

Investment for the Future

Benchmarking IT Industry Competitiveness 2011



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BSA CEO LETTER

Technology innovation boosts productivity and spurs economic growth, economists have long understood, because it allows companies to get more out of the investments they make in labor and capital. In the industrial era, this happened as new machines automated the factory floor. Today, for our globally connected digital economy, we have information and communications technologies.

But how do we keep the engine of IT innovation humming? The formula is here in the *IT Industry Competitiveness Index*. In short, a country must have a healthy business environment plus a first-rate IT infrastructure, dynamic human capital, robust research and development, a strong legal environment, and adequate public support for industry development.

With support from the Business Software Alliance, the Economist Intelligence Unit benchmarks 66 countries every two years on a series of indicators in each of those six categories. In this latest edition of the *Index*, we see the continuation of a distinct trend: The competitive environment in the IT sector is heating up globally.

As the overall rankings attest, established IT powerhouses like the United States are holding their leadership positions — even in the face of the recent economic turmoil — because of the solid competitive foundations they have built up through years of investment. “Advantage begets advantage,” notes Professor David Hsu of the Wharton Business School in one of the interviews the Economist Intelligence Unit has conducted for this year’s study.

But the field of competition is becoming more crowded as new players rise steadily to meet the standards that the leaders have set. India, for example, has leapt 10 spots in the overall rankings by posting strong scores on indicators of human capital and research and development. Others, such as Singapore, Mexico and Poland, have climbed in the rankings by showing new levels of strength across the board, proving that *investment* begets advantage, too.

Meanwhile, countries that are treading water or drifting off course offer cautionary tales about the consequences of cutting corners or neglecting the fundamentals of IT competitiveness. China, for example, after making impressive headway in previous years, has seen its momentum slow considerably in large part because of its poor record of protecting intellectual property rights. Canada, too, has dropped down the overall rankings because it has allowed its IP standards to fall.

How will this story have changed two years hence? It depends on decisions countries are making today.

Robert Holleyman
President and CEO
Business Software Alliance

PREFACE

This report is published by BSA and written by the Economist Intelligence Unit, with the exception of the BSA CEO Letter and BSA commentary appearing on pages 18–20. The views expressed by the Economist Intelligence Unit do not necessarily reflect those of BSA.

The Economist Intelligence Unit research drew on two main initiatives:

- > Updating of the IT Industry Competitiveness Index, which compares 66 countries on the extent to which they support the competitiveness of information technology (IT) firms. The Index was created in 2007.
- > The conduct of in-depth interviews with nine IT industry executives and independent experts, all with unique perspectives on the drivers of IT competitiveness.

Sincere thanks go to the interviewees for sharing their insights on this topic. The following individuals were interviewed for the study:

- > Walter Deppeler, *President EMEA, Acer*
- > Brett Dawson, *Chief Executive, Dimension Data*
- > Karen Geary, *Group Director of Human Resources and Corporate Communications, Sage*
- > Antony Gold, *Head of Contentious Intellectual Property, Eversheds*
- > David Hsu, *Associate Professor of Management, Wharton Business School*
- > Ian Ing, *Analyst, Gleacher & Company*
- > Phaneesh Murthy, *Chief Executive, iGATE Patni*
- > Charlotte Walker Osborn, *Head of Telecommunications, Media and Technology, Eversheds*
- > Mike Shove, *President, CSC Asia Group*

September 2011

INTRODUCTION

Maintaining investment levels during an economic downturn is no easy feat, but business leaders know the benefit: the ability to compete at a higher level when markets recover. The same may be said of the information technology (IT) industry and national governments, as continued attention to factors such as education, research and development (R&D), high-speed communications networks, and access to finance is needed to ensure the sector's global competitiveness in the longer term.

The virtue of sustained investment in the enablers of sector competitiveness is borne out in the 2011 IT Industry Competitiveness Index. The two years since the last study have been the leanest financial times IT producers have known in a decade, and for many governments — in at least a generation. But countries that have seen continued investment in key competitiveness enablers such as the R&D environment, talent and skills are notable gainers in the 2011 Index.

For example, despite its obvious economic problems, or perhaps because of them, Ireland appears to have redoubled efforts to cultivate one of the world's most competitive environments for IT producers. Private-sector R&D spending was up in the early part of the downturn (as was enrolment



in science and engineering programs). With IT patent generation also increasing, the effect is to boost Ireland's score for the R&D environment and advance the country to joint 8th position this year (with Australia) from 11th in 2009. A similar improvement in the R&D environment, with higher private-sector spending, along with increased patent activity, lifts Israel from 13th to joint 10th (with the Netherlands). And significant improvement across all R&D environment indicators, as well as in higher education enrolment, has boosted India ten places to joint 34th this year (tied with Lithuania).

There are other noteworthy upward shifts in 2011. Singapore, advancing to 3rd position in the table, has benefited from a vastly improved score in the human capital environment. Its northern neighbour Malaysia has jumped to 31st place thanks to much improved performance in its R&D indicators — and especially in IT patent activity. Germany, Austria, Poland and Turkey are other countries registering significant gains due to improvement in one or both of these Index categories. Conversely, Lithuania (41st) and Russia (46th) have fallen back several places due mainly to a decline in scores in the key R&D category. The other BRIC countries, China and Brazil, have maintained slow but steady improvement in Index performance, with both advancing one place this year, to 38th and 39th respectively.

The US is probably the world's best example of the virtues of long-term investment in the enablers of IT sector competitiveness. The US tops the Index once again, its high scores across all categories reflecting not only the historical strength of its IT industry but also the high quality of its education and talent environments, its strong encouragement of innovation and entrepreneurialism, and its well developed legal system. Recent economic and fiscal problems have not dented its clear IT industry strengths.

The importance of competitive IT industry environments extends, of course, beyond the sector and its players to impact on national economic competitiveness overall. There is a high degree of correlation, for example (0.88), between the results of this year's IT Industry Competitiveness Index and those of the World Economic Forum's Global Competitiveness Index 2010–2011.

This report, beyond highlighting selected countries' performance in the 2011 Index, explores how companies and governments are addressing major trends affecting the industry. The examples and expert insights provided will underscore the critical importance of innovation, people, transparency (of laws and rules) and balance (of industry policy), not only to the competitiveness of industry environments, but to IT producers themselves.

Overall Scores and Ranks IT Industry Competitiveness Index 2011

Countries are scored on a scale of 1–100.

RANK			SCORE / 100		RANK			SCORE / 100	
2011	YoY		2011	YoY	2011	YoY	2011	YoY	
1	-	United States	80.5	+1.6	=34	-1	Latvia	41.6	-1.0
2	-	Finland	72.0	-1.6	=34	+10	India	41.6	+7.5
3	+6	Singapore	69.8	+1.6	36	-4	Greece	40.7	-2.3
4	-1	Sweden	69.4	-2.1	37	-1	Romania	40.4	+0.8
5	+1	United Kingdom	68.1	-2.1	38	+1	China	39.8	+3.1
6	+2	Denmark	67.9	-0.7	39	+1	Brazil	39.5	+2.9
7	-3	Canada	67.6	-3.7	40	-3	Croatia	39.0	+0.7
=8	+3	Ireland	67.5	+0.6	=41	+5	Turkey	38.7	+4.9
=8	-1	Australia	67.5	-1.2	=41	-10	Lithuania	38.7	-4.6
=10	-5	Netherlands	65.8	-4.9	43	+4	Bulgaria	38.1	+4.5
=10	+3	Israel	65.8	+1.5	44	+4	Mexico	37.0	+5.0
12	+2	Switzerland	65.4	+1.9	45	-4	Argentina	36.2	-0.3
13	+2	Taiwan	64.4	+1.0	46	-8	Russia	35.2	-1.6
14	-4	Norway	64.3	-2.8	47	-4	South Africa	35.0	-0.3
15	+5	Germany	64.1	+6.0	48	-3	Saudi Arabia	34.1	+0.2
16	-4	Japan	63.4	-1.7	49	+3	Colombia	33.7	+5.3
17	+5	Austria	61.4	+4.4	50	-1	Thailand	30.5	-1.3
18	+1	New Zealand	61.3	+2.5	51	-1	Ukraine	28.9	-2.5
=19	-3	South Korea	60.8	-1.9	52	-1	Philippines	27.9	-0.6
=19	+2	Hong Kong	60.8	+3.3	53	+3	Vietnam	27.1	+2.1
21	-4	France	59.3	+0.1	54	-1	Egypt	26.3	-0.5
22	-5	Belgium	57.7	-1.5	55	-	Peru	25.5	-0.5
23	+1	Italy	50.7	+2.2	56	+2	Sri Lanka	25.0	+1.1
24	+1	Spain	50.4	+3.0	57	+2	Indonesia	24.8	+2.0
25	+4	Slovenia	48.8	+3.5	58	-1	Venezuela	24.5	+0.1
26	+3	Portugal	47.1	+1.8	59	+1	Ecuador	23.1	+0.4
27	-1	Czech Republic	46.1	-0.9	60	-6	Kazakhstan	22.8	-3.6
28	-1	Hungary	45.4	-0.7	61	+2	Pakistan	22.3	+2.3
29	-6	Estonia	45.0	-10.6	62	+3	Nigeria	21.4	+2.6
30	+5	Poland	44.6	+3.8	63	-1	Bangladesh	20.6	-0.5
31	+11	Malaysia	44.1	+8.5	64	-3	Azerbaijan	20.3	-1.0
32	-5	Chile	43.2	-2.9	65	-1	Algeria	19.5	-0.3
33	+1	Slovakia	42.1	+0.7	66	-	Iran	18.8	+1.7

Source: Economist Intelligence Unit



INNOVATION LEADERS

When it comes to innovation, is the US losing its edge? Walter Deppeler, EMEA President of Acer, a Taiwanese computer maker, believes the IT industry's center of gravity is "shifting from West to East". Brett Dawson, Chief Executive of Dimension Data, a South Africa-based provider of IT software and services, also notes the "material gains of Asia-based technology companies against those in the US and Europe". Yet the companies seen as the real game-changers, attracting the loftiest valuations, still have US roots. Think Apple, Google, Amazon, and — even more recently — Facebook.

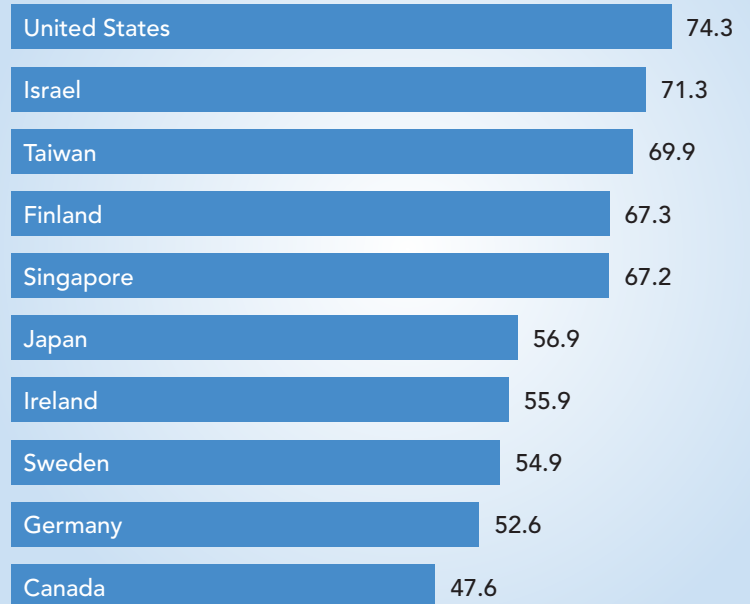
For Professor David Hsu of Wharton Business School, the US is not about to slip behind its emerging-market rivals anytime soon. Besides having all the vital ingredients needed for entrepreneurs to thrive, including world-class educational institutions, a developed venture-capital community and a business-friendly political system, the US also has a deep-seated culture of encouraging experimentation. "Around 75% of American venture-capital investments result in an exit value of zero, but without this tolerance of failure there would be fewer successes," he says.

It may thus come as no surprise that the US is the top-ranked country in 2011 in the R&D environment category of the Index, which considers such indicators as IT patent generation and public and private R&D spending. Israel, Taiwan, Finland and Singapore round out the top five in this category.

The other great advantage enjoyed by the US is what Professor Hsu calls the "incestuous" relationships fostered by Silicon Valley: the technology community is perpetually regenerating itself as individuals leave one organization to begin another, and angel investors follow. In today's environment, such start-ups could quickly become pricey acquisition targets, fuelling even more entrepreneurial interest. "A big motivation is being taken over by the Oracles and Microsofts of the world," says Mike Shove, Asia Group President of CSC, an IT services firm.

R&D Environment Top 10 Countries

Countries are scored on a scale of 1–100.



Source: Economist Intelligence Unit

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Yet wider developments could boost innovation in other parts of the world. For a start, as extending working visas for the US becomes more difficult, Asian expatriates may return home and exploit their knowledge of local market conditions, combined with their experiences and contacts in the US, to come up with new IT products and services. The lessening wage disparity between the US and some Far Eastern emerging markets is likely to work in favor of this trend.

Rising labor costs are already forcing change in countries where hardware production is of critical importance. Ian Ing, an analyst at New York-based Gleacher & Company, says it is unfair to continue accusing Chinese technology giants Huawei and ZTE of simply producing low-cost versions of goods first developed in the US or Europe. "They are still focused on low-cost solutions but now have leading-edge products and are open to new ways of improving value-for-performance," he says. "Innovative component start-ups or smaller companies, indeed, have a much better chance of selling to Huawei and ZTE than to Ericsson and Cisco, which only want to deal with large, publicly traded companies. Optichron (now Netlogic) and Lattice Semiconductor are examples in the area of wireless base stations."

Moving up

The gradual ebbing away of the low-cost advantage will bring about more profound shifts. For Taiwanese companies, which have moved a lot of their hardware production to China, a strategic priority is developing expertise in the more profitable area of software and services, according to Mr. Deppeler of Acer. As it tries to

build a reputation for quality and innovation, Acer has been successful at turning itself into a global brand and cultivating relationships with others, including Google. "The challenge for some of these companies is making the transition from being a small part of a supply chain to being at the forefront of a given category," says Professor Hsu.

But that is not the only difficulty. In many emerging markets, IT companies are not as close to consumers as they are in the West, and so innovations in areas such as social networking — where there is the potential to develop a "platform" and become a global phenomenon — are much harder to realize. "The US has been very innovative because it has this large domestic market that accounts for [a large share] of global technology spending," says Phaneesh Murthy, Chief Executive of Indian IT services company iGATE Patni. "Being based in that market, you have an understanding of the usage culture."

By contrast, in small but relatively wealthy Israel, the IT sector is largely export-driven. While successful, its companies tend to be important cogs rather than instantly recognizable brands in their own right. And because the addressable market for sophisticated technology is limited in the BRICs, their IT companies struggle to appeal to consumers in developed economies. "Once you have developed the most cutting-edge products, you can dumb them down for different income categories," says Professor Hsu. "It's much harder to do the reverse."



PEOPLE FOR TECHNOLOGY

A German executive interviewed in 2009 for the last iteration of this study expressed a concern that jobs would begin migrating from Europe to less heavily regulated markets post recession. But inflexible labor markets are not the most serious issue confronting Europe's IT employers today. Sage, a UK-based provider of business-management software and services, bemoans the poor quality and availability of IT workers in Europe. Unless the situation improves, the company is likely to fill more roles with individuals from emerging markets in the future (see case study, "A Technology Talent Crunch").

Professor Hsu of Wharton Business School says that European countries have most of the ingredients needed for a competitive IT industry — including the physical infrastructure, stable political systems and good enforcement of intellectual property rights — but marks them down on what he calls "labor rigidity". "If you have government policy or a business culture that induces this rigid labor market, it will work to the detriment of innovation," he says.

The contrast, clearly, is with the US, where both recruiting and laying off staff are perceived to be less cumbersome processes, suiting the culture of experimentation discussed earlier. Yet workers from neither Europe nor the US can compete with those from emerging markets on cost. "If I start thinking about countries where the talent is available at a more affordable price range, then India clearly has significant advantages," says Mr. Murthy of iGATE Patni. "In terms of a value for money, it remains the world number one."

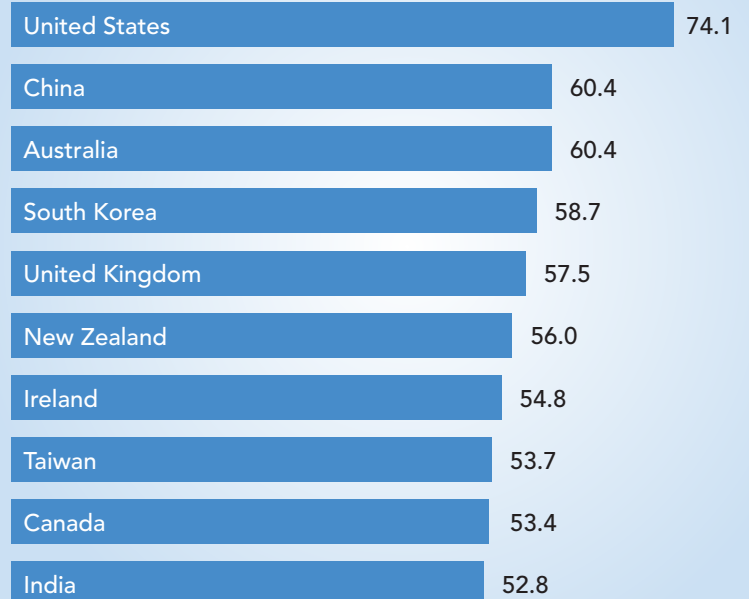
As emerging-market wages rise, this advantage will slowly fade away. Nor does it necessarily boost the competitiveness of IT industries in emerging

markets if their workers are being lured to the West. But the growing availability and quality of IT workers from Asia, in particular, must be a long-term worry for more developed economies. "There are enormous talent pools across the Asian region, with China alone set to churn out about 400,000 IT graduates this year," says CSC's Mr. Shove. "And the quality is there on a number of levels."

Sheer numbers such as these, when combined with lower costs and increasing quality, mean something to IT producers in any part of the world worried about future talent shortages. China employs by far the largest number of IT workers

Human Capital Top 10 Countries

Countries are scored on a scale of 1–100.



Source: Economist Intelligence Unit

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in the world (over 5m according to Economist Intelligence Unit estimates), and is just behind Russia and India when it comes to students enrolled in tertiary-level science and engineering courses. These are reasons why China occupies 2nd position globally, behind the US, in the Index's human capital category. (India and Russia rank a relatively high 10th and 11th, respectively.)

A softer touch

Perhaps the biggest change taking place in Asia is the improvement in so-called "soft skills" that fall outside the traditional remit of the IT worker. While Mr. Shove says there is still some immaturity in the area of project management, which is important to CSC as an IT services company, Professor Hsu observes a "huge move" in business education that will have far-reaching implications. "We [Wharton Business School] helped set up the Indian School of Business and we have a

partnership in China with Beijing University," he says. "The development of local managerial talent is going to be a big disruptor by helping these countries to break through."

Of course, the US can still boast probably the world's best environment for business education. Along with the UK, Ireland and Australia, the US gets top marks in the Index's "quality of technology skills" indicator, which assesses the educational system's ability to train technologists with business skills. Mr. Ing of Gleacher & Company suggests that business acumen could inform the decisions of traditional IT educators about where to focus resources. "My graduate engineering school, Georgia Tech, now produces fewer semiconductor designers, because a lot of those jobs have moved to Asia, but it has lots of expertise in search-engine optimization," he says. "You have to be nimble in terms of where you are investing and play to your strengths."

CASE STUDY

A TECHNOLOGY TALENT CRUNCH

The hunt for IT talent in Western Europe is growing ever more difficult, according to Sage. As one of the region's largest providers of business-management software and services, the UK-based company employs about 13,500 employees globally, with around 20% in research and development and 15% in technical support roles. Employee turnover runs at about 15% annually, and so the company needs to fill some 2,000 jobs a year even before it considers any growth initiatives.

For Karen Geary, Group Director of Human Resources and Corporate Communications, the low availability of skills is a particular concern. In the UK, for instance, relatively fewer youngsters now choose IT/technology-based courses at the higher-education level. (According to data from UNESCO, the number of students enrolled in tertiary science courses in the UK declined by more than 7% between 2005 and 2008.)

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The contrast with other parts of the world is stark. “The availability of IT talent is much greater in some of the Asian economies because that is what they are churning out in schools,” says Ms. Geary. “I think IT is seen as a more acceptable discipline to pursue. This is especially so when gender is added to the mix, as Asian females are well represented in technology, in contrast to Western Europe. So on pure numbers alone Europe’s available talent pool is probably smaller.”

But it is not just low availability that worries Ms. Geary. The quality of the skills on offer is often much poorer in Western European economies than elsewhere, she says. While graduates tend to be more IT-savvy these days, they often lack the business acumen and training that a customer-facing organization like Sage increasingly values. “Universities are still producing candidates with primarily technical skills, whereas other skills are also required often in equal measure,” observes Ms. Geary.

Her criticisms may surprise those who think Asia is the true laggard in this area, but Ms. Geary believes the region has made big improvements in recent years. “I know that certain parts of Asia have a reputation for being too focused on the technology part, but the students I have met are a lot more rounded than they used to be,” she says.

Although Sage is involved at the educational level — with senior staff taking advisory board roles at universities and providing input to curricula — the slower pace of academic life makes it difficult to embed new skills within courses. The company still spends a considerable amount of time getting new recruits up to speed, with technical-support staff requiring three-to-six months of initial on-the-job training and software developers as much as a year.

Long term, the implications of Europe’s perceived shortcomings could be dramatic. Sage is already starting to fill roles in the US and Europe with IT professionals from emerging markets. Ms. Geary says that trend will accelerate over the next few years unless more youngsters can be persuaded to choose science-based degrees. “We need to make technology more attractive in terms of placements, scholarships and financial incentives,” she says.

Offshoring could also become more appealing if skills shortages persist. Owing to its emphasis on customer support, Sage has no plans to shift its human capital to other parts of the world. But other companies will feel differently. Cost used to be the main reason for offshoring. Could talent take its place?

UPHOLDING THE LAW

If the recent recession has had a single major impact on the legal environment it is perhaps to have reduced the appetite for litigation — a costly method of solving disputes — and raised interest in collaborative activities such as cross-licensing. “We’ve been helping our IT clients in quite different ways,” says Charlotte Walker Osborn, Head of Telecommunications, Media and Technology at Eversheds, an international law firm with headquarters in London. “There is a lot of work we’re seeing where makers of technology products are marrying providers of technology services.”

These tie-ups, of course, are being encouraged by wider trends, but in such circumstances legal experts can do a lot to boost the competitiveness of national IT industries. “If lawyers show they can find other solutions, involving negotiation or mediation, instead of just putting clients through any form of protracted dispute, they make their country look a lot more attractive,” says Antony Gold, Head of Contentious Intellectual Property at Eversheds.

Even so, when it comes to the enforcement of intellectual property rights (IPR) — a significant concern for many IT companies — some countries are still perceived to be lagging. Mr. Murthy observes that many technology firms still have significant concerns about intellectual property protection in China. Indeed, although China has long been under pressure from the World Trade Organization and the US to make improvements in this area, it is still singled out as the main culprit when it comes to slack IPR enforcement.

According to Mr. Gold, the biggest problem in China is not obvious corruption but simply that legal processes can be drawn out over many years. “With something like opposition to a trademark, which is a common problem in China, a process that would last just a few months in the UK can take up to four years,” he says. “We have several clients that are snarled up in that system.” Aggravating matters is the fact that certain types of legal work can only be done by Chinese companies, and not international firms.

Legal Environment Top 10 Countries

Countries are scored on a scale of 1–100.

Australia	92.5
United States	92.0
Netherlands	90.5
Germany	90.5
Denmark	90.5
Finland	89.5
United Kingdom	88.5
Switzerland	88.5
Belgium	88.5
Austria	88.5

Source: Economist Intelligence Unit



A groundswell of innovation, and the need for Chinese IT companies to diversify away from manufacturing and into software development, could provide the impetus for change. “As innovation happens, interest in intellectual-property protection will come from inside the country instead of from a US multinational complaining about the system,” says Mr. Shove of CSC. “In other words, as Chinese companies start to develop their own software products, they will want to be protected.”

The spotlight on China should not, of course, distract attention from shortcomings elsewhere. While Mr. Gold lauds Germany and Austria for having justice systems that are both speedy and cheap for litigants, he says the French system is very slow, while that in the UK is perceived to be quite costly. “We have been trying hard to improve that, partly through the Patents County Court [set up to provide a less costly and complex alternative to the High Court], and you do get a relatively good system of justice in the UK,” he says.

The virtues of alliance

While rigorous patenting systems are sometimes seen as a barrier to innovation, the lack of legal protection for social-networking sites and apps could be just as troubling. Because these newer developments are usually protected only by copyright law, and not by the stricter laws on patents designed for more substantive innovations, they are much easier to replicate without fear of legal reprisal, according to Ms. Walker Osborn. “It puts pressure on innovation in this area,” she says. “You don’t want to risk spending lots of money if someone else can copy your idea.”

By contrast, there have been some encouraging developments in the area of cross-border collaboration on cyber crime. Since the last update of our study a number of countries — including Austria, Germany, Portugal, Spain and Azerbaijan — have ratified their governments’ adherence to the Council of Europe Convention on Cybercrime. And July 2011 saw the launch of the non-profit International Cyber Security Protection Alliance (ICSPA), whose stated aim is “to channel funding, expertise and assistance directly to assist law-enforcement cyber crime units”. Ms. Walker Osborn, a member of the British Computer Society Information Security Specialist Group (BCS-ISSG), sees the establishment of the ICSPA as a positive move. “A lot of technical understanding is needed to deal with these crimes, and police have been stretched just dealing with local issues,” she says.

Although based in the UK, and backed by UK politicians, it is a primary goal of the ICSPA to provide assistance to other countries. Those that are most serious about IT industry competitiveness are likely to welcome its appearance. “Governments that want success for their technology businesses know they must tackle the cyber crime problem,” says Ms. Walker Osborn. “Because of its borderless nature, the best way to do that is through alliance.”

POLICY AND INFRASTRUCTURE

While governments in China and South Korea announced some bold initiatives around green technology and smart grids during the downturn, many in the recession-struck West were more focused on short-term stimulus. In the US, for instance, this took the form of public-works projects to create temporary jobs. "It's a little bit disappointing there wasn't more foresight," says Mr. Ing of Gleacher & Company. "The US taxpayers were willing to step up in 2009, and in today's environment they probably aren't." All the same, the US remains a

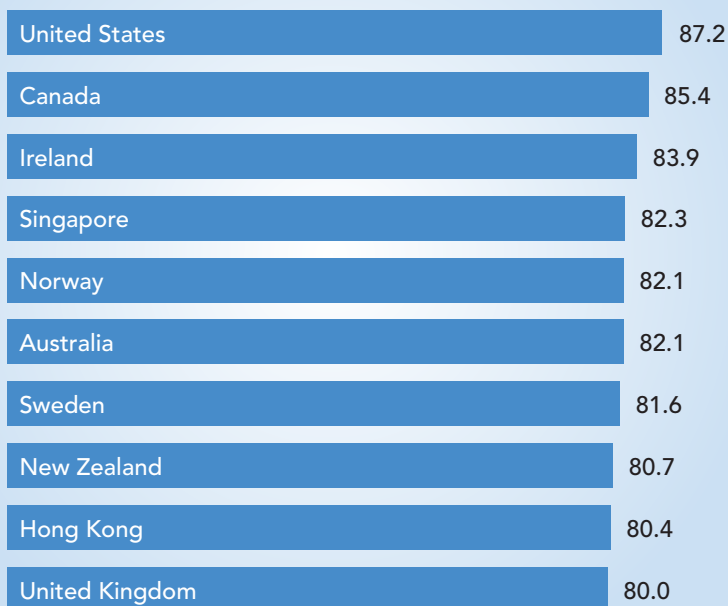
top performer when it comes to the strength of its legal environment for IT producers, although it's yielded the pole position in 2011 to Australia.

Even during the recession, software company SAP had complained about Germany's car-scrappping scheme for the same reason, arguing that policymakers would do better supporting technologies designed to improve the competitiveness of various industries. The Economist Intelligence Unit doubts the wisdom of government support for specific technologies but agrees that, as the global economy starts to recover, the need for governments to take a long-term view of IT industry development appears stronger than ever.

"Much like venture capitalists, policymakers cannot just look at something on an annual basis," says Professor Hsu of Wharton Business School. "In terms of their investments, they have to think about the next seven to nine years if they are going to make substantive changes with regard to country competitiveness."

Support for IT Industry Development Top 10 Countries

Countries are scored on a scale of 1–100.



Source: Economist Intelligence Unit



CASE STUDY

THE PAYOFFS AND PERILS OF IT INDUSTRY POLICY

Policymakers are widely credited with making South Korea an IT powerhouse and one of the world's most connected countries. It ranks a respectable 19th in the 2011 IT Industry Competitive Index. But government efforts to foster a competitive IT sector have come in for plenty of criticism, too.

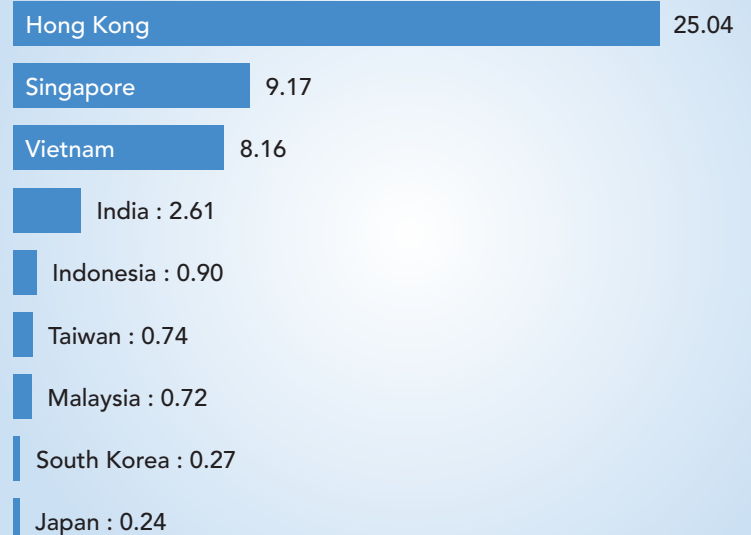
No doubt, the IT industry is the driver of South Korea's economic success. The Asian country is today the world's biggest producer of memory semiconductors and display panels and the second-biggest maker of mobile phones. According to the Ministry of the Knowledge Economy (MKE), IT exports increased from US\$5m in 1970 to US\$154bn in 2010 and now represent 33% of total exports. The IT sector accounts for about 11% of GDP, compared with just 0.01% 40 years ago.

MKE officials stress that the key to this success is effective collaboration between the government and the private sector. A good example is in the rollout of super-fast broadband networks, which will be crucial in the era of cloud computing. By establishing firm targets for speed and coverage, and providing incentives such as a favourable tax regime, the government has encouraged the private sector to invest the bulk of the funds needed while ensuring competition does not suffer.

The government's efforts in the educational area are also laudable. One initiative is to promote cooperation between businesses, universities and research institutions. An "IT mentoring" program gives students the opportunity to gain experience in a commercial environment. At the same time, the government tries to ensure that businesspeople are involved in shaping university curricula. All of this is aimed at matching the needs of the IT sector with the educational system.

Nevertheless, South Korea has acquired a reputation over the years for protectionist policies that favour chaebols, like Samsung, and discourage foreign direct investment. In 2009 — the last year for which actual data

Inward Foreign Direct Investment as a % of GDP, 2009



Source: Economist Intelligence Unit

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were available — South Korea ranked lower than any regional peer apart from Japan in terms of inward direct investment as a percentage of GDP (see chart; although not industry-specific, this statistic is almost certainly reflective of foreign investment in the technology industry, which in South Korea accounts for a large share of economic output). The MKE puts its hand up for “causing controversy over discrimination against foreign enterprises”, but insists it has recently expanded the scope of sectors open to foreign investment and is trying to create an environment of fair competition for foreign companies.

A related criticism is that policymakers have promoted technologies with limited commercial appeal simply to bolster the chaebols. The classic example — albeit from the telecoms industry — is of WiBro, a mobile broadband technology developed largely by Samsung. The government essentially forced Korea Telecom and SK Telecom, the country’s two biggest operators, to launch WiBro despite their own preference for more established 3G standards. As both operators now start migrating from 3G to LTE, a so-called ‘4G’ technology, the money spent on WiBro appears largely to have been wasted.

Perhaps the biggest problem the government has created is a cultural one. Chaebols like Samsung have become so powerful that smaller domestic firms have been squeezed out of the picture almost entirely. As a result, South Korea’s brightest students have seen little incentive in becoming entrepreneurs. The government now says it is pursuing policies to nurture creative IT talent and provide greater support to small and medium-sized firms. Supporting alternative sources of innovation to ageing technology giants seems eminently sensible.

Of particular importance here is recognizing and responding to the big shift currently taking place in IT. As more software and applications move from desktops and locally hosted servers into the “cloud”, policymakers can take various steps to ensure their own consumers and producers do not miss out. Yet Mr. Dawson of Dimension Data suggests they could be more ambitious in their approaches. “There are many government agencies using aspects of the cloud but not many that have come up with bold approaches,” he says. “There is a dearth of centralized medical information and government financial systems, for example. Governments must transform their own ICT platforms to drive widespread cloud adoption.”

European policymakers are attempting to address some of the cross-border issues raised by the cloud. By 2012, European Commission Vice-President Neelie Kroes wants to have a plan developed for an EU-wide cloud-computing strategy that would also tackle other issues, such as interoperability and allocation of funds to further research and development of cloud solutions. In a speech given last January at the World Economic Forum’s annual meeting in Davos, she cited three key areas for this strategy: the legal framework; the technical and commercial fundamentals; and the market. Clearly, the first of these alone poses some big questions. Which



country's laws, for instance, would apply if a company's headquarters, back-office systems and customers were each located in a different country?

Another, critical way in which governments can facilitate a move towards cloud computing is by ensuring the underlying infrastructure is in place. "If we're going to create cloud centers that can be used across the Asia-Pacific region then we need strong telecommunications links," says CSC's Mr. Shove. As Mr. Dawson notes, government involvement in broadband rollout has taken many different forms, from public-sector funding in Australia and South Korea to light-touch regulation in the US. But getting a scheme wrong could hamper deployment or competition. In parts of Western Europe, authorities have already come under fire for exempting high-speed networks from regulations applied to older broadband investments.

Switzerland is the Index leader this year in the IT infrastructure category, with Denmark, the Netherlands, Sweden and Australia also extremely competitive. Beyond having one of the world's highest rates of broadband penetration, its performance improved since 2009 across all other infrastructure indicators — and especially so when it comes to Internet security, which is also central to the success of cloud computing.

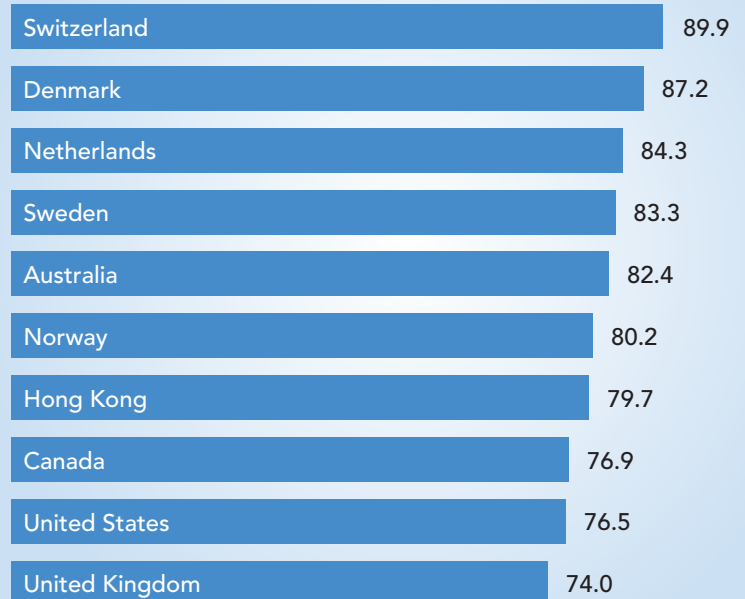
Policymakers have stoked other concerns besides infrastructure. A lack of transparency around business proceedings in some Asian markets is a cause for considerable "nervousness" on the part of a large US-based multinational, says Mr.

Shove. He also cautions against dependency on government incentives or tax breaks to make a business viable. "If that changes you suddenly have a less-than-competitive center."

A lacklustre economic recovery, or the need to maintain a fast pace of growth, could also fuel subtle forms of protectionism, such as sovereign-backed vendor financing. Mr. Ing notes that not all US companies have the balance sheets for vendor financing today, but that the Chinese government can help national champions like Huawei and ZTE. "As a result," he says, "it's not truly an open market."

IT Infrastructure Top 10 Countries

Countries are scored on a scale of 1–100.



Source: Economist Intelligence Unit

CASE STUDY

CLOUD COMPUTING: THE JOURNEY YET TO BEGIN

Cloud computing is arguably the most important innovation the IT industry has seen for many years — comparable to the move from mainframes to personal computers. The benefits to enterprise users of cloud-based services are potentially significant, including cost savings from the reduction of fixed infrastructure costs and greater flexibility to scale IT resources up or down as circumstances dictate. Yet the path to a cloud-computing future is littered with obstacles, according to Dimension Data, a South Africa-based provider of IT software and services.

In developed markets, and particularly the enterprise sector, IT customers still have many reservations about the cloud. “Some of our clients have major security concerns and are not prepared to give up their core applications at this stage,” says Brett Dawson, Dimension Data’s chief executive. Many large corporations are also burdened with ageing, bespoke IT systems and have made little progress on standardization and virtualization of their applications. “These companies need to adopt a lot of the cloud architecture principles internally before they can move to the public cloud,” he says.

Mr. Dawson reckons most big enterprises, as well as public-sector organizations and governments, will need to spend at least another year on consolidating their IT activities before the journey to the cloud can truly begin.

High-profile security breaches at Sony and downtime at Amazon earlier this year will no doubt cause even more “head-scratching” at already apprehensive organizations, says Mr. Dawson. In response to that, he believes, a new class of cloud provider will appear over the next couple of years, offering guaranteed levels of service with the enterprise sector specifically in mind. Until then, enterprises may continue to favour the use of so-called private clouds, which are operated for a single organisation. These promise some of the economic benefits of the more open public cloud but entail less of the risk.

By contrast, in emerging markets, and among small and medium-sized organizations, there is greater enthusiasm for the cloud. “It allows these companies to deploy IT systems without the same degree of cost and complexity as more traditional solutions,” says Mr. Dawson. Of course, cost savings are a big incentive for the enterprise sector as well, but many start-ups and younger organizations do not have to make such a difficult transition from those older systems in the first place.

The major constraint in emerging markets is likely to be the basic communications infrastructure — or rather the lack of it. Mr. Dawson applauds the installation of new submarine capacity off the coast of Africa, saying this will help to lower the cost of Internet access and spur take-up of cloud services. But he thinks a lot of emerging markets still need more telecoms deregulation and investment in fixed-line and mobile networks.

Mr. Dawson said he would like to see more countries adopting bold approaches like Europe and the US which would facilitate the move to cloud computing. There are some notable examples: in Brazil, for instance, the government is promoting the cloud as part of its modernization initiative. Yet there has been limited international progress on creating a legislative environment in which cloud computing can flourish. Laws prohibiting the storage of financial data in another jurisdiction, for example, could be seen as a further brake on the rollout of cloud computing.

In the meantime, cloud innovators will continue to find answers. “Because of these laws, providers serving the enterprise sector will need infrastructure in multiple geographies, which is a challenge in terms of complexity and management,” says Mr. Dawson. “It’s another reason why I think an enterprise-grade service provider will emerge in the near future.”



CONCLUSION: MANY CENTERS OF COMPETITIVENESS

Despite the impact of the recent recession on the developed world, North American and Western European nations still perform strongly in our Index. For many of these, not least the US, the benefits of long-term vision and sustained investment in the enablers of IT industry competitiveness are bearing fruit. Indeed, the continued dominance of the US is hardly surprising given the country's long-standing reputation for innovation, academic excellence, business acumen and political stability. In combination, those factors have produced an environment in which, to quote Professor Hsu of Wharton Business School, "advantage begets advantage". For the IT industries of other countries, struggling to raise capital or against government bureaucracy, the US might sometimes appear to be disappearing even further into the distance.

Even so, big changes are taking place that could ultimately lead to a reshaping of the global market. Although India and China currently lie mid-rankings, both countries have gained ground in the Index since its inception, and it would not be surprising to see further gains in the years ahead. Having built competitive IT industries in the services and manufacturing sectors, both countries face a threat to their low-cost-labor advantage as wages rise and commoditizing

businesses move to other emerging markets. Yet several industry experts interviewed for this study noted improvements in the quality of IT talent in these markets. With the emergence of a more business-savvy managerial class, and the impetus provided by recent economic developments, China and India are being taken more seriously from an entrepreneurial perspective. As innovation gathers pace, the enforcement of intellectual property rights — which has always been viewed as a problem in this part of the world — is likely to improve as well.

Europe, meanwhile, still looks attractive in terms of IT infrastructure and the legal environment, among other factors. But the continent is arguably failing to keep pace with other regions when it comes to human capital, while rigid labor-market regulations and a poor climate for investment in next-generation broadband networks could stymie the development of the IT sector in the future. Maintaining their high rankings in the Index may be a tough challenge for these countries in years to come.

BSA BLUEPRINT FOR GLOBAL IT COMPETITIVENESS

Technology innovation drives economic growth and improves people's daily lives, but countries cannot take innovation for granted. They must actively promote it with public policies that foster development of new technologies. As the leading advocate for the global software industry, the Business Software Alliance (BSA) champions national policy frameworks that protect intellectual property, attract and welcome talent from around the world, invest in basic science, create exceptional schools, promote open markets, ensure fair competition, and build trust and confidence in technology.

The blueprint outlined here is broadly applicable for all countries aspiring to thrive in today's globally integrated digital economy.

Promote Job Creation by Fostering Creativity and Innovation

Robust intellectual property protections — including copyright, patent and trademark laws — provide the very foundation for creative enterprise to flourish.

BSA recommends the following:

Strong intellectual property enforcement

- > Raise awareness among the public about the roles that intellectual property rights play in fostering innovation and driving wage and job growth.

- > Vigorously enforce copyright and trademark laws — and ensure they keep pace with new innovations such as cloud computing.
- > Institute civil and criminal penalties to combat IP infringement, especially in the world's fastest-growing markets for information technology, such as China, India, Brazil, and Russia.

World-class patent systems

- > Devote adequate resources to patent offices to ensure they can review applications efficiently and award high-quality patents while weeding out those that are undeserving.
- > Do not discriminate among technologies or types of inventions.

Technology neutrality

- > Promote technology-neutral principles in government procurement and other policy initiatives.



Spur the Digital Economy by Inspiring Online Confidence and Trust

BSA calls for policies that foster a vibrant online marketplace in which government, citizens and businesses can use information tools with confidence and trust — regardless of whether the tools are mobile, installed on a desktop or served through a cloud. This is a shared responsibility for technology industry, governments, businesses and consumers.

BSA recommends the following:

Consumer privacy and data security

- > Support development of sound data-stewardship practices to protect consumers' privacy; bolster security practices to address constantly evolving threats; and promote responsible habits among Internet users.
- > Ensure that privacy policies leave ample room for technological innovation and the development of new services such as cloud computing.
- > Streamline compliance for businesses and reduce confusion for consumers by establishing uniform national standards and requiring that consumers be notified when a breach of their personal information puts them at risk of identity theft, fraud or unlawful activity.

Cross-border data transfers

- > Forge bilateral or multilateral agreements that harmonize the increasingly inconsistent web of rules governing the movement of data across borders.

Supply-chain security

- > Promote international standards for supply-chain audits and security assurance — with intellectual property rights honored and respected by manufacturers and service providers at every stage.

Critical infrastructure

- > Strengthen cybersecurity with voluntary standards that focus on risks in a flexible, non-burdensome manner, so technology companies can innovate faster than threats develop.

Cybercrime

- > Enact strong laws to deter and punish cybercrime, such as those prescribed in the Council of Europe Cybercrime Convention.
- > Create specialized cybercrime authorities, including investigators, prosecutors and judges who are well equipped and adequately trained.
- > Overcome the borderless nature of cybercrime by building networks of relationships among law enforcement agencies around the world.

Open Global Markets and Create Business Opportunities

BSA believes that international trade creates jobs and boosts economic growth. This entails eliminating market barriers and discouraging discriminatory procurement practices in the public sector. This is especially important in rapidly growing economies such as Brazil, Russia, India and China.

BSA recommends the following:

Market-opening trade agreements

- > Support trade agreements that open markets to all manner of legitimate goods and services, including cloud computing solutions.
- > Redouble efforts to ensure that trading partners adopt and vigorously enforce modern, effective laws against intellectual property theft.

Invest in the Foundations of the Digital Economy

BSA calls for policies to promote investment in next-generation technologies, including smart infrastructure. This spurs growth and innovation not just in the technology industry but in the broader economy.

BSA recommends the following:

Education and support for research and development

- > Promote educational opportunities in science, technology, engineering and mathematics.
- > Boost funding for basic and applied research at universities and government institutions.

E-government

- > Expand e-government programs that allow citizens to interact with government and access public services.
- > Work toward comprehensive government IT plans that are flexible and technology-neutral, and that protect citizens' privacy and security.
- > Lead by example in adopting cloud computing solutions where appropriate.

Tax policy

- > Ensure tax laws promote investment in new technologies and provide a level playing field for domestic and multinational companies.



APPENDIX 1: INDEX METHODOLOGY AND DEFINITIONS

The purpose of the IT Industry Competitiveness Index is to compare countries in different regions of the world on the extent to which they possess the conditions necessary to support a strong IT industry. To achieve this, the Economist Intelligence Unit maintains a benchmarking model which scores individual countries on the key attributes of a competitive IT sector.

There are six categories of indicator used in the Index; these are set out in the table below, along with their weights in the Index, and that of each indicator in the category. The main data sources for each indicator are also provided, along with an indication of whether the score is based on quantitative data (for example, US\$ spend, number of students) or on a qualitative assessment made by Economist Intelligence Unit analysts.

Qualitative indicators are scored on a 1–5 basis. Quantitative indicators are normalized through the population set so that each country is measured from 0 to 1 by applying a formula ($Y_{ij} = [x_{ij} - \min_{ij}] / [\max_{ij} - \min_{ij}]$) to each data point. Each indicator is then converted into a score of 0–100 by applying the appropriate multiplier (20 for the qualitative indicators, 100 for the quantitative indicators). As the weights sum to 1, the composite score for each country is also based on an Index range of 0 to 100 (with 100 representing the highest and best possible score).

When employing a normalization method of scoring as we have, there occurs some score distortion in selected indicators at both the highest and lowest ends of the score range. This occurs when indicator scores are based solely on quantitative data, and explains why some countries' scores in certain categories shown are below 1 while others exceed 80 in the same category.

Normalization is also the reason why some countries' scores in individual categories, or the overall Index, may be lower than in the previous year even though their actual performance may not have deteriorated. If the score of the global leader in a quantitative indicator is lower than that of the previous year's leader, the scores of other countries in that indicator will be affected, possibly irrespective of their actual performance.

No changes have been made to the indicators or scoring methodology in 2011, and the previous weights remain unaltered. We have, however, changed the source of data used in scoring one important indicator — IT patents. Statistics on IT-specific patent applications collected by the World Intellectual Property Organization (WIPO) are now used for this indicator. (The European Patent Office was the source used in 2009).

Benchmarking Model

INDICATOR	WEIGHT	MAIN DATA SOURCES	YEAR	TYPE OF SCORE
Category 1: Overall business environment	10%			
<i>Foreign investment policy:</i> Government policy towards foreign capital; cultural receptivity to foreign influence; risk of expropriation; investment protection	20%	Economist Intelligence Unit: Business Environment Rankings	2006-10	Qualitative: assigned by Economist Intelligence Unit analysts
<i>Private property protection:</i> Degree to which private property rights are guaranteed and protected	35%	Economist Intelligence Unit: Business Environment Rankings	2006-10	Qualitative: assigned by Economist Intelligence Unit analysts
<i>Government regulation:</i> Level of government regulation (mainly licensing procedures) on setting up new private businesses	25%	Economist Intelligence Unit: Business Environment Rankings	2006-10	Qualitative: assigned by Economist Intelligence Unit analysts
<i>Freedom to compete:</i> Freedom of existing businesses to compete in domestic markets	20%	Economist Intelligence Unit: Business Environment Rankings	2006-10	Qualitative: assigned by Economist Intelligence Unit analysts
Category 2: IT infrastructure	20%			
<i>IT investment:</i> Market spending on hardware, software and IT services (US\$ per 100 people)	15%	IDC	2010	Quantitative
<i>PC ownership:</i> Desktop and laptop computers per 100 people	35%	Pyramid Research, ITU	2010	Quantitative
<i>Broadband penetration:</i> Broadband connections (xDSL, ISDN PRI, FWB, cable, FTTx) per 100 people	25%	Pyramid Research	2010	Quantitative
<i>Internet security:</i> Secure Internet servers per 100,000 people	10%	World Bank, Netcraft	2010	Quantitative
<i>Mobile penetration:</i> Mobile phone subscriptions per 100 people	15%	Pyramid Research	2010	Quantitative

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INDICATOR	WEIGHT	MAIN DATA SOURCES	YEAR	TYPE OF SCORE
Category 3: Human capital	20%			
<i>Enrolment in higher education:</i> Total number of students in higher education, as % of gross university-age population	25%	UNESCO	2009	Quantitative
<i>Enrolment in science:</i> Enrolment in tertiary-level science programmes (number of people)	15%	UNESCO	2009	Quantitative
<i>Employment in IT:</i> Employment in technology sector (number of people)	20%	OECD; Economist Intelligence Unit estimates	2010	Quantitative
<i>Quality of technology skills:</i> The education system's capacity to train technologists with business skills (project management, customer-facing application and web development, etc)	40%	Economist Intelligence Unit	2010	Qualitative: assigned by Economist Intelligence Unit analysts
Category 4: R&D environment	25%			
<i>Public sector R&D:</i> Gross government expenditure on R&D (US\$ at purchasing power parity-PPP, per capita)	15%	UNESCO; World Bank	2008	Quantitative
<i>Private sector R&D:</i> Gross private-sector expenditure on R&D (US\$ at PPP, per capita)	15%	UNESCO; World Bank	2008	Quantitative
<i>Patents:</i> Number of new domestic IT patent applications filed by residents each year, as % of total patent applications	50%	WIPO; Economist Intelligence Unit estimates	2007	Quantitative
<i>Royalty and license fees:</i> Receipts from royalty and license fees (US\$ per 100 people)	20%	World Bank, IMF	2009	Quantitative
Category 5: Legal environment	10%			
<i>Intellectual property protection:</i> Comprehensiveness, transparency of IP legislation; adherence to treaties	35%	Economist Intelligence Unit: Business Environment Rankings; national sources	2006-10	Qualitative: assigned by Economist Intelligence Unit analysts
<i>Enforcement of IP rights:</i> Enforcement of IP legislation by government authorities and courts	35%	Economist Intelligence Unit; USTR; national sources	2010	Qualitative: assigned by Economist Intelligence Unit analysts

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INDICATOR	WEIGHT	MAIN DATA SOURCES	YEAR	TYPE OF SCORE
Category 5: Legal environment (continued)		10%		
<i>Electronic signature:</i> Status of electronic signature legislation	10%	National sources	2010	Qualitative: assigned by Economist Intelligence Unit analysts
<i>Data privacy and spam:</i> Status of data privacy and anti-spam laws	10%	National sources	2010	Qualitative: assigned by Economist Intelligence Unit analysts
<i>Cybercrime:</i> Status of cybercrime laws	10%	National sources	2010	Qualitative: assigned by Economist Intelligence Unit analysts
Category 6: Support for IT industry development		15%		
<i>Access to investment capital:</i> Access to medium-term finance for investment from domestic and foreign sources	20%	Economist Intelligence Unit: Business Environment Rankings	2006-10	Qualitative: assigned by Economist Intelligence Unit analysts
<i>E-government strategy:</i> Existence of a coherent national government strategy to achieve e-government objectives, aimed at improving both public service delivery and efficiency of back-office operations	30%	UN; European Commission; Economist Intelligence Unit analysts	2010	Qualitative: assigned by Economist Intelligence Unit analysts
<i>Public procurement of IT:</i> Government spending on IT hardware, software and services (US\$ per capita)	15%	IDC; Economist Intelligence Unit estimates	2009	Quantitative
<i>Government technology neutrality:</i> Existence of an even-handed public policy stance on technology or sector development (absence of preferential government support for specific technologies or sector)	35%	Economist Intelligence Unit analysts	2010	Qualitative: assigned by Economist Intelligence Unit analysts



Appendix 2: Index Scores by Region

RANK	COUNTRY	SCORE	YOY CHANGE
The Americas			
1	United States	80.5	+1.6
2	Canada	67.6	-3.7
3	Chile	43.2	-2.9
4	Brazil	39.5	+2.9
5	Mexico	37.0	+4.9
6	Argentina	36.2	-0.2
7	Colombia	33.7	+5.3
8	Peru	25.5	-0.6
9	Venezuela	24.5	+0.1
10	Ecuador	23.1	+0.3
Western Europe			
1	Finland	72.0	-1.6
2	Sweden	69.4	-2.1
3	United Kingdom	68.1	-2.1
4	Denmark	67.9	-0.7
5	Ireland	67.5	+0.6
6	Netherlands	65.8	-4.9
7	Switzerland	65.4	+1.8
8	Norway	64.3	-2.8
9	Germany	64.1	+6.0
10	Austria	61.4	+4.4
11	France	59.3	+0.1
12	Belgium	57.7	-1.5
13	Italy	50.7	+2.2
14	Spain	50.4	+3.1
15	Portugal	47.1	+1.9
16	Greece	40.7	-2.3
Eastern Europe			
1	Slovenia	48.8	+3.5
2	Czech Republic	46.1	-0.9
3	Hungary	45.4	-0.7
4	Estonia	45.0	-10.5
5	Poland	44.6	+3.9
6	Slovakia	42.1	+0.7
7	Latvia	41.6	-0.9

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RANK	COUNTRY	SCORE	YOY CHANGE
Eastern Europe <i>(continued)</i>			
8	Romania	40.4	+0.8
9	Croatia	39.0	+0.7
10	Lithuania	38.7	-4.6
11	Bulgaria	38.1	+4.5
12	Russia	35.2	-1.5
13	Ukraine	28.9	-2.5
14	Kazakhstan	22.8	-3.6
15	Azerbaijan	20.3	-0.9
Middle East & Africa			
1	Israel	65.8	+1.5
2	Turkey	38.7	+5.0
3	South Africa	35.0	-0.3
4	Saudi Arabia	34.1	+0.2
5	Egypt	26.3	-0.4
6	Nigeria	21.4	+2.7
7	Algeria	19.5	-0.3
8	Iran	18.8	+1.7
Asia-Pacific			
1	Singapore	69.8	+1.6
2	Australia	67.5	-1.1
3	Taiwan	64.4	+1.0
4	Japan	63.4	-1.8
5	New Zealand	61.3	+2.5
6	Hong Kong	60.8	+3.3
7	South Korea	60.8	-1.9
8	Malaysia	44.1	+8.5
9	India	41.6	+7.5
10	China	39.8	+3.1
11	Thailand	30.5	-1.3
12	Philippines	27.9	-0.6
13	Vietnam	27.1	+2.1
14	Sri Lanka	25.0	+1.0
15	Indonesia	24.8	+2.0
16	Pakistan	22.3	+2.4
17	Bangladesh	20.6	-0.5



Appendix 3: Index Scores by Category

	OVERALL	BUSINESS ENVIRONMENT	IT INFRASTRUCTURE	HUMAN CAPITAL	R&D ENVIRONMENT	LEGAL ENVIRONMENT	SUPPORT FOR IT INDUSTRY DEVELOPMENT
Category Weight		10.0%	20.0%	20.0%	25.0%	10.0%	15.0%
United States	80.5	95.3	76.5	74.1	74.3	92.0	87.2
Finland	72.0	98.2	71.0	52.1	67.3	89.5	78.6
Singapore	69.8	91.0	65.2	51.8	67.2	81.5	82.3
Sweden	69.4	90.1	83.3	46.4	54.9	85.0	81.6
United Kingdom	68.1	93.2	74.0	57.5	46.7	88.5	80.0
Denmark	67.9	95.1	87.2	47.9	42.0	90.5	79.0
Canada	67.6	88.3	76.9	53.4	47.6	79.5	85.4
Australia	67.5	92.3	82.4	60.4	32.7	92.5	82.1
Ireland	67.5	96.0	59.3	54.8	55.9	85.0	83.9
Netherlands	65.8	90.1	84.3	43.8	43.8	90.5	74.6
Israel	65.8	81.3	64.4	47.2	71.3	73.0	68.1
Switzerland	65.4	88.3	89.9	40.7	41.3	88.5	75.0
Taiwan	64.4	86.5	54.1	53.7	69.9	74.5	61.4
Norway	64.3	87.4	80.2	46.6	36.8	87.0	82.1
Germany	64.1	88.3	70.5	46.0	52.6	90.5	65.1
Japan	63.4	82.9	69.9	50.7	56.9	79.0	58.9
Austria	61.4	87.4	69.9	42.0	40.7	88.5	74.9
New Zealand	61.3	93.4	67.1	56.0	29.2	80.0	80.7
Hong Kong	60.8	97.3	79.7	46.4	23.0	81.0	80.4
South Korea	60.8	79.7	62.4	58.7	46.4	78.5	61.0
France	59.3	82.4	65.8	44.1	40.6	87.0	68.3
Belgium	57.7	89.2	60.1	44.1	34.5	88.5	69.8
Italy	50.7	74.7	50.0	47.0	25.4	80.0	63.2
Spain	50.4	84.4	44.6	47.1	24.4	76.5	66.1
Slovenia	48.8	67.8	41.2	45.9	29.1	73.0	66.7
Portugal	47.1	85.6	47.8	43.3	11.3	76.5	65.9
Czech Republic	46.1	77.3	45.8	43.0	20.4	71.0	56.4
Hungary	45.4	79.1	39.0	44.6	23.1	67.5	55.2
Estonia	45.0	88.3	45.9	44.0	4.3	73.0	65.7
Poland	44.6	76.5	42.8	42.6	18.1	70.0	55.9

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	OVERALL	BUSINESS ENVIRONMENT	IT INFRASTRUCTURE	HUMAN CAPITAL	R&D ENVIRONMENT	LEGAL ENVIRONMENT	SUPPORT FOR IT INDUSTRY DEVELOPMENT
Malaysia	44.1	69.6	27.4	29.9	43.9	59.5	58.2
Chile	43.2	94.1	32.3	42.1	1.4	72.5	75.4
Slovakia	42.1	77.1	36.4	37.5	19.1	69.5	52.6
Latvia	41.6	78.6	28.1	45.4	20.1	62.0	52.5
India	41.6	61.8	5.8	52.8	42.9	53.5	51.0
Greece	40.7	72.7	29.0	47.3	11.3	71.0	54.9
Romania	40.4	70.4	31.0	32.9	31.8	56.0	46.7
China	39.8	54.5	18.1	60.4	25.6	59.5	42.2
Brazil	39.5	73.6	25.9	33.1	21.2	58.0	61.3
Croatia	39.0	60.8	36.6	36.4	18.2	59.5	52.0
Turkey	38.7	75.9	20.8	38.9	19.4	62.0	54.2
Lithuania	38.7	73.7	34.7	43.5	2.3	67.5	55.5
Bulgaria	38.1	64.2	33.2	36.8	21.7	56.0	44.0
Mexico	37.0	72.5	19.5	33.1	16.3	65.5	57.4
Argentina	36.2	53.9	28.7	38.3	16.8	67.5	43.3
Russia	35.2	48.4	32.0	52.4	15.4	50.0	31.1
South Africa	35.0	57.5	17.5	32.1	18.4	64.5	55.2
Saudi Arabia	34.1	70.0	29.1	32.9	5.6	55.0	51.9
Colombia	33.7	68.5	17.8	25.8	15.1	62.0	54.3
Thailand	30.5	78.8	16.1	34.0	0.3	43.5	54.2
Ukraine	28.9	40.3	22.2	37.0	10.8	51.5	34.5
Philippines	27.9	67.8	7.3	34.9	0.0	50.5	51.0
Vietnam	27.1	60.8	23.5	23.5	0.2	50.0	43.5
Egypt	26.3	66.5	10.9	29.9	0.6	42.0	47.9
Peru	25.5	61.5	13.2	21.9	0.2	52.0	47.0
Sri Lanka	25.0	64.5	8.6	20.9	0.1	53.5	48.0
Indonesia	24.8	52.7	7.2	30.1	0.1	48.0	48.0
Venezuela	24.5	46.6	18.0	36.8	0.5	37.0	33.9
Ecuador	23.1	49.9	12.9	22.8	0.3	53.0	37.0
Kazakhstan	22.8	47.3	16.6	23.4	0.7	42.0	38.0
Pakistan	22.3	58.4	2.9	22.8	0.4	41.5	47.5
Nigeria	21.4	42.1	4.4	23.3	3.3	36.5	48.1
Bangladesh	20.6	47.1	0.9	20.1	0.0	40.0	51.0
Azerbaijan	20.3	40.3	9.9	16.8	1.0	50.0	38.0
Algeria	19.5	49.0	8.6	20.2	0.2	35.0	34.9
Iran	18.8	32.9	12.4	23.0	7.6	34.0	20.9



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