.29 |
| 86 | Chile[1] | 0.29 |
| 87 | Bulgaria | 0.30 |
| 88 | Latvia | 0.31 |
| 89 | Bangladesh | 0.31 |
| 90 | South Africa | 0.31 |
| 91 | Mongolia | 0.32 |
| 92 | Philippines | 0.34 |
| 93 | Brazil | 0.37 |
| 94 | Georgia[1] | 0.39 |
| 95 | Namibia | 0.43 |
| 96 | Peru | 0.43 |
| 97 | Nepal | 0.45 |
| 98 | Cambodia[1] | 0.50 |
| 99 | Albania | 0.54 |
| 100 | Macedonia, FYR | 0.54 |
| 101 | Guyana | 0.55 |
| 102 | Romania | 0.59 |
| 103 | Honduras | 0.62 |
| 104 | Morocco | 0.63 |
| 105 | Mauritania | 0.64 |
| 106 | Bolivia | 0.66 |
| 107 | Nigeria | 0.70 |
| 108 | Vietnam | 0.71 |
| 109 | Senegal | 0.89 |
| 110 | Lesotho[1] | 0.89 |
| 111 | Ghana | 0.92 |
| 112 | Kyrgyz Republic | 1.06 |
| 113 | Tajikistan | 1.29 |
| 114 | Mozambique | 1.31 |
| 115 | Moldova | 1.37 |
| 116 | Kenya[2] | 1.54 |
| 117 | Cameroon | 1.62 |
| 118 | Ethiopia | 1.70 |
| 119 | Nicaragua[1] | 1.72 |
| 120 | Madagascar | 1.77 |
| 121 | Benin | 1.84 |
| 122 | Chad | 1.85 |
| 123 | Timor-Leste[2] | 2.04 |
| 124 | Mali | 2.10 |
| 125 | Uganda | 2.24 |
| 126 | Tanzania | 2.37 |
| 127 | Burkina Faso | 2.87 |
| 128 | Côte d'Ivoire | 2.88 |
| 129 | Malawi | 3.00 |
| 130 | Burundi | 5.83 |
| n/a | Gambia, The | n/a |
| n/a | Japan | n/a |
| n/a | Zambia | n/a |
| n/a | Zimbabwe | n/a |



**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2007 edition)

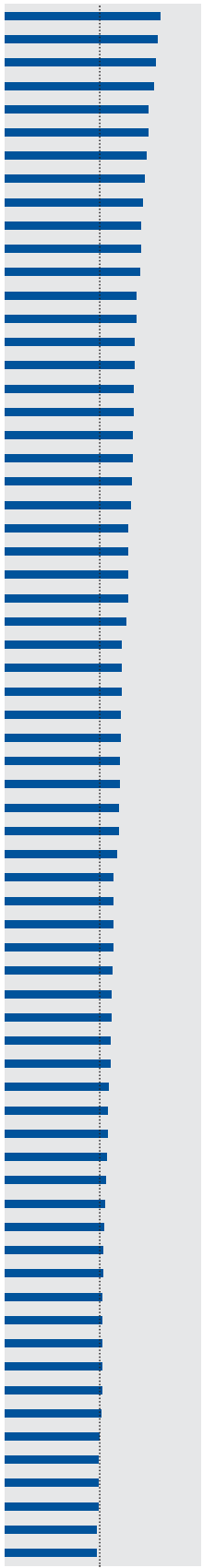
[1] 2005 [2] 2007

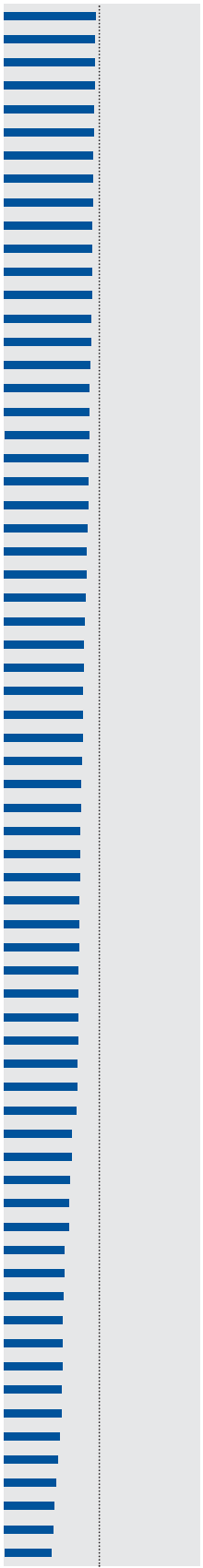
# 5th pillar
# Business readiness

# 5.01 Extent of staff training

The general approach of companies in your country to human resources is (1 = to invest little in training and employee development, 7 = to invest heavily to attract, train, and retain employees)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Denmark | 5.85 |
| 2 | Switzerland | 5.76 |
| 3 | Singapore | 5.70 |
| 4 | Sweden | 5.66 |
| 5 | Japan | 5.49 |
| 6 | United States | 5.47 |
| 7 | Norway | 5.43 |
| 8 | Netherlands | 5.36 |
| 9 | Iceland | 5.32 |
| 10 | Korea, Rep. | 5.25 |
| 11 | Finland | 5.25 |
| 12 | Germany | 5.22 |
| 13 | Belgium | 5.11 |
| 14 | Luxembourg | 5.10 |
| 15 | South Africa | 5.05 |
| 16 | Taiwan, China | 5.04 |
| 17 | Australia | 5.02 |
| 18 | Austria | 5.01 |
| 19 | Canada | 5.00 |
| 20 | Malaysia | 4.98 |
| 21 | Ireland | 4.97 |
| 22 | United Kingdom | 4.93 |
| 23 | Puerto Rico | 4.86 |
| 24 | France | 4.86 |
| 25 | Costa Rica | 4.84 |
| 26 | New Zealand | 4.84 |
| 27 | Tunisia | 4.79 |
| 28 | Czech Republic | 4.66 |
| 29 | Hong Kong SAR | 4.66 |
| 30 | Philippines | 4.65 |
| 31 | Indonesia | 4.63 |
| 32 | Israel | 4.62 |
| 33 | Qatar | 4.59 |
| 34 | India | 4.59 |
| 35 | Estonia | 4.57 |
| 36 | Mauritius | 4.56 |
| 37 | United Arab Emirates | 4.49 |
| 38 | Lithuania | 4.40 |
| 39 | Azerbaijan | 4.40 |
| 40 | Slovak Republic | 4.40 |
| 41 | Barbados | 4.39 |
| 42 | China | 4.36 |
| 43 | Slovenia | 4.34 |
| 44 | Namibia | 4.33 |
| 45 | Malta | 4.31 |
| 46 | Brazil | 4.30 |
| 47 | Kenya | 4.24 |
| 48 | Chile | 4.22 |
| 49 | Oman | 4.21 |
| 50 | Jordan | 4.19 |
| 51 | Thailand | 4.15 |
| 52 | Saudi Arabia | 4.12 |
| 53 | Gambia, The | 4.09 |
| 54 | Romania | 4.07 |
| 55 | Guatemala | 4.06 |
| 56 | Cyprus | 4.05 |
| 57 | Kuwait | 4.05 |
| 58 | Panama | 4.04 |
| 59 | Sri Lanka | 4.04 |
| 60 | Bahrain | 4.03 |
| 61 | Brunei Darussalam | 4.00 |
| 62 | Latvia | 3.95 |
| 63 | Spain | 3.94 |
| 64 | Croatia | 3.94 |
| 65 | Trinidad and Tobago | 3.92 |
| 66 | El Salvador | 3.88 |
| 67 | Zimbabwe | 3.88 |
| 68 | Côte d'Ivoire | 3.88 |
| 69 | Botswana | 3.84 |
| 70 | Portugal | 3.84 |
| 71 | Albania | 3.83 |
| 72 | Vietnam | 3.80 |
| 73 | Georgia | 3.80 |
| 74 | Mozambique | 3.79 |
| 75 | Lesotho | 3.78 |
| 76 | Malawi | 3.78 |
| 77 | Honduras | 3.76 |
| 78 | Dominican Republic | 3.75 |
| 79 | Morocco | 3.74 |
| 80 | Russian Federation | 3.74 |
| 81 | Greece | 3.72 |
| 82 | Guyana | 3.71 |
| 83 | Macedonia, FYR | 3.69 |
| 84 | Montenegro | 3.67 |
| 85 | Jamaica | 3.66 |
| 86 | Argentina | 3.65 |
| 87 | Mexico | 3.64 |
| 88 | Nigeria | 3.63 |
| 89 | Poland | 3.63 |
| 90 | Turkey | 3.60 |
| 91 | Colombia | 3.59 |
| 92 | Kazakhstan | 3.58 |
| 93 | Peru | 3.54 |
| 94 | Venezuela | 3.51 |
| 95 | Tanzania | 3.49 |
| 96 | Egypt | 3.49 |
| 97 | Madagascar | 3.47 |
| 98 | Uruguay | 3.46 |
| 99 | Ukraine | 3.46 |
| 100 | Uganda | 3.43 |
| 101 | Hungary | 3.41 |
| 102 | Kyrgyz Republic | 3.41 |
| 103 | Ghana | 3.37 |
| 104 | Cameroon | 3.37 |
| 105 | Tajikistan | 3.37 |
| 106 | Zambia | 3.35 |
| 107 | Cambodia | 3.35 |
| 108 | Suriname | 3.35 |
| 109 | Italy | 3.33 |
| 110 | Senegal | 3.33 |
| 111 | Moldova | 3.33 |
| 112 | Syria | 3.31 |
| 113 | Mongolia | 3.28 |
| 114 | Libya | 3.28 |
| 115 | Nicaragua | 3.27 |
| 116 | Timor-Leste | 3.13 |
| 117 | Armenia | 3.12 |
| 118 | Bulgaria | 3.07 |
| 119 | Pakistan | 3.03 |
| 120 | Ecuador | 3.03 |
| 121 | Serbia | 2.89 |
| 122 | Benin | 2.88 |
| 123 | Mali | 2.86 |
| 124 | Bolivia | 2.84 |
| 125 | Burkina Faso | 2.84 |
| 126 | Bosnia and Herzegovina | 2.82 |
| 127 | Ethiopia | 2.81 |
| 128 | Algeria | 2.80 |
| 129 | Paraguay | 2.73 |
| 130 | Mauritania | 2.69 |
| 131 | Burundi | 2.63 |
| 132 | Nepal | 2.56 |
| 133 | Bangladesh | 2.55 |
| 134 | Chad | 2.47 |



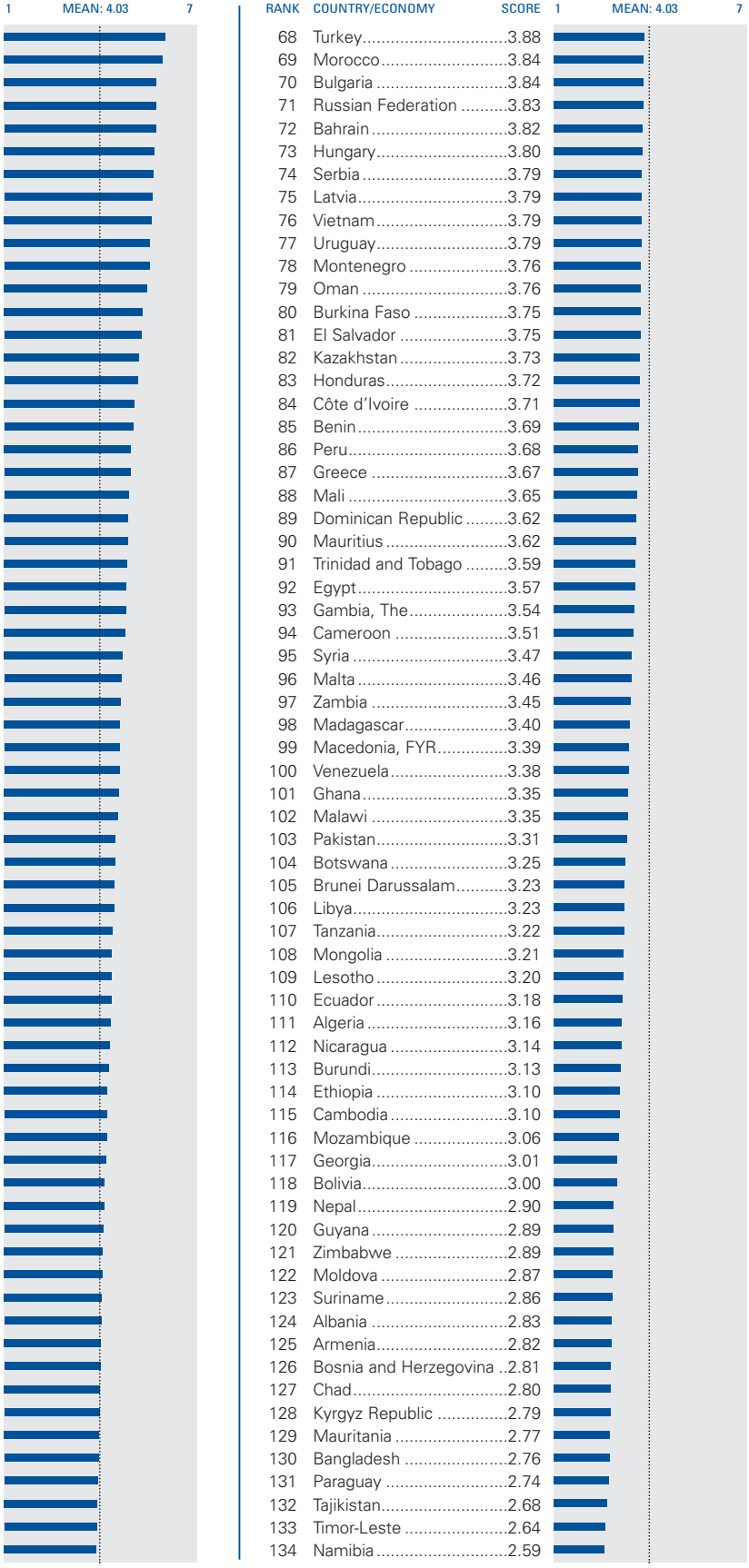




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 5.02 Local availability of specialized research and training services

In your country, specialized research and training services are (1 = not available, 7 = available from world-class local institutions)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | United States | 6.12 |
| 2 | Switzerland | 6.02 |
| 3 | Netherlands | 5.83 |
| 4 | Finland | 5.82 |
| 5 | Germany | 5.81 |
| 6 | Denmark | 5.77 |
| 7 | Sweden | 5.73 |
| 8 | France | 5.69 |
| 9 | United Kingdom | 5.68 |
| 10 | Canada | 5.63 |
| 11 | Belgium | 5.61 |
| 12 | Japan | 5.53 |
| 13 | Singapore | 5.40 |
| 14 | Israel | 5.35 |
| 15 | Australia | 5.27 |
| 16 | Austria | 5.23 |
| 17 | Iceland | 5.13 |
| 18 | Norway | 5.09 |
| 19 | Taiwan, China | 5.01 |
| 20 | Korea, Rep. | 5.00 |
| 21 | Estonia | 4.94 |
| 22 | Ireland | 4.93 |
| 23 | Czech Republic | 4.92 |
| 24 | New Zealand | 4.91 |
| 25 | Hong Kong SAR | 4.88 |
| 26 | Brazil | 4.86 |
| 27 | Malaysia | 4.85 |
| 28 | Tunisia | 4.76 |
| 29 | South Africa | 4.71 |
| 30 | Senegal | 4.69 |
| 31 | Puerto Rico | 4.68 |
| 32 | India | 4.66 |
| 33 | Slovenia | 4.66 |
| 34 | Portugal | 4.65 |
| 35 | Italy | 4.61 |
| 36 | Kenya | 4.52 |
| 37 | Spain | 4.51 |
| 38 | Luxembourg | 4.49 |
| 39 | China | 4.49 |
| 40 | Costa Rica | 4.44 |
| 41 | Sri Lanka | 4.42 |
| 42 | Saudi Arabia | 4.42 |
| 43 | Indonesia | 4.41 |
| 44 | United Arab Emirates | 4.39 |
| 45 | Qatar | 4.36 |
| 46 | Chile | 4.32 |
| 47 | Croatia | 4.26 |
| 48 | Guatemala | 4.25 |
| 49 | Cyprus | 4.25 |
| 50 | Poland | 4.23 |
| 51 | Philippines | 4.18 |
| 52 | Nigeria | 4.18 |
| 53 | Jordan | 4.14 |
| 54 | Barbados | 4.12 |
| 55 | Mexico | 4.12 |
| 56 | Lithuania | 4.10 |
| 57 | Jamaica | 4.08 |
| 58 | Thailand | 4.07 |
| 59 | Slovak Republic | 4.05 |
| 60 | Argentina | 4.03 |
| 61 | Colombia | 4.02 |
| 62 | Uganda | 4.00 |
| 63 | Romania | 3.99 |
| 64 | Kuwait | 3.96 |
| 65 | Panama | 3.95 |
| 66 | Ukraine | 3.94 |
| 67 | Azerbaijan | 3.93 |
| 68 | Turkey | 3.88 |
| 69 | Morocco | 3.84 |
| 70 | Bulgaria | 3.84 |
| 71 | Russian Federation | 3.83 |
| 72 | Bahrain | 3.82 |
| 73 | Hungary | 3.80 |
| 74 | Serbia | 3.79 |
| 75 | Latvia | 3.79 |
| 76 | Vietnam | 3.79 |
| 77 | Uruguay | 3.79 |
| 78 | Montenegro | 3.76 |
| 79 | Oman | 3.76 |
| 80 | Burkina Faso | 3.75 |
| 81 | El Salvador | 3.75 |
| 82 | Kazakhstan | 3.73 |
| 83 | Honduras | 3.72 |
| 84 | Côte d'Ivoire | 3.71 |
| 85 | Benin | 3.69 |
| 86 | Peru | 3.68 |
| 87 | Greece | 3.67 |
| 88 | Mali | 3.65 |
| 89 | Dominican Republic | 3.62 |
| 90 | Mauritius | 3.62 |
| 91 | Trinidad and Tobago | 3.59 |
| 92 | Egypt | 3.57 |
| 93 | Gambia, The | 3.54 |
| 94 | Cameroon | 3.51 |
| 95 | Syria | 3.47 |
| 96 | Malta | 3.46 |
| 97 | Zambia | 3.45 |
| 98 | Madagascar | 3.40 |
| 99 | Macedonia, FYR | 3.39 |
| 100 | Venezuela | 3.38 |
| 101 | Ghana | 3.35 |
| 102 | Malawi | 3.35 |
| 103 | Pakistan | 3.31 |
| 104 | Botswana | 3.25 |
| 105 | Brunei Darussalam | 3.23 |
| 106 | Libya | 3.23 |
| 107 | Tanzania | 3.22 |
| 108 | Mongolia | 3.21 |
| 109 | Lesotho | 3.20 |
| 110 | Ecuador | 3.18 |
| 111 | Algeria | 3.16 |
| 112 | Nicaragua | 3.14 |
| 113 | Burundi | 3.13 |
| 114 | Ethiopia | 3.10 |
| 115 | Cambodia | 3.10 |
| 116 | Mozambique | 3.06 |
| 117 | Georgia | 3.01 |
| 118 | Bolivia | 3.00 |
| 119 | Nepal | 2.90 |
| 120 | Guyana | 2.89 |
| 121 | Zimbabwe | 2.89 |
| 122 | Moldova | 2.87 |
| 123 | Suriname | 2.86 |
| 124 | Albania | 2.83 |
| 125 | Armenia | 2.82 |
| 126 | Bosnia and Herzegovina | 2.81 |
| 127 | Chad | 2.80 |
| 128 | Kyrgyz Republic | 2.79 |
| 129 | Mauritania | 2.77 |
| 130 | Bangladesh | 2.76 |
| 131 | Paraguay | 2.74 |
| 132 | Tajikistan | 2.68 |
| 133 | Timor-Leste | 2.64 |
| 134 | Namibia | 2.59 |

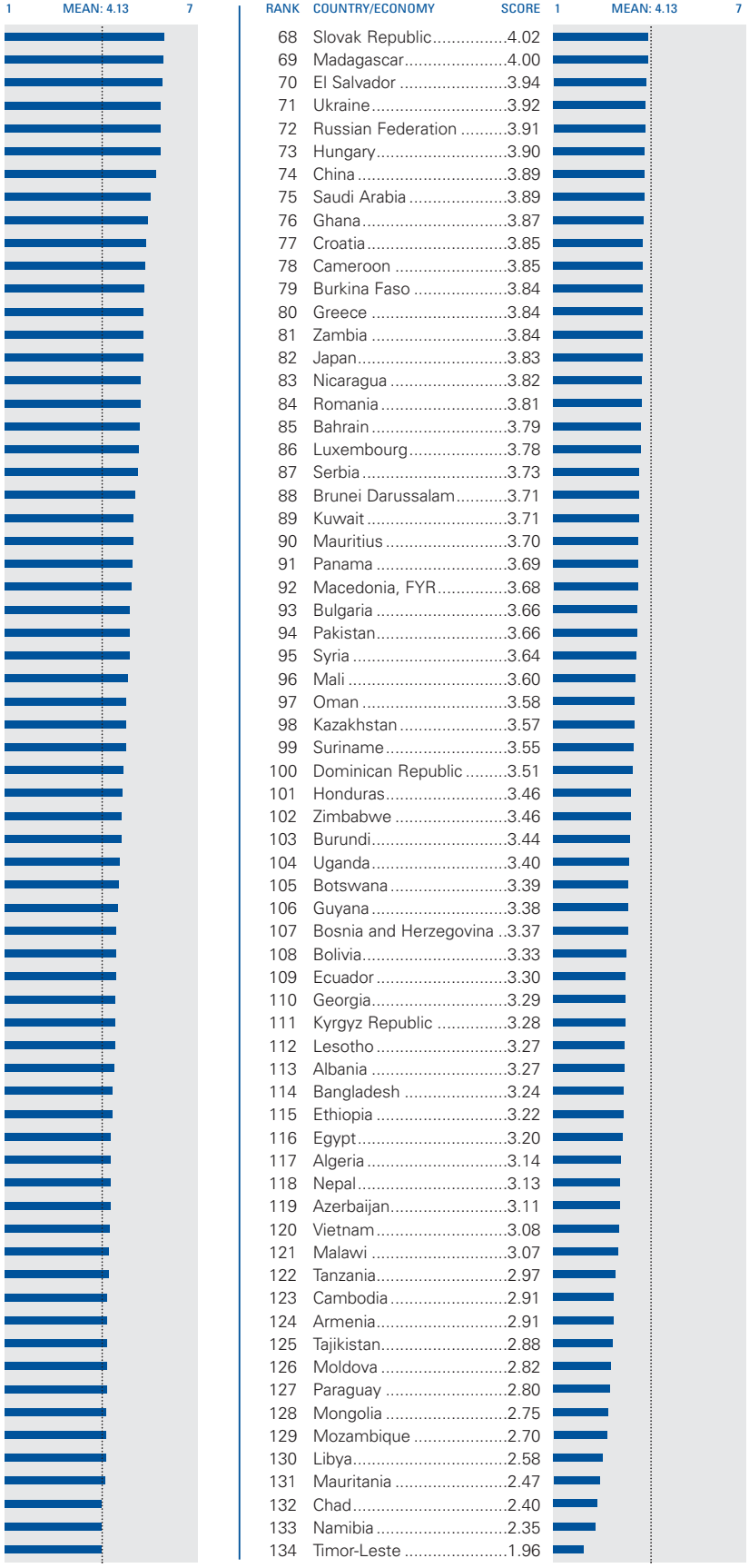



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 5.03 Quality of management schools

Management or business schools in your country are (1 = limited or of poor quality, 7 = among the best in the world)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | France | 6.07 |
| 2 | Switzerland | 6.04 |
| 3 | United States | 6.00 |
| 4 | Canada | 5.95 |
| 5 | Belgium | 5.94 |
| 6 | Spain | 5.94 |
| 7 | Singapore | 5.79 |
| 8 | Denmark | 5.63 |
| 9 | Finland | 5.53 |
| 10 | Netherlands | 5.47 |
| 11 | Australia | 5.44 |
| 12 | India | 5.42 |
| 13 | Iceland | 5.41 |
| 14 | Ireland | 5.41 |
| 15 | Sweden | 5.40 |
| 16 | Austria | 5.32 |
| 17 | Tunisia | 5.32 |
| 18 | United Kingdom | 5.29 |
| 19 | Chile | 5.24 |
| 20 | Costa Rica | 5.22 |
| 21 | Germany | 5.14 |
| 22 | Norway | 5.07 |
| 23 | Malaysia | 5.07 |
| 24 | Israel | 5.05 |
| 25 | South Africa | 5.02 |
| 26 | Argentina | 4.96 |
| 27 | New Zealand | 4.96 |
| 28 | Hong Kong SAR | 4.96 |
| 29 | Senegal | 4.92 |
| 30 | Korea, Rep. | 4.85 |
| 31 | Philippines | 4.84 |
| 32 | Estonia | 4.84 |
| 33 | Taiwan, China | 4.77 |
| 34 | Czech Republic | 4.74 |
| 35 | Qatar | 4.70 |
| 36 | Barbados | 4.69 |
| 37 | Trinidad and Tobago | 4.64 |
| 38 | Portugal | 4.62 |
| 39 | Slovenia | 4.58 |
| 40 | Malta | 4.54 |
| 41 | Sri Lanka | 4.53 |
| 42 | Cyprus | 4.53 |
| 43 | Poland | 4.51 |
| 44 | Puerto Rico | 4.50 |
| 45 | Jordan | 4.49 |
| 46 | United Arab Emirates | 4.47 |
| 47 | Guatemala | 4.41 |
| 48 | Indonesia | 4.41 |
| 49 | Thailand | 4.36 |
| 50 | Latvia | 4.36 |
| 51 | Colombia | 4.35 |
| 52 | Lithuania | 4.35 |
| 53 | Mexico | 4.32 |
| 54 | Uruguay | 4.31 |
| 55 | Kenya | 4.30 |
| 56 | Benin | 4.24 |
| 57 | Peru | 4.24 |
| 58 | Brazil | 4.24 |
| 59 | Nigeria | 4.23 |
| 60 | Venezuela | 4.23 |
| 61 | Italy | 4.21 |
| 62 | Côte d'Ivoire | 4.20 |
| 63 | Morocco | 4.20 |
| 64 | Jamaica | 4.18 |
| 65 | Turkey | 4.07 |
| 66 | Gambia, The | 4.07 |
| 67 | Montenegro | 4.06 |
| 68 | Slovak Republic | 4.02 |
| 69 | Madagascar | 4.00 |
| 70 | El Salvador | 3.94 |
| 71 | Ukraine | 3.92 |
| 72 | Russian Federation | 3.91 |
| 73 | Hungary | 3.90 |
| 74 | China | 3.89 |
| 75 | Saudi Arabia | 3.89 |
| 76 | Ghana | 3.87 |
| 77 | Croatia | 3.85 |
| 78 | Cameroon | 3.85 |
| 79 | Burkina Faso | 3.84 |
| 80 | Greece | 3.84 |
| 81 | Zambia | 3.84 |
| 82 | Japan | 3.83 |
| 83 | Nicaragua | 3.82 |
| 84 | Romania | 3.81 |
| 85 | Bahrain | 3.79 |
| 86 | Luxembourg | 3.78 |
| 87 | Serbia | 3.73 |
| 88 | Brunei Darussalam | 3.71 |
| 89 | Kuwait | 3.71 |
| 90 | Mauritius | 3.70 |
| 91 | Panama | 3.69 |
| 92 | Macedonia, FYR | 3.68 |
| 93 | Bulgaria | 3.66 |
| 94 | Pakistan | 3.66 |
| 95 | Syria | 3.64 |
| 96 | Mali | 3.60 |
| 97 | Oman | 3.58 |
| 98 | Kazakhstan | 3.57 |
| 99 | Suriname | 3.55 |
| 100 | Dominican Republic | 3.51 |
| 101 | Honduras | 3.46 |
| 102 | Zimbabwe | 3.46 |
| 103 | Burundi | 3.44 |
| 104 | Uganda | 3.40 |
| 105 | Botswana | 3.39 |
| 106 | Guyana | 3.38 |
| 107 | Bosnia and Herzegovina | 3.37 |
| 108 | Bolivia | 3.33 |
| 109 | Ecuador | 3.30 |
| 110 | Georgia | 3.29 |
| 111 | Kyrgyz Republic | 3.28 |
| 112 | Lesotho | 3.27 |
| 113 | Albania | 3.27 |
| 114 | Bangladesh | 3.24 |
| 115 | Ethiopia | 3.22 |
| 116 | Egypt | 3.20 |
| 117 | Algeria | 3.14 |
| 118 | Nepal | 3.13 |
| 119 | Azerbaijan | 3.11 |
| 120 | Vietnam | 3.08 |
| 121 | Malawi | 3.07 |
| 122 | Tanzania | 2.97 |
| 123 | Cambodia | 2.91 |
| 124 | Armenia | 2.91 |
| 125 | Tajikistan | 2.88 |
| 126 | Moldova | 2.82 |
| 127 | Paraguay | 2.80 |
| 128 | Mongolia | 2.75 |
| 129 | Mozambique | 2.70 |
| 130 | Libya | 2.58 |
| 131 | Mauritania | 2.47 |
| 132 | Chad | 2.40 |
| 133 | Namibia | 2.35 |
| 134 | Timor-Leste | 1.96 |

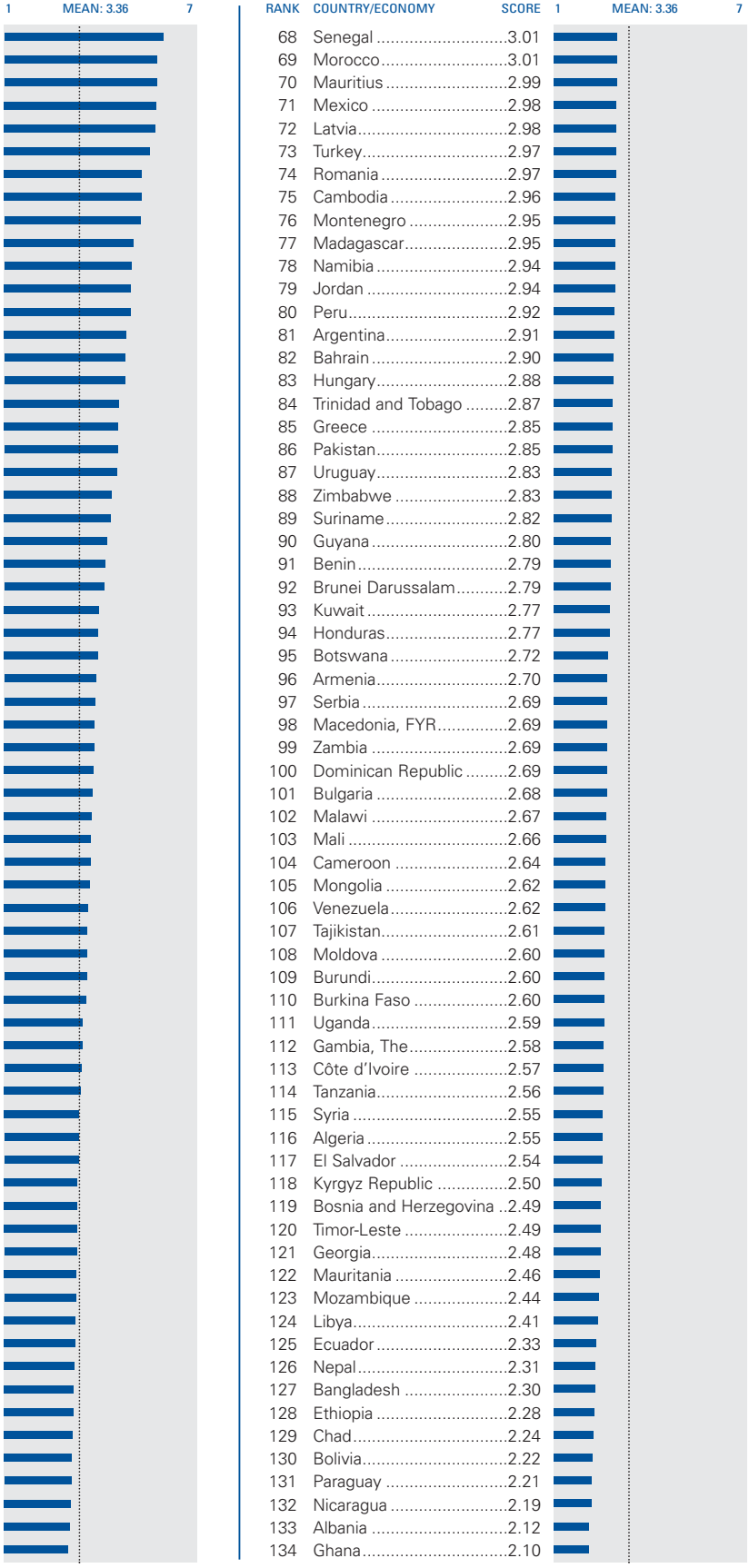



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 5.04 Company spending on R&D

Companies in your country (1 = do not spend money on research and development, 7 = spend heavily on research and development relative to international peers)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Switzerland | 6.04 |
| 2 | Japan | 5.84 |
| 3 | United States | 5.84 |
| 4 | Sweden | 5.83 |
| 5 | Germany | 5.80 |
| 6 | Denmark | 5.62 |
| 7 | Korea, Rep. | 5.37 |
| 8 | Israel | 5.36 |
| 9 | Finland | 5.32 |
| 10 | Singapore | 5.11 |
| 11 | Netherlands | 5.03 |
| 12 | United Kingdom | 5.02 |
| 13 | France | 5.01 |
| 14 | Belgium | 4.88 |
| 15 | Austria | 4.83 |
| 16 | Taiwan, China | 4.83 |
| 17 | Iceland | 4.64 |
| 18 | Malaysia | 4.61 |
| 19 | Norway | 4.60 |
| 20 | Ireland | 4.59 |
| 21 | Luxembourg | 4.41 |
| 22 | Canada | 4.38 |
| 23 | Australia | 4.27 |
| 24 | China | 4.21 |
| 25 | Hong Kong SAR | 4.17 |
| 26 | Czech Republic | 4.01 |
| 27 | Slovenia | 3.97 |
| 28 | South Africa | 3.97 |
| 29 | India | 3.91 |
| 30 | Costa Rica | 3.88 |
| 31 | Brazil | 3.87 |
| 32 | Sri Lanka | 3.86 |
| 33 | Nigeria | 3.83 |
| 34 | Indonesia | 3.80 |
| 35 | Qatar | 3.77 |
| 36 | New Zealand | 3.75 |
| 37 | Kenya | 3.73 |
| 38 | Tunisia | 3.72 |
| 39 | Spain | 3.66 |
| 40 | Estonia | 3.64 |
| 41 | Puerto Rico | 3.63 |
| 42 | Vietnam | 3.62 |
| 43 | Saudi Arabia | 3.60 |
| 44 | Oman | 3.49 |
| 45 | Croatia | 3.48 |
| 46 | Russian Federation | 3.45 |
| 47 | Philippines | 3.44 |
| 48 | Lithuania | 3.38 |
| 49 | Cyprus | 3.36 |
| 50 | United Arab Emirates | 3.36 |
| 51 | Italy | 3.32 |
| 52 | Ukraine | 3.32 |
| 53 | Portugal | 3.31 |
| 54 | Thailand | 3.30 |
| 55 | Slovak Republic | 3.29 |
| 56 | Lesotho | 3.27 |
| 57 | Egypt | 3.26 |
| 58 | Jamaica | 3.25 |
| 59 | Barbados | 3.22 |
| 60 | Guatemala | 3.21 |
| 61 | Malta | 3.20 |
| 62 | Kazakhstan | 3.17 |
| 63 | Panama | 3.15 |
| 64 | Chile | 3.13 |
| 65 | Poland | 3.12 |
| 66 | Colombia | 3.09 |
| 67 | Azerbaijan | 3.02 |
| 68 | Senegal | 3.01 |
| 69 | Morocco | 3.01 |
| 70 | Mauritius | 2.99 |
| 71 | Mexico | 2.98 |
| 72 | Latvia | 2.98 |
| 73 | Turkey | 2.97 |
| 74 | Romania | 2.97 |
| 75 | Cambodia | 2.96 |
| 76 | Montenegro | 2.95 |
| 77 | Madagascar | 2.95 |
| 78 | Namibia | 2.94 |
| 79 | Jordan | 2.94 |
| 80 | Peru | 2.92 |
| 81 | Argentina | 2.91 |
| 82 | Bahrain | 2.90 |
| 83 | Hungary | 2.88 |
| 84 | Trinidad and Tobago | 2.87 |
| 85 | Greece | 2.85 |
| 86 | Pakistan | 2.85 |
| 87 | Uruguay | 2.83 |
| 88 | Zimbabwe | 2.83 |
| 89 | Suriname | 2.82 |
| 90 | Guyana | 2.80 |
| 91 | Benin | 2.79 |
| 92 | Brunei Darussalam | 2.79 |
| 93 | Kuwait | 2.77 |
| 94 | Honduras | 2.77 |
| 95 | Botswana | 2.72 |
| 96 | Armenia | 2.70 |
| 97 | Serbia | 2.69 |
| 98 | Macedonia, FYR | 2.69 |
| 99 | Zambia | 2.69 |
| 100 | Dominican Republic | 2.69 |
| 101 | Bulgaria | 2.68 |
| 102 | Malawi | 2.67 |
| 103 | Mali | 2.66 |
| 104 | Cameroon | 2.64 |
| 105 | Mongolia | 2.62 |
| 106 | Venezuela | 2.62 |
| 107 | Tajikistan | 2.61 |
| 108 | Moldova | 2.60 |
| 109 | Burundi | 2.60 |
| 110 | Burkina Faso | 2.60 |
| 111 | Uganda | 2.59 |
| 112 | Gambia, The | 2.58 |
| 113 | Côte d'Ivoire | 2.57 |
| 114 | Tanzania | 2.56 |
| 115 | Syria | 2.55 |
| 116 | Algeria | 2.55 |
| 117 | El Salvador | 2.54 |
| 118 | Kyrgyz Republic | 2.50 |
| 119 | Bosnia and Herzegovina | 2.49 |
| 120 | Timor-Leste | 2.49 |
| 121 | Georgia | 2.48 |
| 122 | Mauritania | 2.46 |
| 123 | Mozambique | 2.44 |
| 124 | Libya | 2.41 |
| 125 | Ecuador | 2.33 |
| 126 | Nepal | 2.31 |
| 127 | Bangladesh | 2.30 |
| 128 | Ethiopia | 2.28 |
| 129 | Chad | 2.24 |
| 130 | Bolivia | 2.22 |
| 131 | Paraguay | 2.21 |
| 132 | Nicaragua | 2.19 |
| 133 | Albania | 2.12 |
| 134 | Ghana | 2.10 |

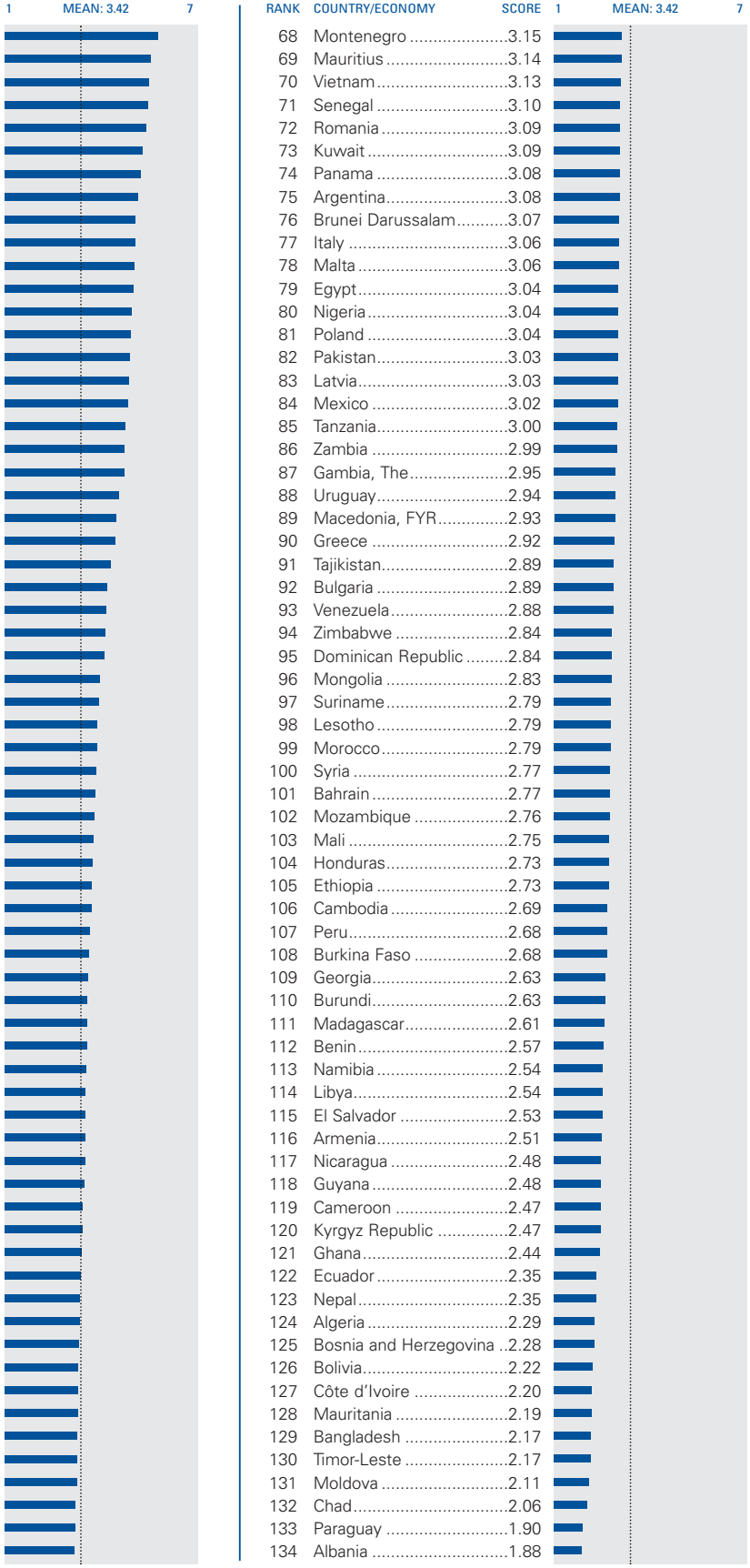



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 5.05 University-industry research collaboration

In its R&D activity, business collaboration with local universities is (1 = minimal or nonexistent, 7 = intensive and ongoing)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | United States | 5.85 |
| 2 | Switzerland | 5.63 |
| 3 | Sweden | 5.56 |
| 4 | Finland | 5.54 |
| 5 | Singapore | 5.47 |
| 6 | Germany | 5.37 |
| 7 | Denmark | 5.30 |
| 8 | Belgium | 5.23 |
| 9 | United Kingdom | 5.14 |
| 10 | Taiwan, China | 5.13 |
| 11 | Netherlands | 5.12 |
| 12 | Korea, Rep. | 5.07 |
| 13 | Austria | 5.03 |
| 14 | Canada | 4.98 |
| 15 | Iceland | 4.96 |
| 16 | Ireland | 4.94 |
| 17 | Norway | 4.92 |
| 18 | Israel | 4.81 |
| 19 | Australia | 4.79 |
| 20 | Malaysia | 4.78 |
| 21 | Japan | 4.61 |
| 22 | Hong Kong SAR | 4.53 |
| 23 | China | 4.51 |
| 24 | New Zealand | 4.35 |
| 25 | Qatar | 4.23 |
| 26 | Czech Republic | 4.20 |
| 27 | Puerto Rico | 4.19 |
| 28 | South Africa | 4.16 |
| 29 | Estonia | 4.01 |
| 30 | Hungary | 3.98 |
| 31 | Slovenia | 3.93 |
| 32 | France | 3.93 |
| 33 | Costa Rica | 3.90 |
| 34 | Luxembourg | 3.87 |
| 35 | Tunisia | 3.84 |
| 36 | Sri Lanka | 3.81 |
| 37 | Saudi Arabia | 3.77 |
| 38 | Thailand | 3.75 |
| 39 | Oman | 3.74 |
| 40 | Kenya | 3.70 |
| 41 | Barbados | 3.67 |
| 42 | Portugal | 3.64 |
| 43 | Croatia | 3.62 |
| 44 | Colombia | 3.61 |
| 45 | India | 3.60 |
| 46 | Spain | 3.57 |
| 47 | Azerbaijan | 3.56 |
| 48 | Russian Federation | 3.56 |
| 49 | Ukraine | 3.56 |
| 50 | Brazil | 3.55 |
| 51 | Chile | 3.51 |
| 52 | Guatemala | 3.47 |
| 53 | Lithuania | 3.47 |
| 54 | Indonesia | 3.45 |
| 55 | Jamaica | 3.42 |
| 56 | Slovak Republic | 3.39 |
| 57 | Turkey | 3.38 |
| 58 | United Arab Emirates | 3.35 |
| 59 | Cyprus | 3.33 |
| 60 | Jordan | 3.32 |
| 61 | Uganda | 3.31 |
| 62 | Serbia | 3.29 |
| 63 | Philippines | 3.29 |
| 64 | Kazakhstan | 3.28 |
| 65 | Malawi | 3.22 |
| 66 | Botswana | 3.22 |
| 67 | Trinidad and Tobago | 3.20 |
| 68 | Montenegro | 3.15 |
| 69 | Mauritius | 3.14 |
| 70 | Vietnam | 3.13 |
| 71 | Senegal | 3.10 |
| 72 | Romania | 3.09 |
| 73 | Kuwait | 3.09 |
| 74 | Panama | 3.08 |
| 75 | Argentina | 3.08 |
| 76 | Brunei Darussalam | 3.07 |
| 77 | Italy | 3.06 |
| 78 | Malta | 3.06 |
| 79 | Egypt | 3.04 |
| 80 | Nigeria | 3.04 |
| 81 | Poland | 3.04 |
| 82 | Pakistan | 3.03 |
| 83 | Latvia | 3.03 |
| 84 | Mexico | 3.02 |
| 85 | Tanzania | 3.00 |
| 86 | Zambia | 2.99 |
| 87 | Gambia, The | 2.95 |
| 88 | Uruguay | 2.94 |
| 89 | Macedonia, FYR | 2.93 |
| 90 | Greece | 2.92 |
| 91 | Tajikistan | 2.89 |
| 92 | Bulgaria | 2.89 |
| 93 | Venezuela | 2.88 |
| 94 | Zimbabwe | 2.84 |
| 95 | Dominican Republic | 2.84 |
| 96 | Mongolia | 2.83 |
| 97 | Suriname | 2.79 |
| 98 | Lesotho | 2.79 |
| 99 | Morocco | 2.79 |
| 100 | Syria | 2.77 |
| 101 | Bahrain | 2.77 |
| 102 | Mozambique | 2.76 |
| 103 | Mali | 2.75 |
| 104 | Honduras | 2.73 |
| 105 | Ethiopia | 2.73 |
| 106 | Cambodia | 2.69 |
| 107 | Peru | 2.68 |
| 108 | Burkina Faso | 2.68 |
| 109 | Georgia | 2.63 |
| 110 | Burundi | 2.63 |
| 111 | Madagascar | 2.61 |
| 112 | Benin | 2.57 |
| 113 | Namibia | 2.54 |
| 114 | Libya | 2.54 |
| 115 | El Salvador | 2.53 |
| 116 | Armenia | 2.51 |
| 117 | Nicaragua | 2.48 |
| 118 | Guyana | 2.48 |
| 119 | Cameroon | 2.47 |
| 120 | Kyrgyz Republic | 2.47 |
| 121 | Ghana | 2.44 |
| 122 | Ecuador | 2.35 |
| 123 | Nepal | 2.35 |
| 124 | Algeria | 2.29 |
| 125 | Bosnia and Herzegovina | 2.28 |
| 126 | Bolivia | 2.22 |
| 127 | Côte d'Ivoire | 2.20 |
| 128 | Mauritania | 2.19 |
| 129 | Bangladesh | 2.17 |
| 130 | Timor-Leste | 2.17 |
| 131 | Moldova | 2.11 |
| 132 | Chad | 2.06 |
| 133 | Paraguay | 1.90 |
| 134 | Albania | 1.88 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 5.06 Business telephone connection charge (hard data)

One-time business telephone connection charge (US$) as a percentage of GDP per capita | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Algeria | 0.00 |
| 1 | Romania | 0.00 |
| 3 | Czech Republic | 0.06 |
| 4 | Turkey[2] | 0.06 |
| 5 | Switzerland | 0.06 |
| 6 | Qatar | 0.07 |
| 7 | Iceland | 0.07 |
| 8 | Luxembourg[2] | 0.08 |
| 9 | Singapore | 0.09 |
| 10 | Ghana | 0.10 |
| 11 | Brunei Darussalam[2] | 0.10 |
| 12 | Australia | 0.11 |
| 13 | United Arab Emirates | 0.12 |
| 14 | New Zealand | 0.13 |
| 15 | Greece[2] | 0.15 |
| 16 | United States[2] | 0.16 |
| 17 | Oman[2] | 0.19 |
| 18 | France[2] | 0.19 |
| 19 | Trinidad and Tobago | 0.20 |
| 20 | Hong Kong SAR | 0.20 |
| 21 | Malaysia | 0.21 |
| 22 | Germany[2] | 0.21 |
| 23 | El Salvador | 0.21 |
| 24 | Norway[2] | 0.21 |
| 25 | Belgium[2] | 0.22 |
| 26 | Bahrain | 0.23 |
| 27 | Austria | 0.26 |
| 28 | Israel[2] | 0.27 |
| 29 | Spain[2] | 0.27 |
| 30 | Sweden | 0.28 |
| 31 | Ireland[2] | 0.29 |
| 32 | Finland[2] | 0.31 |
| 33 | Korea, Rep. | 0.32 |
| 34 | Denmark[1] | 0.33 |
| 35 | Jamaica[2] | 0.37 |
| 36 | Slovak Republic[2] | 0.39 |
| 37 | Barbados | 0.40 |
| 38 | Cyprus | 0.43 |
| 39 | Venezuela | 0.44 |
| 40 | Tunisia | 0.46 |
| 41 | United Kingdom | 0.46 |
| 42 | Estonia | 0.46 |
| 43 | Chile[1] | 0.49 |
| 44 | Brazil[1] | 0.50 |
| 45 | Saudi Arabia[2] | 0.53 |
| 46 | Puerto Rico[1] | 0.57 |
| 47 | Slovenia[2] | 0.59 |
| 48 | Italy[2] | 0.59 |
| 49 | Taiwan, China[1] | 0.60 |
| 50 | Portugal[2] | 0.62 |
| 51 | Uruguay | 0.64 |
| 52 | Costa Rica | 0.69 |
| 53 | Botswana | 0.69 |
| 54 | Argentina | 0.73 |
| 55 | Macedonia, FYR | 0.74 |
| 56 | Panama[2] | 0.77 |
| 57 | India | 0.77 |
| 58 | Kuwait[2] | 0.84 |
| 59 | Malta[2] | 0.88 |
| 60 | Colombia[2] | 0.92 |
| 61 | South Africa | 0.92 |
| 62 | Japan[2] | 0.92 |
| 63 | Croatia | 0.98 |
| 64 | Lithuania[2] | 1.02 |
| 65 | Namibia | 1.03 |
| 66 | Guyana | 1.05 |
| 67 | Poland[2] | 1.08 |
| 68 | Bulgaria[2] | 1.09 |
| 69 | Dominican Republic[2] | 1.10 |
| 70 | Mexico[2] | 1.14 |
| 71 | Mauritius | 1.16 |
| 72 | Latvia[2] | 1.23 |
| 73 | Libya[2] | 1.48 |
| 74 | Pakistan[2] | 1.52 |
| 75 | Hungary[2] | 1.52 |
| 76 | Syria[2] | 1.56 |
| 77 | Armenia | 1.58 |
| 78 | Ecuador | 1.80 |
| 79 | Mauritania | 1.94 |
| 80 | Côte d'Ivoire | 1.97 |
| 81 | Senegal | 2.28 |
| 82 | Montenegro[1] | 2.44 |
| 83 | Kazakhstan | 2.90 |
| 84 | Thailand[1] | 3.07 |
| 85 | Bosnia and Herzegovina[2] | 3.10 |
| 86 | Jordan | 3.15 |
| 87 | Serbia | 3.18 |
| 88 | Peru | 3.29 |
| 89 | Vietnam[2] | 3.46 |
| 90 | Paraguay | 3.51 |
| 91 | Indonesia[1] | 3.56 |
| 92 | Tanzania | 3.75 |
| 93 | Zambia | 3.99 |
| 94 | Honduras[2] | 4.17 |
| 95 | Mongolia[2] | 4.21 |
| 96 | Suriname[1] | 4.28 |
| 97 | Guatemala[2] | 4.33 |
| 98 | Tajikistan[1] | 4.43 |
| 99 | Malawi[1] | 4.57 |
| 100 | Philippines | 4.66 |
| 101 | Bolivia | 4.71 |
| 102 | Mozambique | 4.74 |
| 103 | Georgia[1] | 5.21 |
| 104 | Ukraine[2] | 5.68 |
| 105 | Morocco | 6.05 |
| 106 | Nigeria | 6.16 |
| 107 | Kenya | 6.47 |
| 108 | Lesotho | 6.73 |
| 109 | Russian Federation[1] | 7.17 |
| 110 | Nepal[2] | 7.43 |
| 111 | Mali | 7.87 |
| 112 | Madagascar | 8.04 |
| 113 | Azerbaijan[1] | 8.13 |
| 114 | Timor-Leste | 8.23 |
| 115 | Cambodia | 9.90 |
| 116 | Egypt | 10.31 |
| 117 | Burkina Faso | 10.61 |
| 118 | Sri Lanka | 11.00 |
| 119 | Moldova[2] | 13.62 |
| 120 | Chad[2] | 14.92 |
| 121 | Kyrgyz Republic[2] | 15.42 |
| 122 | Nicaragua | 17.20 |
| 123 | Ethiopia[2] | 17.35 |
| 124 | Uganda | 18.27 |
| 125 | Bangladesh | 18.36 |
| 126 | Cameroon | 19.02 |
| 127 | Burundi[2] | 48.56 |
| 128 | Benin | 51.74 |
| n/a | Albania | n/a |
| n/a | Canada | n/a |
| n/a | China | n/a |
| n/a | Gambia, The | n/a |
| n/a | Netherlands | n/a |
| n/a | Zimbabwe | n/a |

**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2008 edition); national sources

[1] 2005 [2] 2006

# 5.07 Business monthly telephone subscription (hard data)

Business monthly telephone subscription (US$) as a percentage of monthly GDP per capita | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Ghana | 0.05 |
| 2 | United Arab Emirates | 0.12 |
| 3 | Singapore | 0.19 |
| 4 | Romania | 0.19 |
| 5 | Serbia | 0.29 |
| 6 | Luxembourg[2] | 0.32 |
| 7 | Brunei Darussalam[2] | 0.32 |
| 8 | Bahrain[2] | 0.33 |
| 9 | Korea, Rep. | 0.34 |
| 10 | Norway[2] | 0.41 |
| 11 | Suriname[1] | 0.43 |
| 12 | Switzerland[2] | 0.45 |
| 13 | Finland[2] | 0.47 |
| 14 | Qatar | 0.49 |
| 15 | Syria[2] | 0.50 |
| 16 | Denmark[1] | 0.50 |
| 17 | Iceland | 0.54 |
| 18 | Israel[2] | 0.54 |
| 19 | Austria | 0.54 |
| 20 | Sweden | 0.57 |
| 21 | Netherlands[2] | 0.58 |
| 22 | Saudi Arabia[2] | 0.64 |
| 23 | Oman[2] | 0.67 |
| 24 | Germany[2] | 0.68 |
| 25 | France[2] | 0.68 |
| 26 | El Salvador | 0.68 |
| 27 | Belgium[2] | 0.69 |
| 28 | Ireland[2] | 0.69 |
| 29 | Taiwan, China[1] | 0.71 |
| 30 | Hong Kong SAR | 0.71 |
| 31 | Spain[2] | 0.72 |
| 32 | Tunisia | 0.73 |
| 33 | Japan[2] | 0.75 |
| 34 | Greece[2] | 0.77 |
| 35 | Kuwait[2] | 0.78 |
| 36 | Estonia | 0.81 |
| 37 | Australia | 0.81 |
| 38 | Cyprus | 0.85 |
| 39 | Slovenia[2] | 0.92 |
| 40 | Costa Rica | 0.96 |
| 41 | Canada[1] | 1.02 |
| 42 | Hungary | 1.05 |
| 43 | Colombia[2] | 1.10 |
| 44 | Thailand[1] | 1.10 |
| 45 | Portugal[2] | 1.23 |
| 46 | United States[2] | 1.23 |
| 47 | Italy[2] | 1.25 |
| 48 | China | 1.27 |
| 49 | Puerto Rico | 1.29 |
| 50 | Chile[1] | 1.37 |
| 51 | Lithuania[2] | 1.38 |
| 52 | Kazakhstan | 1.38 |
| 53 | Croatia | 1.42 |
| 54 | Libya[2] | 1.48 |
| 55 | Malta[2] | 1.49 |
| 56 | New Zealand | 1.51 |
| 57 | Argentina | 1.52 |
| 58 | Mauritius | 1.57 |
| 59 | Slovak Republic[2] | 1.62 |
| 60 | Russian Federation[1] | 1.67 |
| 61 | Poland[2] | 1.72 |
| 62 | Latvia[2] | 1.75 |
| 63 | Venezuela | 1.86 |
| 64 | Egypt | 1.98 |
| 65 | United Kingdom | 2.13 |
| 66 | Barbados | 2.23 |
| 67 | Mexico | 2.24 |
| 68 | Czech Republic[2] | 2.26 |
| 69 | Malaysia | 2.26 |
| 70 | Albania[1] | 2.30 |
| 71 | Ukraine[2] | 2.62 |
| 72 | Algeria | 2.66 |
| 73 | Vietnam[2] | 2.80 |
| 74 | Trinidad and Tobago | 2.96 |
| 75 | Bangladesh | 3.01 |
| 76 | Guatemala[2] | 3.04 |
| 77 | Namibia | 3.07 |
| 78 | Botswana | 3.08 |
| 79 | Bulgaria[2] | 3.08 |
| 80 | Panama[2] | 3.44 |
| 81 | Uruguay[2] | 3.45 |
| 82 | Dominican Republic[2] | 3.48 |
| 83 | India | 3.70 |
| 84 | Paraguay | 3.71 |
| 85 | Moldova[2] | 3.81 |
| 86 | Turkey[2] | 3.84 |
| 87 | Bosnia and Herzegovina[2] | 3.96 |
| 88 | Burundi[2] | 4.08 |
| 89 | Pakistan[2] | 4.24 |
| 90 | South Africa | 4.28 |
| 91 | Ecuador | 4.32 |
| 92 | Honduras[2] | 4.34 |
| 93 | Georgia[1] | 4.46 |
| 94 | Malawi[1] | 4.57 |
| 95 | Mongolia[2] | 4.63 |
| 96 | Macedonia, FYR | 5.01 |
| 97 | Indonesia[1] | 5.46 |
| 98 | Peru | 5.61 |
| 99 | Azerbaijan[1] | 5.69 |
| 100 | Nigeria | 5.75 |
| 101 | Mauritania | 6.05 |
| 102 | Tajikistan[1] | 6.17 |
| 103 | Bolivia[2] | 6.25 |
| 104 | Guyana | 6.31 |
| 105 | Armenia | 6.33 |
| 106 | Brazil[1] | 6.49 |
| 107 | Jordan | 6.55 |
| 108 | Jamaica[1] | 6.60 |
| 109 | Kyrgyz Republic[2] | 6.79 |
| 110 | Cameroon | 6.85 |
| 111 | Sri Lanka | 8.35 |
| 112 | Morocco | 8.71 |
| 113 | Senegal[2] | 9.26 |
| 114 | Benin | 9.82 |
| 115 | Nepal[2] | 9.90 |
| 116 | Tanzania | 11.25 |
| 117 | Kenya | 11.43 |
| 118 | Ethiopia[2] | 11.61 |
| 119 | Chad[2] | 11.93 |
| 120 | Burkina Faso | 12.73 |
| 121 | Zambia | 12.78 |
| 122 | Cambodia | 12.87 |
| 123 | Montenegro[2] | 13.20 |
| 124 | Nicaragua | 13.76 |
| 125 | Lesotho | 14.40 |
| 126 | Côte d'Ivoire | 16.77 |
| 127 | Uganda | 18.27 |
| 128 | Madagascar | 19.62 |
| 129 | Philippines | 20.15 |
| 130 | Mali | 21.20 |
| 131 | Mozambique | 26.34 |
| 132 | Timor-Leste | 46.99 |
| n/a | Gambia, The | n/a |
| n/a | Zimbabwe | n/a |

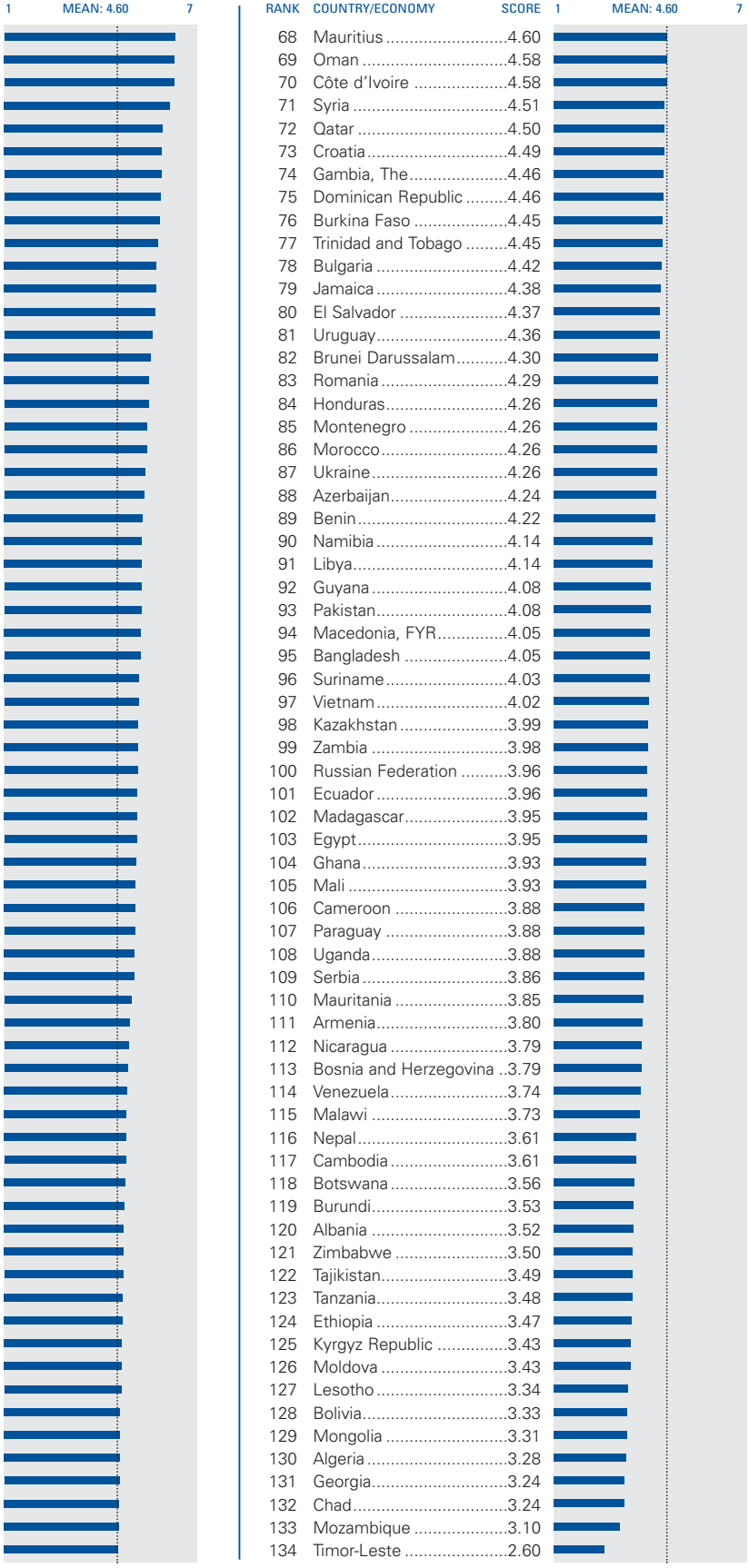
**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2008 edition); national sources

[1] 2005 [2] 2006

# 5.08 Local supplier quality

The quality of local suppliers in your country is (1 = poor, as they are inefficient and have little technological capability, 7 = very good, as they are internationally competitive and assist in new product and process development)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Austria | 6.41 |
| 2 | Germany | 6.40 |
| 3 | Switzerland | 6.39 |
| 4 | Japan | 6.25 |
| 5 | Belgium | 6.02 |
| 6 | Netherlands | 6.00 |
| 7 | United States | 5.98 |
| 8 | Sweden | 5.95 |
| 9 | Denmark | 5.92 |
| 10 | France | 5.87 |
| 11 | Norway | 5.83 |
| 12 | Canada | 5.83 |
| 13 | Finland | 5.79 |
| 14 | Australia | 5.69 |
| 15 | Taiwan, China | 5.66 |
| 16 | Puerto Rico | 5.59 |
| 17 | Hong Kong SAR | 5.58 |
| 18 | Ireland | 5.52 |
| 19 | Iceland | 5.52 |
| 20 | New Zealand | 5.46 |
| 21 | Czech Republic | 5.43 |
| 22 | Singapore | 5.39 |
| 23 | United Kingdom | 5.37 |
| 24 | South Africa | 5.37 |
| 25 | Spain | 5.35 |
| 26 | Italy | 5.35 |
| 27 | Israel | 5.33 |
| 28 | Chile | 5.32 |
| 29 | Korea, Rep. | 5.27 |
| 30 | Kuwait | 5.26 |
| 31 | Slovenia | 5.25 |
| 32 | Malaysia | 5.25 |
| 33 | Luxembourg | 5.23 |
| 34 | United Arab Emirates | 5.22 |
| 35 | Estonia | 5.21 |
| 36 | Lithuania | 5.20 |
| 37 | India | 5.19 |
| 38 | Bahrain | 5.16 |
| 39 | Costa Rica | 5.16 |
| 40 | Thailand | 5.15 |
| 41 | Brazil | 5.14 |
| 42 | Cyprus | 5.13 |
| 43 | Guatemala | 5.03 |
| 44 | Tunisia | 4.97 |
| 45 | Colombia | 4.94 |
| 46 | Mexico | 4.92 |
| 47 | Sri Lanka | 4.91 |
| 48 | Senegal | 4.88 |
| 49 | Saudi Arabia | 4.87 |
| 50 | Portugal | 4.86 |
| 51 | Slovak Republic | 4.84 |
| 52 | Malta | 4.81 |
| 53 | Panama | 4.78 |
| 54 | Peru | 4.78 |
| 55 | Turkey | 4.77 |
| 56 | Jordan | 4.76 |
| 57 | Indonesia | 4.75 |
| 58 | Barbados | 4.73 |
| 59 | Poland | 4.72 |
| 60 | Nigeria | 4.71 |
| 61 | Greece | 4.68 |
| 62 | China | 4.68 |
| 63 | Hungary | 4.67 |
| 64 | Philippines | 4.66 |
| 65 | Argentina | 4.65 |
| 66 | Kenya | 4.64 |
| 67 | Latvia | 4.62 |
| 68 | Mauritius | 4.60 |
| 69 | Oman | 4.58 |
| 70 | Côte d'Ivoire | 4.58 |
| 71 | Syria | 4.51 |
| 72 | Qatar | 4.50 |
| 73 | Croatia | 4.49 |
| 74 | Gambia, The | 4.46 |
| 75 | Dominican Republic | 4.46 |
| 76 | Burkina Faso | 4.45 |
| 77 | Trinidad and Tobago | 4.45 |
| 78 | Bulgaria | 4.42 |
| 79 | Jamaica | 4.38 |
| 80 | El Salvador | 4.37 |
| 81 | Uruguay | 4.36 |
| 82 | Brunei Darussalam | 4.30 |
| 83 | Romania | 4.29 |
| 84 | Honduras | 4.26 |
| 85 | Montenegro | 4.26 |
| 86 | Morocco | 4.26 |
| 87 | Ukraine | 4.26 |
| 88 | Azerbaijan | 4.24 |
| 89 | Benin | 4.22 |
| 90 | Namibia | 4.14 |
| 91 | Libya | 4.14 |
| 92 | Guyana | 4.08 |
| 93 | Pakistan | 4.08 |
| 94 | Macedonia, FYR | 4.05 |
| 95 | Bangladesh | 4.05 |
| 96 | Suriname | 4.03 |
| 97 | Vietnam | 4.02 |
| 98 | Kazakhstan | 3.99 |
| 99 | Zambia | 3.98 |
| 100 | Russian Federation | 3.96 |
| 101 | Ecuador | 3.96 |
| 102 | Madagascar | 3.95 |
| 103 | Egypt | 3.95 |
| 104 | Ghana | 3.93 |
| 105 | Mali | 3.93 |
| 106 | Cameroon | 3.88 |
| 107 | Paraguay | 3.88 |
| 108 | Uganda | 3.88 |
| 109 | Serbia | 3.86 |
| 110 | Mauritania | 3.85 |
| 111 | Armenia | 3.80 |
| 112 | Nicaragua | 3.79 |
| 113 | Bosnia and Herzegovina | 3.79 |
| 114 | Venezuela | 3.74 |
| 115 | Malawi | 3.73 |
| 116 | Nepal | 3.61 |
| 117 | Cambodia | 3.61 |
| 118 | Botswana | 3.56 |
| 119 | Burundi | 3.53 |
| 120 | Albania | 3.52 |
| 121 | Zimbabwe | 3.50 |
| 122 | Tajikistan | 3.49 |
| 123 | Tanzania | 3.48 |
| 124 | Ethiopia | 3.47 |
| 125 | Kyrgyz Republic | 3.43 |
| 126 | Moldova | 3.43 |
| 127 | Lesotho | 3.34 |
| 128 | Bolivia | 3.33 |
| 129 | Mongolia | 3.31 |
| 130 | Algeria | 3.28 |
| 131 | Georgia | 3.24 |
| 132 | Chad | 3.24 |
| 133 | Mozambique | 3.10 |
| 134 | Timor-Leste | 2.60 |

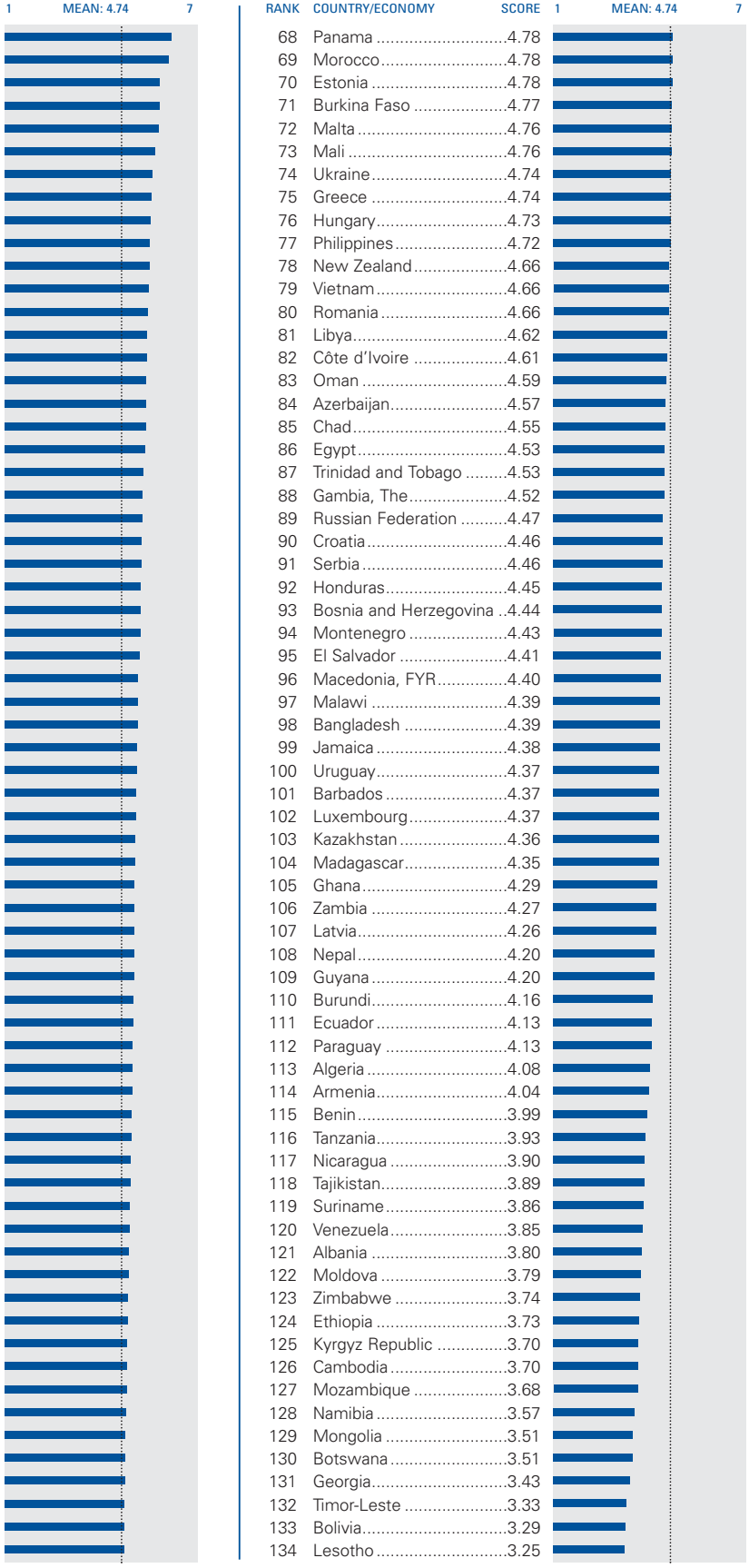



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 5.09 Local supplier quantity

Local suppliers in your country are (1 = largely nonexistent, 7 = numerous and include the most important materials, components, equipment, and services)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Japan | 6.28 |
| 2 | Germany | 6.20 |
| 3 | Austria | 5.91 |
| 4 | India | 5.91 |
| 5 | Switzerland | 5.88 |
| 6 | United States | 5.77 |
| 7 | France | 5.68 |
| 8 | Czech Republic | 5.65 |
| 9 | Kuwait | 5.64 |
| 10 | Spain | 5.61 |
| 11 | Netherlands | 5.60 |
| 12 | Belgium | 5.58 |
| 13 | Brazil | 5.53 |
| 14 | Hong Kong SAR | 5.52 |
| 15 | Denmark | 5.51 |
| 16 | Malaysia | 5.49 |
| 17 | Canada | 5.48 |
| 18 | China | 5.47 |
| 19 | Sweden | 5.44 |
| 20 | Chile | 5.39 |
| 21 | Tunisia | 5.37 |
| 22 | Norway | 5.36 |
| 23 | Korea, Rep. | 5.34 |
| 24 | Finland | 5.33 |
| 25 | Thailand | 5.32 |
| 26 | Taiwan, China | 5.31 |
| 27 | Italy | 5.31 |
| 28 | Slovak Republic | 5.28 |
| 29 | Lithuania | 5.22 |
| 30 | Jordan | 5.22 |
| 31 | United Arab Emirates | 5.21 |
| 32 | Turkey | 5.18 |
| 33 | Ireland | 5.18 |
| 34 | Kenya | 5.17 |
| 35 | Puerto Rico | 5.16 |
| 36 | Saudi Arabia | 5.15 |
| 37 | Qatar | 5.13 |
| 38 | Senegal | 5.12 |
| 39 | Syria | 5.12 |
| 40 | Costa Rica | 5.11 |
| 41 | United Kingdom | 5.10 |
| 42 | Australia | 5.10 |
| 43 | South Africa | 5.09 |
| 44 | Singapore | 5.08 |
| 45 | Guatemala | 5.06 |
| 46 | Colombia | 5.05 |
| 47 | Bahrain | 5.04 |
| 48 | Iceland | 5.01 |
| 49 | Sri Lanka | 5.01 |
| 50 | Indonesia | 4.99 |
| 51 | Poland | 4.98 |
| 52 | Peru | 4.97 |
| 53 | Israel | 4.95 |
| 54 | Portugal | 4.93 |
| 55 | Mexico | 4.93 |
| 56 | Cameroon | 4.92 |
| 57 | Dominican Republic | 4.91 |
| 58 | Slovenia | 4.89 |
| 59 | Mauritania | 4.89 |
| 60 | Cyprus | 4.88 |
| 61 | Bulgaria | 4.84 |
| 62 | Argentina | 4.83 |
| 63 | Brunei Darussalam | 4.83 |
| 64 | Mauritius | 4.82 |
| 65 | Nigeria | 4.80 |
| 66 | Pakistan | 4.79 |
| 67 | Uganda | 4.79 |
| 68 | Panama | 4.78 |
| 69 | Morocco | 4.78 |
| 70 | Estonia | 4.78 |
| 71 | Burkina Faso | 4.77 |
| 72 | Malta | 4.76 |
| 73 | Mali | 4.76 |
| 74 | Ukraine | 4.74 |
| 75 | Greece | 4.74 |
| 76 | Hungary | 4.73 |
| 77 | Philippines | 4.72 |
| 78 | New Zealand | 4.66 |
| 79 | Vietnam | 4.66 |
| 80 | Romania | 4.66 |
| 81 | Libya | 4.62 |
| 82 | Côte d'Ivoire | 4.61 |
| 83 | Oman | 4.59 |
| 84 | Azerbaijan | 4.57 |
| 85 | Chad | 4.55 |
| 86 | Egypt | 4.53 |
| 87 | Trinidad and Tobago | 4.53 |
| 88 | Gambia, The | 4.52 |
| 89 | Russian Federation | 4.47 |
| 90 | Croatia | 4.46 |
| 91 | Serbia | 4.46 |
| 92 | Honduras | 4.45 |
| 93 | Bosnia and Herzegovina | 4.44 |
| 94 | Montenegro | 4.43 |
| 95 | El Salvador | 4.41 |
| 96 | Macedonia, FYR | 4.40 |
| 97 | Malawi | 4.39 |
| 98 | Bangladesh | 4.39 |
| 99 | Jamaica | 4.38 |
| 100 | Uruguay | 4.37 |
| 101 | Barbados | 4.37 |
| 102 | Luxembourg | 4.37 |
| 103 | Kazakhstan | 4.36 |
| 104 | Madagascar | 4.35 |
| 105 | Ghana | 4.29 |
| 106 | Zambia | 4.27 |
| 107 | Latvia | 4.26 |
| 108 | Nepal | 4.20 |
| 109 | Guyana | 4.20 |
| 110 | Burundi | 4.16 |
| 111 | Ecuador | 4.13 |
| 112 | Paraguay | 4.13 |
| 113 | Algeria | 4.08 |
| 114 | Armenia | 4.04 |
| 115 | Benin | 3.99 |
| 116 | Tanzania | 3.93 |
| 117 | Nicaragua | 3.90 |
| 118 | Tajikistan | 3.89 |
| 119 | Suriname | 3.86 |
| 120 | Venezuela | 3.85 |
| 121 | Albania | 3.80 |
| 122 | Moldova | 3.79 |
| 123 | Zimbabwe | 3.74 |
| 124 | Ethiopia | 3.73 |
| 125 | Kyrgyz Republic | 3.70 |
| 126 | Cambodia | 3.70 |
| 127 | Mozambique | 3.68 |
| 128 | Namibia | 3.57 |
| 129 | Mongolia | 3.51 |
| 130 | Botswana | 3.51 |
| 131 | Georgia | 3.43 |
| 132 | Timor-Leste | 3.33 |
| 133 | Bolivia | 3.29 |
| 134 | Lesotho | 3.25 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 5.10 Computer, communications, and other services imports (hard data)

Computer, communications, and other services as percentage of total commercial services imports | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Ireland | 70.60 |
| 2 | Azerbaijan | 69.94 |
| 3 | Saudi Arabia[3] | 69.65 |
| 4 | Suriname | 68.21 |
| 5 | Kazakhstan | 68.02 |
| 6 | Nigeria[2] | 64.20 |
| 7 | Hungary[3] | 56.48 |
| 8 | Netherlands | 52.86 |
| 9 | Finland | 52.38 |
| 10 | Gambia, The[3] | 51.74 |
| 11 | Sweden[3] | 50.88 |
| 12 | Italy | 49.68 |
| 13 | Croatia | 48.09 |
| 14 | Israel | 47.33 |
| 15 | Slovenia | 47.05 |
| 16 | Spain | 46.82 |
| 17 | Malta | 46.54 |
| 18 | Brazil | 45.63 |
| 19 | Cameroon[1] | 44.15 |
| 20 | Japan | 43.99 |
| 21 | Belgium | 42.78 |
| 22 | Czech Republic[3] | 42.46 |
| 23 | India[3] | 42.07 |
| 24 | Russian Federation | 41.20 |
| 25 | Macedonia, FYR[3] | 40.38 |
| 26 | Switzerland | 40.32 |
| 27 | Singapore[3] | 39.45 |
| 28 | Oman[3] | 39.36 |
| 29 | Pakistan | 39.21 |
| 30 | France | 39.18 |
| 31 | Zambia | 38.58 |
| 32 | Malaysia | 38.35 |
| 33 | Poland | 38.20 |
| 34 | Germany[3] | 37.50 |
| 35 | Indonesia | 36.58 |
| 36 | United Kingdom | 36.34 |
| 37 | Korea, Rep. | 36.27 |
| 38 | Mozambique[3] | 35.91 |
| 39 | Austria | 35.59 |
| 40 | Portugal[3] | 34.99 |
| 41 | Denmark[1] | 34.84 |
| 42 | Madagascar[2] | 34.66 |
| 43 | Canada | 34.50 |
| 44 | Romania | 34.34 |
| 45 | Thailand | 34.03 |
| 46 | Estonia | 33.08 |
| 47 | United States | 32.37 |
| 48 | Latvia | 32.10 |
| 49 | China[3] | 31.81 |
| 50 | Ethiopia[3] | 30.98 |
| 51 | Namibia[3] | 30.79 |
| 52 | Jamaica[3] | 30.45 |
| 53 | Uganda | 29.63 |
| 54 | Mauritius[3] | 29.35 |
| 55 | Tajikistan[3] | 28.93 |
| 56 | New Zealand | 28.67 |
| 57 | Morocco[3] | 28.59 |
| 58 | Egypt[3] | 28.52 |
| 59 | Argentina | 28.39 |
| 60 | Norway | 26.99 |
| 61 | Guyana[3] | 26.71 |
| 62 | Senegal[1] | 25.63 |
| 63 | Australia | 25.02 |
| 64 | Costa Rica | 24.98 |
| 65 | Côte d'Ivoire | 24.87 |
| 66 | Botswana[3] | 24.68 |
| 67 | Colombia | 24.21 |
| 68 | South Africa | 23.86 |
| 69 | Ukraine | 23.55 |
| 70 | Uruguay | 23.48 |
| 71 | Hong Kong SAR[3] | 23.35 |
| 72 | Brunei Darussalam[3] | 23.31 |
| 73 | Peru[3] | 23.29 |
| 74 | Bulgaria | 23.17 |
| 75 | Iceland | 23.11 |
| 76 | Kyrgyz Republic | 22.82 |
| 77 | Honduras[3] | 22.78 |
| 78 | Ecuador[3] | 21.37 |
| 79 | Cambodia | 20.77 |
| 80 | Tunisia[3] | 20.76 |
| 81 | Luxembourg | 20.69 |
| 82 | Moldova | 20.56 |
| 83 | Ghana[3] | 19.96 |
| 84 | Kenya[3] | 19.86 |
| 85 | Venezuela | 19.62 |
| 86 | Cyprus | 19.30 |
| 87 | Philippines[3] | 19.17 |
| 88 | Barbados[2] | 19.16 |
| 89 | Greece[3] | 19.15 |
| 90 | Chile | 18.88 |
| 91 | Albania[3] | 18.13 |
| 92 | Bolivia[3] | 17.79 |
| 93 | Nepal | 17.38 |
| 94 | Turkey[3] | 17.01 |
| 95 | Tanzania[3] | 16.77 |
| 96 | Mali[3] | 16.75 |
| 97 | Sri Lanka[3] | 16.25 |
| 98 | El Salvador[3] | 15.70 |
| 99 | Lithuania[3] | 15.41 |
| 100 | Trinidad and Tobago[2] | 14.63 |
| 101 | Bangladesh | 13.61 |
| 102 | Benin[2] | 13.48 |
| 103 | Nicaragua[3] | 13.20 |
| 104 | Bosnia and Herzegovina | 12.25 |
| 105 | Libya[3] | 11.88 |
| 106 | Bahrain[3] | 11.70 |
| 107 | Syria[3] | 11.16 |
| 108 | Panama | 10.95 |
| 109 | Mongolia[3] | 10.11 |
| 110 | Jordan[3] | 9.65 |
| 111 | Armenia | 8.95 |
| 112 | Mexico[3] | 8.44 |
| 113 | Georgia | 7.60 |
| 114 | Dominican Republic | 7.55 |
| 115 | Guatemala[3] | 5.06 |
| 116 | Burundi[3] | 5.03 |
| 117 | Paraguay[3] | 3.31 |
| 118 | Lesotho[3] | 1.99 |
| 119 | Kuwait[3] | 1.62 |
| n/a | Algeria | n/a |
| n/a | Burkina Faso | n/a |
| n/a | Chad | n/a |
| n/a | Malawi | n/a |
| n/a | Mauritania | n/a |
| n/a | Montenegro | n/a |
| n/a | Puerto Rico | n/a |
| n/a | Qatar | n/a |
| n/a | Serbia | n/a |
| n/a | Slovak Republic | n/a |
| n/a | Taiwan, China | n/a |
| n/a | Timor-Leste | n/a |
| n/a | United Arab Emirates | n/a |
| n/a | Vietnam | n/a |
| n/a | Zimbabwe | n/a |

**SOURCE:** The World Bank, *World Development Indicators Online Database* (retrieved October 20, 2008)

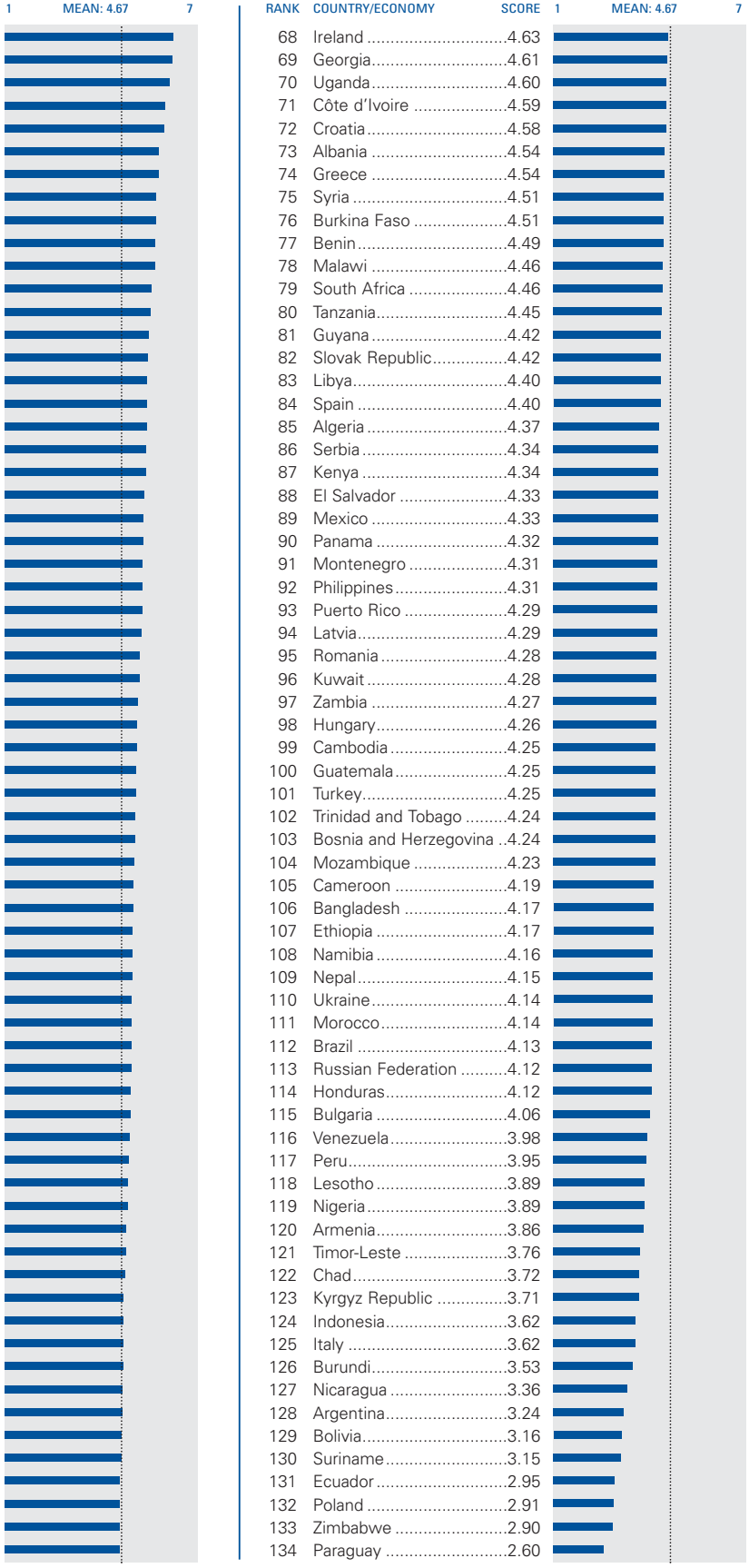
[1] 2004 [2] 2005 [3] 2006

# 6th pillar
# Government readiness

# 6.01 Government prioritization of ICT

Information and communication technologies (computers, Internet, etc.) are an overall priority for the government (1 = strongly disagree, 7 = strongly agree)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Singapore | 6.34 |
| 2 | Malta | 6.33 |
| 3 | Denmark | 6.23 |
| 4 | Estonia | 6.10 |
| 5 | United Arab Emirates | 6.05 |
| 6 | Iceland | 5.90 |
| 7 | Sweden | 5.90 |
| 8 | Tunisia | 5.80 |
| 9 | Portugal | 5.80 |
| 10 | Malaysia | 5.77 |
| 11 | Finland | 5.76 |
| 12 | Taiwan, China | 5.65 |
| 13 | Korea, Rep. | 5.62 |
| 14 | Norway | 5.56 |
| 15 | Qatar | 5.55 |
| 16 | Gambia, The | 5.52 |
| 17 | Jordan | 5.52 |
| 18 | United States | 5.51 |
| 19 | Barbados | 5.48 |
| 20 | Hong Kong SAR | 5.48 |
| 21 | Bahrain | 5.42 |
| 22 | Israel | 5.41 |
| 23 | Luxembourg | 5.39 |
| 24 | India | 5.38 |
| 25 | Mauritius | 5.37 |
| 26 | Australia | 5.36 |
| 27 | Switzerland | 5.35 |
| 28 | Austria | 5.27 |
| 29 | Dominican Republic | 5.27 |
| 30 | Brunei Darussalam | 5.21 |
| 31 | Mali | 5.18 |
| 32 | Egypt | 5.18 |
| 33 | Saudi Arabia | 5.17 |
| 34 | Sri Lanka | 5.16 |
| 35 | Azerbaijan | 5.14 |
| 36 | Senegal | 5.14 |
| 37 | Canada | 5.12 |
| 38 | China | 5.07 |
| 39 | Mongolia | 5.07 |
| 40 | Uruguay | 5.05 |
| 41 | Japan | 5.04 |
| 42 | Ghana | 5.04 |
| 43 | Vietnam | 5.03 |
| 44 | United Kingdom | 5.03 |
| 45 | Cyprus | 5.03 |
| 46 | Oman | 5.02 |
| 47 | France | 4.99 |
| 48 | Costa Rica | 4.99 |
| 49 | Germany | 4.97 |
| 50 | Netherlands | 4.94 |
| 51 | Mauritania | 4.91 |
| 52 | Botswana | 4.91 |
| 53 | Tajikistan | 4.86 |
| 54 | Chile | 4.84 |
| 55 | Jamaica | 4.83 |
| 56 | Macedonia, FYR | 4.77 |
| 57 | Pakistan | 4.77 |
| 58 | Belgium | 4.75 |
| 59 | New Zealand | 4.75 |
| 60 | Colombia | 4.73 |
| 61 | Czech Republic | 4.72 |
| 62 | Madagascar | 4.71 |
| 63 | Slovenia | 4.69 |
| 64 | Moldova | 4.66 |
| 65 | Lithuania | 4.64 |
| 66 | Kazakhstan | 4.64 |
| 67 | Thailand | 4.64 |
| 68 | Ireland | 4.63 |
| 69 | Georgia | 4.61 |
| 70 | Uganda | 4.60 |
| 71 | Côte d'Ivoire | 4.59 |
| 72 | Croatia | 4.58 |
| 73 | Albania | 4.54 |
| 74 | Greece | 4.54 |
| 75 | Syria | 4.51 |
| 76 | Burkina Faso | 4.51 |
| 77 | Benin | 4.49 |
| 78 | Malawi | 4.46 |
| 79 | South Africa | 4.46 |
| 80 | Tanzania | 4.45 |
| 81 | Guyana | 4.42 |
| 82 | Slovak Republic | 4.42 |
| 83 | Libya | 4.40 |
| 84 | Spain | 4.40 |
| 85 | Algeria | 4.37 |
| 86 | Serbia | 4.34 |
| 87 | Kenya | 4.34 |
| 88 | El Salvador | 4.33 |
| 89 | Mexico | 4.33 |
| 90 | Panama | 4.32 |
| 91 | Montenegro | 4.31 |
| 92 | Philippines | 4.31 |
| 93 | Puerto Rico | 4.29 |
| 94 | Latvia | 4.29 |
| 95 | Romania | 4.28 |
| 96 | Kuwait | 4.28 |
| 97 | Zambia | 4.27 |
| 98 | Hungary | 4.26 |
| 99 | Cambodia | 4.25 |
| 100 | Guatemala | 4.25 |
| 101 | Turkey | 4.25 |
| 102 | Trinidad and Tobago | 4.24 |
| 103 | Bosnia and Herzegovina | 4.24 |
| 104 | Mozambique | 4.23 |
| 105 | Cameroon | 4.19 |
| 106 | Bangladesh | 4.17 |
| 107 | Ethiopia | 4.17 |
| 108 | Namibia | 4.16 |
| 109 | Nepal | 4.15 |
| 110 | Ukraine | 4.14 |
| 111 | Morocco | 4.14 |
| 112 | Brazil | 4.13 |
| 113 | Russian Federation | 4.12 |
| 114 | Honduras | 4.12 |
| 115 | Bulgaria | 4.06 |
| 116 | Venezuela | 3.98 |
| 117 | Peru | 3.95 |
| 118 | Lesotho | 3.89 |
| 119 | Nigeria | 3.89 |
| 120 | Armenia | 3.86 |
| 121 | Timor-Leste | 3.76 |
| 122 | Chad | 3.72 |
| 123 | Kyrgyz Republic | 3.71 |
| 124 | Indonesia | 3.62 |
| 125 | Italy | 3.62 |
| 126 | Burundi | 3.53 |
| 127 | Nicaragua | 3.36 |
| 128 | Argentina | 3.24 |
| 129 | Bolivia | 3.16 |
| 130 | Suriname | 3.15 |
| 131 | Ecuador | 2.95 |
| 132 | Poland | 2.91 |
| 133 | Zimbabwe | 2.90 |
| 134 | Paraguay | 2.60 |

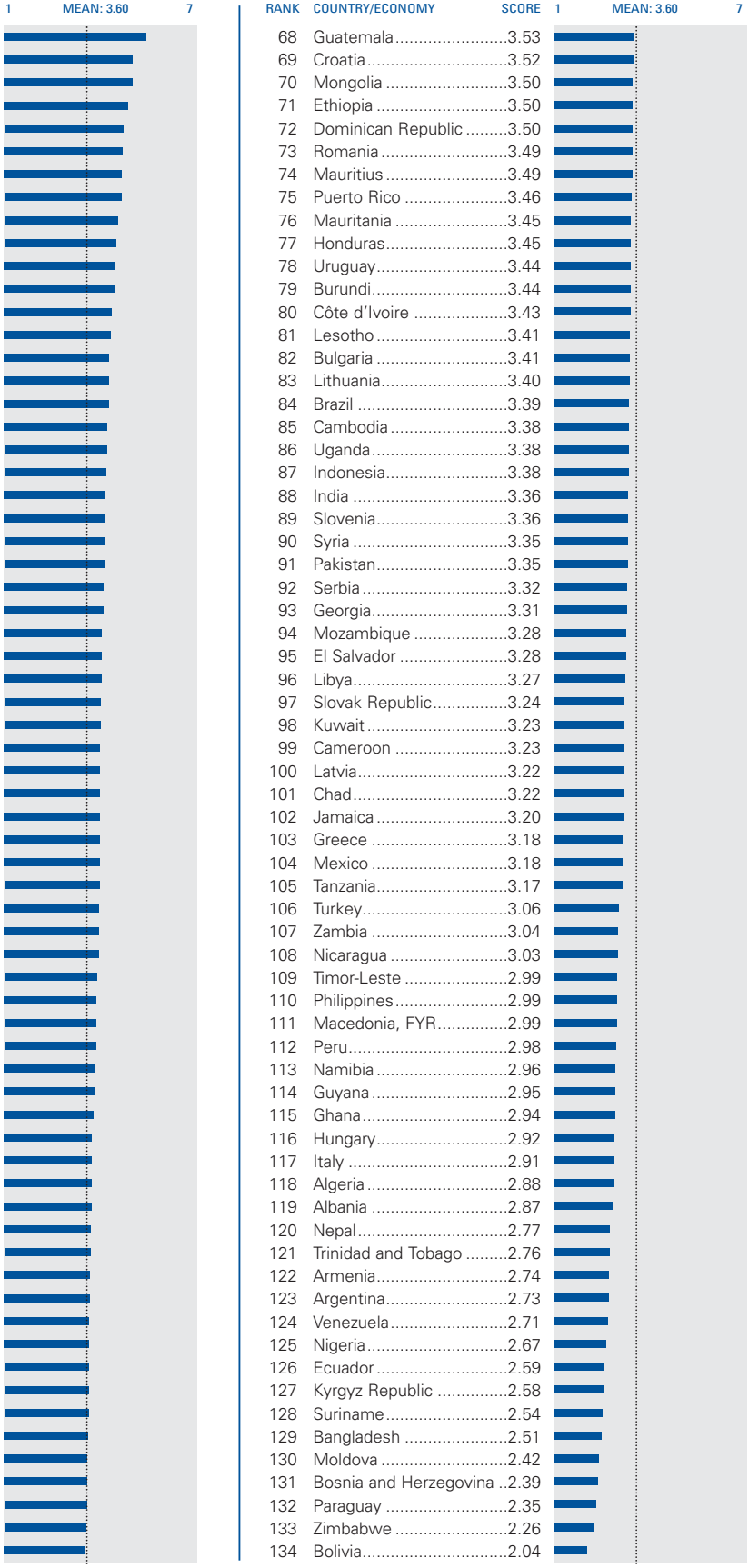



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 6.02 Government procurement of advanced technology products

Government purchase decisions for the procurement of advanced technology products are (1 = based solely on price, 7 = based on technical performance and innovativeness)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Singapore | 5.51 |
| 2 | Korea, Rep. | 5.08 |
| 3 | Tunisia | 5.07 |
| 4 | United States | 4.93 |
| 5 | Israel | 4.77 |
| 6 | Malaysia | 4.75 |
| 7 | Finland | 4.73 |
| 8 | Sweden | 4.71 |
| 9 | Qatar | 4.60 |
| 10 | Denmark | 4.54 |
| 11 | United Arab Emirates | 4.53 |
| 12 | Taiwan, China | 4.53 |
| 13 | Iceland | 4.41 |
| 14 | Luxembourg | 4.38 |
| 15 | Saudi Arabia | 4.33 |
| 16 | Norway | 4.33 |
| 17 | Hong Kong SAR | 4.32 |
| 18 | Estonia | 4.26 |
| 19 | France | 4.25 |
| 20 | China | 4.22 |
| 21 | Vietnam | 4.19 |
| 22 | Oman | 4.19 |
| 23 | Azerbaijan | 4.17 |
| 24 | Senegal | 4.17 |
| 25 | Mali | 4.16 |
| 26 | Switzerland | 4.15 |
| 27 | Bahrain | 4.10 |
| 28 | Madagascar | 4.09 |
| 29 | Canada | 4.09 |
| 30 | Australia | 4.05 |
| 31 | Portugal | 4.05 |
| 32 | United Kingdom | 4.04 |
| 33 | Jordan | 4.04 |
| 34 | Germany | 4.04 |
| 35 | Czech Republic | 4.03 |
| 36 | Cyprus | 4.03 |
| 37 | Netherlands | 4.03 |
| 38 | Costa Rica | 4.02 |
| 39 | Gambia, The | 4.01 |
| 40 | Austria | 4.00 |
| 41 | Belgium | 4.00 |
| 42 | Japan | 3.94 |
| 43 | Ireland | 3.92 |
| 44 | Malta | 3.91 |
| 45 | Brunei Darussalam | 3.91 |
| 46 | Colombia | 3.90 |
| 47 | Burkina Faso | 3.89 |
| 48 | Thailand | 3.83 |
| 49 | Benin | 3.77 |
| 50 | Botswana | 3.77 |
| 51 | Sri Lanka | 3.77 |
| 52 | Panama | 3.77 |
| 53 | Chile | 3.75 |
| 54 | Ukraine | 3.73 |
| 55 | Spain | 3.72 |
| 56 | Kenya | 3.71 |
| 57 | Egypt | 3.70 |
| 58 | Morocco | 3.69 |
| 59 | Kazakhstan | 3.68 |
| 60 | Malawi | 3.68 |
| 61 | Tajikistan | 3.68 |
| 62 | Poland | 3.66 |
| 63 | South Africa | 3.64 |
| 64 | New Zealand | 3.63 |
| 65 | Barbados | 3.62 |
| 66 | Russian Federation | 3.59 |
| 67 | Montenegro | 3.54 |
| 68 | Guatemala | 3.53 |
| 69 | Croatia | 3.52 |
| 70 | Mongolia | 3.50 |
| 71 | Ethiopia | 3.50 |
| 72 | Dominican Republic | 3.50 |
| 73 | Romania | 3.49 |
| 74 | Mauritius | 3.49 |
| 75 | Puerto Rico | 3.46 |
| 76 | Mauritania | 3.45 |
| 77 | Honduras | 3.45 |
| 78 | Uruguay | 3.44 |
| 79 | Burundi | 3.44 |
| 80 | Côte d'Ivoire | 3.43 |
| 81 | Lesotho | 3.41 |
| 82 | Bulgaria | 3.41 |
| 83 | Lithuania | 3.40 |
| 84 | Brazil | 3.39 |
| 85 | Cambodia | 3.38 |
| 86 | Uganda | 3.38 |
| 87 | Indonesia | 3.38 |
| 88 | India | 3.36 |
| 89 | Slovenia | 3.36 |
| 90 | Syria | 3.35 |
| 91 | Pakistan | 3.35 |
| 92 | Serbia | 3.32 |
| 93 | Georgia | 3.31 |
| 94 | Mozambique | 3.28 |
| 95 | El Salvador | 3.28 |
| 96 | Libya | 3.27 |
| 97 | Slovak Republic | 3.24 |
| 98 | Kuwait | 3.23 |
| 99 | Cameroon | 3.23 |
| 100 | Latvia | 3.22 |
| 101 | Chad | 3.22 |
| 102 | Jamaica | 3.20 |
| 103 | Greece | 3.18 |
| 104 | Mexico | 3.18 |
| 105 | Tanzania | 3.17 |
| 106 | Turkey | 3.06 |
| 107 | Zambia | 3.04 |
| 108 | Nicaragua | 3.03 |
| 109 | Timor-Leste | 2.99 |
| 110 | Philippines | 2.99 |
| 111 | Macedonia, FYR | 2.99 |
| 112 | Peru | 2.98 |
| 113 | Namibia | 2.96 |
| 114 | Guyana | 2.95 |
| 115 | Ghana | 2.94 |
| 116 | Hungary | 2.92 |
| 117 | Italy | 2.91 |
| 118 | Algeria | 2.88 |
| 119 | Albania | 2.87 |
| 120 | Nepal | 2.77 |
| 121 | Trinidad and Tobago | 2.76 |
| 122 | Armenia | 2.74 |
| 123 | Argentina | 2.73 |
| 124 | Venezuela | 2.71 |
| 125 | Nigeria | 2.67 |
| 126 | Ecuador | 2.59 |
| 127 | Kyrgyz Republic | 2.58 |
| 128 | Suriname | 2.54 |
| 129 | Bangladesh | 2.51 |
| 130 | Moldova | 2.42 |
| 131 | Bosnia and Herzegovina | 2.39 |
| 132 | Paraguay | 2.35 |
| 133 | Zimbabwe | 2.26 |
| 134 | Bolivia | 2.04 |

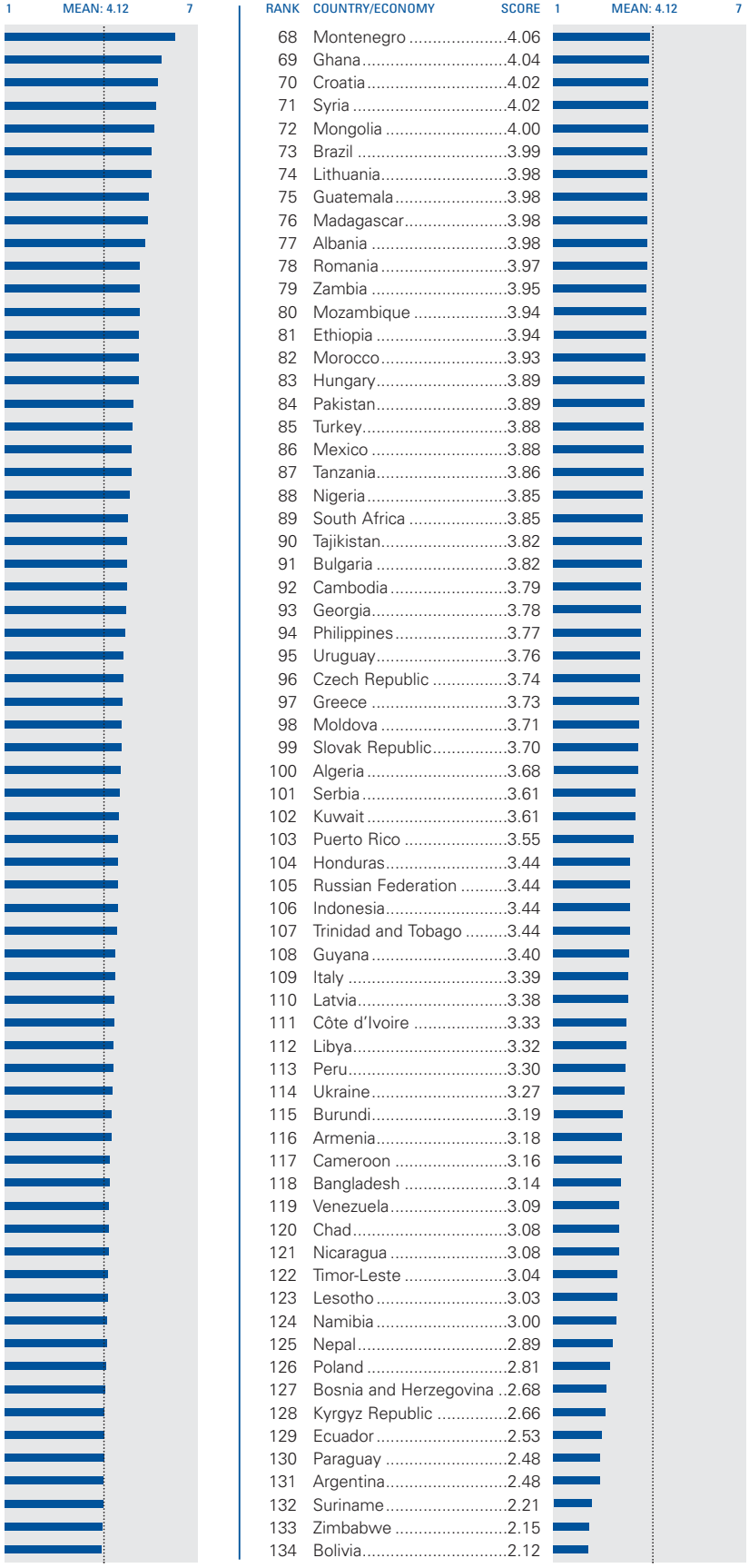



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 6.03 Importance of ICT to government vision of the future

The government has a clear implementation plan for utilizing information and communication technologies for improving the country's overall competitiveness (1 = strongly disagree, 7 = strongly agree)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Singapore | 6.40 |
| 2 | Malta | 5.96 |
| 3 | United Arab Emirates | 5.86 |
| 4 | Portugal | 5.79 |
| 5 | Korea, Rep. | 5.73 |
| 6 | Qatar | 5.66 |
| 7 | Denmark | 5.65 |
| 8 | Estonia | 5.57 |
| 9 | Malaysia | 5.55 |
| 10 | Tunisia | 5.45 |
| 11 | Sweden | 5.29 |
| 12 | Iceland | 5.29 |
| 13 | Finland | 5.27 |
| 14 | Hong Kong SAR | 5.26 |
| 15 | Taiwan, China | 5.24 |
| 16 | Norway | 5.24 |
| 17 | China | 5.09 |
| 18 | Jordan | 5.04 |
| 19 | Bahrain | 5.03 |
| 20 | Gambia, The | 5.02 |
| 21 | Oman | 4.97 |
| 22 | Australia | 4.90 |
| 23 | Azerbaijan | 4.89 |
| 24 | Switzerland | 4.89 |
| 25 | Mali | 4.88 |
| 26 | Vietnam | 4.84 |
| 27 | Saudi Arabia | 4.81 |
| 28 | United States | 4.77 |
| 29 | Austria | 4.76 |
| 30 | Brunei Darussalam | 4.74 |
| 31 | Japan | 4.71 |
| 32 | France | 4.69 |
| 33 | India | 4.68 |
| 34 | Luxembourg | 4.64 |
| 35 | Canada | 4.63 |
| 36 | Slovenia | 4.60 |
| 37 | Dominican Republic | 4.59 |
| 38 | Sri Lanka | 4.59 |
| 39 | Israel | 4.59 |
| 40 | Chile | 4.56 |
| 41 | Mauritius | 4.50 |
| 42 | Cyprus | 4.49 |
| 43 | Kazakhstan | 4.48 |
| 44 | Thailand | 4.46 |
| 45 | Egypt | 4.45 |
| 46 | Ireland | 4.45 |
| 47 | Barbados | 4.41 |
| 48 | United Kingdom | 4.40 |
| 49 | Senegal | 4.40 |
| 50 | Colombia | 4.33 |
| 51 | Netherlands | 4.32 |
| 52 | Germany | 4.30 |
| 53 | Macedonia, FYR | 4.29 |
| 54 | Spain | 4.29 |
| 55 | New Zealand | 4.26 |
| 56 | Botswana | 4.26 |
| 57 | Panama | 4.24 |
| 58 | Benin | 4.24 |
| 59 | Belgium | 4.20 |
| 60 | Burkina Faso | 4.19 |
| 61 | Costa Rica | 4.16 |
| 62 | Mauritania | 4.16 |
| 63 | Jamaica | 4.15 |
| 64 | Kenya | 4.14 |
| 65 | Malawi | 4.12 |
| 66 | Uganda | 4.09 |
| 67 | El Salvador | 4.08 |
| 68 | Montenegro | 4.06 |
| 69 | Ghana | 4.04 |
| 70 | Croatia | 4.02 |
| 71 | Syria | 4.02 |
| 72 | Mongolia | 4.00 |
| 73 | Brazil | 3.99 |
| 74 | Lithuania | 3.98 |
| 75 | Guatemala | 3.98 |
| 76 | Madagascar | 3.98 |
| 77 | Albania | 3.98 |
| 78 | Romania | 3.97 |
| 79 | Zambia | 3.95 |
| 80 | Mozambique | 3.94 |
| 81 | Ethiopia | 3.94 |
| 82 | Morocco | 3.93 |
| 83 | Hungary | 3.89 |
| 84 | Pakistan | 3.89 |
| 85 | Turkey | 3.88 |
| 86 | Mexico | 3.88 |
| 87 | Tanzania | 3.86 |
| 88 | Nigeria | 3.85 |
| 89 | South Africa | 3.85 |
| 90 | Tajikistan | 3.82 |
| 91 | Bulgaria | 3.82 |
| 92 | Cambodia | 3.79 |
| 93 | Georgia | 3.78 |
| 94 | Philippines | 3.77 |
| 95 | Uruguay | 3.76 |
| 96 | Czech Republic | 3.74 |
| 97 | Greece | 3.73 |
| 98 | Moldova | 3.71 |
| 99 | Slovak Republic | 3.70 |
| 100 | Algeria | 3.68 |
| 101 | Serbia | 3.61 |
| 102 | Kuwait | 3.61 |
| 103 | Puerto Rico | 3.55 |
| 104 | Honduras | 3.44 |
| 105 | Russian Federation | 3.44 |
| 106 | Indonesia | 3.44 |
| 107 | Trinidad and Tobago | 3.44 |
| 108 | Guyana | 3.40 |
| 109 | Italy | 3.39 |
| 110 | Latvia | 3.38 |
| 111 | Côte d'Ivoire | 3.33 |
| 112 | Libya | 3.32 |
| 113 | Peru | 3.30 |
| 114 | Ukraine | 3.27 |
| 115 | Burundi | 3.19 |
| 116 | Armenia | 3.18 |
| 117 | Cameroon | 3.16 |
| 118 | Bangladesh | 3.14 |
| 119 | Venezuela | 3.09 |
| 120 | Chad | 3.08 |
| 121 | Nicaragua | 3.08 |
| 122 | Timor-Leste | 3.04 |
| 123 | Lesotho | 3.03 |
| 124 | Namibia | 3.00 |
| 125 | Nepal | 2.89 |
| 126 | Poland | 2.81 |
| 127 | Bosnia and Herzegovina | 2.68 |
| 128 | Kyrgyz Republic | 2.66 |
| 129 | Ecuador | 2.53 |
| 130 | Paraguay | 2.48 |
| 131 | Argentina | 2.48 |
| 132 | Suriname | 2.21 |
| 133 | Zimbabwe | 2.15 |
| 134 | Bolivia | 2.12 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 6.04 E-Government Readiness Index (hard data)

The E-Government Readiness Index assesses e-government readiness based on website assessment, telecommunications infrastructure, and human resource endowment | 2008

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Sweden | 0.916 |
| 2 | Denmark | 0.913 |
| 3 | Norway | 0.892 |
| 4 | United States | 0.864 |
| 5 | Netherlands | 0.863 |
| 6 | Korea, Rep. | 0.832 |
| 7 | Canada | 0.817 |
| 8 | Australia | 0.811 |
| 9 | France | 0.804 |
| 10 | United Kingdom | 0.787 |
| 11 | Japan | 0.770 |
| 12 | Switzerland | 0.763 |
| 13 | Estonia | 0.760 |
| 14 | Luxembourg | 0.751 |
| 15 | Finland | 0.749 |
| 16 | Austria | 0.743 |
| 17 | Israel | 0.739 |
| 18 | New Zealand | 0.739 |
| 19 | Ireland | 0.730 |
| 20 | Spain | 0.723 |
| 21 | Iceland | 0.718 |
| 22 | Germany | 0.714 |
| 23 | Singapore | 0.701 |
| 24 | Belgium | 0.678 |
| 25 | Czech Republic | 0.670 |
| 26 | Slovenia | 0.668 |
| 27 | Italy | 0.668 |
| 28 | Lithuania | 0.662 |
| 29 | Malta | 0.658 |
| 30 | Hungary | 0.649 |
| 31 | Portugal | 0.648 |
| 32 | United Arab Emirates | 0.630 |
| 33 | Poland | 0.613 |
| 34 | Malaysia | 0.606 |
| 35 | Cyprus | 0.602 |
| 36 | Latvia | 0.594 |
| 37 | Mexico | 0.589 |
| 38 | Slovak Republic | 0.589 |
| 39 | Argentina | 0.584 |
| 40 | Chile | 0.582 |
| 41 | Ukraine | 0.573 |
| 42 | Bahrain | 0.572 |
| 43 | Bulgaria | 0.572 |
| 44 | Greece | 0.572 |
| 45 | Brazil | 0.568 |
| 46 | Barbados | 0.567 |
| 47 | Croatia | 0.565 |
| 48 | Uruguay | 0.565 |
| 49 | Jordan | 0.548 |
| 50 | Romania | 0.538 |
| 51 | Colombia | 0.532 |
| 52 | Qatar | 0.531 |
| 53 | Trinidad and Tobago | 0.531 |
| 54 | Peru | 0.525 |
| 55 | Kuwait | 0.520 |
| 56 | Costa Rica | 0.514 |
| 57 | Russian Federation | 0.512 |
| 58 | South Africa | 0.512 |
| 59 | Venezuela | 0.510 |
| 60 | Mauritius | 0.509 |
| 61 | Thailand | 0.503 |
| 62 | China | 0.502 |
| 63 | Philippines | 0.500 |
| 64 | El Salvador | 0.497 |
| 65 | Dominican Republic | 0.494 |
| 66 | Saudi Arabia | 0.494 |
| 67 | Bolivia | 0.487 |
| 68 | Macedonia, FYR | 0.487 |
| 69 | Ecuador | 0.484 |
| 70 | Turkey | 0.483 |
| 71 | Serbia | 0.483 |
| 72 | Egypt | 0.477 |
| 73 | Kazakhstan | 0.474 |
| 74 | Mongolia | 0.474 |
| 75 | Panama | 0.472 |
| 76 | Oman | 0.469 |
| 77 | Jamaica | 0.468 |
| 78 | Albania | 0.467 |
| 79 | Brunei Darussalam | 0.467 |
| 80 | Paraguay | 0.465 |
| 81 | Azerbaijan | 0.461 |
| 82 | Georgia | 0.460 |
| 83 | Vietnam | 0.456 |
| 84 | Moldova | 0.451 |
| 85 | Bosnia and Herzegovina | 0.451 |
| 86 | Guyana | 0.438 |
| 87 | Guatemala | 0.428 |
| 88 | Montenegro | 0.428 |
| 89 | Sri Lanka | 0.424 |
| 90 | Kyrgyz Republic | 0.420 |
| 91 | Armenia | 0.418 |
| 92 | Indonesia | 0.411 |
| 93 | Honduras | 0.405 |
| 94 | India | 0.381 |
| 95 | Lesotho | 0.381 |
| 96 | Nicaragua | 0.367 |
| 97 | Botswana | 0.365 |
| 98 | Syria | 0.361 |
| 99 | Libya | 0.355 |
| 100 | Algeria | 0.352 |
| 101 | Kenya | 0.347 |
| 102 | Suriname | 0.347 |
| 103 | Tunisia | 0.346 |
| 104 | Namibia | 0.345 |
| 105 | Pakistan | 0.316 |
| 106 | Tajikistan | 0.315 |
| 107 | Uganda | 0.313 |
| 108 | Madagascar | 0.307 |
| 109 | Nigeria | 0.306 |
| 110 | Cambodia | 0.302 |
| 111 | Zimbabwe | 0.300 |
| 112 | Ghana | 0.300 |
| 113 | Morocco | 0.294 |
| 114 | Bangladesh | 0.294 |
| 115 | Tanzania | 0.293 |
| 116 | Malawi | 0.288 |
| 117 | Cameroon | 0.286 |
| 118 | Nepal | 0.273 |
| 119 | Mozambique | 0.256 |
| 120 | Senegal | 0.253 |
| 121 | Timor-Leste | 0.246 |
| 122 | Zambia | 0.227 |
| 123 | Gambia, The | 0.225 |
| 124 | Mauritania | 0.203 |
| 125 | Benin | 0.186 |
| 126 | Ethiopia | 0.186 |
| 127 | Côte d'Ivoire | 0.185 |
| 128 | Burundi | 0.179 |
| 129 | Mali | 0.159 |
| 130 | Burkina Faso | 0.154 |
| 131 | Chad | 0.105 |
| n/a | Hong Kong SAR | n/a |
| n/a | Puerto Rico | n/a |
| n/a | Taiwan, China | n/a |

**SOURCE:** United Nations, *e-Government Survey 2008: From e-Government to Connected Governance*

# 7th pillar
# Individual usage

# 7.01 Mobile telephone subscribers (hard data)

Mobile telephone subscribers per 100 population | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | United Arab Emirates | 173.37 |
| 2 | Qatar | 150.41 |
| 3 | Estonia | 148.42 |
| 4 | Bahrain | 148.28 |
| 5 | Hong Kong SAR | 146.41 |
| 6 | Lithuania | 144.90 |
| 7 | Italy[2] | 135.14 |
| 8 | Bulgaria | 129.57 |
| 9 | Luxembourg | 129.50 |
| 10 | Israel | 128.50 |
| 11 | Czech Republic | 128.36 |
| 12 | Singapore | 126.66 |
| 13 | Portugal | 126.26 |
| 14 | Ukraine | 119.55 |
| 15 | United Kingdom | 118.47 |
| 16 | Germany | 117.62 |
| 17 | Austria | 116.83 |
| 18 | Cyprus | 115.64 |
| 19 | Iceland | 115.44 |
| 20 | Finland | 115.22 |
| 21 | Ireland | 114.86 |
| 22 | Saudi Arabia | 114.74 |
| 23 | Denmark | 114.71 |
| 24 | Russian Federation | 114.60 |
| 25 | Sweden | 113.73 |
| 26 | Slovak Republic | 112.58 |
| 27 | Croatia | 110.52 |
| 28 | Norway | 110.50 |
| 29 | Greece | 110.30 |
| 30 | Spain | 110.24 |
| 31 | Hungary | 109.97 |
| 32 | Poland | 108.68 |
| 33 | Switzerland | 108.18 |
| 34 | Montenegro[2] | 107.28 |
| 35 | Romania | 106.70 |
| 36 | Taiwan, China | 106.11 |
| 37 | Netherlands[2] | 105.91 |
| 38 | Australia | 102.49 |
| 39 | Argentina | 102.20 |
| 40 | New Zealand | 101.59 |
| 41 | Belgium | 97.83 |
| 42 | Latvia | 97.36 |
| 43 | Kuwait | 97.28 |
| 44 | Slovenia | 96.35 |
| 45 | Oman | 96.33 |
| 46 | Macedonia, FYR | 95.50 |
| 47 | Jamaica[2] | 93.74 |
| 48 | Malta | 91.38 |
| 49 | Korea, Rep. | 90.20 |
| 50 | Uruguay | 89.96 |
| 51 | France | 89.80 |
| 52 | El Salvador | 89.50 |
| 53 | Malaysia | 87.86 |
| 54 | Barbados[2] | 87.76 |
| 55 | South Africa | 87.08 |
| 56 | Venezuela | 86.13 |
| 57 | Serbia | 85.74 |
| 58 | Puerto Rico[1] | 84.80 |
| 59 | Chile | 83.89 |
| 60 | Japan | 83.88 |
| 61 | United States | 83.51 |
| 62 | Turkey | 82.77 |
| 63 | Kazakhstan | 81.62 |
| 64 | Algeria | 81.41 |
| 65 | Jordan | 80.53 |
| 66 | Thailand | 80.42 |
| 67 | Brunei Darussalam[2] | 78.92 |
| 68 | Guatemala | 76.01 |
| 69 | Tunisia | 75.94 |
| 70 | Botswana | 75.84 |
| 71 | Ecuador | 75.60 |
| 72 | Trinidad and Tobago | 75.58 |
| 73 | Mauritius | 74.19 |
| 74 | Colombia | 73.54 |
| 75 | Libya | 73.05 |
| 76 | Albania | 72.10 |
| 77 | Panama | 71.54 |
| 78 | Suriname[2] | 70.80 |
| 79 | Paraguay | 70.67 |
| 80 | Morocco | 64.15 |
| 81 | Mexico | 64.07 |
| 82 | Brazil | 63.08 |
| 83 | Bosnia and Herzegovina | 62.28 |
| 84 | Canada | 61.68 |
| 85 | Philippines | 58.88 |
| 86 | Dominican Republic | 56.49 |
| 87 | Peru | 55.25 |
| 88 | Azerbaijan | 50.78 |
| 89 | Moldova | 49.63 |
| 90 | Pakistan | 48.11 |
| 91 | Gambia, The | 46.58 |
| 92 | Mauritania | 41.62 |
| 93 | Sri Lanka | 41.37 |
| 94 | China | 41.19 |
| 95 | Kyrgyz Republic | 40.47 |
| 96 | Egypt | 39.82 |
| 97 | Namibia | 38.58 |
| 98 | Georgia[2] | 38.43 |
| 99 | Nicaragua | 37.88 |
| 100 | Guyana[1] | 37.45 |
| 101 | Côte d'Ivoire | 36.60 |
| 102 | Indonesia | 35.33 |
| 103 | Bolivia | 34.17 |
| 104 | Costa Rica | 33.76 |
| 105 | Syria | 33.62 |
| 106 | Senegal | 33.31 |
| 107 | Ghana | 32.39 |
| 108 | Kenya | 30.48 |
| 109 | Honduras[2] | 30.44 |
| 110 | Mongolia[2] | 28.94 |
| 111 | Nigeria | 27.28 |
| 112 | Vietnam | 27.16 |
| 113 | Cameroon | 24.45 |
| 114 | Lesotho | 22.71 |
| 115 | Zambia | 22.14 |
| 116 | Bangladesh | 21.66 |
| 117 | Benin | 20.98 |
| 118 | Mali | 20.51 |
| 119 | Tanzania | 20.40 |
| 120 | India | 19.98 |
| 121 | Cambodia | 17.88 |
| 122 | Mozambique | 15.42 |
| 123 | Uganda | 13.58 |
| 124 | Madagascar | 11.27 |
| 125 | Burkina Faso | 10.90 |
| 126 | Armenia[1] | 10.54 |
| 127 | Zimbabwe | 9.18 |
| 128 | Chad | 8.52 |
| 129 | Malawi | 7.55 |
| 130 | Timor-Leste | 6.77 |
| 131 | Nepal[2] | 4.18 |
| 132 | Tajikistan[1] | 4.07 |
| 133 | Burundi | 2.94 |
| 134 | Ethiopia | 1.45 |

**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

[1] 2005 [2] 2006

# 7.02 Personal computers (hard data)

Personal computers per 100 population | 2006 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Canada | 94.58 |
| 2 | Netherlands | 91.22 |
| 3 | Switzerland | 88.30 |
| 4 | Sweden | 88.20 |
| 5 | United Kingdom | 81.21 |
| 6 | United States | 79.89 |
| 7 | Australia | 75.70 |
| 8 | Denmark | 72.75 |
| 9 | Singapore | 72.61 |
| 10 | Japan | 67.60 |
| 11 | Taiwan, China | 67.60 |
| 12 | Luxembourg | 67.54 |
| 13 | France | 65.87 |
| 14 | Germany | 65.28 |
| 15 | Norway | 63.13 |
| 16 | Hong Kong SAR | 62.97 |
| 17 | Austria[2] | 61.12 |
| 18 | Ireland | 58.91 |
| 19 | Korea, Rep. | 54.44 |
| 20 | New Zealand | 54.15 |
| 21 | Iceland | 53.85 |
| 22 | Estonia | 51.32 |
| 23 | Finland[2] | 50.01 |
| 24 | Slovak Republic | 42.96 |
| 25 | Belgium | 42.16 |
| 26 | Slovenia | 41.51 |
| 27 | Cyprus | 38.36 |
| 28 | Italy[2] | 36.99 |
| 29 | Spain | 36.88 |
| 30 | Latvia | 32.59 |
| 31 | Hungary | 31.78 |
| 32 | United Arab Emirates | 30.06 |
| 33 | Czech Republic[2] | 27.40 |
| 34 | Macedonia, FYR | 26.51 |
| 35 | Malaysia | 23.41 |
| 36 | Costa Rica[2] | 23.11 |
| 37 | Kuwait[2] | 22.33 |
| 38 | Croatia | 19.90 |
| 39 | Namibia | 19.49 |
| 40 | Qatar | 18.71 |
| 41 | Bahrain | 18.28 |
| 42 | Lithuania | 18.13 |
| 43 | Mauritius | 17.52 |
| 44 | Trinidad and Tobago | 17.42 |
| 45 | Portugal | 17.06 |
| 46 | Poland | 16.77 |
| 47 | Serbia | 16.19 |
| 48 | Brazil[2] | 16.09 |
| 49 | Barbados[2] | 14.87 |
| 50 | Romania | 14.79 |
| 51 | Chile[2] | 14.75 |
| 52 | Saudi Arabia | 13.89 |
| 53 | Mexico | 13.85 |
| 54 | Uruguay[2] | 13.85 |
| 55 | Mongolia | 13.44 |
| 56 | Russian Federation | 13.33 |
| 57 | Ecuador | 12.74 |
| 58 | Moldova | 10.11 |
| 59 | Peru[2] | 10.01 |
| 60 | Armenia[2] | 9.85 |
| 61 | Vietnam | 9.51 |
| 62 | Greece | 9.38 |
| 63 | Venezuela[2] | 9.25 |
| 64 | Argentina[2] | 9.07 |
| 65 | Brunei Darussalam[2] | 8.82 |
| 66 | South Africa[2] | 8.36 |
| 67 | Paraguay[2] | 7.47 |
| 68 | Philippines | 7.46 |
| 69 | Oman | 6.89 |
| 70 | Thailand[2] | 6.86 |
| 71 | Jamaica[2] | 6.75 |
| 72 | Syria | 6.66 |
| 73 | Zimbabwe | 6.61 |
| 74 | Jordan | 6.34 |
| 75 | Tunisia | 6.22 |
| 76 | Bosnia and Herzegovina | 6.19 |
| 77 | Bulgaria[1] | 5.94 |
| 78 | Turkey | 5.93 |
| 79 | China | 5.60 |
| 80 | Colombia | 5.38 |
| 81 | Botswana | 5.11 |
| 82 | El Salvador[2] | 5.09 |
| 83 | Georgia[2] | 4.70 |
| 84 | Ukraine | 4.61 |
| 85 | Panama[2] | 4.56 |
| 86 | Suriname[2] | 4.45 |
| 87 | Mauritania | 4.40 |
| 88 | Egypt | 4.19 |
| 89 | Guyana[2] | 3.86 |
| 90 | Albania | 3.81 |
| 91 | Nicaragua[2] | 3.77 |
| 92 | Sri Lanka[2] | 3.54 |
| 93 | Morocco | 2.99 |
| 94 | India | 2.76 |
| 95 | Bangladesh | 2.42 |
| 96 | Bolivia[2] | 2.40 |
| 97 | Dominican Republic[2] | 2.32 |
| 98 | Azerbaijan[2] | 2.31 |
| 99 | Libya[2] | 2.22 |
| 100 | Senegal[2] | 2.14 |
| 101 | Guatemala[2] | 2.08 |
| 102 | Gambia, The | 2.02 |
| 103 | Indonesia | 2.00 |
| 104 | Honduras | 1.90 |
| 105 | Kyrgyz Republic[2] | 1.90 |
| 106 | Côte d'Ivoire[2] | 1.78 |
| 107 | Uganda | 1.67 |
| 108 | Kenya[2] | 1.44 |
| 109 | Mozambique[2] | 1.43 |
| 110 | Tajikistan[2] | 1.30 |
| 111 | Cameroon[2] | 1.23 |
| 112 | Zambia[2] | 1.12 |
| 113 | Algeria[2] | 1.06 |
| 114 | Tanzania[2] | 0.93 |
| 115 | Nigeria[2] | 0.91 |
| 116 | Puerto Rico[2] | 0.83 |
| 117 | Burundi | 0.83 |
| 118 | Mali[3] | 0.81 |
| 119 | Burkina Faso | 0.66 |
| 120 | Ghana[2] | 0.58 |
| 121 | Benin | 0.57 |
| 122 | Ethiopia | 0.55 |
| 123 | Madagascar[2] | 0.55 |
| 124 | Nepal[2] | 0.49 |
| 125 | Cambodia | 0.33 |
| 126 | Lesotho[2] | 0.28 |
| 127 | Malawi[2] | 0.19 |
| 128 | Chad[2] | 0.16 |
| n/a | Israel | n/a |
| n/a | Kazakhstan | n/a |
| n/a | Malta | n/a |
| n/a | Montenegro | n/a |
| n/a | Pakistan | n/a |
| n/a | Timor-Leste | n/a |

**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

[1] 2004 [2] 2005 [3] 2007

# 7.03 Broadband Internet subscribers (hard data)

Total broadband Internet subscribers per 100 population | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Denmark | 36.33 |
| 2 | Iceland | 34.76 |
| 3 | Sweden | 34.34 |
| 4 | Netherlands | 33.54 |
| 5 | Switzerland | 32.07 |
| 6 | Finland | 30.64 |
| 7 | Norway | 30.57 |
| 8 | Korea, Rep. | 29.44 |
| 9 | Canada | 27.60 |
| 10 | Hong Kong SAR | 26.09 |
| 11 | Belgium | 25.97 |
| 12 | United Kingdom | 25.55 |
| 13 | France | 25.22 |
| 14 | Luxembourg | 24.16 |
| 15 | Germany | 23.97 |
| 16 | Australia | 23.28 |
| 17 | New Zealand | 22.50 |
| 18 | Japan | 22.47 |
| 19 | Israel | 22.06 |
| 20 | United States | 21.46 |
| 21 | Taiwan, China | 20.93 |
| 22 | Estonia | 20.80 |
| 23 | Barbados[2] | 20.45 |
| 24 | Singapore | 19.87 |
| 25 | Austria | 18.86 |
| 26 | Italy | 18.45 |
| 27 | Spain | 17.94 |
| 28 | Slovenia | 17.23 |
| 29 | Ireland | 16.40 |
| 30 | Czech Republic | 15.95 |
| 31 | Portugal | 15.13 |
| 32 | Malta | 15.09 |
| 33 | Hungary | 15.06 |
| 34 | Lithuania | 14.97 |
| 35 | Cyprus | 11.70 |
| 36 | Romania | 9.95 |
| 37 | Greece | 9.13 |
| 38 | Croatia | 8.45 |
| 39 | Qatar | 8.37 |
| 40 | Slovak Republic | 8.23 |
| 41 | Poland[2] | 7.56 |
| 42 | Bulgaria | 7.37 |
| 43 | Chile | 7.20 |
| 44 | Argentina | 6.58 |
| 45 | Latvia | 6.41 |
| 46 | Turkey | 5.80 |
| 47 | Bahrain[2] | 5.23 |
| 48 | United Arab Emirates[2] | 5.17 |
| 49 | Malaysia | 5.15 |
| 50 | China | 5.00 |
| 51 | Uruguay | 4.94 |
| 52 | Macedonia, FYR | 4.93 |
| 53 | Montenegro[2] | 4.30 |
| 54 | Mexico | 4.27 |
| 55 | Brazil | 4.22 |
| 56 | Serbia | 3.30 |
| 57 | Venezuela | 3.10 |
| 58 | Puerto Rico[1] | 2.99 |
| 59 | Jamaica[2] | 2.97 |
| 60 | Costa Rica | 2.93 |
| 61 | Brunei Darussalam | 2.87 |
| 62 | Russian Federation | 2.81 |
| 63 | Colombia | 2.62 |
| 64 | Kazakhstan | 2.47 |
| 65 | Saudi Arabia | 2.43 |
| 66 | Ecuador | 2.39 |
| 67 | Bosnia and Herzegovina | 2.15 |
| 68 | Peru | 2.04 |
| 69 | Mauritius[2] | 1.74 |
| 70 | Ukraine | 1.73 |
| 71 | Dominican Republic | 1.57 |
| 72 | Jordan | 1.55 |
| 73 | Morocco | 1.53 |
| 74 | Vietnam | 1.48 |
| 75 | Thailand | 1.43 |
| 76 | El Salvador | 1.31 |
| 77 | Moldova | 1.24 |
| 78 | Trinidad and Tobago | 1.17 |
| 79 | Tunisia | 1.11 |
| 80 | Philippines | 1.10 |
| 81 | Georgia | 1.06 |
| 82 | Panama | 1.03 |
| 83 | Kuwait[1] | 0.93 |
| 84 | Algeria | 0.85 |
| 85 | Paraguay | 0.80 |
| 86 | Oman | 0.73 |
| 87 | South Africa[2] | 0.70 |
| 88 | Suriname[2] | 0.59 |
| 89 | Egypt | 0.57 |
| 90 | Bolivia | 0.36 |
| 91 | Nicaragua[2] | 0.34 |
| 92 | Sri Lanka | 0.33 |
| 93 | Senegal | 0.31 |
| 94 | India | 0.27 |
| 95 | Guyana[1] | 0.27 |
| 96 | Guatemala[1] | 0.22 |
| 97 | Botswana | 0.19 |
| 98 | Libya[2] | 0.16 |
| 99 | Mongolia[2] | 0.13 |
| 100 | Zimbabwe | 0.11 |
| 101 | Indonesia | 0.11 |
| 102 | Pakistan | 0.08 |
| 103 | Armenia[1] | 0.07 |
| 104 | Ghana | 0.06 |
| 105 | Cambodia | 0.06 |
| 106 | Kyrgyz Republic | 0.05 |
| 107 | Côte d'Ivoire[2] | 0.05 |
| 108 | Kenya[2] | 0.05 |
| 109 | Nepal | 0.05 |
| 110 | Syria[2] | 0.04 |
| 111 | Mauritania[2] | 0.03 |
| 112 | Azerbaijan[1] | 0.03 |
| 113 | Mali | 0.03 |
| 114 | Benin | 0.02 |
| 115 | Zambia[2] | 0.02 |
| 116 | Burkina Faso[2] | 0.01 |
| 117 | Namibia | 0.01 |
| 118 | Malawi | 0.01 |
| 119 | Albania[1] | 0.01 |
| 120 | Uganda | 0.01 |
| 121 | Gambia, The[1] | 0.00 |
| 122 | Timor-Leste | 0.00 |
| 123 | Cameroon[2] | 0.00 |
| 124 | Lesotho[1] | 0.00 |
| 125 | Tajikistan[1] | 0.00 |
| 126 | Nigeria[1] | 0.00 |
| 127 | Ethiopia | 0.00 |
| 128 | Bangladesh[1] | 0.00 |
| 128 | Burundi[1] | 0.00 |
| 128 | Chad[1] | 0.00 |
| 128 | Honduras[1] | 0.00 |
| 128 | Madagascar[1] | 0.00 |
| 128 | Mozambique[1] | 0.00 |
| 128 | Tanzania[1] | 0.00 |

**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

[1] 2005 [2] 2006

# 7.04 Internet users (hard data)

Internet users per 100 population | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Netherlands | 91.36 |
| 2 | Norway | 80.88 |
| 3 | New Zealand | 80.41 |
| 4 | Canada[2] | 76.77 |
| 5 | Sweden | 76.76 |
| 6 | Luxembourg | 73.95 |
| 7 | Korea, Rep. | 73.80 |
| 8 | United States | 71.94 |
| 9 | Singapore | 69.99 |
| 10 | Japan | 68.85 |
| 11 | Finland | 68.22 |
| 12 | Iceland | 67.20 |
| 13 | United Kingdom | 66.15 |
| 14 | Slovenia | 64.95 |
| 15 | Taiwan, China | 64.45 |
| 16 | Denmark | 64.31 |
| 17 | Switzerland | 61.60 |
| 18 | Malaysia | 59.72 |
| 19 | Barbados[1] | 59.48 |
| 20 | Estonia | 58.41 |
| 21 | Romania | 55.98 |
| 22 | Jamaica | 55.27 |
| 23 | Hong Kong SAR | 54.97 |
| 24 | Italy | 54.35 |
| 25 | Australia | 54.19 |
| 26 | United Arab Emirates | 52.51 |
| 27 | Latvia | 51.68 |
| 28 | Germany | 51.45 |
| 29 | Austria | 51.16 |
| 30 | Belgium | 49.92 |
| 31 | France[2] | 49.57 |
| 32 | Montenegro | 46.82 |
| 33 | Spain | 44.47 |
| 34 | Cyprus | 44.46 |
| 35 | Croatia | 43.80 |
| 36 | Slovak Republic | 43.60 |
| 37 | Czech Republic | 43.20 |
| 38 | Poland | 42.01 |
| 39 | Hungary | 41.88 |
| 40 | Qatar | 41.75 |
| 41 | Brunei Darussalam[2] | 41.69 |
| 42 | Ireland | 39.71 |
| 43 | Lithuania | 39.33 |
| 44 | Malta | 38.86 |
| 45 | Costa Rica | 33.57 |
| 46 | Chile | 33.48 |
| 47 | Portugal | 33.41 |
| 48 | Bahrain | 33.22 |
| 49 | Trinidad and Tobago | 32.31 |
| 50 | Kuwait | 31.57 |
| 51 | Uruguay | 28.98 |
| 52 | Israel | 28.87 |
| 53 | Peru | 27.37 |
| 54 | Mauritius | 26.95 |
| 55 | Bosnia and Herzegovina | 26.81 |
| 56 | Colombia | 26.22 |
| 57 | Brazil | 26.07 |
| 58 | Guyana | 25.75 |
| 59 | Saudi Arabia | 25.07 |
| 60 | Puerto Rico | 25.06 |
| 61 | Bulgaria | 24.85 |
| 62 | Argentina | 23.55 |
| 63 | Greece | 22.79 |
| 64 | Ukraine | 21.64 |
| 65 | Mexico | 21.41 |
| 66 | Morocco | 21.14 |
| 67 | Russian Federation | 21.05 |
| 68 | Thailand | 21.00 |
| 69 | Venezuela | 20.68 |
| 70 | Vietnam | 20.45 |
| 71 | Macedonia, FYR | 20.43 |
| 72 | Jordan | 19.02 |
| 73 | Moldova | 18.45 |
| 74 | Turkey[2] | 17.73 |
| 75 | Syria | 17.41 |
| 76 | Dominican Republic | 17.18 |
| 77 | Tunisia | 16.68 |
| 78 | China | 15.81 |
| 79 | Panama | 15.71 |
| 80 | Serbia | 15.22 |
| 81 | Albania[2] | 14.98 |
| 82 | Kyrgyz Republic | 14.11 |
| 83 | Oman | 13.10 |
| 84 | Kazakhstan | 12.32 |
| 85 | Azerbaijan | 12.23 |
| 86 | Mongolia[2] | 11.57 |
| 87 | Ecuador[2] | 11.54 |
| 88 | Egypt | 11.42 |
| 89 | El Salvador | 11.13 |
| 90 | Pakistan | 10.68 |
| 91 | Bolivia | 10.50 |
| 92 | Algeria | 10.34 |
| 93 | Guatemala[2] | 10.22 |
| 94 | Zimbabwe | 10.12 |
| 95 | Suriname | 9.61 |
| 96 | Georgia | 8.19 |
| 97 | South Africa | 8.16 |
| 98 | Kenya | 7.99 |
| 99 | India | 6.93 |
| 100 | Nigeria | 6.75 |
| 101 | Senegal | 6.62 |
| 102 | Uganda | 6.48 |
| 103 | Philippines | 6.03 |
| 104 | Gambia, The | 5.87 |
| 105 | Armenia[2] | 5.75 |
| 106 | Indonesia | 5.61 |
| 107 | Namibia | 4.87 |
| 108 | Honduras[2] | 4.67 |
| 109 | Paraguay | 4.57 |
| 110 | Libya[2] | 4.36 |
| 111 | Botswana | 4.25 |
| 112 | Zambia | 4.19 |
| 113 | Sri Lanka | 4.00 |
| 114 | Lesotho | 3.49 |
| 115 | Ghana | 2.77 |
| 116 | Nicaragua[2] | 2.77 |
| 117 | Cameroon[2] | 2.23 |
| 118 | Benin | 1.66 |
| 119 | Côte d'Ivoire[2] | 1.63 |
| 120 | Nepal | 1.20 |
| 121 | Malawi | 1.00 |
| 122 | Tanzania | 0.99 |
| 123 | Mauritania[2] | 0.95 |
| 124 | Mozambique | 0.93 |
| 125 | Mali | 0.81 |
| 126 | Burundi[2] | 0.77 |
| 127 | Chad[2] | 0.60 |
| 128 | Burkina Faso[2] | 0.59 |
| 129 | Madagascar[2] | 0.58 |
| 130 | Cambodia | 0.48 |
| 131 | Ethiopia | 0.35 |
| 132 | Bangladesh | 0.32 |
| 133 | Tajikistan[1] | 0.30 |
| 134 | Timor-Leste[2] | 0.12 |

**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

[1] 2005 [2] 2006

# 7.05 Internet bandwidth (hard data)

International Internet bandwidth (mB/s) per 10,000 population | 2007 or most recent year available

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | Denmark[2] | 346.02 |
| 2 | Netherlands[1] | 205.19 |
| 3 | Luxembourg[2] | 200.72 |
| 4 | Jamaica[2] | 191.60 |
| 5 | Sweden[1] | 174.36 |
| 6 | Hong Kong SAR | 132.94 |
| 7 | Estonia | 119.82 |
| 8 | Belgium[1] | 111.82 |
| 9 | Switzerland[1] | 95.81 |
| 10 | Norway[1] | 93.11 |
| 11 | Taiwan, China | 81.41 |
| 12 | Iceland | 73.09 |
| 13 | Germany[1] | 68.46 |
| 14 | Canada[1] | 67.12 |
| 15 | Austria[1] | 66.81 |
| 16 | Ireland[1] | 59.27 |
| 17 | Malta | 57.68 |
| 18 | Australia | 55.44 |
| 19 | Lithuania | 46.36 |
| 20 | Finland[1] | 43.09 |
| 21 | Hungary | 39.88 |
| 22 | Latvia | 35.35 |
| 23 | Bulgaria[2] | 34.06 |
| 24 | France[2] | 32.94 |
| 25 | Romania | 29.60 |
| 26 | Slovak Republic[2] | 29.07 |
| 27 | Spain[1] | 28.22 |
| 28 | Qatar | 27.66 |
| 29 | Croatia[2] | 25.26 |
| 30 | Israel[1] | 24.64 |
| 31 | Barbados[1] | 22.30 |
| 32 | United Arab Emirates[2] | 21.63 |
| 33 | Serbia | 21.43 |
| 34 | Italy[2] | 20.60 |
| 35 | Brunei Darussalam[2] | 14.53 |
| 36 | Slovenia[1] | 12.76 |
| 37 | Montenegro[2] | 12.50 |
| 38 | Turkey | 12.09 |
| 39 | New Zealand[1] | 11.36 |
| 40 | Korea, Rep. | 10.32 |
| 41 | Moldova | 9.34 |
| 42 | Portugal[1] | 8.33 |
| 43 | Chile[1] | 8.15 |
| 44 | Morocco | 8.05 |
| 45 | Costa Rica | 7.95 |
| 46 | Azerbaijan | 7.09 |
| 47 | Argentina[2] | 6.90 |
| 48 | Trinidad and Tobago | 6.75 |
| 49 | Greece[1] | 5.86 |
| 50 | Poland[1] | 5.55 |
| 51 | Bahrain[2] | 5.54 |
| 52 | Colombia[2] | 5.52 |
| 53 | Cyprus[1] | 5.39 |
| 54 | Bosnia and Herzegovina | 5.08 |
| 55 | Puerto Rico[1] | 5.06 |
| 56 | Uruguay[1] | 4.92 |
| 57 | Oman | 4.82 |
| 58 | Suriname[2] | 4.42 |
| 59 | Thailand | 3.90 |
| 60 | Peru[1] | 3.58 |
| 61 | Kuwait[1] | 3.28 |
| 62 | Tunisia | 3.00 |
| 63 | Panama[1] | 2.87 |
| 64 | China | 2.78 |
| 65 | Ecuador[2] | 2.24 |
| 66 | Dominican Republic | 1.54 |
| 67 | Mauritius[2] | 1.53 |
| 68 | Paraguay | 1.53 |
| 69 | Brazil[1] | 1.50 |
| 70 | Vietnam | 1.44 |
| 71 | Egypt | 1.43 |
| 72 | Senegal | 1.38 |
| 73 | Kazakhstan | 1.30 |
| 74 | Malaysia[1] | 1.23 |
| 75 | Saudi Arabia[2] | 1.18 |
| 76 | Philippines | 1.14 |
| 77 | Kyrgyz Republic | 1.12 |
| 78 | Mongolia[2] | 1.12 |
| 79 | Mexico[1] | 1.05 |
| 80 | Russian Federation[1] | 1.00 |
| 81 | Algeria | 0.89 |
| 82 | South Africa | 0.70 |
| 83 | Guatemala[1] | 0.56 |
| 84 | Jordan[1] | 0.54 |
| 85 | Indonesia | 0.52 |
| 86 | Sri Lanka | 0.50 |
| 87 | Venezuela[1] | 0.50 |
| 88 | Guyana[1] | 0.48 |
| 89 | Pakistan | 0.43 |
| 90 | Botswana | 0.43 |
| 91 | Bolivia | 0.42 |
| 92 | Gambia, The | 0.36 |
| 93 | Syria[2] | 0.34 |
| 94 | Mauritania[2] | 0.29 |
| 95 | Namibia | 0.27 |
| 96 | India[2] | 0.24 |
| 97 | Ghana[2] | 0.23 |
| 98 | Kenya[2] | 0.22 |
| 99 | Libya[2] | 0.21 |
| 100 | Ukraine[1] | 0.18 |
| 101 | El Salvador | 0.17 |
| 102 | Cambodia | 0.17 |
| 103 | Mali | 0.17 |
| 104 | Benin | 0.17 |
| 105 | Côte d'Ivoire[2] | 0.17 |
| 106 | Macedonia, FYR | 0.17 |
| 107 | Burkina Faso[2] | 0.16 |
| 108 | Uganda | 0.11 |
| 109 | Cameroon[1] | 0.09 |
| 110 | Timor-Leste | 0.09 |
| 111 | Bangladesh[2] | 0.09 |
| 112 | Madagascar | 0.08 |
| 113 | Georgia[1] | 0.07 |
| 114 | Honduras[1] | 0.06 |
| 115 | Nepal | 0.05 |
| 116 | Malawi | 0.05 |
| 117 | Zimbabwe | 0.04 |
| 118 | Albania[2] | 0.04 |
| 119 | Mozambique[2] | 0.04 |
| 120 | Zambia | 0.03 |
| 121 | Tanzania[1] | 0.03 |
| 122 | Lesotho[1] | 0.02 |
| 123 | Ethiopia[2] | 0.01 |
| 124 | Nigeria[1] | 0.01 |
| 125 | Nicaragua[1] | 0.01 |
| 126 | Chad[2] | 0.01 |
| 127 | Burundi[1] | 0.01 |
| 128 | Tajikistan[1] | 0.00 |
| n/a | Armenia | n/a |
| n/a | Czech Republic | n/a |
| n/a | Japan | n/a |
| n/a | Singapore | n/a |
| n/a | United Kingdom | n/a |
| n/a | United States | n/a |

**SOURCE:** International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

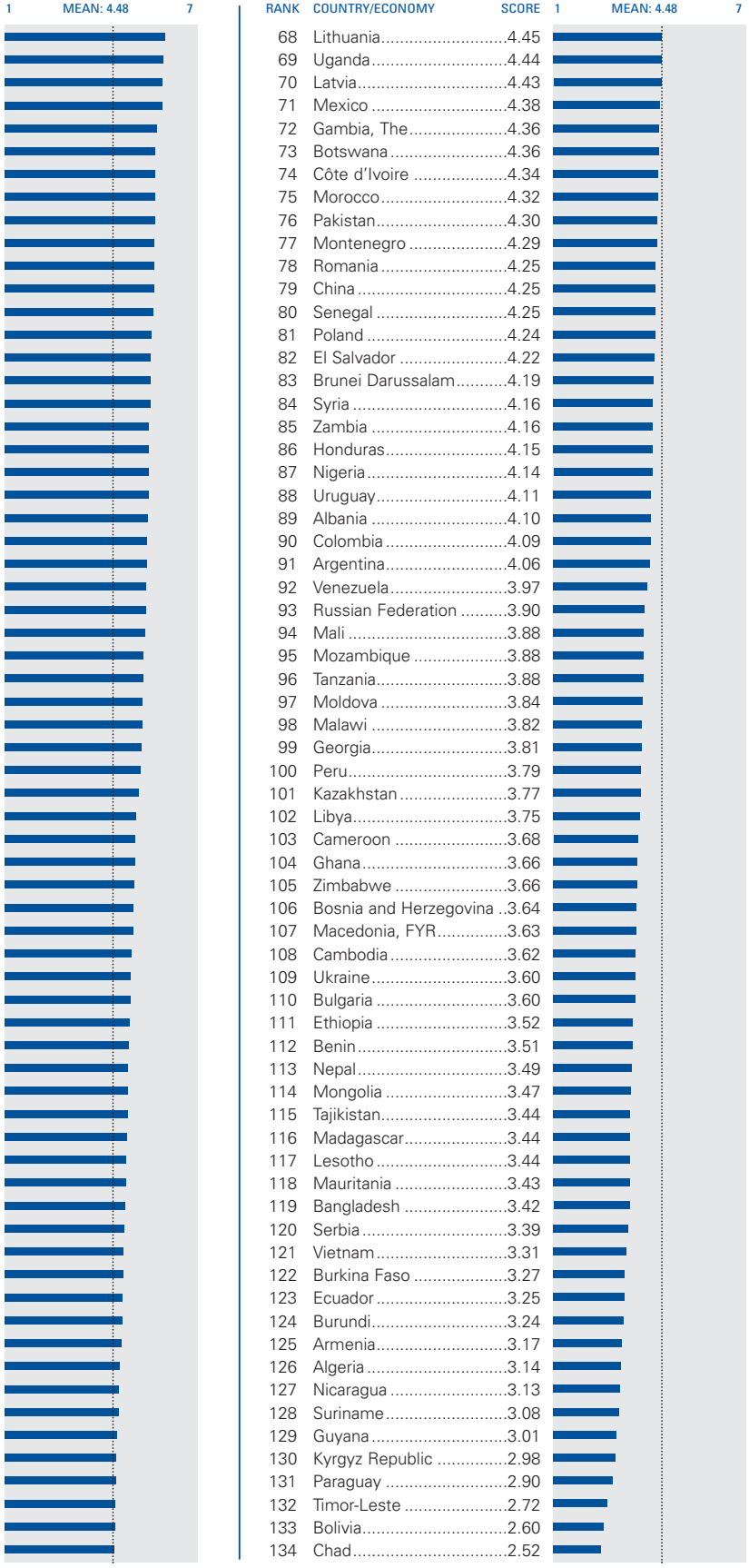
[1] 2005 [2] 2006

# 8th pillar
# Business usage

# 8.01 Prevalence of foreign technology licensing

In your country, licensing of foreign technology is (1 = uncommon, 7 = a common means of acquiring new technology)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Denmark | 6.09 |
| 2 | Canada | 6.04 |
| 3 | Iceland | 6.01 |
| 4 | Singapore | 6.01 |
| 5 | Norway | 5.83 |
| 6 | Taiwan, China | 5.78 |
| 7 | Japan | 5.76 |
| 8 | Finland | 5.76 |
| 9 | United Arab Emirates | 5.76 |
| 10 | Switzerland | 5.74 |
| 11 | Netherlands | 5.73 |
| 12 | Australia | 5.73 |
| 13 | Sweden | 5.72 |
| 14 | United States | 5.65 |
| 15 | Portugal | 5.64 |
| 16 | New Zealand | 5.64 |
| 17 | Germany | 5.64 |
| 18 | Belgium | 5.58 |
| 19 | Austria | 5.57 |
| 20 | Israel | 5.56 |
| 21 | United Kingdom | 5.56 |
| 22 | South Africa | 5.54 |
| 23 | Korea, Rep. | 5.51 |
| 24 | Luxembourg | 5.51 |
| 25 | Hong Kong SAR | 5.49 |
| 26 | Ireland | 5.47 |
| 27 | Malaysia | 5.45 |
| 28 | France | 5.40 |
| 29 | Bahrain | 5.39 |
| 30 | India | 5.38 |
| 31 | Jordan | 5.38 |
| 32 | Qatar | 5.34 |
| 33 | Tunisia | 5.32 |
| 34 | Malta | 5.25 |
| 35 | Spain | 5.17 |
| 36 | Indonesia | 5.15 |
| 37 | Czech Republic | 5.13 |
| 38 | Slovak Republic | 5.11 |
| 39 | Puerto Rico | 5.08 |
| 40 | Chile | 5.07 |
| 41 | Kuwait | 5.03 |
| 42 | Thailand | 4.99 |
| 43 | Cyprus | 4.99 |
| 44 | Saudi Arabia | 4.97 |
| 45 | Turkey | 4.94 |
| 46 | Greece | 4.91 |
| 47 | Sri Lanka | 4.91 |
| 48 | Brazil | 4.90 |
| 49 | Oman | 4.87 |
| 50 | Panama | 4.86 |
| 51 | Italy | 4.85 |
| 52 | Estonia | 4.83 |
| 53 | Slovenia | 4.79 |
| 54 | Costa Rica | 4.76 |
| 55 | Philippines | 4.75 |
| 56 | Croatia | 4.73 |
| 57 | Trinidad and Tobago | 4.72 |
| 58 | Dominican Republic | 4.69 |
| 59 | Azerbaijan | 4.65 |
| 60 | Mauritius | 4.62 |
| 61 | Hungary | 4.61 |
| 62 | Barbados | 4.57 |
| 63 | Jamaica | 4.54 |
| 64 | Namibia | 4.52 |
| 65 | Kenya | 4.50 |
| 66 | Guatemala | 4.50 |
| 67 | Egypt | 4.46 |
| 68 | Lithuania | 4.45 |
| 69 | Uganda | 4.44 |
| 70 | Latvia | 4.43 |
| 71 | Mexico | 4.38 |
| 72 | Gambia, The | 4.36 |
| 73 | Botswana | 4.36 |
| 74 | Côte d'Ivoire | 4.34 |
| 75 | Morocco | 4.32 |
| 76 | Pakistan | 4.30 |
| 77 | Montenegro | 4.29 |
| 78 | Romania | 4.25 |
| 79 | China | 4.25 |
| 80 | Senegal | 4.25 |
| 81 | Poland | 4.24 |
| 82 | El Salvador | 4.22 |
| 83 | Brunei Darussalam | 4.19 |
| 84 | Syria | 4.16 |
| 85 | Zambia | 4.16 |
| 86 | Honduras | 4.15 |
| 87 | Nigeria | 4.14 |
| 88 | Uruguay | 4.11 |
| 89 | Albania | 4.10 |
| 90 | Colombia | 4.09 |
| 91 | Argentina | 4.06 |
| 92 | Venezuela | 3.97 |
| 93 | Russian Federation | 3.90 |
| 94 | Mali | 3.88 |
| 95 | Mozambique | 3.88 |
| 96 | Tanzania | 3.88 |
| 97 | Moldova | 3.84 |
| 98 | Malawi | 3.82 |
| 99 | Georgia | 3.81 |
| 100 | Peru | 3.79 |
| 101 | Kazakhstan | 3.77 |
| 102 | Libya | 3.75 |
| 103 | Cameroon | 3.68 |
| 104 | Ghana | 3.66 |
| 105 | Zimbabwe | 3.66 |
| 106 | Bosnia and Herzegovina | 3.64 |
| 107 | Macedonia, FYR | 3.63 |
| 108 | Cambodia | 3.62 |
| 109 | Ukraine | 3.60 |
| 110 | Bulgaria | 3.60 |
| 111 | Ethiopia | 3.52 |
| 112 | Benin | 3.51 |
| 113 | Nepal | 3.49 |
| 114 | Mongolia | 3.47 |
| 115 | Tajikistan | 3.44 |
| 116 | Madagascar | 3.44 |
| 117 | Lesotho | 3.44 |
| 118 | Mauritania | 3.43 |
| 119 | Bangladesh | 3.42 |
| 120 | Serbia | 3.39 |
| 121 | Vietnam | 3.31 |
| 122 | Burkina Faso | 3.27 |
| 123 | Ecuador | 3.25 |
| 124 | Burundi | 3.24 |
| 125 | Armenia | 3.17 |
| 126 | Algeria | 3.14 |
| 127 | Nicaragua | 3.13 |
| 128 | Suriname | 3.08 |
| 129 | Guyana | 3.01 |
| 130 | Kyrgyz Republic | 2.98 |
| 131 | Paraguay | 2.90 |
| 132 | Timor-Leste | 2.72 |
| 133 | Bolivia | 2.60 |
| 134 | Chad | 2.52 |

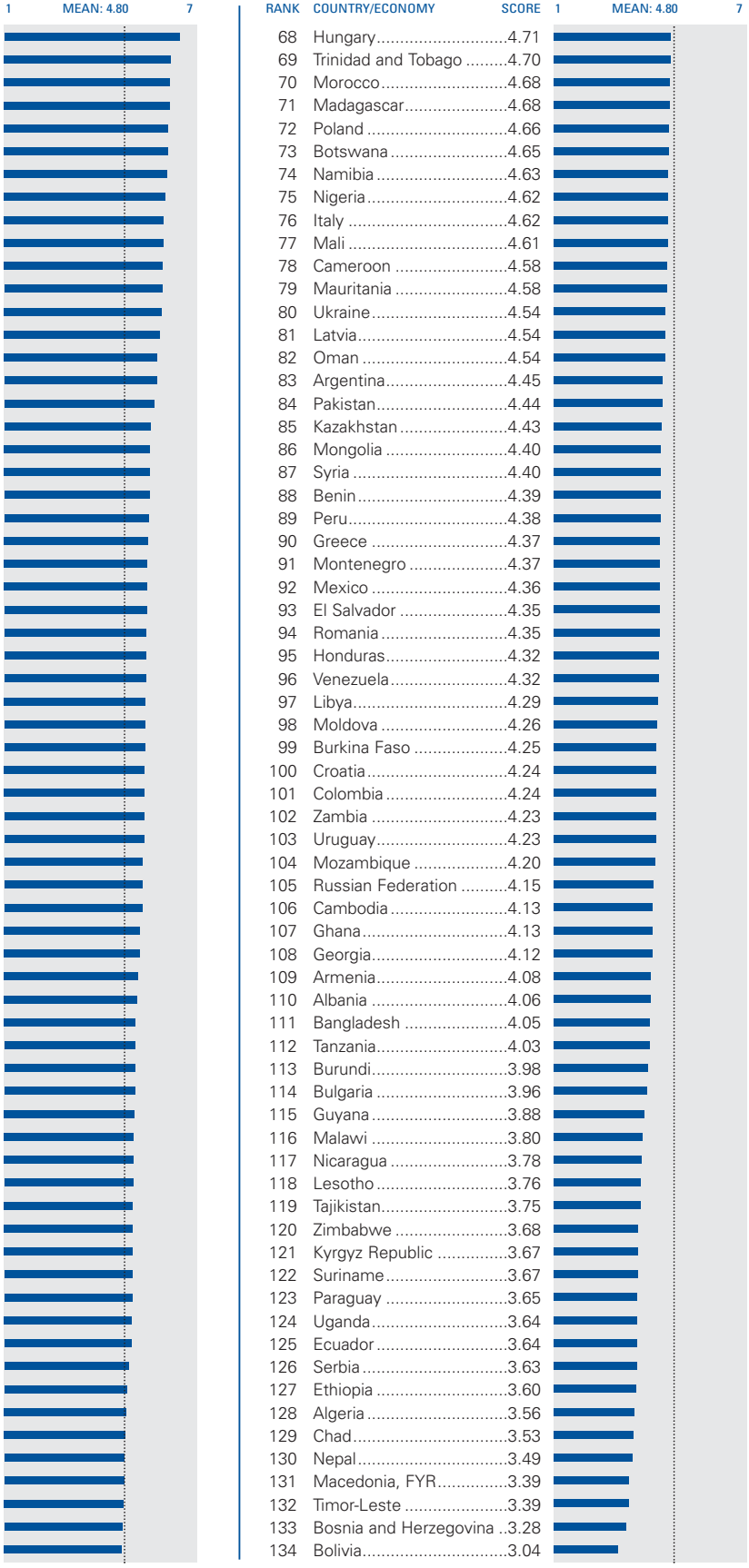



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 8.02 Firm-level technology absorption

Companies in your country are (1 = not able to absorb new technology, 7 = aggressive in absorbing new technology)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Iceland | 6.56 |
| 2 | Japan | 6.29 |
| 3 | United States | 6.26 |
| 4 | Sweden | 6.25 |
| 5 | Switzerland | 6.20 |
| 6 | Denmark | 6.20 |
| 7 | Austria | 6.17 |
| 8 | Finland | 6.11 |
| 9 | Norway | 6.06 |
| 10 | Taiwan, China | 6.05 |
| 11 | Israel | 6.03 |
| 12 | Germany | 6.01 |
| 13 | Singapore | 5.99 |
| 14 | United Arab Emirates | 5.93 |
| 15 | Korea, Rep. | 5.85 |
| 16 | Hong Kong SAR | 5.84 |
| 17 | Australia | 5.75 |
| 18 | Canada | 5.64 |
| 19 | Senegal | 5.63 |
| 20 | United Kingdom | 5.62 |
| 21 | Malaysia | 5.61 |
| 22 | Puerto Rico | 5.58 |
| 23 | France | 5.57 |
| 24 | New Zealand | 5.54 |
| 25 | Belgium | 5.54 |
| 26 | India | 5.52 |
| 27 | Netherlands | 5.49 |
| 28 | Kuwait | 5.49 |
| 29 | Ireland | 5.49 |
| 30 | Estonia | 5.48 |
| 31 | Luxembourg | 5.46 |
| 32 | South Africa | 5.46 |
| 33 | Chile | 5.44 |
| 34 | Tunisia | 5.44 |
| 35 | Jordan | 5.43 |
| 36 | Bahrain | 5.43 |
| 37 | Slovak Republic | 5.38 |
| 38 | Czech Republic | 5.38 |
| 39 | Portugal | 5.38 |
| 40 | Qatar | 5.31 |
| 41 | Côte d'Ivoire | 5.31 |
| 42 | Brazil | 5.25 |
| 43 | Malta | 5.22 |
| 44 | Saudi Arabia | 5.17 |
| 45 | Sri Lanka | 5.15 |
| 46 | China | 5.15 |
| 47 | Barbados | 5.15 |
| 48 | Turkey | 5.14 |
| 49 | Philippines | 5.11 |
| 50 | Cyprus | 5.11 |
| 51 | Guatemala | 5.09 |
| 52 | Azerbaijan | 5.08 |
| 53 | Brunei Darussalam | 5.07 |
| 54 | Vietnam | 5.07 |
| 55 | Costa Rica | 5.06 |
| 56 | Panama | 5.06 |
| 57 | Spain | 5.04 |
| 58 | Lithuania | 5.03 |
| 59 | Jamaica | 4.94 |
| 60 | Slovenia | 4.89 |
| 61 | Thailand | 4.88 |
| 62 | Dominican Republic | 4.84 |
| 63 | Egypt | 4.80 |
| 64 | Mauritius | 4.80 |
| 65 | Indonesia | 4.79 |
| 66 | Kenya | 4.74 |
| 67 | Gambia, The | 4.72 |
| 68 | Hungary | 4.71 |
| 69 | Trinidad and Tobago | 4.70 |
| 70 | Morocco | 4.68 |
| 71 | Madagascar | 4.68 |
| 72 | Poland | 4.66 |
| 73 | Botswana | 4.65 |
| 74 | Namibia | 4.63 |
| 75 | Nigeria | 4.62 |
| 76 | Italy | 4.62 |
| 77 | Mali | 4.61 |
| 78 | Cameroon | 4.58 |
| 79 | Mauritania | 4.58 |
| 80 | Ukraine | 4.54 |
| 81 | Latvia | 4.54 |
| 82 | Oman | 4.54 |
| 83 | Argentina | 4.45 |
| 84 | Pakistan | 4.44 |
| 85 | Kazakhstan | 4.43 |
| 86 | Mongolia | 4.40 |
| 87 | Syria | 4.40 |
| 88 | Benin | 4.39 |
| 89 | Peru | 4.38 |
| 90 | Greece | 4.37 |
| 91 | Montenegro | 4.37 |
| 92 | Mexico | 4.36 |
| 93 | El Salvador | 4.35 |
| 94 | Romania | 4.35 |
| 95 | Honduras | 4.32 |
| 96 | Venezuela | 4.32 |
| 97 | Libya | 4.29 |
| 98 | Moldova | 4.26 |
| 99 | Burkina Faso | 4.25 |
| 100 | Croatia | 4.24 |
| 101 | Colombia | 4.24 |
| 102 | Zambia | 4.23 |
| 103 | Uruguay | 4.23 |
| 104 | Mozambique | 4.20 |
| 105 | Russian Federation | 4.15 |
| 106 | Cambodia | 4.13 |
| 107 | Ghana | 4.13 |
| 108 | Georgia | 4.12 |
| 109 | Armenia | 4.08 |
| 110 | Albania | 4.06 |
| 111 | Bangladesh | 4.05 |
| 112 | Tanzania | 4.03 |
| 113 | Burundi | 3.98 |
| 114 | Bulgaria | 3.96 |
| 115 | Guyana | 3.88 |
| 116 | Malawi | 3.80 |
| 117 | Nicaragua | 3.78 |
| 118 | Lesotho | 3.76 |
| 119 | Tajikistan | 3.75 |
| 120 | Zimbabwe | 3.68 |
| 121 | Kyrgyz Republic | 3.67 |
| 122 | Suriname | 3.67 |
| 123 | Paraguay | 3.65 |
| 124 | Uganda | 3.64 |
| 125 | Ecuador | 3.64 |
| 126 | Serbia | 3.63 |
| 127 | Ethiopia | 3.60 |
| 128 | Algeria | 3.56 |
| 129 | Chad | 3.53 |
| 130 | Nepal | 3.49 |
| 131 | Macedonia, FYR | 3.39 |
| 132 | Timor-Leste | 3.39 |
| 133 | Bosnia and Herzegovina | 3.28 |
| 134 | Bolivia | 3.04 |

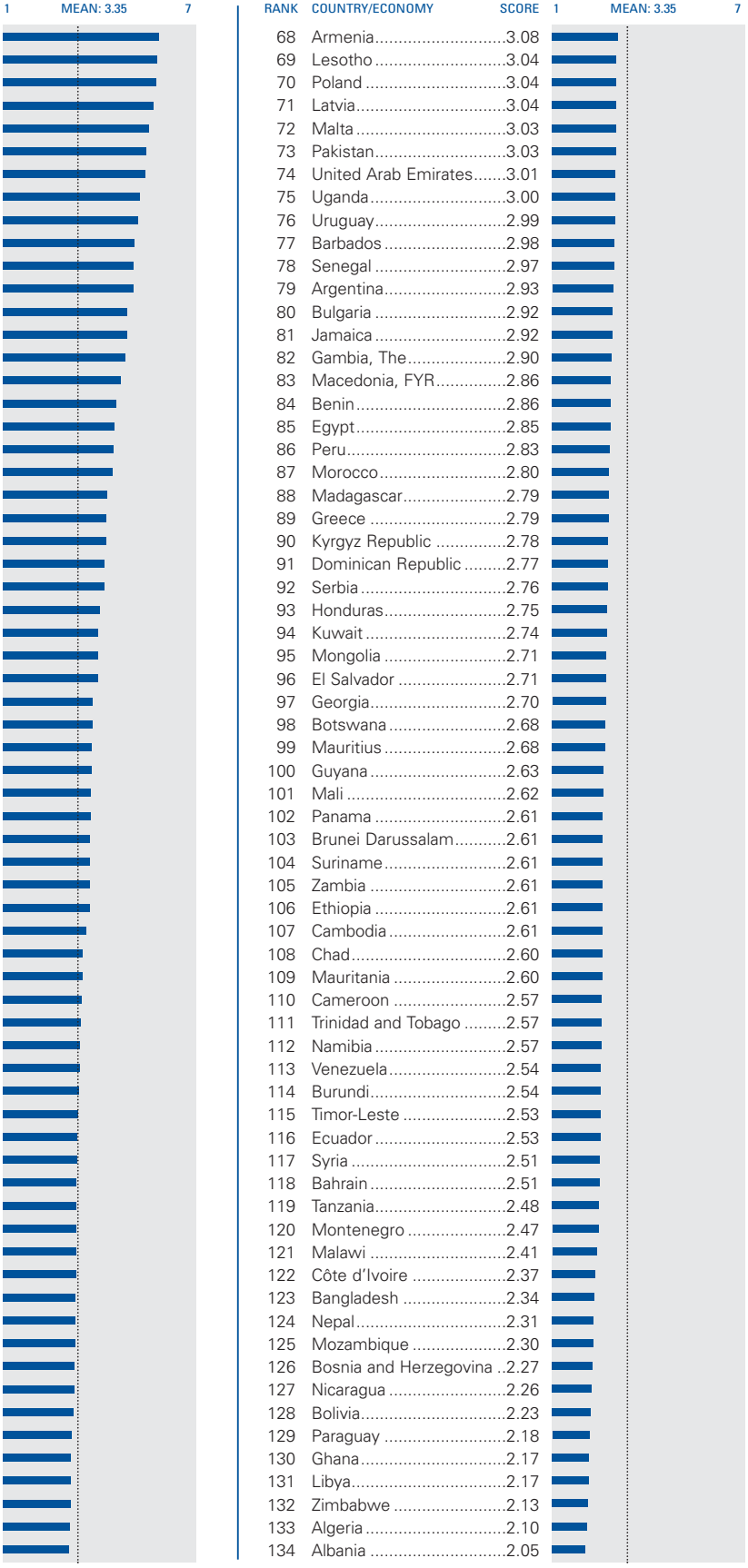



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 8.03 Capacity for innovation

Companies obtain technology (1 = exclusively from licensing or imitating foreign companies, 7 = by conducting formal research and pioneering their own new products and processes)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Germany | 5.95 |
| 2 | Japan | 5.88 |
| 3 | Switzerland | 5.87 |
| 4 | Sweden | 5.78 |
| 5 | Finland | 5.64 |
| 6 | United States | 5.53 |
| 7 | Denmark | 5.52 |
| 8 | France | 5.35 |
| 9 | Korea, Rep. | 5.27 |
| 10 | Israel | 5.17 |
| 11 | Netherlands | 5.14 |
| 12 | Austria | 5.13 |
| 13 | Norway | 4.94 |
| 14 | United Kingdom | 4.93 |
| 15 | Belgium | 4.89 |
| 16 | Taiwan, China | 4.73 |
| 17 | Iceland | 4.59 |
| 18 | Canada | 4.54 |
| 19 | Singapore | 4.50 |
| 20 | Slovenia | 4.47 |
| 21 | Malaysia | 4.31 |
| 22 | Italy | 4.28 |
| 23 | Luxembourg | 4.26 |
| 24 | Czech Republic | 4.21 |
| 25 | China | 4.20 |
| 26 | Ireland | 4.06 |
| 27 | Brazil | 4.02 |
| 28 | New Zealand | 4.01 |
| 29 | Australia | 4.01 |
| 30 | Spain | 3.84 |
| 31 | Ukraine | 3.84 |
| 32 | Portugal | 3.82 |
| 33 | Hong Kong SAR | 3.80 |
| 34 | Sri Lanka | 3.77 |
| 35 | India | 3.77 |
| 36 | South Africa | 3.76 |
| 37 | Saudi Arabia | 3.75 |
| 38 | Tunisia | 3.74 |
| 39 | Azerbaijan | 3.74 |
| 40 | Estonia | 3.64 |
| 41 | Vietnam | 3.53 |
| 42 | Croatia | 3.53 |
| 43 | Costa Rica | 3.49 |
| 44 | Kenya | 3.46 |
| 45 | Russian Federation | 3.43 |
| 46 | Hungary | 3.43 |
| 47 | Nigeria | 3.42 |
| 48 | Puerto Rico | 3.38 |
| 49 | Oman | 3.35 |
| 50 | Kazakhstan | 3.35 |
| 51 | Cyprus | 3.33 |
| 52 | Lithuania | 3.33 |
| 53 | Indonesia | 3.33 |
| 54 | Colombia | 3.32 |
| 55 | Turkey | 3.31 |
| 56 | Slovak Republic | 3.30 |
| 57 | Chile | 3.28 |
| 58 | Romania | 3.28 |
| 59 | Moldova | 3.27 |
| 60 | Qatar | 3.25 |
| 61 | Tajikistan | 3.22 |
| 62 | Burkina Faso | 3.18 |
| 63 | Philippines | 3.16 |
| 64 | Thailand | 3.16 |
| 65 | Guatemala | 3.15 |
| 66 | Jordan | 3.11 |
| 67 | Mexico | 3.10 |
| 68 | Armenia | 3.08 |
| 69 | Lesotho | 3.04 |
| 70 | Poland | 3.04 |
| 71 | Latvia | 3.04 |
| 72 | Malta | 3.03 |
| 73 | Pakistan | 3.03 |
| 74 | United Arab Emirates | 3.01 |
| 75 | Uganda | 3.00 |
| 76 | Uruguay | 2.99 |
| 77 | Barbados | 2.98 |
| 78 | Senegal | 2.97 |
| 79 | Argentina | 2.93 |
| 80 | Bulgaria | 2.92 |
| 81 | Jamaica | 2.92 |
| 82 | Gambia, The | 2.90 |
| 83 | Macedonia, FYR | 2.86 |
| 84 | Benin | 2.86 |
| 85 | Egypt | 2.85 |
| 86 | Peru | 2.83 |
| 87 | Morocco | 2.80 |
| 88 | Madagascar | 2.79 |
| 89 | Greece | 2.79 |
| 90 | Kyrgyz Republic | 2.78 |
| 91 | Dominican Republic | 2.77 |
| 92 | Serbia | 2.76 |
| 93 | Honduras | 2.75 |
| 94 | Kuwait | 2.74 |
| 95 | Mongolia | 2.71 |
| 96 | El Salvador | 2.71 |
| 97 | Georgia | 2.70 |
| 98 | Botswana | 2.68 |
| 99 | Mauritius | 2.68 |
| 100 | Guyana | 2.63 |
| 101 | Mali | 2.62 |
| 102 | Panama | 2.61 |
| 103 | Brunei Darussalam | 2.61 |
| 104 | Suriname | 2.61 |
| 105 | Zambia | 2.61 |
| 106 | Ethiopia | 2.61 |
| 107 | Cambodia | 2.61 |
| 108 | Chad | 2.60 |
| 109 | Mauritania | 2.60 |
| 110 | Cameroon | 2.57 |
| 111 | Trinidad and Tobago | 2.57 |
| 112 | Namibia | 2.57 |
| 113 | Venezuela | 2.54 |
| 114 | Burundi | 2.54 |
| 115 | Timor-Leste | 2.53 |
| 116 | Ecuador | 2.53 |
| 117 | Syria | 2.51 |
| 118 | Bahrain | 2.51 |
| 119 | Tanzania | 2.48 |
| 120 | Montenegro | 2.47 |
| 121 | Malawi | 2.41 |
| 122 | Côte d'Ivoire | 2.37 |
| 123 | Bangladesh | 2.34 |
| 124 | Nepal | 2.31 |
| 125 | Mozambique | 2.30 |
| 126 | Bosnia and Herzegovina | 2.27 |
| 127 | Nicaragua | 2.26 |
| 128 | Bolivia | 2.23 |
| 129 | Paraguay | 2.18 |
| 130 | Ghana | 2.17 |
| 131 | Libya | 2.17 |
| 132 | Zimbabwe | 2.13 |
| 133 | Algeria | 2.10 |
| 134 | Albania | 2.05 |

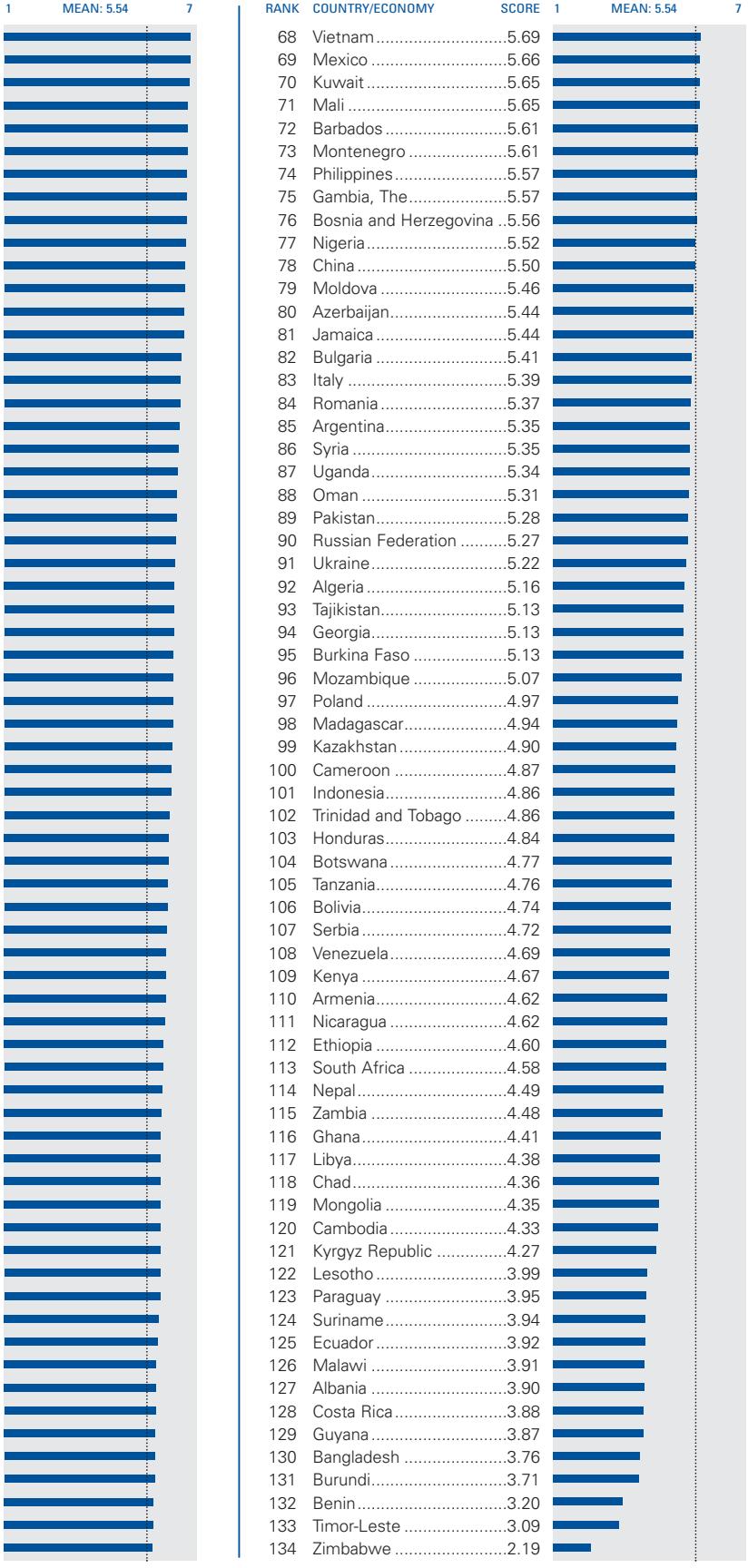



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 8.04 Availability of new telephone lines

New telephone lines for your business are (1 = scarce and difficult to obtain, 7 = widely available and highly reliable)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Switzerland | 6.91 |
| 2 | Finland | 6.90 |
| 3 | Denmark | 6.89 |
| 4 | Sweden | 6.84 |
| 5 | Austria | 6.82 |
| 6 | Singapore | 6.82 |
| 7 | Iceland | 6.81 |
| 8 | Canada | 6.81 |
| 9 | Norway | 6.79 |
| 10 | Hong Kong SAR | 6.77 |
| 11 | Japan | 6.75 |
| 12 | France | 6.73 |
| 13 | Netherlands | 6.72 |
| 14 | Germany | 6.72 |
| 15 | United States | 6.63 |
| 16 | Israel | 6.60 |
| 17 | Belgium | 6.59 |
| 18 | United Arab Emirates | 6.57 |
| 19 | Jordan | 6.55 |
| 20 | Chile | 6.52 |
| 21 | Malta | 6.49 |
| 22 | Guatemala | 6.48 |
| 23 | Estonia | 6.44 |
| 24 | Slovak Republic | 6.41 |
| 25 | Egypt | 6.40 |
| 26 | El Salvador | 6.39 |
| 27 | Czech Republic | 6.39 |
| 28 | Hungary | 6.38 |
| 29 | Taiwan, China | 6.38 |
| 30 | United Kingdom | 6.37 |
| 31 | Portugal | 6.36 |
| 32 | Dominican Republic | 6.33 |
| 33 | Cyprus | 6.30 |
| 34 | Uruguay | 6.30 |
| 35 | Tunisia | 6.24 |
| 36 | Bahrain | 6.22 |
| 37 | Croatia | 6.21 |
| 38 | India | 6.20 |
| 39 | Brazil | 6.18 |
| 40 | Luxembourg | 6.17 |
| 41 | Australia | 6.15 |
| 42 | Lithuania | 6.14 |
| 43 | Côte d'Ivoire | 6.14 |
| 44 | Thailand | 6.11 |
| 45 | Slovenia | 6.05 |
| 46 | Malaysia | 6.04 |
| 47 | Saudi Arabia | 6.03 |
| 48 | Qatar | 5.99 |
| 49 | Mauritania | 5.97 |
| 50 | Sri Lanka | 5.97 |
| 51 | Latvia | 5.96 |
| 52 | New Zealand | 5.96 |
| 53 | Mauritius | 5.96 |
| 54 | Panama | 5.96 |
| 55 | Senegal | 5.95 |
| 56 | Morocco | 5.95 |
| 57 | Spain | 5.91 |
| 58 | Colombia | 5.87 |
| 59 | Greece | 5.83 |
| 60 | Ireland | 5.82 |
| 61 | Korea, Rep. | 5.81 |
| 62 | Turkey | 5.79 |
| 63 | Puerto Rico | 5.78 |
| 64 | Brunei Darussalam | 5.78 |
| 65 | Peru | 5.74 |
| 66 | Macedonia, FYR | 5.74 |
| 67 | Namibia | 5.70 |
| 68 | Vietnam | 5.69 |
| 69 | Mexico | 5.66 |
| 70 | Kuwait | 5.65 |
| 71 | Mali | 5.65 |
| 72 | Barbados | 5.61 |
| 73 | Montenegro | 5.61 |
| 74 | Philippines | 5.57 |
| 75 | Gambia, The | 5.57 |
| 76 | Bosnia and Herzegovina | 5.56 |
| 77 | Nigeria | 5.52 |
| 78 | China | 5.50 |
| 79 | Moldova | 5.46 |
| 80 | Azerbaijan | 5.44 |
| 81 | Jamaica | 5.44 |
| 82 | Bulgaria | 5.41 |
| 83 | Italy | 5.39 |
| 84 | Romania | 5.37 |
| 85 | Argentina | 5.35 |
| 86 | Syria | 5.35 |
| 87 | Uganda | 5.34 |
| 88 | Oman | 5.31 |
| 89 | Pakistan | 5.28 |
| 90 | Russian Federation | 5.27 |
| 91 | Ukraine | 5.22 |
| 92 | Algeria | 5.16 |
| 93 | Tajikistan | 5.13 |
| 94 | Georgia | 5.13 |
| 95 | Burkina Faso | 5.13 |
| 96 | Mozambique | 5.07 |
| 97 | Poland | 4.97 |
| 98 | Madagascar | 4.94 |
| 99 | Kazakhstan | 4.90 |
| 100 | Cameroon | 4.87 |
| 101 | Indonesia | 4.86 |
| 102 | Trinidad and Tobago | 4.86 |
| 103 | Honduras | 4.84 |
| 104 | Botswana | 4.77 |
| 105 | Tanzania | 4.76 |
| 106 | Bolivia | 4.74 |
| 107 | Serbia | 4.72 |
| 108 | Venezuela | 4.69 |
| 109 | Kenya | 4.67 |
| 110 | Armenia | 4.62 |
| 111 | Nicaragua | 4.62 |
| 112 | Ethiopia | 4.60 |
| 113 | South Africa | 4.58 |
| 114 | Nepal | 4.49 |
| 115 | Zambia | 4.48 |
| 116 | Ghana | 4.41 |
| 117 | Libya | 4.38 |
| 118 | Chad | 4.36 |
| 119 | Mongolia | 4.35 |
| 120 | Cambodia | 4.33 |
| 121 | Kyrgyz Republic | 4.27 |
| 122 | Lesotho | 3.99 |
| 123 | Paraguay | 3.95 |
| 124 | Suriname | 3.94 |
| 125 | Ecuador | 3.92 |
| 126 | Malawi | 3.91 |
| 127 | Albania | 3.90 |
| 128 | Costa Rica | 3.88 |
| 129 | Guyana | 3.87 |
| 130 | Bangladesh | 3.76 |
| 131 | Burundi | 3.71 |
| 132 | Benin | 3.20 |
| 133 | Timor-Leste | 3.09 |
| 134 | Zimbabwe | 2.19 |

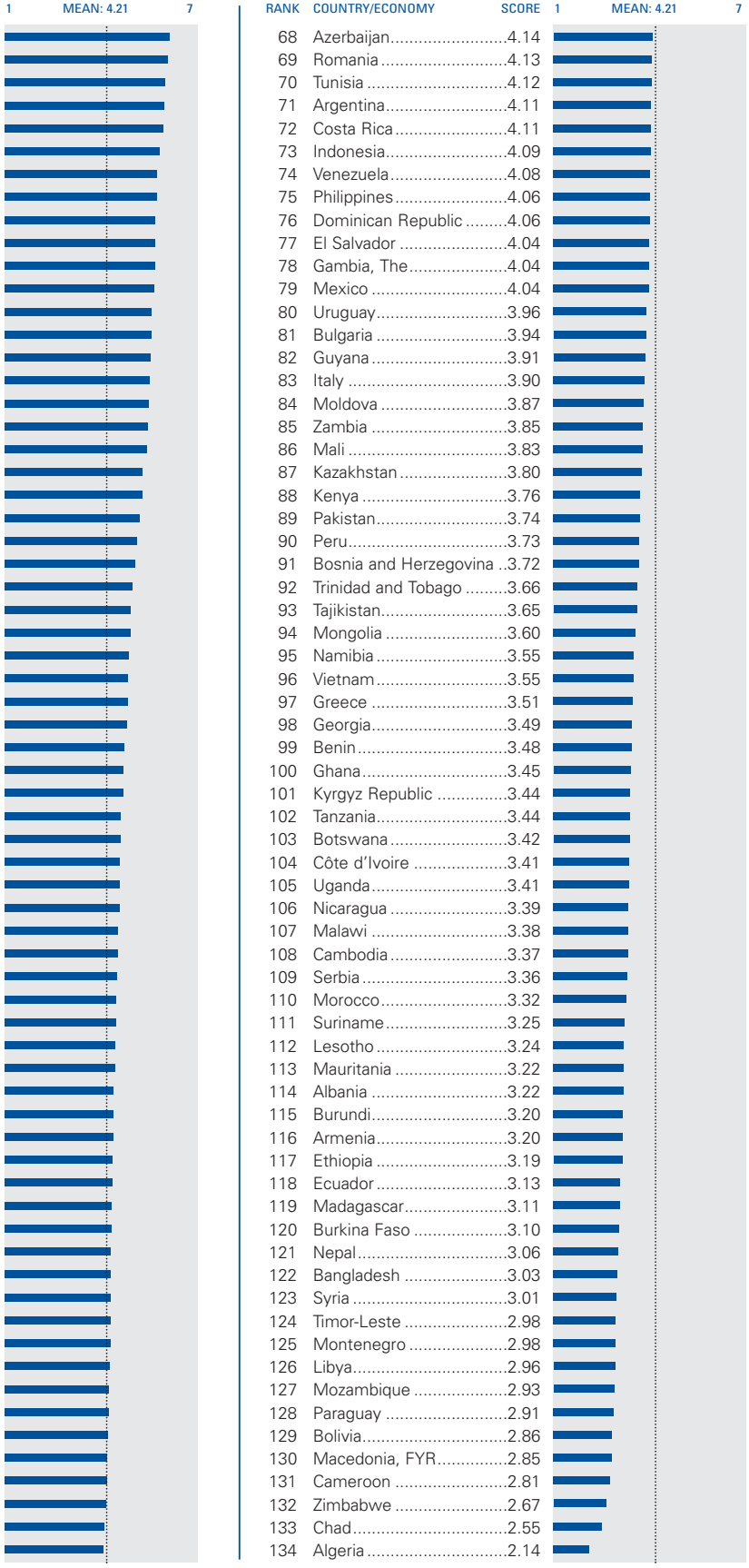



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 8.05 Extent of business Internet use

Companies in your country use the Internet extensively for buying and selling goods, and for interacting with customers and suppliers (1 = strongly disagree, 7 = strongly agree)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | United States | 6.22 |
| 2 | Sweden | 6.16 |
| 3 | Korea, Rep. | 6.08 |
| 4 | Estonia | 6.07 |
| 5 | Denmark | 6.04 |
| 6 | Germany | 5.91 |
| 7 | Switzerland | 5.84 |
| 8 | Canada | 5.84 |
| 9 | United Kingdom | 5.78 |
| 10 | Finland | 5.77 |
| 11 | Japan | 5.77 |
| 12 | Taiwan, China | 5.74 |
| 13 | Austria | 5.66 |
| 14 | Norway | 5.66 |
| 15 | Netherlands | 5.63 |
| 16 | Iceland | 5.59 |
| 17 | Israel | 5.56 |
| 18 | Singapore | 5.54 |
| 19 | Czech Republic | 5.50 |
| 20 | Hong Kong SAR | 5.38 |
| 21 | Australia | 5.36 |
| 22 | Puerto Rico | 5.28 |
| 23 | France | 5.20 |
| 24 | Belgium | 5.14 |
| 25 | Luxembourg | 5.06 |
| 26 | New Zealand | 5.00 |
| 27 | Chile | 4.98 |
| 28 | Brazil | 4.94 |
| 29 | Malaysia | 4.91 |
| 30 | Poland | 4.91 |
| 31 | Ireland | 4.88 |
| 32 | Guatemala | 4.80 |
| 33 | Lithuania | 4.76 |
| 34 | Malta | 4.75 |
| 35 | Slovenia | 4.68 |
| 36 | Egypt | 4.68 |
| 37 | United Arab Emirates | 4.66 |
| 38 | Portugal | 4.66 |
| 39 | Jordan | 4.64 |
| 40 | Jamaica | 4.60 |
| 41 | India | 4.58 |
| 42 | Cyprus | 4.57 |
| 43 | Senegal | 4.54 |
| 44 | Ukraine | 4.52 |
| 45 | Latvia | 4.50 |
| 46 | Turkey | 4.50 |
| 47 | South Africa | 4.45 |
| 48 | Saudi Arabia | 4.44 |
| 49 | Honduras | 4.44 |
| 50 | Sri Lanka | 4.42 |
| 51 | Brunei Darussalam | 4.41 |
| 52 | Russian Federation | 4.40 |
| 53 | Qatar | 4.39 |
| 54 | China | 4.37 |
| 55 | Barbados | 4.37 |
| 56 | Thailand | 4.37 |
| 57 | Panama | 4.36 |
| 58 | Slovak Republic | 4.35 |
| 59 | Hungary | 4.32 |
| 60 | Bahrain | 4.29 |
| 61 | Colombia | 4.29 |
| 62 | Spain | 4.27 |
| 63 | Kuwait | 4.23 |
| 64 | Nigeria | 4.23 |
| 65 | Mauritius | 4.22 |
| 66 | Croatia | 4.17 |
| 67 | Oman | 4.14 |
| 68 | Azerbaijan | 4.14 |
| 69 | Romania | 4.13 |
| 70 | Tunisia | 4.12 |
| 71 | Argentina | 4.11 |
| 72 | Costa Rica | 4.11 |
| 73 | Indonesia | 4.09 |
| 74 | Venezuela | 4.08 |
| 75 | Philippines | 4.06 |
| 76 | Dominican Republic | 4.06 |
| 77 | El Salvador | 4.04 |
| 78 | Gambia, The | 4.04 |
| 79 | Mexico | 4.04 |
| 80 | Uruguay | 3.96 |
| 81 | Bulgaria | 3.94 |
| 82 | Guyana | 3.91 |
| 83 | Italy | 3.90 |
| 84 | Moldova | 3.87 |
| 85 | Zambia | 3.85 |
| 86 | Mali | 3.83 |
| 87 | Kazakhstan | 3.80 |
| 88 | Kenya | 3.76 |
| 89 | Pakistan | 3.74 |
| 90 | Peru | 3.73 |
| 91 | Bosnia and Herzegovina | 3.72 |
| 92 | Trinidad and Tobago | 3.66 |
| 93 | Tajikistan | 3.65 |
| 94 | Mongolia | 3.60 |
| 95 | Namibia | 3.55 |
| 96 | Vietnam | 3.55 |
| 97 | Greece | 3.51 |
| 98 | Georgia | 3.49 |
| 99 | Benin | 3.48 |
| 100 | Ghana | 3.45 |
| 101 | Kyrgyz Republic | 3.44 |
| 102 | Tanzania | 3.44 |
| 103 | Botswana | 3.42 |
| 104 | Côte d'Ivoire | 3.41 |
| 105 | Uganda | 3.41 |
| 106 | Nicaragua | 3.39 |
| 107 | Malawi | 3.38 |
| 108 | Cambodia | 3.37 |
| 109 | Serbia | 3.36 |
| 110 | Morocco | 3.32 |
| 111 | Suriname | 3.25 |
| 112 | Lesotho | 3.24 |
| 113 | Mauritania | 3.22 |
| 114 | Albania | 3.22 |
| 115 | Burundi | 3.20 |
| 116 | Armenia | 3.20 |
| 117 | Ethiopia | 3.19 |
| 118 | Ecuador | 3.13 |
| 119 | Madagascar | 3.11 |
| 120 | Burkina Faso | 3.10 |
| 121 | Nepal | 3.06 |
| 122 | Bangladesh | 3.03 |
| 123 | Syria | 3.01 |
| 124 | Timor-Leste | 2.98 |
| 125 | Montenegro | 2.98 |
| 126 | Libya | 2.96 |
| 127 | Mozambique | 2.93 |
| 128 | Paraguay | 2.91 |
| 129 | Bolivia | 2.86 |
| 130 | Macedonia, FYR | 2.85 |
| 131 | Cameroon | 2.81 |
| 132 | Zimbabwe | 2.67 |
| 133 | Chad | 2.55 |
| 134 | Algeria | 2.14 |



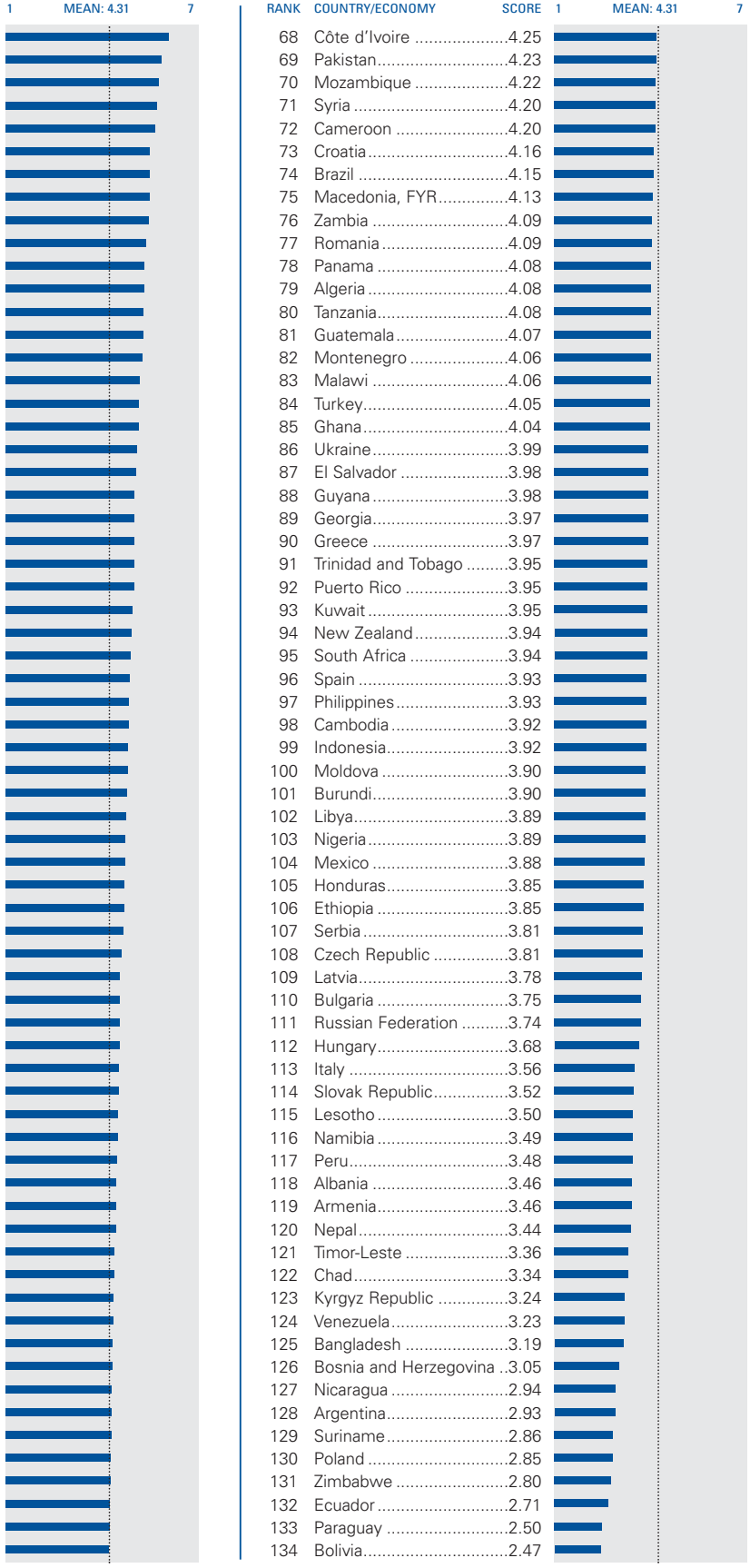

**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 9th pillar
# Government usage

# 9.01 Government success in ICT promotion

Government programs promoting the use of information and communication technologies are (1 = not very successful, 7 = highly successful)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Singapore | 6.16 |
| 2 | Malta | 5.94 |
| 3 | Tunisia | 5.86 |
| 4 | United Arab Emirates | 5.80 |
| 5 | Estonia | 5.74 |
| 6 | Denmark | 5.58 |
| 7 | Sweden | 5.56 |
| 8 | Qatar | 5.56 |
| 9 | Korea, Rep. | 5.55 |
| 10 | Taiwan, China | 5.46 |
| 11 | Iceland | 5.40 |
| 12 | Portugal | 5.39 |
| 13 | Malaysia | 5.38 |
| 14 | Gambia, The | 5.37 |
| 15 | Norway | 5.33 |
| 16 | Finland | 5.26 |
| 17 | Mali | 5.23 |
| 18 | Jordan | 5.21 |
| 19 | Hong Kong SAR | 5.17 |
| 20 | Azerbaijan | 5.15 |
| 21 | United States | 5.09 |
| 22 | China | 5.08 |
| 23 | India | 5.08 |
| 24 | Senegal | 5.07 |
| 25 | Brunei Darussalam | 5.07 |
| 26 | Luxembourg | 5.03 |
| 27 | Bahrain | 4.98 |
| 28 | Israel | 4.95 |
| 29 | France | 4.94 |
| 30 | Egypt | 4.92 |
| 31 | Barbados | 4.91 |
| 32 | Saudi Arabia | 4.89 |
| 33 | Switzerland | 4.88 |
| 34 | Oman | 4.85 |
| 35 | Austria | 4.82 |
| 36 | Australia | 4.80 |
| 37 | Madagascar | 4.78 |
| 38 | Canada | 4.77 |
| 39 | Mauritania | 4.76 |
| 40 | Mauritius | 4.73 |
| 41 | Sri Lanka | 4.68 |
| 42 | Cyprus | 4.63 |
| 43 | Dominican Republic | 4.62 |
| 44 | Burkina Faso | 4.61 |
| 45 | Morocco | 4.61 |
| 46 | Thailand | 4.60 |
| 47 | Germany | 4.58 |
| 48 | Mongolia | 4.57 |
| 49 | Benin | 4.55 |
| 50 | Lithuania | 4.52 |
| 51 | Botswana | 4.51 |
| 52 | United Kingdom | 4.50 |
| 53 | Netherlands | 4.49 |
| 54 | Belgium | 4.44 |
| 55 | Vietnam | 4.44 |
| 56 | Kazakhstan | 4.43 |
| 57 | Uruguay | 4.42 |
| 58 | Costa Rica | 4.39 |
| 59 | Japan | 4.38 |
| 60 | Jamaica | 4.36 |
| 61 | Colombia | 4.35 |
| 62 | Slovenia | 4.35 |
| 63 | Uganda | 4.32 |
| 64 | Kenya | 4.32 |
| 65 | Chile | 4.31 |
| 66 | Ireland | 4.30 |
| 67 | Tajikistan | 4.27 |
| 68 | Côte d'Ivoire | 4.25 |
| 69 | Pakistan | 4.23 |
| 70 | Mozambique | 4.22 |
| 71 | Syria | 4.20 |
| 72 | Cameroon | 4.20 |
| 73 | Croatia | 4.16 |
| 74 | Brazil | 4.15 |
| 75 | Macedonia, FYR | 4.13 |
| 76 | Zambia | 4.09 |
| 77 | Romania | 4.09 |
| 78 | Panama | 4.08 |
| 79 | Algeria | 4.08 |
| 80 | Tanzania | 4.08 |
| 81 | Guatemala | 4.07 |
| 82 | Montenegro | 4.06 |
| 83 | Malawi | 4.06 |
| 84 | Turkey | 4.05 |
| 85 | Ghana | 4.04 |
| 86 | Ukraine | 3.99 |
| 87 | El Salvador | 3.98 |
| 88 | Guyana | 3.98 |
| 89 | Georgia | 3.97 |
| 90 | Greece | 3.97 |
| 91 | Trinidad and Tobago | 3.95 |
| 92 | Puerto Rico | 3.95 |
| 93 | Kuwait | 3.95 |
| 94 | New Zealand | 3.94 |
| 95 | South Africa | 3.94 |
| 96 | Spain | 3.93 |
| 97 | Philippines | 3.93 |
| 98 | Cambodia | 3.92 |
| 99 | Indonesia | 3.92 |
| 100 | Moldova | 3.90 |
| 101 | Burundi | 3.90 |
| 102 | Libya | 3.89 |
| 103 | Nigeria | 3.89 |
| 104 | Mexico | 3.88 |
| 105 | Honduras | 3.85 |
| 106 | Ethiopia | 3.85 |
| 107 | Serbia | 3.81 |
| 108 | Czech Republic | 3.81 |
| 109 | Latvia | 3.78 |
| 110 | Bulgaria | 3.75 |
| 111 | Russian Federation | 3.74 |
| 112 | Hungary | 3.68 |
| 113 | Italy | 3.56 |
| 114 | Slovak Republic | 3.52 |
| 115 | Lesotho | 3.50 |
| 116 | Namibia | 3.49 |
| 117 | Peru | 3.48 |
| 118 | Albania | 3.46 |
| 119 | Armenia | 3.46 |
| 120 | Nepal | 3.44 |
| 121 | Timor-Leste | 3.36 |
| 122 | Chad | 3.34 |
| 123 | Kyrgyz Republic | 3.24 |
| 124 | Venezuela | 3.23 |
| 125 | Bangladesh | 3.19 |
| 126 | Bosnia and Herzegovina | 3.05 |
| 127 | Nicaragua | 2.94 |
| 128 | Argentina | 2.93 |
| 129 | Suriname | 2.86 |
| 130 | Poland | 2.85 |
| 131 | Zimbabwe | 2.80 |
| 132 | Ecuador | 2.71 |
| 133 | Paraguay | 2.50 |
| 134 | Bolivia | 2.47 |

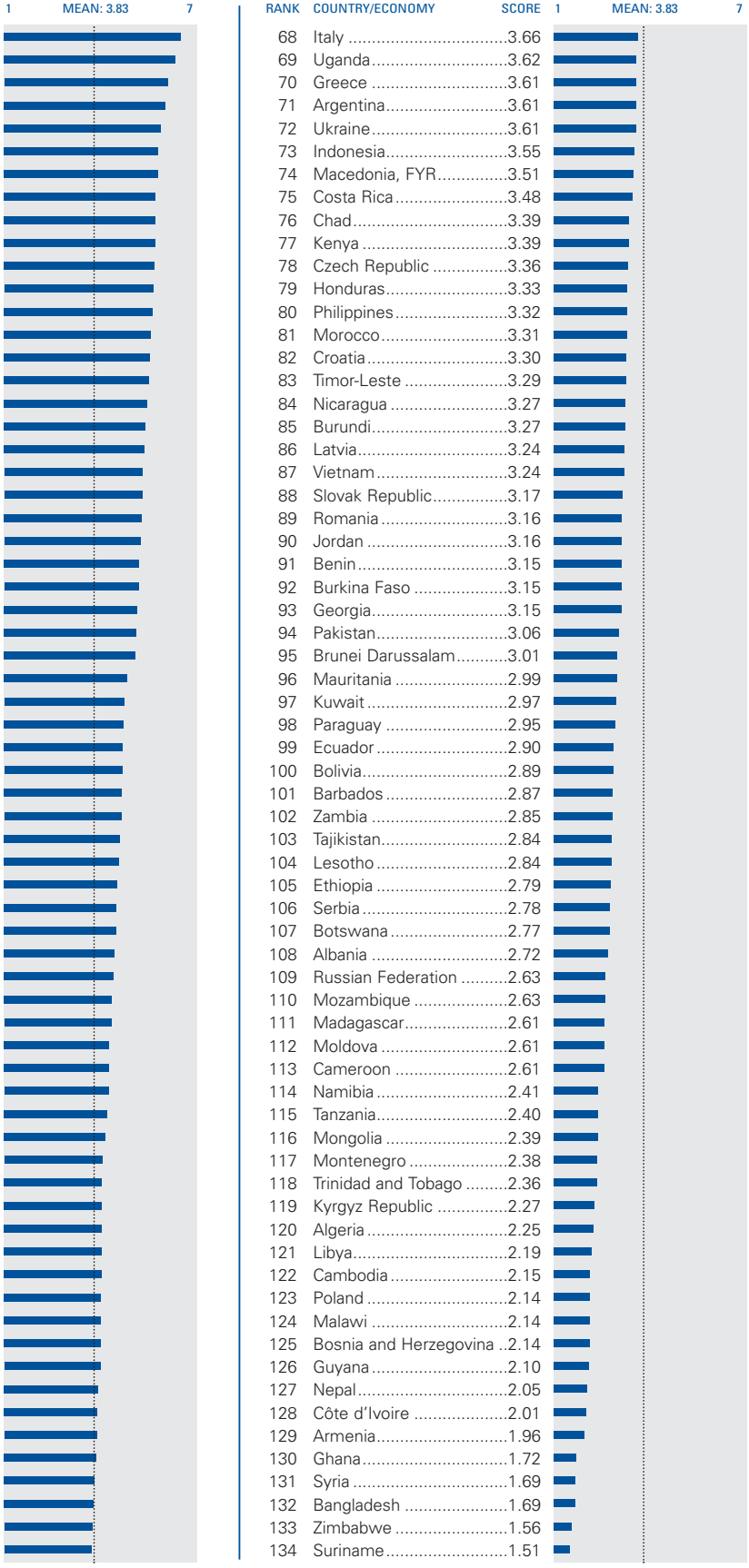



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 9.02 Availability of government online services

In your country, online government services such as personal tax, car registrations, passport applications, business permits, and e-procurement are (1 = not available, 7 = extensively available)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Estonia | 6.60 |
| 2 | Singapore | 6.43 |
| 3 | Denmark | 6.18 |
| 4 | Sweden | 6.11 |
| 5 | Malta | 5.97 |
| 6 | Austria | 5.89 |
| 7 | Iceland | 5.88 |
| 8 | Hong Kong SAR | 5.79 |
| 9 | Portugal | 5.79 |
| 10 | United States | 5.79 |
| 11 | Norway | 5.77 |
| 12 | Chile | 5.72 |
| 13 | Canada | 5.70 |
| 14 | Ireland | 5.66 |
| 15 | Australia | 5.62 |
| 16 | United Kingdom | 5.60 |
| 17 | Korea, Rep. | 5.53 |
| 18 | Finland | 5.48 |
| 19 | Israel | 5.44 |
| 20 | New Zealand | 5.38 |
| 21 | Switzerland | 5.38 |
| 22 | France | 5.36 |
| 23 | Taiwan, China | 5.32 |
| 24 | Malaysia | 5.27 |
| 25 | Qatar | 5.26 |
| 26 | Brazil | 5.21 |
| 27 | United Arab Emirates | 5.19 |
| 28 | Netherlands | 5.16 |
| 29 | Dominican Republic | 4.91 |
| 30 | Slovenia | 4.80 |
| 31 | Cyprus | 4.78 |
| 32 | Bahrain | 4.76 |
| 33 | Belgium | 4.74 |
| 34 | Thailand | 4.73 |
| 35 | China | 4.71 |
| 36 | Lithuania | 4.68 |
| 37 | Guatemala | 4.65 |
| 38 | Oman | 4.58 |
| 39 | Germany | 4.56 |
| 40 | Spain | 4.55 |
| 41 | Tunisia | 4.49 |
| 42 | Hungary | 4.46 |
| 43 | Panama | 4.41 |
| 44 | Azerbaijan | 4.40 |
| 45 | Jamaica | 4.33 |
| 46 | Saudi Arabia | 4.32 |
| 47 | El Salvador | 4.31 |
| 48 | Mexico | 4.26 |
| 49 | India | 4.21 |
| 50 | Turkey | 4.11 |
| 51 | Japan | 4.10 |
| 52 | Bulgaria | 4.09 |
| 53 | Senegal | 4.09 |
| 54 | Uruguay | 4.09 |
| 55 | Egypt | 4.09 |
| 56 | Kazakhstan | 4.07 |
| 57 | Mali | 4.07 |
| 58 | Nigeria | 4.06 |
| 59 | Luxembourg | 4.05 |
| 60 | South Africa | 3.98 |
| 61 | Puerto Rico | 3.95 |
| 62 | Colombia | 3.94 |
| 63 | Peru | 3.93 |
| 64 | Venezuela | 3.86 |
| 65 | Mauritius | 3.83 |
| 66 | Gambia, The | 3.79 |
| 67 | Sri Lanka | 3.76 |
| 68 | Italy | 3.66 |
| 69 | Uganda | 3.62 |
| 70 | Greece | 3.61 |
| 71 | Argentina | 3.61 |
| 72 | Ukraine | 3.61 |
| 73 | Indonesia | 3.55 |
| 74 | Macedonia, FYR | 3.51 |
| 75 | Costa Rica | 3.48 |
| 76 | Chad | 3.39 |
| 77 | Kenya | 3.39 |
| 78 | Czech Republic | 3.36 |
| 79 | Honduras | 3.33 |
| 80 | Philippines | 3.32 |
| 81 | Morocco | 3.31 |
| 82 | Croatia | 3.30 |
| 83 | Timor-Leste | 3.29 |
| 84 | Nicaragua | 3.27 |
| 85 | Burundi | 3.27 |
| 86 | Latvia | 3.24 |
| 87 | Vietnam | 3.24 |
| 88 | Slovak Republic | 3.17 |
| 89 | Romania | 3.16 |
| 90 | Jordan | 3.16 |
| 91 | Benin | 3.15 |
| 92 | Burkina Faso | 3.15 |
| 93 | Georgia | 3.15 |
| 94 | Pakistan | 3.06 |
| 95 | Brunei Darussalam | 3.01 |
| 96 | Mauritania | 2.99 |
| 97 | Kuwait | 2.97 |
| 98 | Paraguay | 2.95 |
| 99 | Ecuador | 2.90 |
| 100 | Bolivia | 2.89 |
| 101 | Barbados | 2.87 |
| 102 | Zambia | 2.85 |
| 103 | Tajikistan | 2.84 |
| 104 | Lesotho | 2.84 |
| 105 | Ethiopia | 2.79 |
| 106 | Serbia | 2.78 |
| 107 | Botswana | 2.77 |
| 108 | Albania | 2.72 |
| 109 | Russian Federation | 2.63 |
| 110 | Mozambique | 2.63 |
| 111 | Madagascar | 2.61 |
| 112 | Moldova | 2.61 |
| 113 | Cameroon | 2.61 |
| 114 | Namibia | 2.41 |
| 115 | Tanzania | 2.40 |
| 116 | Mongolia | 2.39 |
| 117 | Montenegro | 2.38 |
| 118 | Trinidad and Tobago | 2.36 |
| 119 | Kyrgyz Republic | 2.27 |
| 120 | Algeria | 2.25 |
| 121 | Libya | 2.19 |
| 122 | Cambodia | 2.15 |
| 123 | Poland | 2.14 |
| 124 | Malawi | 2.14 |
| 125 | Bosnia and Herzegovina | 2.14 |
| 126 | Guyana | 2.10 |
| 127 | Nepal | 2.05 |
| 128 | Côte d'Ivoire | 2.01 |
| 129 | Armenia | 1.96 |
| 130 | Ghana | 1.72 |
| 131 | Syria | 1.69 |
| 132 | Bangladesh | 1.69 |
| 133 | Zimbabwe | 1.56 |
| 134 | Suriname | 1.51 |

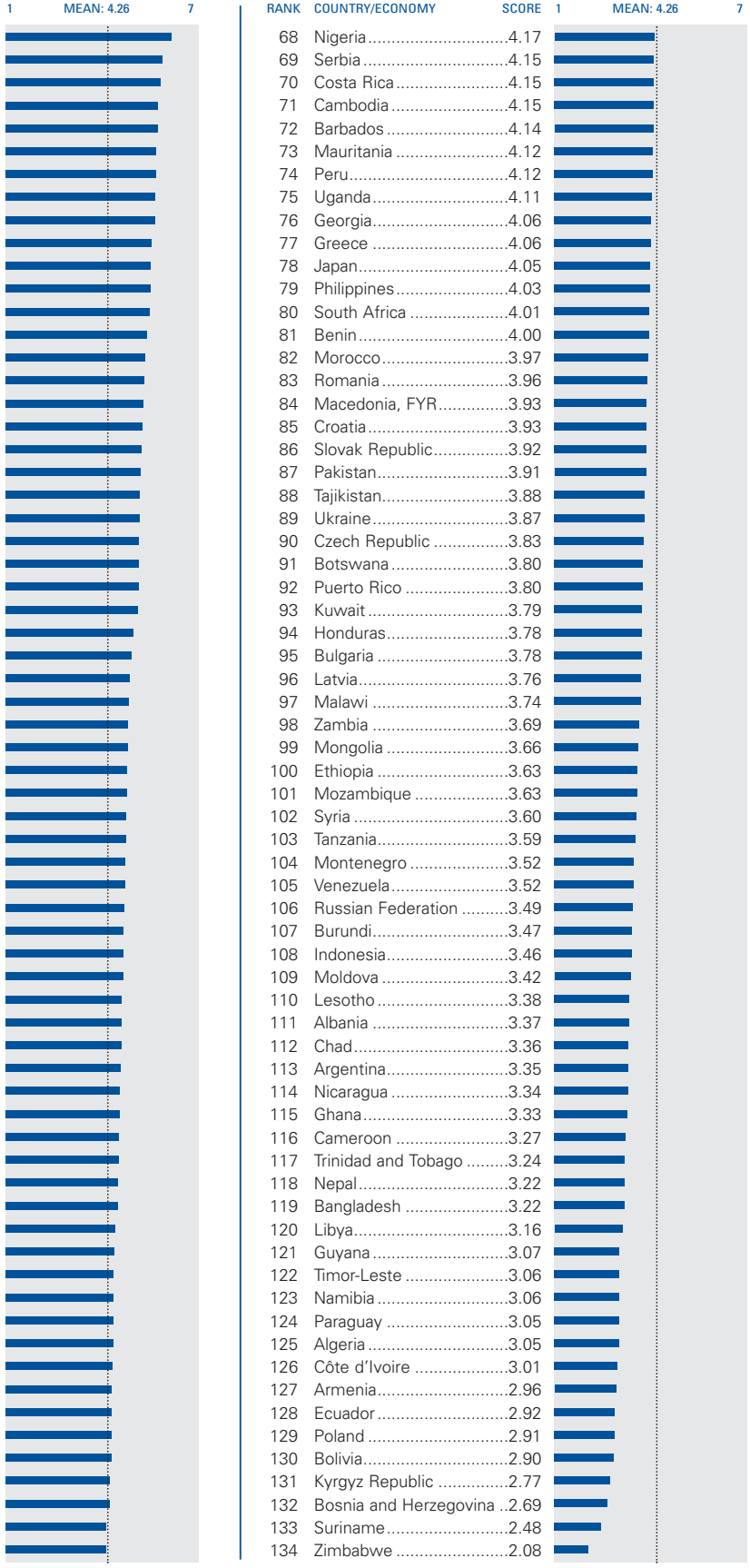



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 9.03 ICT use and government efficiency

The use of information and communication technologies by the government has improved the efficiency of government services, facilitating interaction with businesses and individuals (1 = strongly disagree, 7 = strongly agree)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Singapore | 6.27 |
| 2 | Estonia | 5.96 |
| 3 | Denmark | 5.92 |
| 4 | United Arab Emirates | 5.84 |
| 5 | Malta | 5.83 |
| 6 | Korea, Rep. | 5.78 |
| 7 | Hong Kong SAR | 5.76 |
| 8 | Sweden | 5.74 |
| 9 | Portugal | 5.73 |
| 10 | Iceland | 5.63 |
| 11 | Taiwan, China | 5.61 |
| 12 | Malaysia | 5.59 |
| 13 | Norway | 5.56 |
| 14 | Finland | 5.47 |
| 15 | Qatar | 5.43 |
| 16 | Austria | 5.41 |
| 17 | Chile | 5.36 |
| 18 | United States | 5.34 |
| 19 | Switzerland | 5.31 |
| 20 | Tunisia | 5.27 |
| 21 | France | 5.25 |
| 22 | Canada | 5.25 |
| 23 | Slovenia | 5.22 |
| 24 | Israel | 5.22 |
| 25 | Ireland | 5.21 |
| 26 | Australia | 5.18 |
| 27 | Dominican Republic | 5.04 |
| 28 | Bahrain | 4.98 |
| 29 | Jordan | 4.94 |
| 30 | Italy | 4.90 |
| 31 | China | 4.88 |
| 32 | Gambia, The | 4.87 |
| 33 | India | 4.85 |
| 34 | Azerbaijan | 4.85 |
| 35 | Netherlands | 4.82 |
| 36 | Germany | 4.82 |
| 37 | Thailand | 4.80 |
| 38 | Oman | 4.78 |
| 39 | Cyprus | 4.77 |
| 40 | Spain | 4.73 |
| 41 | New Zealand | 4.73 |
| 42 | Guatemala | 4.72 |
| 43 | Lithuania | 4.68 |
| 44 | Saudi Arabia | 4.68 |
| 45 | Turkey | 4.67 |
| 46 | Senegal | 4.64 |
| 47 | United Kingdom | 4.63 |
| 48 | Brunei Darussalam | 4.61 |
| 49 | Luxembourg | 4.60 |
| 50 | Brazil | 4.59 |
| 51 | Mali | 4.57 |
| 52 | Jamaica | 4.55 |
| 53 | Belgium | 4.46 |
| 54 | Vietnam | 4.45 |
| 55 | Sri Lanka | 4.43 |
| 56 | Burkina Faso | 4.43 |
| 57 | Uruguay | 4.41 |
| 58 | Colombia | 4.41 |
| 59 | El Salvador | 4.38 |
| 60 | Panama | 4.37 |
| 61 | Mexico | 4.36 |
| 62 | Egypt | 4.35 |
| 63 | Mauritius | 4.35 |
| 64 | Hungary | 4.30 |
| 65 | Kazakhstan | 4.29 |
| 66 | Kenya | 4.19 |
| 67 | Madagascar | 4.18 |
| 68 | Nigeria | 4.17 |
| 69 | Serbia | 4.15 |
| 70 | Costa Rica | 4.15 |
| 71 | Cambodia | 4.15 |
| 72 | Barbados | 4.14 |
| 73 | Mauritania | 4.12 |
| 74 | Peru | 4.12 |
| 75 | Uganda | 4.11 |
| 76 | Georgia | 4.06 |
| 77 | Greece | 4.06 |
| 78 | Japan | 4.05 |
| 79 | Philippines | 4.03 |
| 80 | South Africa | 4.01 |
| 81 | Benin | 4.00 |
| 82 | Morocco | 3.97 |
| 83 | Romania | 3.96 |
| 84 | Macedonia, FYR | 3.93 |
| 85 | Croatia | 3.93 |
| 86 | Slovak Republic | 3.92 |
| 87 | Pakistan | 3.91 |
| 88 | Tajikistan | 3.88 |
| 89 | Ukraine | 3.87 |
| 90 | Czech Republic | 3.83 |
| 91 | Botswana | 3.80 |
| 92 | Puerto Rico | 3.80 |
| 93 | Kuwait | 3.79 |
| 94 | Honduras | 3.78 |
| 95 | Bulgaria | 3.78 |
| 96 | Latvia | 3.76 |
| 97 | Malawi | 3.74 |
| 98 | Zambia | 3.69 |
| 99 | Mongolia | 3.66 |
| 100 | Ethiopia | 3.63 |
| 101 | Mozambique | 3.63 |
| 102 | Syria | 3.60 |
| 103 | Tanzania | 3.59 |
| 104 | Montenegro | 3.52 |
| 105 | Venezuela | 3.52 |
| 106 | Russian Federation | 3.49 |
| 107 | Burundi | 3.47 |
| 108 | Indonesia | 3.46 |
| 109 | Moldova | 3.42 |
| 110 | Lesotho | 3.38 |
| 111 | Albania | 3.37 |
| 112 | Chad | 3.36 |
| 113 | Argentina | 3.35 |
| 114 | Nicaragua | 3.34 |
| 115 | Ghana | 3.33 |
| 116 | Cameroon | 3.27 |
| 117 | Trinidad and Tobago | 3.24 |
| 118 | Nepal | 3.22 |
| 119 | Bangladesh | 3.22 |
| 120 | Libya | 3.16 |
| 121 | Guyana | 3.07 |
| 122 | Timor-Leste | 3.06 |
| 123 | Namibia | 3.06 |
| 124 | Paraguay | 3.05 |
| 125 | Algeria | 3.05 |
| 126 | Côte d'Ivoire | 3.01 |
| 127 | Armenia | 2.96 |
| 128 | Ecuador | 2.92 |
| 129 | Poland | 2.91 |
| 130 | Bolivia | 2.90 |
| 131 | Kyrgyz Republic | 2.77 |
| 132 | Bosnia and Herzegovina | 2.69 |
| 133 | Suriname | 2.48 |
| 134 | Zimbabwe | 2.08 |

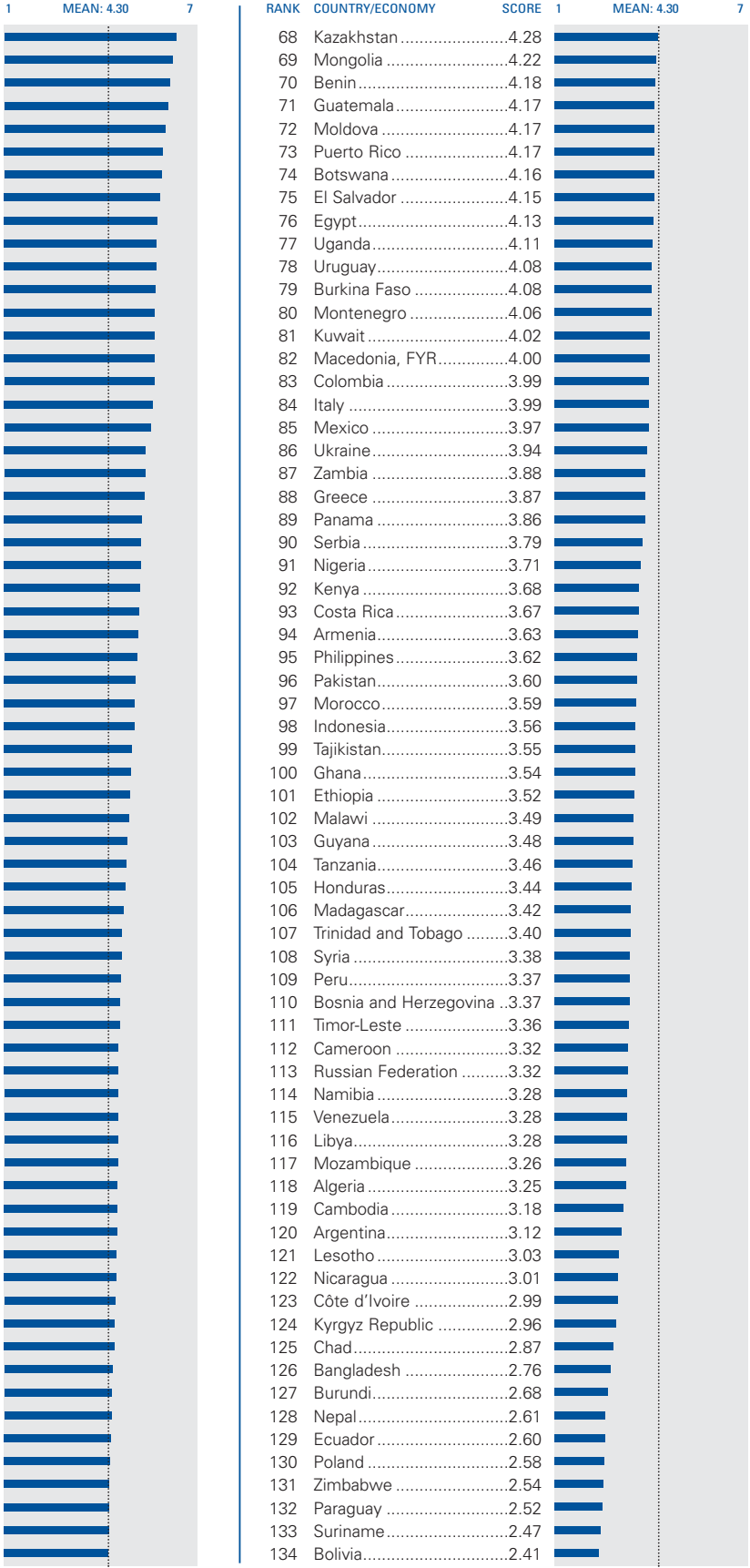



**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 9.04 Presence of ICT in government offices

The presence of information and communication technologies in government offices in your country is (1 = very rare, 7 = commonplace and pervasive)

| RANK | COUNTRY/ECONOMY | SCORE |
|---|---|---|
| 1 | Singapore | 6.44 |
| 2 | Estonia | 6.33 |
| 3 | Sweden | 6.24 |
| 4 | Denmark | 6.18 |
| 5 | Switzerland | 6.10 |
| 6 | Korea, Rep. | 6.03 |
| 7 | Iceland | 5.98 |
| 8 | Austria | 5.93 |
| 9 | Norway | 5.85 |
| 10 | Hong Kong SAR | 5.83 |
| 11 | Australia | 5.82 |
| 12 | Taiwan, China | 5.80 |
| 13 | Finland | 5.77 |
| 14 | Canada | 5.77 |
| 15 | Malta | 5.76 |
| 16 | United States | 5.75 |
| 17 | United Arab Emirates | 5.71 |
| 18 | New Zealand | 5.64 |
| 19 | Netherlands | 5.48 |
| 20 | Portugal | 5.46 |
| 21 | Malaysia | 5.44 |
| 22 | Germany | 5.36 |
| 23 | Qatar | 5.33 |
| 24 | United Kingdom | 5.33 |
| 25 | China | 5.30 |
| 26 | Ireland | 5.27 |
| 27 | Israel | 5.25 |
| 28 | Azerbaijan | 5.20 |
| 29 | Chile | 5.17 |
| 30 | Bahrain | 5.13 |
| 31 | Slovenia | 5.13 |
| 32 | Tunisia | 5.04 |
| 33 | Senegal | 5.01 |
| 34 | Lithuania | 4.98 |
| 35 | Japan | 4.95 |
| 36 | Gambia, The | 4.89 |
| 37 | France | 4.87 |
| 38 | Luxembourg | 4.85 |
| 39 | Spain | 4.78 |
| 40 | Jordan | 4.73 |
| 41 | Thailand | 4.71 |
| 42 | Saudi Arabia | 4.70 |
| 43 | Brazil | 4.68 |
| 44 | Latvia | 4.68 |
| 45 | Hungary | 4.61 |
| 46 | Cyprus | 4.61 |
| 47 | Romania | 4.60 |
| 48 | Albania | 4.60 |
| 49 | Sri Lanka | 4.60 |
| 50 | Oman | 4.60 |
| 51 | Belgium | 4.59 |
| 52 | Bulgaria | 4.59 |
| 53 | Brunei Darussalam | 4.59 |
| 54 | Croatia | 4.56 |
| 55 | Slovak Republic | 4.55 |
| 56 | Mali | 4.51 |
| 57 | South Africa | 4.49 |
| 58 | Barbados | 4.49 |
| 59 | Czech Republic | 4.43 |
| 60 | Dominican Republic | 4.40 |
| 61 | Jamaica | 4.40 |
| 62 | Mauritius | 4.38 |
| 63 | Vietnam | 4.35 |
| 64 | Georgia | 4.33 |
| 65 | Mauritania | 4.33 |
| 66 | Turkey | 4.33 |
| 67 | India | 4.29 |
| 68 | Kazakhstan | 4.28 |
| 69 | Mongolia | 4.22 |
| 70 | Benin | 4.18 |
| 71 | Guatemala | 4.17 |
| 72 | Moldova | 4.17 |
| 73 | Puerto Rico | 4.17 |
| 74 | Botswana | 4.16 |
| 75 | El Salvador | 4.15 |
| 76 | Egypt | 4.13 |
| 77 | Uganda | 4.11 |
| 78 | Uruguay | 4.08 |
| 79 | Burkina Faso | 4.08 |
| 80 | Montenegro | 4.06 |
| 81 | Kuwait | 4.02 |
| 82 | Macedonia, FYR | 4.00 |
| 83 | Colombia | 3.99 |
| 84 | Italy | 3.99 |
| 85 | Mexico | 3.97 |
| 86 | Ukraine | 3.94 |
| 87 | Zambia | 3.88 |
| 88 | Greece | 3.87 |
| 89 | Panama | 3.86 |
| 90 | Serbia | 3.79 |
| 91 | Nigeria | 3.71 |
| 92 | Kenya | 3.68 |
| 93 | Costa Rica | 3.67 |
| 94 | Armenia | 3.63 |
| 95 | Philippines | 3.62 |
| 96 | Pakistan | 3.60 |
| 97 | Morocco | 3.59 |
| 98 | Indonesia | 3.56 |
| 99 | Tajikistan | 3.55 |
| 100 | Ghana | 3.54 |
| 101 | Ethiopia | 3.52 |
| 102 | Malawi | 3.49 |
| 103 | Guyana | 3.48 |
| 104 | Tanzania | 3.46 |
| 105 | Honduras | 3.44 |
| 106 | Madagascar | 3.42 |
| 107 | Trinidad and Tobago | 3.40 |
| 108 | Syria | 3.38 |
| 109 | Peru | 3.37 |
| 110 | Bosnia and Herzegovina | 3.37 |
| 111 | Timor-Leste | 3.36 |
| 112 | Cameroon | 3.32 |
| 113 | Russian Federation | 3.32 |
| 114 | Namibia | 3.28 |
| 115 | Venezuela | 3.28 |
| 116 | Libya | 3.28 |
| 117 | Mozambique | 3.26 |
| 118 | Algeria | 3.25 |
| 119 | Cambodia | 3.18 |
| 120 | Argentina | 3.12 |
| 121 | Lesotho | 3.03 |
| 122 | Nicaragua | 3.01 |
| 123 | Côte d'Ivoire | 2.99 |
| 124 | Kyrgyz Republic | 2.96 |
| 125 | Chad | 2.87 |
| 126 | Bangladesh | 2.76 |
| 127 | Burundi | 2.68 |
| 128 | Nepal | 2.61 |
| 129 | Ecuador | 2.60 |
| 130 | Poland | 2.58 |
| 131 | Zimbabwe | 2.54 |
| 132 | Paraguay | 2.52 |
| 133 | Suriname | 2.47 |
| 134 | Bolivia | 2.41 |




**SOURCE:** World Economic Forum, Executive Opinion Survey 2007, 2008

# 9.05 E-Participation Index (hard data)

The E-Participation Index assesses the quality, relevance, usefulness, and willingness of government websites for providing online information and participatory tools and services to the people | 2008

| RANK | COUNTRY/ECONOMY | HARD DATA |
|---|---|---|
| 1 | United States | 1.00 |
| 2 | Korea, Rep. | 0.98 |
| 3 | Denmark | 0.93 |
| 3 | France | 0.93 |
| 5 | Australia | 0.89 |
| 6 | New Zealand | 0.80 |
| 7 | Mexico | 0.75 |
| 8 | Estonia | 0.73 |
| 9 | Sweden | 0.66 |
| 10 | Singapore | 0.64 |
| 11 | Canada | 0.61 |
| 11 | Japan | 0.61 |
| 11 | Luxembourg | 0.61 |
| 14 | Ukraine | 0.57 |
| 15 | Jordan | 0.55 |
| 16 | Netherlands | 0.52 |
| 16 | Norway | 0.52 |
| 16 | Vietnam | 0.52 |
| 19 | Austria | 0.48 |
| 19 | China | 0.48 |
| 19 | Lithuania | 0.48 |
| 22 | Argentina | 0.45 |
| 22 | Brazil | 0.45 |
| 24 | Colombia | 0.43 |
| 24 | Mozambique | 0.43 |
| 24 | United Kingdom | 0.43 |
| 27 | Belgium | 0.41 |
| 27 | Bolivia | 0.41 |
| 27 | Switzerland | 0.41 |
| 30 | El Salvador | 0.39 |
| 30 | Malta | 0.39 |
| 32 | Costa Rica | 0.36 |
| 32 | Spain | 0.36 |
| 34 | Bahrain | 0.34 |
| 34 | Venezuela | 0.34 |
| 36 | Dominican Republic | 0.32 |
| 36 | Israel | 0.32 |
| 36 | Saudi Arabia | 0.32 |
| 39 | Botswana | 0.30 |
| 39 | Malaysia | 0.30 |
| 39 | Thailand | 0.30 |
| 39 | United Arab Emirates | 0.30 |
| 43 | Finland | 0.27 |
| 43 | Honduras | 0.27 |
| 43 | Mongolia | 0.27 |
| 43 | Philippines | 0.27 |
| 47 | Azerbaijan | 0.25 |
| 47 | Egypt | 0.25 |
| 47 | India | 0.25 |
| 47 | Ireland | 0.25 |
| 47 | Portugal | 0.25 |
| 47 | South Africa | 0.25 |
| 53 | Cambodia | 0.23 |
| 53 | Italy | 0.23 |
| 53 | Latvia | 0.23 |
| 53 | Poland | 0.23 |
| 53 | Slovenia | 0.23 |
| 58 | Burkina Faso | 0.20 |
| 58 | Czech Republic | 0.20 |
| 58 | Ghana | 0.20 |
| 58 | Hungary | 0.20 |
| 58 | Libya | 0.20 |
| 58 | Oman | 0.20 |
| 58 | Senegal | 0.20 |
| 58 | Trinidad and Tobago | 0.20 |
| 66 | Chile | 0.18 |
| 66 | Qatar | 0.18 |
| 68 | Cameroon | 0.16 |
| 68 | Germany | 0.16 |
| 70 | Bangladesh | 0.14 |
| 70 | Barbados | 0.14 |
| 70 | Croatia | 0.14 |
| 70 | Kyrgyz Republic | 0.14 |
| 70 | Madagascar | 0.14 |
| 70 | Peru | 0.14 |
| 70 | Turkey | 0.14 |
| 77 | Benin | 0.11 |
| 77 | Ecuador | 0.11 |
| 77 | Jamaica | 0.11 |
| 77 | Mauritania | 0.11 |
| 77 | Mauritius | 0.11 |
| 77 | Panama | 0.11 |
| 83 | Bosnia and Herzegovina | 0.09 |
| 83 | Brunei Darussalam | 0.09 |
| 83 | Côte d'Ivoire | 0.09 |
| 83 | Cyprus | 0.09 |
| 83 | Greece | 0.09 |
| 83 | Kazakhstan | 0.09 |
| 83 | Lesotho | 0.09 |
| 83 | Mali | 0.09 |
| 83 | Montenegro | 0.09 |
| 83 | Pakistan | 0.09 |
| 83 | Russian Federation | 0.09 |
| 83 | Uganda | 0.09 |
| 95 | Guyana | 0.07 |
| 95 | Iceland | 0.07 |
| 95 | Kuwait | 0.07 |
| 95 | Moldova | 0.07 |
| 95 | Nigeria | 0.07 |
| 95 | Paraguay | 0.07 |
| 95 | Serbia | 0.07 |
| 95 | Slovak Republic | 0.07 |
| 95 | Sri Lanka | 0.07 |
| 95 | Uruguay | 0.07 |
| 105 | Armenia | 0.05 |
| 105 | Bulgaria | 0.05 |
| 105 | Burundi | 0.05 |
| 105 | Georgia | 0.05 |
| 105 | Guatemala | 0.05 |
| 105 | Indonesia | 0.05 |
| 105 | Kenya | 0.05 |
| 105 | Namibia | 0.05 |
| 105 | Romania | 0.05 |
| 105 | Syria | 0.05 |
| 115 | Albania | 0.02 |
| 115 | Algeria | 0.02 |
| 115 | Gambia, The | 0.02 |
| 115 | Macedonia, FYR | 0.02 |
| 115 | Malawi | 0.02 |
| 115 | Nepal | 0.02 |
| 115 | Tanzania | 0.02 |
| 115 | Tunisia | 0.02 |
| 123 | Chad | 0.00 |
| 123 | Ethiopia | 0.00 |
| 123 | Morocco | 0.00 |
| 123 | Nicaragua | 0.00 |
| 123 | Suriname | 0.00 |
| 123 | Tajikistan | 0.00 |
| 123 | Timor-Leste | 0.00 |
| 123 | Zambia | 0.00 |
| 123 | Zimbabwe | 0.00 |
| n/a | Hong Kong SAR | n/a |
| n/a | Puerto Rico | n/a |
| n/a | Taiwan, China | n/a |

**SOURCE:** United Nations, *e-Government Survey 2008: From e-Government to Connected Governance*

# Technical Notes and Sources

The present section complements the Data Tables by providing additional information for the hard data indicators that enter the composition of the Networked Readiness Index. The data used in this *Report* represent the most recent available figures from various international agencies, private sources, and national authorities at the time when the data collection process took place. It is possible that some data have been updated or revised since then.

## Pillar 1: Market environment

**1.05 Utility patents**

Number of utility patents (i.e., patents for invention) granted between January 1 and December 31, 2007, per million population | 2007

Utility patents are recorded such that the origin of the patent is determined by the first-named inventor at the time of the grant. Patents per million population are calculated by dividing the number of patents granted to a country in 2007 by that country's population in the same year.

Source: US Patent and Trademark Office, *Patents By Country, State, and Year—Utility Patents* (December 2007); The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008); national sources

**1.06 High-tech exports**

High-technology exports as a percentage of total goods exports | 2006 or most recent year available

The value of high-technology exports is expressed as a percentage of the value of manufactured goods exports. According to the World Bank, high-technology exports are products with high R&D intensity, as in aerospace, computers, pharmaceuticals, and scientific instruments.

Source: The World Bank, *World Development Indicators Online Database* (October 2008); Economist Intelligence Unit, *CountryData Database* (retrieved January 9, 2009); authors' estimates based on United Nations Statistics Division's COMTRADE database (retrieved January 9, 2009); national sources

**1.09 Total tax rate**

This variable is a combination of profit tax (percents of profits), labor tax and contribution (percents of profits), and other taxes (percents of profits) | 2007

For details about the methodology employed and the assumptions made to compute this indicator, please consult the Doing Business project's dedicated page at www.doingbusiness.org/methodologysurveys/.

Source: The World Bank Group, *Doing Business 2009*

**1.10 Time required to start a business**

Number of days required to start a business | 2008

For details about the methodology employed and the assumptions made to compute this indicator, please consult the Doing Business project's dedicated page at www.doingbusiness.org/methodologysurveys/.

Source: The World Bank Group, *Doing Business 2009*

**1.11 Number of procedures required to start a business**

Number of procedures required to start a business | 2008

For details about the methodology employed and the assumptions made to compute this indicator, please consult the Doing Business project's dedicated page at www.doingbusiness.org/methodologysurveys/.

Source: The World Bank Group, *Doing Business 2009*

## Pillar 2: Political and regulatory environment

**2.08 Number of procedures to enforce a contract**

Number of procedures from the moment the plaintiff files a lawsuit in court until the moment of payment | 2008

For details about the methodology employed and the assumptions made to compute this indicator, please consult the Doing Business project's dedicated page at www.doingbusiness.org/methodologysurveys/.

Source: The World Bank Group, *Doing Business 2009*

**2.09 Time to enforce a contract**

Number of days required to resolve a dispute | 2008

For details about the methodology employed and the assumptions made to compute this indicator, please consult the Doing Business project's dedicated page at www.doingbusiness.org/methodologysurveys/.

Source: The World Bank Group, *Doing Business 2009*

## Pillar 3: Infrastructure environment

**3.01 Telephone lines**

Main telephone lines per 100 population | 2007 or most recent year available

A *main telephone line* is a telephone line connecting the subscriber's terminal equipment to the public switched telephone network and that has a dedicated port in the telephone exchange equipment.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

**3.02 Secure Internet servers**

Secure Internet servers per million population | 2007 or most recent year available

*Secure Internet servers* are servers using encryption technology in Internet transactions.

Source: The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008)

### 3.03 Electricity production

Electricity production (kWh) per capita | 2005 or most recent year available

Electricity production is measured at the terminals of all alternator sets in a station. In addition to hydropower, coal, oil, gas, and nuclear power generation, it covers generation by geothermal, solar, wind, and tide and wave energy as well as that from combustible renewables and waste. Production includes the output of electricity plants designed to produce electricity only, as well as that of combined heat and power plants.

Source: The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008); US Central Intelligence Agency, *The World Factbook* (retrieved October 23, 2008); national sources

### 3.06 Tertiary education enrollment

Gross tertiary education enrollment rate | 2006 or most recent year available

The reported value corresponds to the total enrollment in tertiary education expressed as a percentage of the population of the five-year age group following on from the secondary school-leaving age. Note that the gross enrollment rate (GER) can exceed 100 percent due to early or late entry and/or grade repetition.

According to UNESCO, tertiary education is composed of two stages. The first stage of tertiary education, ISCED level 5, includes level 5A, composed of largely theoretically based programs intended to provide sufficient qualifications for gaining entry to advanced research programs and professions with high skill requirements; and level 5B, where programs are generally more practical, technical, and/or occupationally specific.

The second stage, ISCED level 6, comprises programs devoted to advanced study and original research, leading to the award of an advanced research qualification.

Source: UNESCO, Institute for Statistics (retrieved January 12, 2008); UNESCO, Education for All Global Monitoring Report 2008—*Education for All by 2015: Will We Make It?*; national sources

### 3.07 Education expenditure

Education expenditure as a percentage of GNI | 2006 or most recent year available

This variable refers to public current operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipment.

Source: The World Bank, *World Development Indicators Online Database* (retrieved November 4, 2008)

## Pillar 4: Individual readiness

### 4.05 Residential telephone connection charge

One-time residential telephone connection charge (US$) as a percentage of GDP per capita | 2007 or most recent year available

This measure refers to the one-time charge involved in applying for basic telephone service for residential purposes.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2008 edition); national sources

### 4.06 Residential monthly telephone subscription

Residential monthly telephone subscription (US$) as a percentage of monthly GDP per capita | 2007 or most recent year available

*Residential monthly telephone subscription* refers to the recurring fixed charge for a residential subscriber to the public switched telephone network (PSTN). The charge should cover the rental of the line but not the rental of the terminal (for example, the telephone set) where the terminal equipment market is liberalized. In some cases, the rental charge includes an allowance for free or reduced-rate call units. If there are different charges for different exchange areas, the largest urban area is used.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2008 edition); national sources

### 4.07 High-speed monthly broadband subscription

High-speed monthly broadband subscription charge (US$) as a percentage of monthly GDP per capita | 2006 or most recent year available

The International Telecommunication Union considers *broadband* to be any dedicated connection to the Internet of 256 kilobits per second (kb/s) or faster, in both directions. The monthly charge reflects the Internet service provider charge for one month of service. It does not include installation fees or modem rental charges if they are charged separately. Speed expressed in kb/s represents the advertised maximum theoretical download speed and not speeds guaranteed to users. *High-speed monthly charge* refers to a faster and typically more expensive offer available in the economy.

Source: International Telecommunication Union, *World Information Society Report 2007*; International Monetary Fund, *World Economic Outlook Database* (October 2007 edition); national sources

### 4.08 Lowest cost of broadband

Lowest sampled cost (US$) per 100 kb/s as a percentage of monthly GNI | 2006 or most recent year available

The lowest sampled cost in US dollars per 100 kilobits per second (kb/s) gives the most cost-effective subscription based on criteria of least cost per 100 kb/s. The International Telecommunication Union calculates this cost by dividing the monthly subscription charge in US dollars by the theoretical download speed, and then multiplying by 100. The lowest cost per 100 kb/s across all Internet services providers is used to compute the lowest sampled cost as a percentage of monthly GNI.

Source: International Telecommunication Union, *World Information Society Report 2007*

### 4.09 Cost of mobile telephone call

Cost of 3-minute local call during peak hours (US$) as a percentage of monthly GDP per capita | 2006 or most recent year available

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2007 edition)

## Pillar 5: Business readiness

### 5.06 Business telephone connection charge

One-time business telephone connection charge (US$) as a percentage of GDP per capita | 2007 or most recent year available

This measure refers to the one-time charge involved in applying for basic telephone service for business purposes.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2008 edition); national sources

**5.07 Business monthly telephone subscription**

Business monthly telephone subscription (US$) as a percentage of monthly GDP per capita | 2007 or most recent year available

*Business monthly telephone subscription* refers to the recurring fixed charge for a business subscriber to the public switched telephone network.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update); International Monetary Fund, *World Economic Outlook Database* (October 2008 edition); national sources

**5.10 Computer, communications, and other services imports**

Computer, communications, and other services as percentage of total commercial services imports | 2007 or most recent year available

Computer, communications, and other services include such activities as international telecommunications; portal and courier services; computer data; news-related service transactions between residents and nonresidents; construction services; royalties and license fees; miscellaneous business, professional, and technical services; and personal, cultural, and recreational services. The total volume of computer, communications, and other services imports is divided by the total volume of commercial service imports, defined as the total service imports minus imports of government services not included elsewhere.

Source: The World Bank, *World Development Indicators Online Database* (retrieved October 20, 2008)

## Pillar 6: Government readiness

**6.04 E-Government Readiness Index**

The E-Government Readiness Index assesses e-government readiness based on website assessment, telecommunications infrastructure, and human resource endowment | 2008

Source: United Nations, *e-Government Survey 2008: From e-Government to Connected Governance*

## Pillar 7: Individual usage

**7.01 Mobile telephone subscribers**

Mobile telephone subscribers per 100 population | 2007 or most recent year available

The term *subscribers* refers to users of mobile telephones subscribing to an automatic public mobile telephone service that provides access to the public switched telephone network using cellular technology. This can include analogue and digital cellular systems but should not include noncellular systems. Subscribers to fixed wireless, public mobile data services, or radio paging services are not included.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

**7.02 Personal computers**

Personal computers per 100 population | 2006 or most recent year available

According to the World Bank, *personal computers* are self-contained computers designed to be used by a single individual.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

**7.03 Broadband Internet subscribers**

Total broadband Internet subscribers per 100 population | 2007 or most recent year available

The International Telecommunication Union considers *broadband* to be any dedicated connection to the Internet of 256 kilobits per second (kb/s) or faster, in both directions. *Broadband subscribers* refers to the sum of DSL, cable modem, and other broadband (for example, fiber optic, fixed wireless, apartment LANs, satellite connections) subscribers.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

**7.04 Internet users**

Internet users per 100 population | 2007 or most recent year available

*Internet users* are people with access to the worldwide network.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

**7.05 Internet bandwidth**

International Internet bandwidth (mB/s) per 10,000 population | 2007 or most recent year available

This measure shows the total capacity of international Internet bandwidth in megabits per second.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators 2008* (September 2008 update)

## Pillar 9: Government usage

**9.05 E-Participation Index**

The E-Participation Index assesses the quality, relevance, usefulness, and willingness of government websites for providing online information and participatory tools and services to the people | 2008

Source: United Nations, *e-Government Survey 2008: From e-Government to Connected Governance*

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