Economist Intelligence Unit

The Economist

Digital economy rankings 2010
Beyond e-readiness

A report from the Economist Intelligence Unit

Written in co-operation with
The IBM Institute for Business Value

IBM

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About the 2010 digital economy rankings

Since 2000, the Economist Intelligence Unit has assessed the world's largest economies on their ability to absorb information and communications technology (ICT) and use it for economic and social benefit. Previously titled the "e-readiness rankings", in 2010 the study is being renamed as the "digital economy rankings", to reflect the increasing influence of ICT in economic (and social) progress. Seventy countries are covered in this annual benchmarking exercise.

The digital economy rankings assess the quality of a country's ICT infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit. When a country uses ICT to conduct more of its activities, the economy can become more transparent and efficient. Our ranking allows governments to gauge the success of their technology initiatives against those of other countries. It also provides companies that wish to invest or trade internationally with an overview of the world's most promising business locations from an ICT perspective.

Over 100 separate criteria, both qualitative and quantitative, are evaluated for each country by the Economist Intelligence Unit's team of analysts. These criteria are scored on their relative presence in a country's economic, political or social landscape. The categories, and the individual criteria within them, are weighted according to our assumptions of their relative importance in fostering a country's information economy. Details on the methodology can be found in the appendix. (We are grateful to the United Nations Department of Economic and Social Affairs for their permission to incorporate in our model the "e-participation" scores for 68 countries from the *UN e-government survey* .)

In this and previous rankings, the Economist Intelligence Unit has worked in co-operation with the IBM Institute for Business Value and its Global Centre for Economic Development. IBM provided feedback on the building and refinement of the rankings model and on the written analysis in the report. "Countries are now challenged to effectively stimulate the use of technology by the vast majority of their citizens, businesses and governments in order to remain competitive," says Peter Korsten, global leader of the IBM Institute for Business Value.

June 2010

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Executive summary

This year begins the second decade of the Economist Intelligence Unit's annual benchmarking study of countries' digital development, previously known as the "e-readiness rankings". Given the prevalence of Internet-connected consumers, businesses and governments, and the indispensable role that digital communications and services now play in most of the world's economies, we believe that the countries in our study have achieved, to one degree or another, a state of e-readiness. The study's new title, the "digital economy rankings", captures the challenge of maximising the use of information and communications technology (ICT) that countries face in the years ahead.

As ICT adapts to changing needs over time, so too do the indicators used in the benchmarking model which underpins our rankings. Most modifications in 2010 are of long-standing measures of the digital world, but one set of changes is worth noting: as a demonstration of how far the world has progressed in terms of the availability of connectivity, we now evaluate the "quality" of broadband and mobile connections in addition to their prevalence (see box on following page).

The addition of these indicators has affected the fortunes of top-ranked economies: many in Europe and North America suffered a decline in both their absolute scores and their positions in the table, as we found the availability of ultra-high speed networks to be in considerable need of development. By contrast, those economies that have invested heavily in the next generation of Internet infrastructure saw their scores—and rankings—rise, notably Asian countries such as Taiwan (12th), South Korea (13th) and Japan (16th).

The top performers in the 2010 digital economy rankings—led this year by Sweden (1st), which dislodged the perennial e-readiness leader, Denmark (2nd), by a narrow margin—demonstrate a high degree of connectivity and score well on all fronts, from the quality of their business and legal environments to social and cultural drivers of digital progress, the existence of sound public policy on ICT, and the levels at which consumers and businesses actually use digital services. This underscores our long-standing premise that progress towards a fully digital economy requires concerted action across all the areas addressed in the rankings.

As in past years, the quantitative evidence suggests that the digital divide is narrowing. Where 5.9 points (on a 1-10 scale) separated the top-ranked country from that of the bottom ranked in 2009, that differential narrowed to 5.5 points in our 2010 study. Likewise, the gap between the first and

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last countries in the top half of the table narrowed to 2.4 points this year from 2.8 one year ago. This is partly due to the aforementioned modifications to our rankings model which, in "raising the bar", have had a larger dampening effect on the scores of top-tier countries than on those in the lower tiers. However, given the increased attention to fast-growing emerging markets by global businesses seeking growth in the recovery, investment levels and wealth levels—and as a result levels of digitalisation—are likely to rise even more rapidly, and the divide may indeed continue to narrow.

The divide is eroding in another way, one which cannot be as precisely measured by comparative scores. Innovative digital practices and applications are arguably being conceived and put in practice in the emerging world faster than in the developed world. Simply put, there are no alternatives but to become "more digital" with whatever assets are available. Mobile data tools and services are one area where the emerging world equals or outpaces the developed world in usage habits; the use of ICT as a platform for building capacity in education services is another. There is always variance, of course, and room for improvement. But the digital economy rankings demonstrate that there are many ways to harness the power of the Internet to improve economic prospects and the lives of people.

What's changed in 2010?

To ensure that the rankings keep pace with trends in the digital world, we have made a few modifications to our model in 2010. The first four changes are in the "connectivity" category of indicators, and the last is in that of "social and cultural environment".

- A new "broadband quality" indicator has been added, which measures, as a proxy for quality, the share of fibre-optic access lines in a country's total broadband access lines.
- A new "mobile quality" indicator assesses the share of 3G and 4G (third generation and fourth generation) mobile subscriptions in a country's total mobile subscriptions.
- In measuring "broadband affordability", the lowest DSL (digital subscriber line) connection speed for which prices are considered is now 256 kilobytes per second (kbps). Previously this was 128 kbps.
- The scoring scale for "Internet user penetration" has been adjusted, with 100% of the population now representing the highest penetration achievable in a country. This had previously been 75%.
- The "educational level" indicator has been expanded to encompass a third sub-indicator—"gross enrolment in tertiary education", which measures the number of students in higher education as a share of the total population in the relevant five-year age group.

Scoring criteria categories and weights

Category	Weight
Connectivity and technology infrastructure	20%
Business environment	15%
Social and cultural environment	15%
Legal environment	10%
Government policy and vision	15%
Consumer and business adoption	25%

Source: Economist Intelligence Unit, 2010

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Digital economy rankings and scores, 2010

2010 rank (of 70)	2009 rank	Country	2010 score (of 10)	2009 score
1	2	Sweden	8.49	8.67
2	1	Denmark	8.41	8.87
3	5	United States	8.41	8.60
4	10	Finland	8.36	8.30
5	3	Netherlands	8.36	8.64
6	4	Norway	8.24	8.62
7	8	Hong Kong	8.22	8.33
8	7	Singapore	8.22	8.35
9	6	Australia	8.21	8.45
10	11	New Zealand	8.07	8.21
11	9	Canada	8.05	8.33
12	16	Taiwan	7.99	7.86
13	19	South Korea	7.94	7.81
14	13	United Kingdom	7.89	8.14
15	14	Austria	7.88	8.02
16	22	Japan	7.85	7.69
17	18	Ireland	7.82	7.84
18	17	Germany	7.80	7.85
19	12	Switzerland	7.72	8.15
20	15	France	7.67	7.89
21	20	Belgium	7.52	7.71
22	21	Bermuda	7.47	7.71
23	23	Malta	7.32	7.46
24	25	Spain	7.31	7.24
25	24	Estonia	7.06	7.28
26	27	Israel	6.96	7.09
27	26	Italy	6.92	7.09
28	28	Portugal	6.90	6.86
29	29	Slovenia	6.81	6.63
30	30	Chile	6.39	6.49
31	31	Czech Republic	6.29	6.46
32	34	United Arab Emirates	6.25	6.12
33	33	Greece	6.20	6.33
34	32	Lithuania	6.14	6.34
35	35	Hungary	6.06	6.04
36	38	Malaysia	5.93	5.87
37	37	Latvia	5.79	5.97
38	36	Slovakia	5.78	6.02
39	39	Poland	5.70	5.80
40	41	South Africa	5.61	5.68
41	40	Mexico	5.53	5.73
42	42	Brazil	5.27	5.42
43	43	Turkey	5.24	5.34
44	44	Jamaica	5.21	5.33
45	47	Bulgaria	5.05	5.11
46	45	Argentina	5.04	5.25
47	48	Romania	5.04	5.07
48	46	Trinidad & Tobago	4.98	5.14
49	49	Thailand	4.86	5.00
50	52	Colombia	4.81	4.84
51	50	Jordan	4.76	4.92
52	51	Saudi Arabia	4.75	4.88
53	53	Peru	4.66	4.75
54	54	Philippines	4.47	4.58
55	55	Venezuela	4.34	4.40
56	56	China	4.28	4.33
57	57	Egypt	4.21	4.33
58	58	India	4.11	4.17
59	59	Russia	3.97	3.98
60	60	Ecuador	3.90	3.97
61	61	Nigeria	3.88	3.89
62	64	Vietnam	3.87	3.80
63	63	Sri Lanka	3.81	3.85
64	62	Ukraine	3.66	3.85
65	65	Indonesia	3.60	3.51
66	66	Pakistan	3.55	3.50
67	69	Kazakhstan	3.44	3.31
68	67	Algeria	3.31	3.46
69	68	Iran	3.24	3.43
70	70	Azerbaijan	3.00	2.97

Note: A four-decimal score is used to determine each country's rank.
Source: Economist Intelligence Unit, 2010.

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Introduction

Every year for more than a decade, the Economist Intelligence Unit has closely examined the development of information and communications technology (ICT) in over 60 of the world's major economies, and evaluated and ranked their relative digital progress. This benchmarking exercise has measured not only the availability and adoption of ICT (or "connectivity") in each country, but also development of the social, cultural and economic building blocks necessary for its effective use. More recently, it has also attempted to gauge the extent to which ICT and selected ICT-enabled services are being used, given that it is the use of technology which ultimately contributes to the overall economic progress of a country.

Ten years ago (as now), people and governments around the world believed this progress to be a journey, one which successfully completed would bring increasing efficiency and prosperity. The journey required preparation, largely in the form of investment in network infrastructure, skills and regulatory frameworks. The notion of preparation lent itself to the term "e-readiness", the original name of our rankings.

Ten years on, the journey continues to gain pace: every month over 40m more people become mobile-phone users, for example, and the phones themselves are increasingly powerful data devices. The Internet—now a ubiquitous platform for commerce, entertainment and communication—has generated a thriving industry. Global monthly Internet traffic in 2010 is two-thirds higher than one year ago, according to Cisco, a network equipment provider. The capacity of the world's international fibre-optic cables—which carry all this traffic—doubles every 18 months, based on estimates by Telegeography, a telecommunications research firm. This demand is being driven by increasingly sophisticated usage of Internet-enabled services: video accounts for more than 50% of global Internet traffic today, and the data generated by Facebook, a social networking site, is estimated to surpass that of all the world's e-mail[1].

In other words, most of the world has achieved "e-readiness" to one degree or another. This does not mean that every country has made equal progress in its digital preparation—far from it, as this report discusses. But we believe that all 70 countries covered by our study have laid the foundations so that the Internet and ICT are an important and growing part of their economies. Consumers and industries globally have access to the Internet and advanced communications networks, and are using them.

[1] Cisco, *Visual networking index: Global mobile data traffic forecast update, 2009-2014;* Nielsen, *Global faces and networked places,* March 2009.

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The challenges ahead for countries, in our view, will be in learning how to extract the maximum economic and other benefits from the use of digital technology. To better reflect this current stage of the journey, we have given a new name to our study: the "digital economy rankings". Viewing the world through this lens allows us to gauge the progress of the 70 countries in leveraging ICT to the benefit of consumers, businesses and governments.

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Key points

- **Broadband quality is high in several developed Asian countries by virtue of widespread adoption of fibre-optic access.**
- **Broadband is becoming more affordable almost across the globe, and prices are declining rapidly in a handful of developing countries such as Vietnam and Nigeria.**

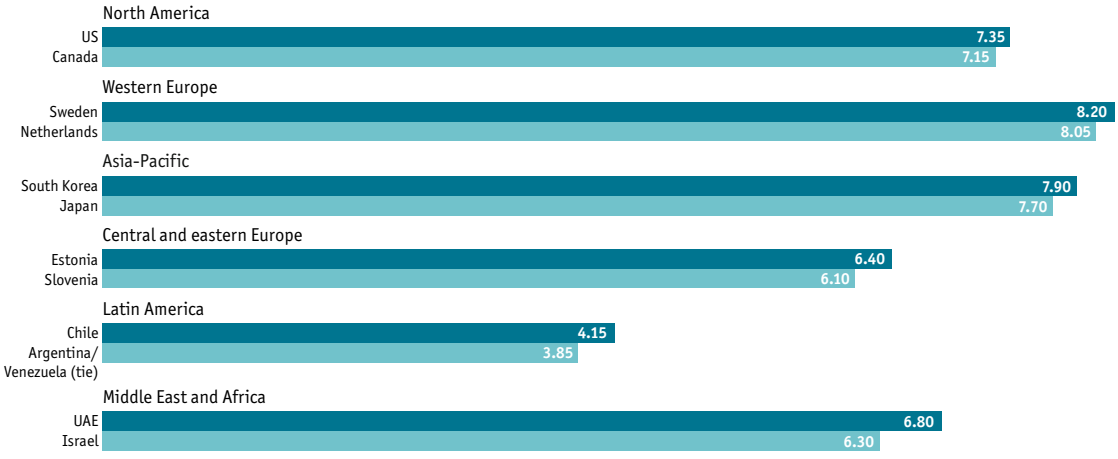
The importance of speed and quality

Reliable, convenient and affordable access to voice and data services continues to underpin a digital economy. In addition, as in most years previously, our research shows continued, steady improvement in broadband, mobile and Internet connectivity levels across most countries in the world. Of the top 20 countries in the overall rankings, all but three—Taiwan, Austria (15th) and Ireland (17th)—had broadband penetration of more than 25% at the end of 2009; and only three—South Korea, the US (3rd) and Canada (11th)—registered mobile penetration levels of less than 100%.

More devices mean more access to the Internet, and all its productivity-enhancing benefits. Broadband is increasingly the default mode of access to the Internet: Pyramid Research, a telecoms research firm, estimates that there were over 450m broadband subscribers in the world in 2009. There are more than 40m smartphones in service in the US, according to media research firm Nielsen, and more than 30m BlackBerry devices and iPhones each globally. Even in emerging markets, broadband reaches deep—of the 390m people online in China (56th), over 100m have fixed broadband connections.

Technology availability by itself is not enough to ensure it can be used. For one thing, it must be affordable, and fortunately this is increasingly becoming the case. In 49 of the 70 countries in the

Regional digital economy rankings leaders: connectivity and technology infrastructure
(score)



Source: Economist Intelligence Unit 2010.

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A fundamental human right?

The goal of achieving uniform access to the Internet across a country's population continues to elude policymakers. Many governments continue to invest heavily in network infrastructure with this objective in mind—Australia, with its A$40bn National Broadband Network initiative, is a noteworthy example. Successful implementation of this initiative would put the minority of Australians (usually remote or rural residents) currently beyond the reach of high-speed Internet on a digital par with their compatriots. A few countries, such as Finland (4th), have gone so far as to enshrine in law Internet access as a basic human right; a recent BBC poll of Internet users found that 87% of people across 27 countries believe this should indeed be the case.

rankings, the monthly fee charged by the main broadband provider amounted to less than 2% of median monthly household income in 2009, according to Economist Intelligence Unit research. (This was the case in 42 of the 70 countries in our 2009 study, and only 33 countries in 2008.) Moreover, in countries with some of the world's steepest fees for broadband access, including Nigeria (61st), Vietnam (62nd) and Indonesia (65th), prices continue to decline.

The quality of access is also important. Accordingly, in 2010 we have added a new indicator to the connectivity category of our model—broadband quality. The proxy we use to assess this is the share of high-capacity fibre-optic access lines in a country's total broadband connections. Fibre networks, while still more expensive than the copper networks that carry DSL traffic, are becoming more cost-effective and have a much higher carrying capacity than current generations of either wireless or enhanced copper access. This speeds up transmission and provides a higher quality experience for Internet users (see box below). Operators are realising the benefits of fibre as networks strain to deliver sufficient bandwidth to meet subscriber demand for video and file-sharing.

Current fibre access adoption levels are still relatively low—less than 9% of total broadband connections globally, according to Pyramid Research—and non-existent in many countries. But fibre is already a key part of the broadband landscape in a few countries, particularly in Asia: more than 70% of the world's fibre-based broadband subscribers at end-2009 were in Asia, according to the same source. Rich and densely urban Asian countries with strong ICT support from the state fare particularly well in this indicator—and partly as a result have risen significantly in the overall rankings. The fibre density of Japan, South Korea and Taiwan is both testament to these countries' ability to execute on their digital agendas and an accurate measure of their achievements relative to their global peers.

Fixed broadband networks are only one means of accessing the Internet. Mobile data is becoming

Quality as well as quantity

The links between fibre connectivity and network quality are described in a study produced by the University of Oxford's Said Business School with the support of Cisco. By evaluating over 24m broadband connections globally, the school ranked upload and download times, and latency of packet transmission, to generate its own "Broadband Quality Score". South Korea and Japan were the clear leaders in its 2009 study. Both these countries are also the leaders in our own broadband quality measure, as over 50% of the broadband accounts in each country are fibre-based. (With 12m accounts, Japan's NTT alone has more than one-quarter of the world's fibre subscribers.) The Oxford-Cisco study also rated the broadband quality of major world cities, ranking three Japanese urban centres—Yokohama, Nagoya and Sapporo—in its top five along with Kaunas in Lithuania (34th) and Seoul in South Korea.

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an increasingly important mode of broadband access. To reflect this, we have introduced a second new indicator to our connectivity category: mobile quality, represented by the share of 3G and 4G subscriptions among a country's total mobile subscriptions. The CDMA Development Group, an industry body, estimates that 3G mobile networks worldwide serve nearly 1.2bn users—one-quarter of the world's mobile subscriptions. Only eight of the countries in the digital economy rankings did not have operating 3G networks in 2009.

Internet users in emerging markets increasingly use smartphones as their primary form of access. Opera, a Norwegian mobile software firm, estimates that page-views in Africa's top ten mobile Internet markets (led by South Africa [40th] and Nigeria) grew almost fourfold in 2009, and that unique users and the data they consumed nearly doubled. By some measures, mobile data consumed in African markets rivals the amounts in most developed markets[2], and like their rich-nation peers, consumers are using the Internet in similar ways.

Whether used for entertainment or essential connectivity, the need for greater wireless speed is pressing, and the world's largest providers of converged services are raising the bar for the next generation of wireless data networks. Verizon, a US operator, which invested around US$17bn in its fixed and mobile network infrastructure last year, is planning to launch 4G services in as many as 30 American cities this year. Advocates of the world's various flavours of ultra-broadband wireless technology are looking to increase penetration through co-operation efforts and standards adoption: the WiMAX Forum, an industry body promoting the use of this fixed-wireless broadband technology, recently announced a simpler device certification process that it hopes will double WiMAX chipsets consumed globally.

[2] Opera, for example, estimates that mobile users in Nigeria, Egypt and Kenya generate more page views, and only slightly less compressed data, on average than users in the US and UK. Opera, *State of the mobile web*, November 2009.

Connecting things as well as people

The increasing use of RFID (radio frequency identification, a wireless data identification and capturing technology) portends another dimension of the Internet in which there is connectivity between things, and not just between people and networks. RFID tags have manifold uses in logistics and supply chain management, such as in inventory control, quality control, baggage handling and automatic toll payments, among other areas.

The use of RFID is growing fastest in the developed world, and in particular among the digital economy rankings leaders in Europe. ABI, a technology research firm, expects that the global RFID market will reach US$5.35bn in value in 2010 and will expand by 14% per year between now and 2014. Such growth, if it materialises, will be impressive but from a relatively small base, as usage remained low as of early 2009 even among its earliest adopters: in a January 2009 enterprise survey conducted by Eurostat, the European Union's statistics agency, only 3% of companies across the EU27 reported using RFID in their operations. (The highest utilisation rates were reported in the Netherlands [5th], at 9%, and Finland, at 8%).

Vehicle immobilisation is currently estimated to be the largest area of RFID application, and forecasters such as ABI expect the areas of rapid growth to be inventory tracking, baggage handling and ID tagging of animals. (On the other hand, another technology research firm, IDC, sees flat RFID growth in the healthcare industry.) The aforementioned Eurostat survey suggests that RFID is currently being used more to track people than to manage quality, costs or materials: personnel identification and access is cited as the most common application, adopted at 56% of firms that use RFID, with supply chain management (at 29%) a distant second.[3]

[3] The sources cited in this box include ABI Research, " RFID market to reach $5.35 billion this year", March 5, 2010; Eurostat, "E-commerce accounted for 12% of enterprises' turnover in the EU27 in 2008", January 19, 2010; and IDC Insights, " RFID Adoption Goes Flat", April 23, 2009.

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Key points

- **Educational levels to support digital development are improving in most countries, notwithstanding a one-off drop in education scores due to a model adjustment.**
- **Emerging markets are a rich source of technology-based innovation, as evidenced, for example, by the growth of mobile applications and content development in Indonesia.**

The social and cultural environment: all roads lead online

While a rich ICT platform remains the key underpinning of any country's digital economy aspirations, access must naturally be accompanied by usage. The latter in turn can only increase in a society which values the benefits provided by the Internet. Education—both in terms of overall levels of formal learning as well as Internet literacy and other technical skills—is a primary driver of the "social and cultural environment" category of the rankings. Expansion of the educational level indicator in this category to encompass enrolment in tertiary education has caused a one-off drop this year in most countries' education scores. This, in turn, has contributed to a decline in all but a few countries' scores in the broader category. (While overall enrolment is generally high across countries, with only one having less than 50% of the school-age population studying, tertiary-level enrolment rates are lower and, moreover, vary widely: they exceed 60% in most OECD countries but often fall below 25% in many developing nations.) Educational levels to support digital development, however, are improving in almost all countries.

National efforts to put digital technology into schools, meanwhile, are being redoubled. The "one to one" development model (where one Internet-connected device is made available to every student) has been seized on by many governments in Latin America, for example. In Uruguay, under the Ceibal Plan, 380,000 computers were supplied to students in 2009 and another 180,000 are planned to be supplied this year; and in Argentina (46th), the government will invest in 600,000 computers for technical and secondary schools.

There is a growing notion, however, that as crucial as ICT usage is in primary and secondary education, investment here should not detract from investment in technology use in higher education. The World Bank recently singled out the importance of tertiary education in improving Africa's economic competitiveness, and ICT's role in support of that goal. Ghana and Nigeria have been successful in expanding the capacity and reach of their Open Universities through distance learning programmes, enabled by digital application, payment and certification platforms. Distance learning has been a powerful enabler of higher education: the Nigerian Open University, with over 75,000 enrolled students, is the country's largest, and it is estimated that 40% of all South African higher education students complete their programmes through distance learning.

In evaluating the ways in which the digital economy intersects with society as a whole, our rankings

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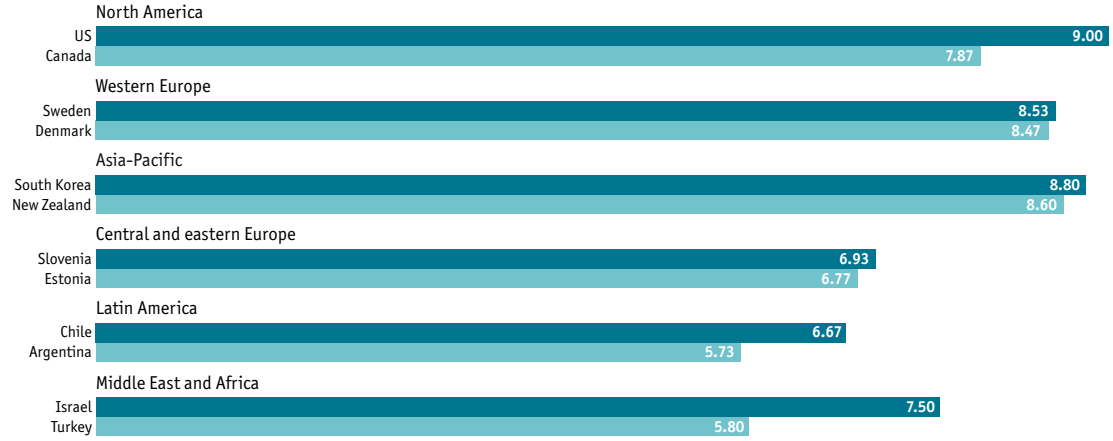
Regional digital economy rankings leaders: social and cultural environment
(score)



Source: Economist Intelligence Unit 2010.

also seek to capture the innovative activity that education helps ignite—patent generation, trademark registration and research and development (R&D) investment are important signals of a country's innovation progress. Although score changes from year to year in such indicators tend to be small (because five-year averages are used), most countries' innovation performance has trended upward in recent years.

In this category, too, much attention is still given over to building capacity. Skills development and application is a particular challenge in Africa, and technology industry incubators and programmes are proliferating there to get professionals into knowledge-intensive industries. One example is the South Africa-based Students2Business initiative, which seeks to place 10,000 graduates in the region this year. UNESCO estimates that the number of researchers in developing economies grew from 1.8m in 2002 to 2.7m in 2007, and that these economies increased their share of global R&D export value from

Social networking innovation in Jakarta

It is estimated that one-third of Jakarta's nearly 9m inhabitants have a BlackBerry—and that is only the most popular of the many millions of smartphones in a city where there are nearly nine mobile phones for every ten people. Jakartans are among the world's leading urban denizens in text messaging and mobile Facebook usage—largely because they lack fixed-line broadband services.

What has started as a technology "work-around", however, is evolving into a new innovative and creative space for social networking, in terms of both applications development and how such applications are utilised by society. Online journalism has thrived as established media giants and one-man bloggers use smartphones to report and publish. The wealth of locally developed content has driven strong growth of mobile advertising spending in the past year. Buzzcity, a Singapore-based mobile media company with campaigns in over 200 countries, reports that Indonesia generated some 2.8bn impressions in the first quarter of 2010, nearly three times more than the firm's next largest market, India, and 35% of its total global traffic. Such activity is beginning to have a further knock-on effect, as Jakarta has a strong and thriving community of mobile application development entrepreneurs that source work globally.

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17% to 24% (although China accounts for much of the growth).

The success of IT outsourcing industries in India (58th), Brazil (42nd) and South Africa, to name just a few examples, is proof that developing countries are dispelling a previously ingrained notion that the lower their connectivity levels, the less digitally innovative their businesses. Consumers offer other evidence—often, for example, finding work-arounds and alternatives to inadequate broadband infrastructure—and innovation develops as a result. Today this often occurs with the most accessible digital device available to consumers, the smartphone (see box on following page).

Regional digital economy rankings leaders: business environment
(score)

Source: Economist Intelligence Unit 2010.

Regional digital economy rankings leaders: legal environment
(score)

Source: Economist Intelligence Unit 2010.

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Uneven progress in e-inclusion

European governments have treated very seriously the mandate to bring the benefits of the Internet to all citizens—a process known as e-inclusion. Thirty European nations signed a ministerial declaration in Riga in 2006 committing them to halve the Internet usage gap between national averages and those among disenfranchised users by 2010. This is proving more difficult than expected, however. When it comes to providing the very elderly or disabled with beneficial ICT access, for example, overcoming physical and mental health challenges is proving a tough hurdle.

A recent research project on digital inclusion by the Spanish National Organisation for the Blind, or ONCE, found that attempts in Spain (24th) to increase digital access for students threatened to put sight-impaired classmates at a greater disadvantage than previously, particularly when it came to accessing educational software. The project found these problems could be overcome with an emphasis on assisting technology (such as larger, and more interactive, screens) and training, not only to give sight-impaired students better access to ICT but also to allow them to learn in the same environment as their peers.

E-inclusion has traditionally been a concern of more developed countries, where policymakers have had the luxury of focusing their efforts on the last few pockets of citizens that are not online. With digital technology increasingly prevalent, some emerging-market governments are also now pursuing e-inclusion initiatives. In Qatar, for example, the government recently launched a trial project specifically targeted at female workers, encouraging government, oil and healthcare sector employers to shift customer service and other IT-enabled job functions to telecommuting positions.

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Key points

- **Accelerating growth in the use of e-government channels by citizens remains a difficult challenge even in the most digitally developed countries.**
- **The strenuous efforts of some governments to control citizens' access to Internet content impedes progress toward a digital economy.**

Using the available technology better

For policymakers, adoption of digital channels by constituents remains an elusive goal. As illustrated by the long-established leaders in our rankings, connecting the dots between the supply of services and the demand for them can be difficult.

South Korea is well known for both the density of its broadband penetration and the strength of its digital vision. The country leads the world in e-government, according to the United Nations survey of member states. Yet even this country's wired citizens do not take full advantage of more than 150 service portals offered by the government. A survey conducted by the government's Board of Audit and Inspection found that although awareness of e-government portals was high, less than one-half of the citizens surveyed actually used them. Utility is the main issue: South Korean e-government channels that were popular either offered an easy solution to a requirement—such as tax filing—or provided additional benefits, such as the anti-corruption and complaint channel, which offers speed of response and anonymity. Governments should take heed: not everything needs to be digitised simply because it can.

People, whether acting as consumers or constituents, use the Internet when it is useful and provides clear benefits (see box). Business and government alike are learning how to respond.

Google's recent entanglement in China shows clearly that this stage of the digital economy journey is different from the previous one. When the primary mission of countries was to become "e-ready", the interests of various stakeholders were aligned around a shared vision to increase digital access. But as the imperative turns from availability to greater usage, those interests can start to diverge. For reasons of safety and security, for example, governments take an interest in how constituents

E-tailing around the world

In Egypt (57th), more than 2.3m Internet users—about one-third of the nation's adults online—engaged in e-commerce in 2009, collectively spending US$2.1bn, according to estimates by The Arab Advisors Group, a technology and media research firm. Although this is a fraction of the size of the US$130bn online commerce market in the US, Egyptian online purchases as a percentage of total disposable income are slightly higher than those in the US in 2009 (1.5% compared with 1.2%). China is also seeing significant growth in this area; the official China Internet Network Information Center places the value of e-commerce at over US$36bn in 2009, or 1.7% of disposable income.

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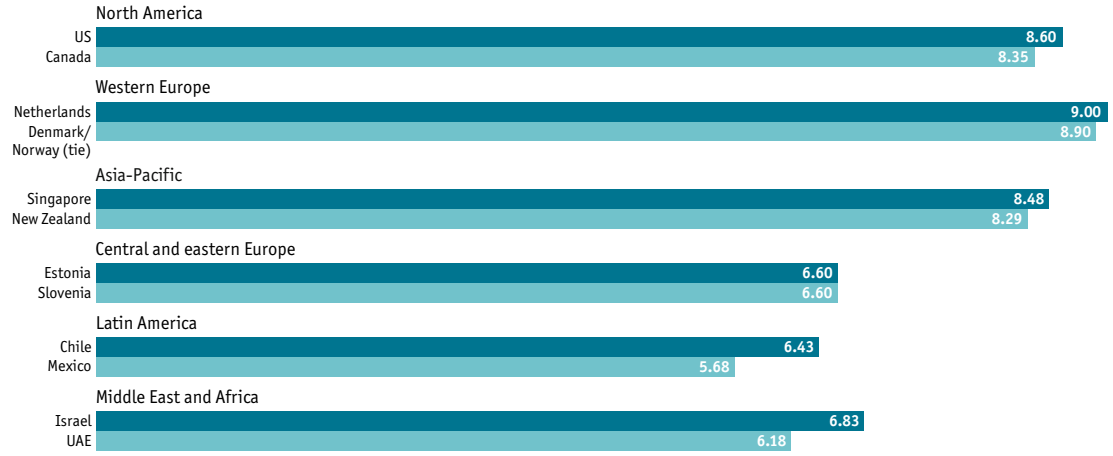
Regional digital economy rankings leaders: government policy and vision
(score)

Source: Economist Intelligence Unit 2010.

Regional digital economy rankings leaders: consumer and business adoption
(score)



Source: Economist Intelligence Unit 2010.

use the Internet. China's interest is particularly keen, but the vigour with which it seeks to "protect" its people from dangerous online content is having a clear impact on the digital economy. One consequence has been Google's retreat from the China market. Social media and user-generated content is also being curtailed there by the government's recent move to effectively restrict Internet domain names to approved groups. But China is far from alone in trying to control its digitally-enabled citizens: the Committee to Protect Journalists names China, Vietnam, Syria, Iran and Egypt among the toughest countries to be a blogger, and has recently criticised Vietnam for shutting down political blogs.

Governments wield the greater power, but digital companies often themselves impose controls on the use of online content. For example, companies and governments generally agree on efforts to limit access to pornography (although many such initiatives are not without controversy), but some

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online firms also restrict access to political cartoonists and certain news outlets. The net effect on individuals' use of digital content and services is usually restrictive.

Such constraints may be one reason why usage of online services is more robust in some places than others. Only 27 of the 70 countries in our rankings boast a score for "use of Internet by consumers" (which considers online purchasing activity and the range of Internet features that individuals use) of seven or higher on a 1-10 scale. Even fewer (23 countries) score at this level when it comes to citizens' use of online public services. Clearly, there remains much work to do by companies and governments, beyond increasing physical access to ICT, to make it attractive for people to use the plethora of digital services available to them.

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Conclusion

The reason the aforementioned clashes occur, and scrutiny of them increases, is because much is at stake. The Internet is now fundamental to commercial success and social prosperity.

This goes back to the central theme of the digital economy: that societies use digital tools to move towards their collective goals more quickly. Therefore, the benefits of having a strong vision for the execution of digital development strategies, be they commercial or social, are clear.

The new title given to our study this year enshrines the evolution of our annual benchmark from e-readiness to a measure of the digital economy. As the journey progresses, we hope that more inclusionary instincts take hold, and that the benefits of productivity, efficiency and education through the Internet continue to proliferate as strongly in the next decade as they did in the last. We also hope that all of society's stakeholders embrace the openness that the Internet both makes possible in society but also needs in order to thrive. Censorship in the interest of political repression, as discussed in the preceding section, is an objectionable aim, regardless of the level of digitalisation.

The goalposts are shifting, but the imperatives for countries to extract the maximum economic and social benefits from the use of digital technology remain:

- Ensure the population has affordable access to the highest quality fixed and wireless data and voice connections possible.
- Establish ICT as a focal point of education, and ensure students at all levels learn how to use digital technology to their benefit.
- Make possible the wide-scale provision of goods and services online which provide genuine utility to citizens and businesses.
- Encourage greater innovation and entrepreneurship, to create the best chances for ICT-enabled change to filter through the economy.
- Ensure that the legal regime avoids placing undue shackles on the use of technology while also providing adequate protection to people and organisations from its abuse.

Governments, of course, are not bystanders on this journey. They cannot themselves make all the above come to pass. But working in concert with business leaders, universities and other stakeholders, they can create the conditions for the digital economy to take root.

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Appendix 1: Methodology and category definitions

The digital economy rankings model consists of over 100 separate quantitative and qualitative criteria, all but one of which are scored by the Economist Intelligence Unit's regional analysts and editors, and are organised into six primary categories. The 39 indicators and 82 sub-indicators are, in turn, weighted according to their assumed importance as influencing factors. Major data sources include the Economist Intelligence Unit, Pyramid Research, the World Bank, the United Nations and the World Intellectual Property Organisation, among others.

The rankings methodology has undergone a handful of changes in 2010. These are detailed in the Executive summary, on page 5.

The six categories and individual criteria, and their weights in the model, are described below.

1. Connectivity and technology infrastructure

Weight in overall score: 20%

Category description: Connectivity measures the extent to which individuals and businesses can access the Internet and mobile networks, and do so affordably with an assurance of quality, reliability and security. Penetration of each market's mobile-phone subscriptions, overall Internet users and broadband Internet accounts are ranked as a percentage of the total population. The affordability of the lowest-priced broadband subscription, measured as a percentage of an average household's median income, is used as the overall measure of digital service affordability. Broadband quality is measured as the extent to which fibre-optic access figures in a country's total broadband connections. Likewise, mobile quality is based on the extent of 3G and 4G mobile subscriptions as a share of total mobile subscriptions. The penetration of secure Internet servers in the population is used as a reference indicator of the extent to which reliable digital transactions can be made in each market. International Internet bandwidth is an indicator of the ability of a country's networks to carry the burgeoning volume of data traffic originating from within and outside of its borders.

Category criteria and weights: Broadband penetration (15%); broadband quality (10%); broadband affordability (10%); mobile-phone penetration (15%); mobile quality (10%); Internet user penetration (15%); international Internet bandwidth (10%); Internet security (15%).

2. Business environment

Weight in overall score: 15%

Category description: In evaluating the general business climate, the Economist Intelligence Unit screens 74 sub-indicators to provide a comprehensive and forward view of each country's attractiveness as a trading economy and as a destination for business investment from 2009 to 2013. The criteria cover such factors as the strength of the economy, political stability, taxation, competition policy, the labour market, and openness to trade and investment. The aggregate scores

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of the individual sub-indicators are grouped into nine higher-level indicators, shown below. Updated quarterly as part of the Economist Intelligence Unit's Country Forecast Service, these rankings have long offered investors an invaluable comparative index for over 60 major economies.
Category criteria and weights: Overall political environment; macroeconomic environment; market opportunities; policy towards private enterprise; foreign investment policy; foreign trade and exchange regimes; tax regime; financing; the labour market. (All nine criteria are weighted equally.)

3. Social and cultural environment
Weight in overall score: 15%
Category description: Education is a precondition to being able to utilise Internet services, but this category also considers a population's web-literacy—its experience using the Internet and its receptivity to it—and the technical skills of the workforce. These technical skills are evaluated by both evidence of the familiarity of a country's population with information technology (IT) applications and the extent to which its schools and governments provide the education infrastructure to engender them. Also included is an assessment of entrepreneurship, while our scoring of innovation levels in each market (measured by the number of patents and trademarks registered, as well as the level of spending on R&D) evaluates how well the society fosters creative business activity that can lead to the creation of intellectual property, new products and industries.
Category criteria and weights: Educational level (measured by school life expectancy, gross enrolment in education and enrolment in tertiary education); Internet literacy; degree of entrepreneurship; technical skills of workforce; degree of innovation (measured by the generation of patents and trademarks, as well as R&D spending). (All five criteria are weighted equally.)

4. Legal environment
Weight in overall score: 10%
Category description: E-business development depends on both a country's overall legal framework and specific laws governing Internet use. This category reflects those legal frameworks that have a direct impact on the use of digital technology to inform, communicate and transact business. Governments need to be forward-thinking in their creation of legal frameworks to cater to Internet commerce. These include legislative approaches to such issues as cybercrime, data privacy and spam, but just as importantly countries need to create a legal atmosphere that works to minimise abuses and non-competitive behaviour, including provisions covering consumer protection and legal jurisdiction. E-ready countries are those that allow businesses and individuals to move nimbly and freely, where there is little bureaucracy to interfere with the registration of a new business or restrict access to information. The commitment of the country to implementing digital identity cards is also considered as a means of determining how a country's population can access digital commerce and digital government services.
Category criteria and weights: Effectiveness of traditional legal framework (30%); laws covering the Internet (25%); level of censorship (10%); ease of registering a new business (25%); electronic ID (10%).

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5. Government policy and vision

Weight in overall score: 15%

Category description: E-ready governments supply their constituents—citizens and organisations—with a clear roadmap for the adoption of technology, and they lead by example in their use of technology to create efficiencies. The Economist Intelligence Unit assesses the activities of governments in this area, and their ability to lead their countries towards a digital future. Are governments employing technology to operate and provide public services with less resource investment? Are they spending on ICT to stimulate similar spending in the greater economy? Are "savings" translated into service gains for citizens? Can more people interact with, and receive information from, the government regardless of their own access to technology? This category also analyses, in each country, the availability of digital channels to individuals and businesses for accessing public services, and to citizens for obtaining government information about civic issues and engaging in consultation with government officials on matters involving the political process.

Category criteria and weights: Government spend on ICT as a proportion of GDP (5%); digital development strategy (25%); e-government strategy (20%); online procurement (5%); availability of online public services for citizens (15%) and businesses (15%); e-participation (15%, based on the UN e-participation index).

6. Consumer and business adoption

Weight in overall score: 25%

Category description: If connectivity, societal adoption, and legal and policy environments are necessary enabling platforms for a digital economy, then the actual utilisation of digital channels by people and companies is a measure of successful implementation. The Economist Intelligence Unit looks at the amount that businesses and consumers spend on accessing ICT services, the extent and range of Internet features used by individuals, their online purchasing activity, and the extent to which individuals and businesses use the online public services that have been made available.

Category criteria and weights: Consumer spending on ICT per head (15%); level of e-business development (10%); use of Internet by consumers (25%, assessing both the range of Internet features used by individuals and their online purchasing activity); use of online public services by citizens (25%) and businesses (25%).

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Appendix 2: Category scores

Economist Intelligence Unit digital economy rankings, 2010

Category scores

	Overall score	Connectivity	Business enviroment	Social and cultural environment	Legal environment	Government policy and vision	Consumer and business adoption
Category weight		***20%***	***15%***	***15%***	***10%***	***15%***	***25%***
Sweden	8.49	8.20	8.13	8.53	8.25	8.90	8.75
Denmark	8.41	7.85	8.18	8.47	8.10	8.70	8.90
United States	8.41	7.35	7.85	9.00	8.70	9.25	8.60
Finland	8.36	8.00	8.30	8.47	8.35	8.00	8.85
Netherlands	8.36	8.05	8.05	8.07	8.45	8.25	9.00
Norway	8.24	7.95	7.95	8.00	8.30	8.05	8.90
Hong Kong	8.22	7.65	8.40	7.27	9.00	9.18	8.28
Singapore	8.22	7.35	8.63	7.33	8.70	9.13	8.48
Australia	8.21	7.35	8.24	8.53	8.50	8.85	8.18
New Zealand	8.07	6.80	8.17	8.60	8.45	8.50	8.29
Canada	8.05	7.15	8.33	7.87	7.95	8.75	8.35
Taiwan	7.99	7.00	7.95	8.40	8.15	8.55	8.15
South Korea	7.94	7.90	7.32	8.80	7.65	9.20	7.18
United Kingdom	7.89	7.65	7.40	7.73	8.10	8.55	8.00
Austria	7.88	7.25	7.54	7.80	8.45	8.55	8.00
Japan	7.85	7.70	7.16	7.80	7.43	8.75	8.04
Ireland	7.82	7.20	7.75	7.60	8.00	7.85	8.40
Germany	7.80	7.60	7.82	8.00	8.05	7.40	7.98
Switzerland	7.72	7.80	8.33	7.93	7.93	6.80	7.65
France	7.67	6.80	7.54	7.60	7.85	8.20	8.10
Belgium	7.52	6.95	7.68	7.33	8.45	7.50	7.63
Bermuda	7.47	7.45	8.04	6.40	8.35	8.50	6.80
Malta	7.32	6.15	7.28	6.80	8.20	8.65	7.45
Spain	7.31	6.20	7.39	7.60	8.35	7.85	7.23
Estonia	7.06	6.40	7.16	6.77	8.40	7.98	6.60
Israel	6.96	6.30	7.39	7.50	7.05	7.05	6.83
Italy	6.92	6.45	6.32	7.60	8.45	6.55	6.88
Portugal	6.90	5.40	6.64	7.33	8.35	7.40	7.10
Slovenia	6.81	6.10	6.82	6.93	7.40	7.60	6.60
Chile	6.39	4.15	8.00	6.67	7.40	6.75	6.43
Czech Republic	6.29	5.55	7.18	6.60	7.20	5.95	6.00
United Arab Emirates	6.25	6.80	7.27	5.47	5.10	6.20	6.18
Greece	6.20	5.15	6.17	7.13	7.15	6.00	6.25

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	Overall score	Connectivity	Business enviroment	Social and cultural environment	Legal environment	Government policy and vision	Consumer and business adoption
Category weight		***20%***	***15%***	***15%***	***10%***	***15%***	***25%***
Lithuania	6.14	5.45	6.51	6.23	7.33	6.20	5.90
Hungary	6.06	5.35	6.71	6.27	7.10	6.23	5.60
Malaysia	5.93	4.35	7.36	5.47	6.88	6.65	5.80
Latvia	5.79	5.25	6.32	6.17	7.38	5.40	5.28
Slovakia	5.78	5.35	6.93	6.07	7.15	4.90	5.25
Poland	5.70	5.10	7.26	5.93	6.83	5.35	4.88
South Africa	5.61	3.65	6.03	5.57	7.58	5.80	6.05
Mexico	5.53	3.10	6.97	5.53	6.35	6.55	5.68
Brazil	5.27	3.60	6.66	5.73	6.10	5.70	4.93
Turkey	5.24	4.20	6.11	5.80	5.45	5.50	4.98
Jamaica	5.21	4.75	5.67	5.33	6.65	4.90	4.83
Bulgaria	5.05	4.80	6.25	5.20	6.65	4.75	4.00
Argentina	5.04	3.85	5.48	5.73	6.05	5.20	4.83
Romania	5.04	4.75	6.22	5.23	6.78	5.65	3.38
Trinidad & Tobago	4.98	3.25	6.43	5.33	6.40	5.60	4.33
Thailand	4.86	3.20	6.83	4.50	6.35	5.60	4.18
Colombia	4.81	3.60	6.29	4.80	6.60	5.00	4.08
Jordan	4.76	3.00	6.12	5.30	4.90	5.45	4.55
Saudi Arabia	4.75	4.25	6.34	5.13	4.75	4.85	3.90
Peru	4.66	2.60	6.47	5.13	5.80	4.75	4.43
Philippines	4.47	2.60	6.35	4.27	4.85	5.20	4.38
Venezuela	4.34	3.85	3.95	5.13	4.70	4.60	4.20
China	4.28	2.65	6.36	5.40	5.20	4.60	3.11
Egypt	4.21	2.55	6.20	5.00	5.20	4.90	3.05
India	4.11	2.15	6.27	4.67	5.60	5.10	2.88
Russia	3.97	3.85	5.72	5.13	3.65	3.00	3.01
Ecuador	3.90	2.95	4.63	4.53	4.75	3.80	3.58
Nigeria	3.88	1.75	4.87	4.53	5.53	4.65	3.50
Vietnam	3.87	3.20	5.70	3.60	4.65	4.60	2.71
Sri Lanka	3.81	2.35	5.68	4.40	5.95	3.95	2.55
Ukraine	3.66	3.50	4.48	5.07	4.23	3.15	2.54
Indonesia	3.60	2.60	6.04	3.60	4.20	3.88	2.55
Pakistan	3.55	2.35	5.31	2.80	5.90	4.30	2.51
Kazakhstan	3.44	3.15	5.26	3.93	3.45	3.93	1.98
Algeria	3.31	2.90	4.74	3.87	3.30	2.65	2.83
Iran	3.24	3.20	4.14	4.90	3.00	2.40	2.33
Azerbaijan	3.00	2.85	4.93	3.17	3.40	2.55	1.98

Source: Economist Intelligence Unit, 2010

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