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**CHAPTER 1.2**

## The Emerging Internet Economy: Looking a Decade Ahead

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Coming out of the recent economic crisis, it is clear that rapid growth in many emerging countries—large and small—is accelerating the transformation of the global economic landscape. Technology, together with the compounding effects of economic and demographic factors, is adding fuel to that fire. The result will be felt particularly strongly in Internet usage and in the markets that revolve around it.

The next decade will see the transformation of the global Internet from an arena dominated by the advanced-market economies and their businesses and citizens to one where emerging-market economies are predominant. The Internet has already generated major economic and social benefits, but most of its global impact is undoubtedly still ahead. It will characterize the decade of the 2010s and, as broadband networks become widespread, it will profoundly change economic and social dynamics across the world.

Although technically nearly 50 years old (since the launch of ARPANET), for all practical purposes, the Internet as a widespread phenomenon is only about a decade and a half old—and this is in the high-income economies that were its first adopters. Over the past 15 years these advanced markets went through a series of critical-mass thresholds leading to the current intensive phase of broadband Internet. Most citizens in advanced economies connect daily to learn, work, and play, as do an increasing number in emerging countries.

As more citizens in emerging economies go online and connectivity levels approach those of advanced economies, the global shares of Internet activity and transactions will increasingly shift toward these economies. In addition, with improvements in the speed and quality of broadband and with Web 2.0 technologies and applications, more economic and social benefit will be generated.

The Internet and the applications riding on high-speed IP networks provide a unique and cost-effective way for economies to enhance national competitiveness and to rise above physical and geographic constraints. Countries and cities that effectively harness the power of broadband networks are treating them as basic infrastructure—key to competitiveness in the knowledge economy.

After exploring the economic aspects of this triple economic/demographic/technological transformation, this chapter will look at the path of Internet connectivity that different economies have followed. Two major factors are noteworthy for their impact on the spread of the Internet: the availability of personal computers

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(PCs) and the density of pre-existing fixed telephone lines and cable. We propose classifying economies, from a connectivity perspective, into one of three categories: first adopters, converging adopters, or belated adopters. Through this analysis and classification we seek to gain insights into the likely dynamics—and the options economies face—as Internet use becomes more intensive, through faster and higher-quality broadband, and more widespread, as fixed and wireless networks connect more and more people around the world.

### The Internet economy

Major socioeconomic shifts underway will affect the markets that revolve around the Internet in the coming decade. As a metric to illustrate and track these shifts, we propose an indicator we call the *Internet economy*. The concept is essentially a proxy for the purchasing power in the hands of people using the Internet. It is meant to complement analyses already available on the shifting composition of the global GDP that are helpful as broad indicators but of more limited value when considering more specific market or socioeconomic dynamics.

The Internet economy metric combines three factors at the economy level (although the same could be applied to cities or regions): the number of Internet users, the average per capita income, and an adjustment factor reflecting the economy's income disparities. The combination of these three factors takes into account the fact that Internet users will have higher-than-average per capita incomes (this adjustment factor fades as Internet use becomes more widespread in a economy and, hence, the income of Internet users approaches the average).<sup>1</sup>

Internet usage penetration rates indicate only the proportion of people who have experienced the Internet rather than households with their own connection. However, these data can provide a good basis on which to construct a leading indicator with very significant implications for market trends. We know from the trajectory of the more advanced economies and cities that the time lag between initial experience of the Internet and more intensive usage is not long, and, in fact, is getting shorter and shorter.

The Internet economy metric has considerable value as relative measure of market size and of the Internet-related maturity of different economies. It is, therefore, complementary to broader indicators such as GDP, which do not factor in how connected an economy is. In addition, a time-series comparison of Internet economy estimates provides a valuable perspective on market trends.

The speed of the change revealed by such trend analysis is impressive. Only 15 years ago, virtually all the global Internet economy was in advanced market economies. This was the infancy of the Internet, so it

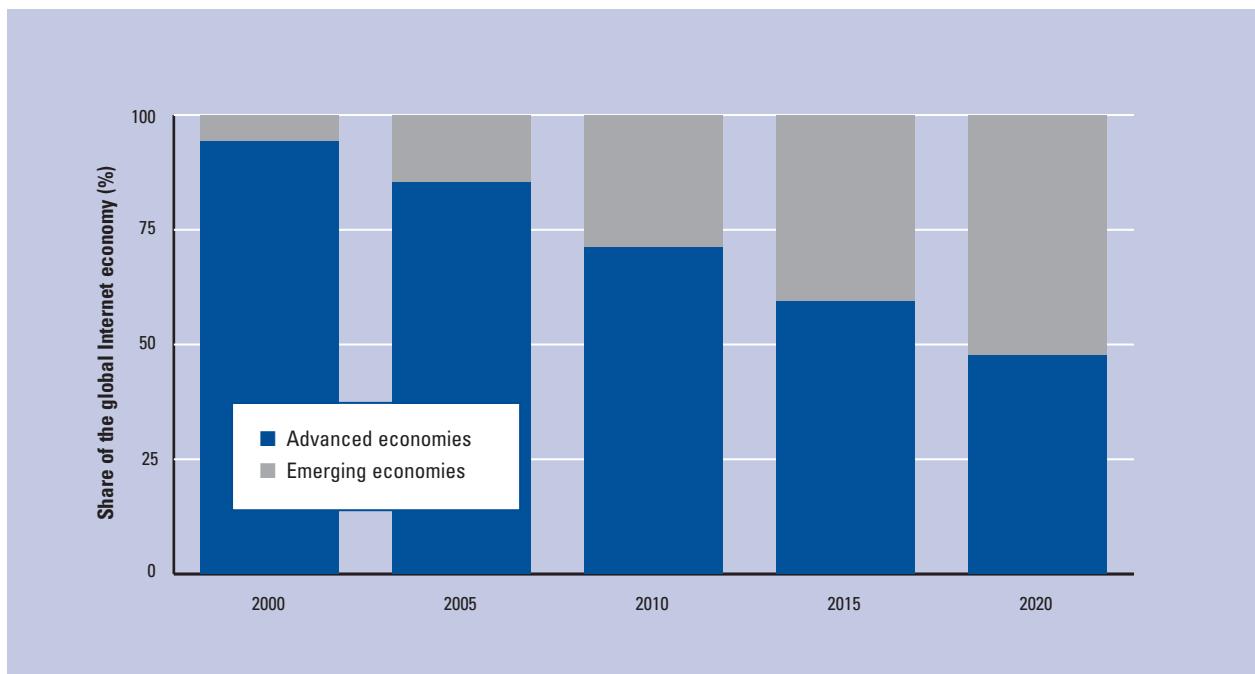
probably is not quite as meaningful as more recent data. In 2000, with the Internet already in full swing, emerging economies accounted for less than 6 percent of the total global Internet economy. This share increased to almost 15 percent by 2005 and to an estimated 30 percent today (Figure 1).

Looking ahead, we estimate that emerging markets will represent about half of the world's Internet economy by 2020. This dramatic pace of change indicates the powerful trends underway that will have a major impact on the global composition of many information and communication technologies (ICT) markets. However, while the direction is clear, we also recognize considerable uncertainties around the actual speed and geographical distribution—hence the work on scenarios described in Box 1.

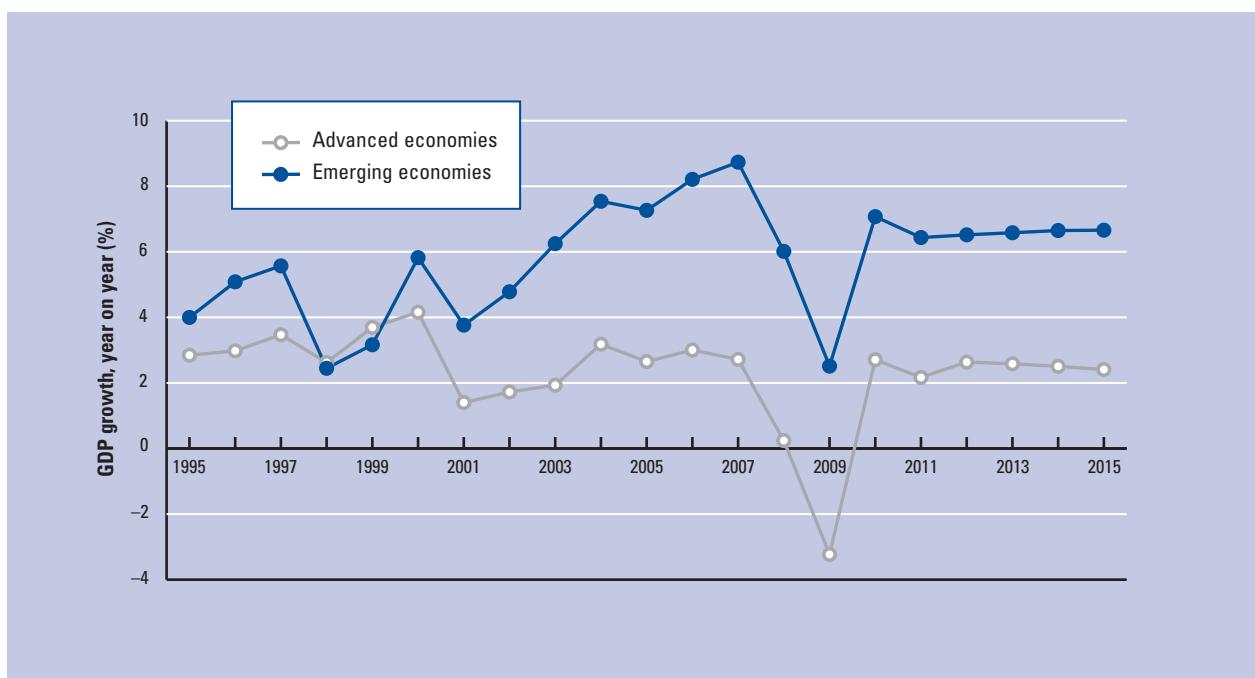
There are two main reasons why we can confidently project a major shift in the composition of the Internet economy. First, the impressive economic growth performance of emerging economies compared with that of the advanced ones and its impact, together with demographic trends, on the expansion of global demand for non-basic items are likely to be an important catalyst in this respect. The recent global economic crisis has further exacerbated the differential in growth rates between emerging and advanced economies—now expected to be on the order of 4 percentage points (Figure 2). The cumulative effect of such growth differential if this trend continues over this decade, along with the fact that emerging economies account for virtually all the increase in the world's population, will be significant on consumption patterns. On one hand, it will lead to a rise in the share of GDP represented by consumer expenditures. On the other, it will result in the rapid expansion of what we call the *global consumer class*.

As an approximation of the size and dynamics of this consumer class, we look at individuals with annual income above US\$6,000 (in real 2007 terms)—an arbitrary boundary but one that is roughly indicative of the income threshold above which consumption for non-basic items begins to grow rapidly in many economies.<sup>2</sup> This is different from analyses that revolve around the concept of “middle class,” which identifies groups falling in between upper- and lower-income thresholds. For our purpose—related to consumption of ICT goods and services—we find it best to rely simply on an income “floor” without considering the income “ceiling” implicit in middle-class estimates.

Based on the above definition, the size of the consumer class is currently about 2.5 billion (up from 1.6 billion in 2000). Growth is expected to accelerate over the next decade, so that the global consumers will number close to 4 billion by 2020. Virtually all of the 2000–20 increase is taking place in emerging countries. These countries will have thus gone from representing

**Figure 1: Shares of the emerging Internet economy, 2000–20**

Sources: ITU, 2010; IMF, 2010; United Nations, 2010; authors' calculations.

**Figure 2: GDP growth, 1995–2015**

Source: IMF, 2010.

### Box 1: Scenarios to explore uncertainties on the Internet of the future path

As noted in the main text, the rapid pace of change in the global composition of the Internet economy is expected to continue. Figure A—indicating that about half of the global Internet economy would be attributable to emerging economies by 2020—shows what could be considered a “base case” for that evolution. Cisco recently conducted a scenario exercise looking at different possible shapes the Internet of the future could take. With 2025 as the time horizon, Cisco explored the implications of each of the four scenarios for the global composition of the Internet economy by that time.

The scenarios were constructed after considering the possible—and plausible—interactions of three axes of uncertainty:

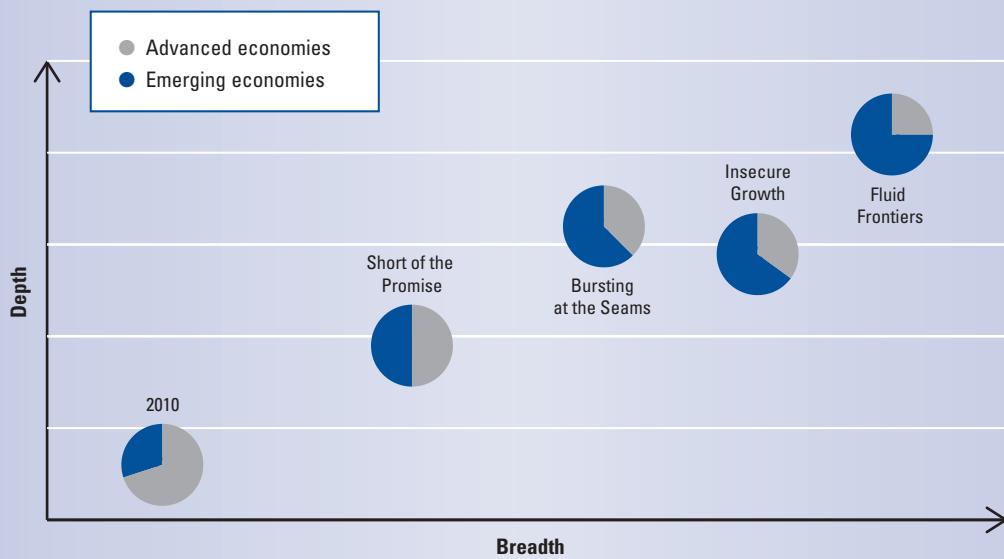
- **Network buildout:** This axis refers to the key characteristics of the global network, including reach, carrying capacity, speed, and other quality factors. How these characteristics differ around the world will significantly influence what the Internet will look like in 2025—and how much of its promise of productivity increases, economic growth, and social inclusion will have been realized.
- **Technological progress:** While failing to invest in research and development (R&D) guarantees that there will be no technological progress, R&D investment *per se* does not ensure technological breakthroughs. This axis reflects the large element of unpredictability associated with efforts to develop new technologies—and with the rate of adoption of newly available technologies.

- **User behavior:** This axis concerns the choices that users—both individuals and businesses—will make and that will, in turn, shape overall demand for Internet access, devices, applications, and content. How will trade-offs between ubiquitous connectivity and security, confidentiality and privacy be resolved across geographies and generations? How will economic factors and demand elasticity to evolving pricing models affect usage?

Using these axes of uncertainty as a framework, four scenarios were developed:

- **Fluid Frontiers:** The Internet has become pervasive and centrifugal. Technology has continued to make connectivity and devices more and more affordable (in spite of limited investment in network buildout) while global entrepreneurship—and fierce competition—have ensured that the wide range of needs and demands from across the world are met quickly and from equally diverse setups and locations.
- **Insecure Growth:** Users—individuals and business alike—have been scared away from intensive reliance on the Internet. Relentless cyber attacks driven by wide-ranging motivations have defied the preventive capabilities of governments and international bodies. A range of secure alternatives has emerged, but they are expensive.

**Figure A: Emerging Internet economy**



### Box 1: Scenarios to explore uncertainties on the Internet of the future path (*cont'd.*)

- **Short of the Promise:** Prolonged economic stagnation in many economies has taken its toll on Internet diffusion. Technology did not offer any compensating surprises and protectionist policy responses to economic weakness made matters worse—both in economic terms and with regard to network technology adoption.
- **Bursting at the Seams:** The Internet has become a victim of its own success. Demand for IP-based services is boundless but capacity constraints and occasional bottlenecks create a gap between the expectations and reality of Internet use. Meanwhile, international agreements on technology standards become elusive as geopolitical factors become important influences on national technology policies.

These scenarios have many implications but we will limit focus here on what they tell us about the global composition of the Internet economy (in terms of its share of emerging economies, which we estimate to be 30 percent in 2010). The

figure shows the different shares implied by each scenario and it also positions each scenario in terms of the breadth (reach, or global penetration) and depth (intensity, or median traffic per user) of Internet usage. Fluid Frontiers is the scenario in which emerging economies dominate the Internet economy by 2025. At the other end of the spectrum, in the Short of the Promise scenario, their share has barely reached 50 percent in 2025 (lagging significantly behind the expectations of our base case).

**Source:** Cisco & Global Business Network 2010.

44 percent of the consumer class in 2000 to 74 percent in 2020 (Figure 3).<sup>3</sup>

As household incomes rise, the share of consumption expenditure (as a share of income) for basic items decreases rapidly, freeing up disposable income for other types of expenditure.<sup>4</sup> Above that level, healthcare (which is turning into an increasingly technology-intensive service) becomes an expenditure priority, followed closely by telecommunications services and equipment. Hence, this emerging consumer class can be expected to use its increased purchasing power, among other things, to gain or improve Internet connectivity.

This will not be a homogeneous phenomenon. The expansion of the consumer class is explosive first in the more dynamic emerging markets that already have large populations near the non-basic consumption threshold (notably Brazil, China, Mexico, Russia, and Turkey); it will then spread to rapidly growing countries where current income levels are still relatively low (such as Egypt, India, Indonesia, and Vietnam).

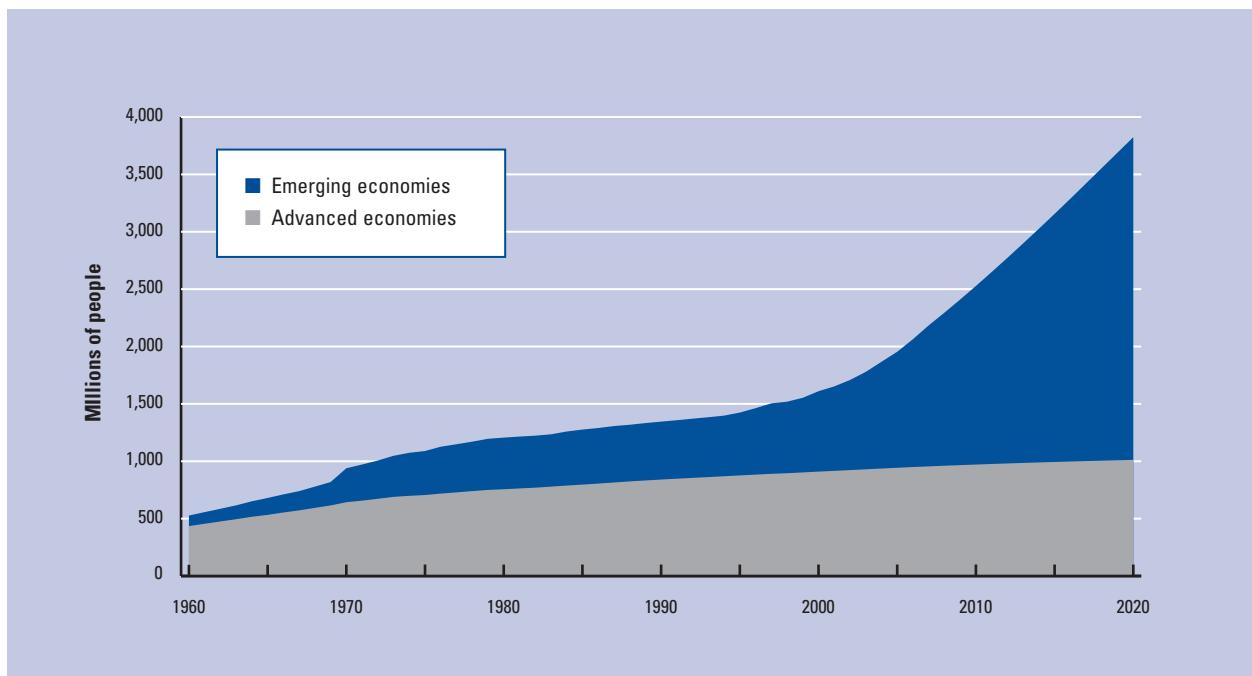
A second driver behind the shift in the composition of the Internet economy is the large “room for growth” for Internet penetration in emerging countries. In advanced economies, over 70 percent of the population are using the Internet, while in emerging ones an average 20 percent do so. The point is simply that as advanced economies are approaching saturation in Internet penetration, emerging ones are just beginning to get connected. Recent growth in Internet usage worldwide already means that a majority of Internet

users live in emerging economies and their numbers are growing very rapidly (Figure 4).

An additional factor is that most emerging economies have yet to reach the thresholds, in terms of Internet and broadband penetration, that generate critical mass or network effects; the related dynamics will accelerate as they start crossing those thresholds (these are generally considered to be around a 20–30 percent penetration rate). The urbanization taking place in many emerging economies will act as an accelerator and further contribute to increasing consumption of telecommunications services, because cities act as “beachheads” for the adoption of communications technology.

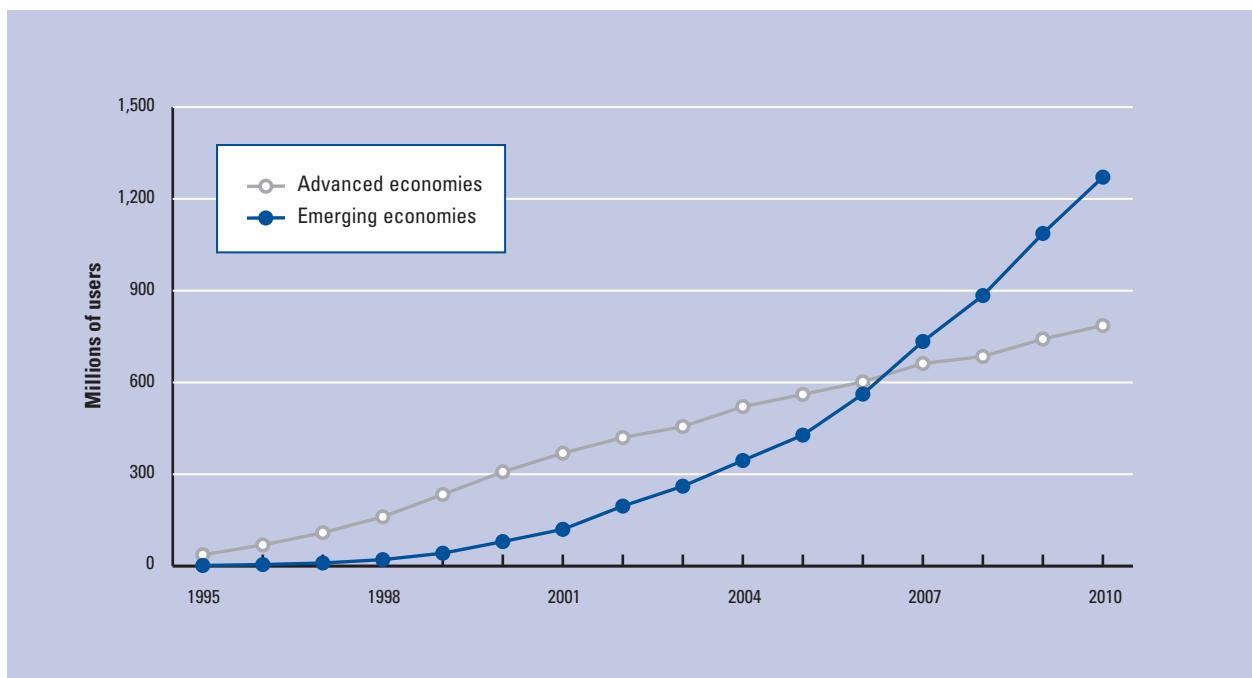
Emerging economies are not homogeneous, of course, and there is wide diversity in this regard. In *The Global Information Technology Report 2008–2009*, we proposed a classification of all economies across five stages of Internet connectivity.<sup>5</sup> The classification in stages—based on snapshots reflecting the situation of individual economy with respect to key thresholds of connectivity at given points in time—continues to be a useful methodological framework to place an economy’s situation in perspective. Appendix A summarizes the stages and highlights recent changes. As we look ahead at likely paths of Internet adoption, we find it useful to group emerging economies in two categories and look for insights that can be derived from differences with the path followed by more advanced economies.

We find two important differences between the connectivity path followed by advanced economies

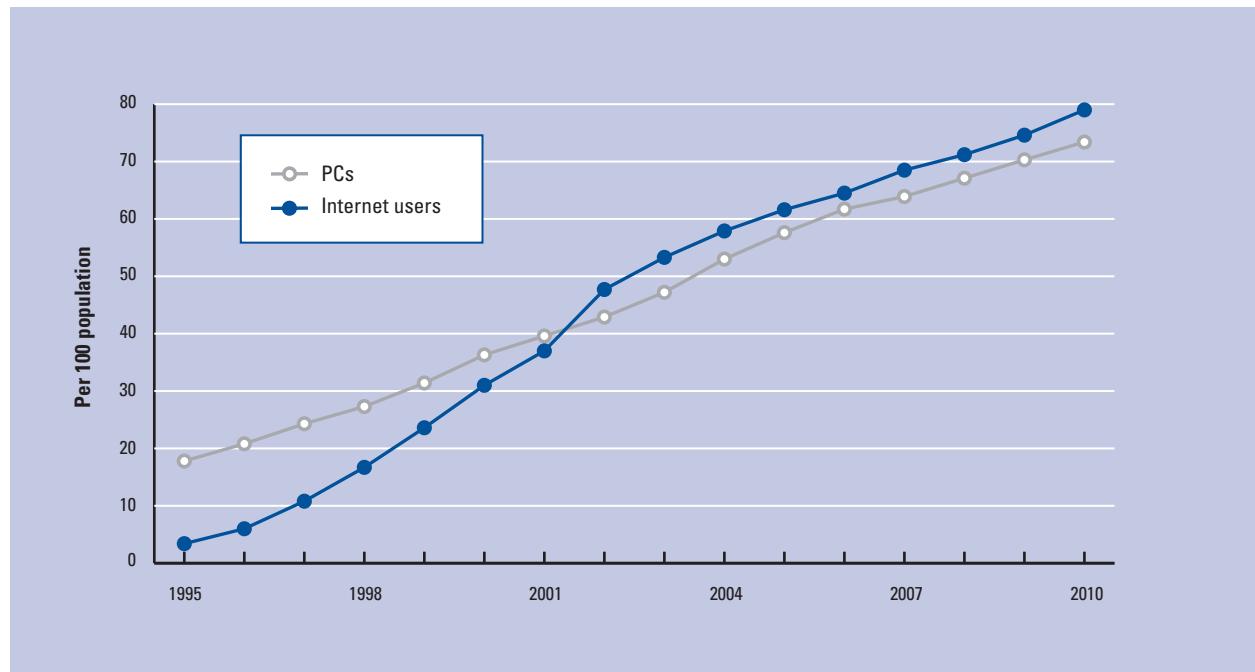
**Figure 3: The consumer class, 1960–2020**

Sources: Goldman Sachs Research, 2010; authors' calculations.

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**Figure 4: Internet users, 1995–2010**

Sources: ITU, 2010; authors' calculations.

**Figure 5: First adopters, 1995–2010**

Sources: ITU, 2010; authors' calculations.

and the one on which most emerging economies have embarked, with a few exceptions, related mainly to economies in Central and Eastern Europe. These are still generally counted as “emerging” but share many characteristics—including EU membership—with advanced economies. The first difference is the fact that in most advanced economies many people were using PCs before they became connected to the Internet, while in many emerging economies PC availability has lagged behind and most Internet users’ first experience was through shared facilities. The second is that the high density of fixed telephone lines in advanced economies, as compared with emerging ones, had made it possible for a relatively quick switch from dial-up connections to broadband as high-speed digital subscriber line (DSL) technology became widespread in response to demand for high-speed connections.

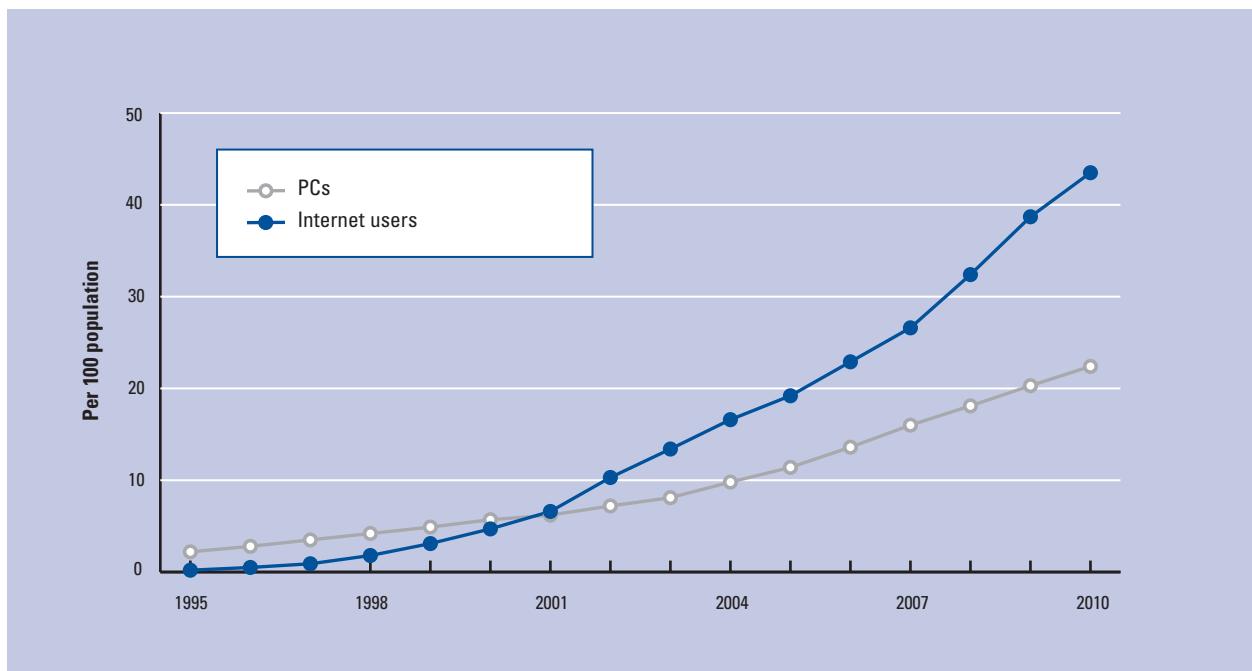
### The first wave of Internet connectivity (1995–2010): PC-enabled

The snapshot of current connectivity identifies the relative differences between economies’ current ICT adoption. However, to understand the recent paths of connectivity and future prospects for specific economies, it is useful to review the dynamics of Internet adoption by country group since 1995. For this purpose we characterized economies as being first adopters, converging adopters, or belated adopters (Appendices A and B

detail the characteristics of the three groups and the economies by each of them).

### First adopters

First-adopter economies are those with populations that are already very connected today, with widespread Internet use mainly via broadband. From a historical perspective, these economies are first adopters of the Internet because they led the way in Internet access and usage. Internet growth in these economies increased dramatically between 1995 and 2005 (Figure 5). The 30 economies that have already crossed the critical mass threshold for broadband connectivity have on average 75 percent of their population using the Internet, and a majority of their households have a broadband connection. Internet penetration is probably approaching saturation level, and now the *intensity* of Internet traffic is growing exponentially. One factor setting these higher-income economies apart from the other two groups is that there was a critical mass of PCs already in use by the time the Internet came around, hence it was easy for people to get connected. In 1995, the average PC-installed base in first adopters was approximately 17.4 per 100 population, compared with 2.1 per 100 population in converging adopters (and 0.5 PCs per 100 population in belated adopters). In the early years of the commercial Internet, there were significant cost barriers to accessibility (PC price and Internet service rates) and citizens in the first-adopter economies were best positioned to “log on.” It is also worth noting, however, that

**Figure 6: Converging adopters, 1995–2010**

Sources: ITU, 2010; authors' calculations.

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a number of economies (Estonia and Korea, Rep. are prime examples) managed to accelerate Internet adoption beyond what their income levels would have suggested, a development that was clearly the result of deliberate policies to promote connectivity.

### Converging adopters

In the next group of economies, Internet connectivity levels are not yet at the intensive use level, but Internet and broadband adoption are quickly accelerating (Figure 6). These economies are adding to the stock of Internet users at a rapid rate—on average, they added 11 new Internet users per 100 population in just the two years between 2007 and 2009. Here Internet use is still outpacing PC adoption, resulting in connectivity methods that are markedly different from those used in the first adopters. Citizens of the converging adopters are using shared facilities to connect (at Internet cafés, community centers, schools, workplaces, and so on). Internet use and broadband adoption is expected to reach first-adopter levels, but the pace at which this takes place will depend on affordability and availability of devices and connections.

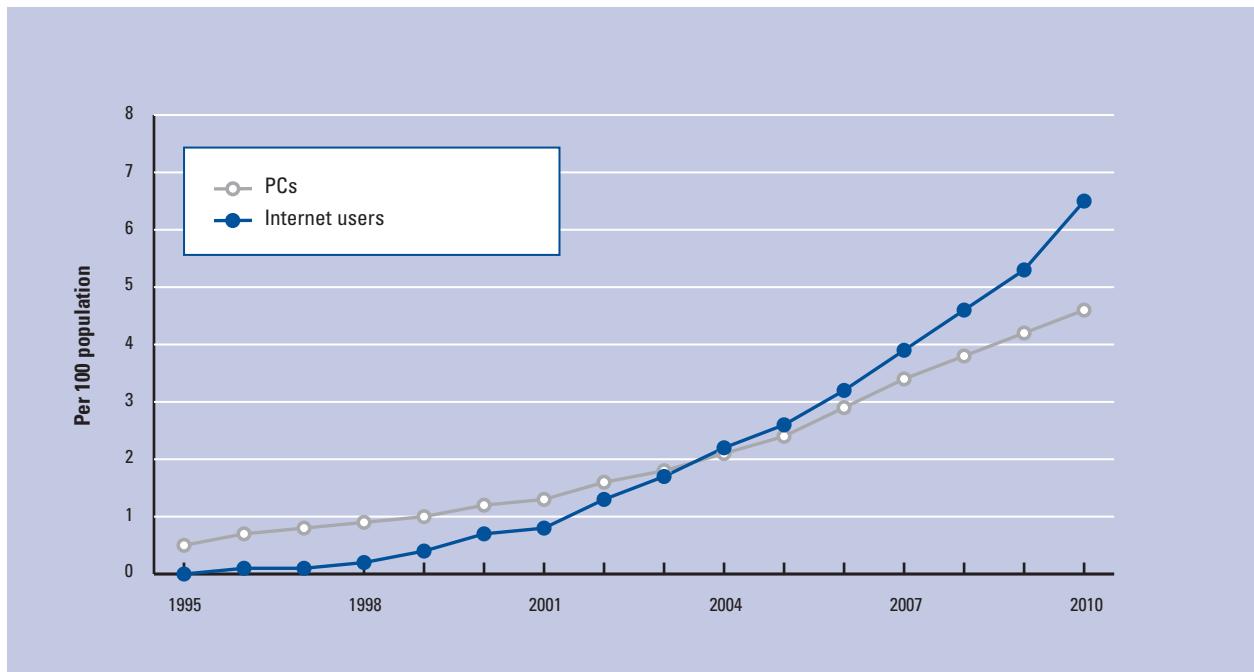
### Belated adopters

At the other end of the spectrum from first adopters are the 61 emerging countries where only about 5 percent of the population uses the Internet and less than 1 percent of households have broadband connections. Belated adopters' populations will take longer to fully participate in the

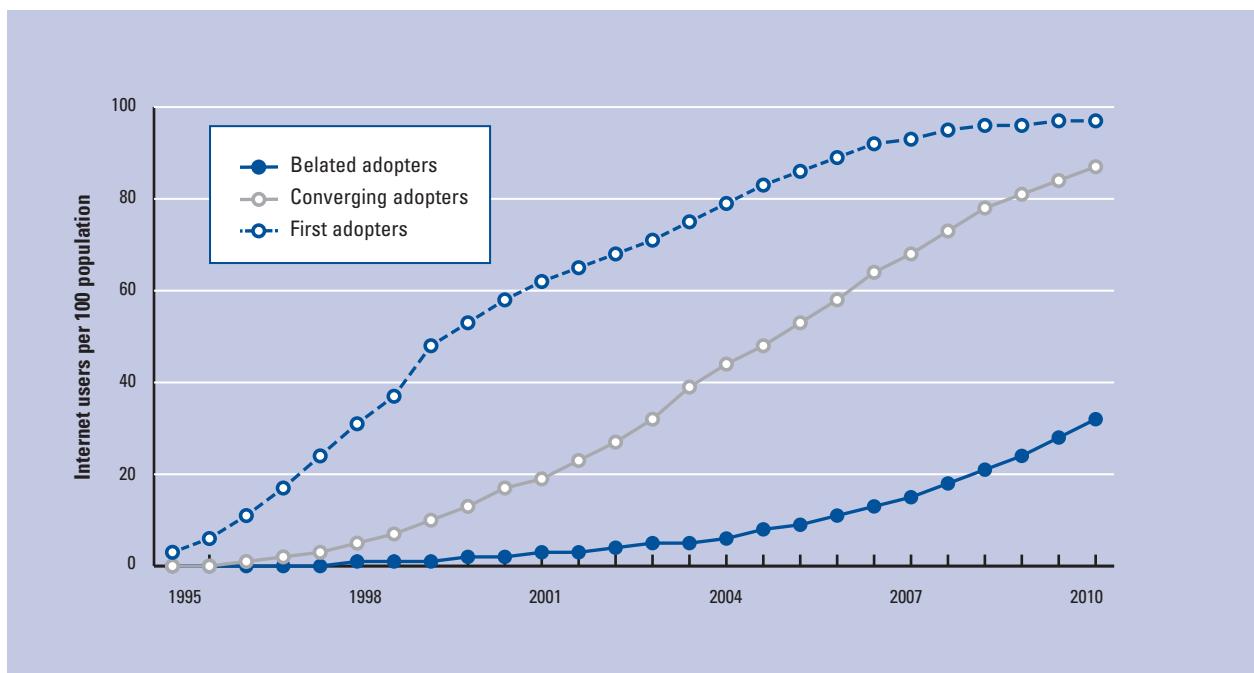
Internet. Currently they have very low rates of Internet use and PC adoption (Figure 7). Although the pattern appears to be similar to that of converging adopters—with Internet usage outpacing PC penetration—the levels are significantly lower and the hurdles to connectivity much higher. If/when technology advances lower the costs of devices and increase connectivity options (especially wireless ones), and as their purchasing power increases, these belated adopters will emerge as the growth areas of Internet adoption, just as the converging adopters are now. Because of the multiplier effect that occurs with rising income (a greater proportion is spent on ICT), and as new methods of access become established (such as the move beyond PCs, as shown by the converging adopters), Internet use will eventually reach a critical mass in these belated adopters and begin to accelerate, as we have seen in the Internet use paths followed by the first and converging adopters.

### Internet connectivity of the future: The wireless Internet revolution

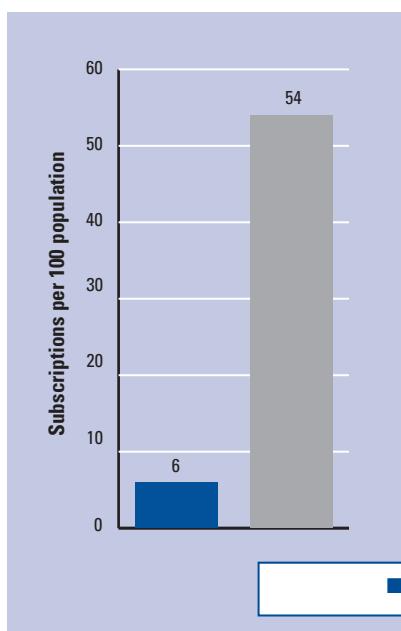
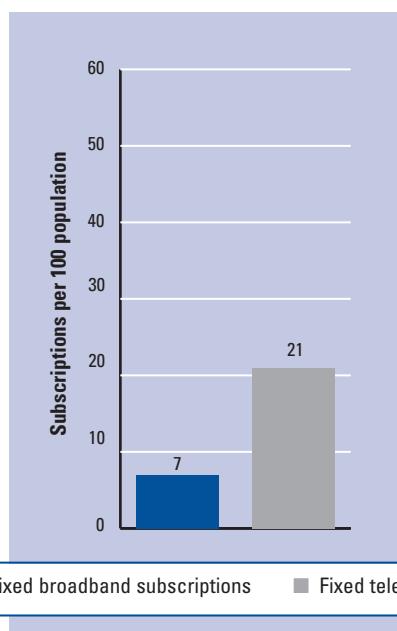
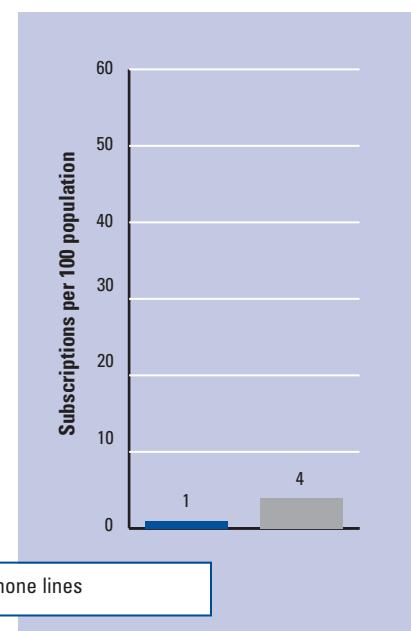
Internet use is forecasted to continue rising rapidly, now particularly in the converging adopters and later in the belated adopters, as Figure 8 illustrates. But though Internet adoption is common to most of the economies across these groupings, the nature of connectivity will be markedly different for economies where Internet use is outpacing PC installation. As technology evolves further, lowering connectivity and device costs, we expect

**Figure 7: Belated adopters, 1995–2010**

Sources: ITU, 2010; authors' calculations.

**Figure 8: Internet penetration for the three groups, 1995–2010**

Sources: ITU, 2010; authors' calculations.

**Figure 9: Ceiling for fixed broadband****9a: First adopters, 2002****9b: Converging adopters, 2009****9c: Belated adopters, 2009**

Sources: ITU, 2010; authors' calculations.

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new modes of access to emerge (e.g., wireless device access).

Simple Internet use, however, is a stepping stone to high-speed broadband access, where the largest gains from ICT adoption occur.<sup>6</sup> And it is the economies in the first-adopter grouping that are reaping the benefits from high-speed broadband Internet use. On average, there are nearly 28 broadband subscribers per 100 population in the first-adopter economies. By comparison, in converging adopters the figure is seven subscribers and near zero in belated adopters.

The rapid spread of broadband in first adopters was facilitated by high densities of fixed telephone lines. This dense installed base of fixed line subscriptions facilitated the adoption of DSL Internet access as Internet subscribers transitioned from dial-up to high-speed connectivity.<sup>7</sup> By contrast, fixed telephone subscriptions in converging adopters is on average half of what it was in first adopters back in 2000. Other economies cannot count on this easy passage, and increasing their broadband penetration will be related to the spread of a wide range of wireless technologies and infrastructure.

The picture is clear when comparing the situation of first adopters in 2002 (when their broadband penetration was only 6 percent but that of fixed telephone lines was 54 percent) with that of converging adopters in 2009 (with a similar broadband penetration but only 21 percent fixed line density). Even more striking is the situation of belated adopters, with currently very low broadband penetration and only 4 percent fixed line

density. The installed base of fixed telephone lines can be seen as a “ceiling” for the low-cost switch to fixed broadband connectivity, hence the appeal of wireless options—including, but not limited to, mobile telephony (Figure 9).

One wireless technology, the mobile phone, demonstrates the exponential growth possibility of wireless communication. In 1999, there were twice as many fixed telephone lines as mobile telephone subscriptions. Ten years later, in 2009, the number of fixed telephone lines has remained flat at 18 percent of the world population, whereas mobile phone subscriptions have risen to 67 percent of world population—an estimated 4.6 billion mobile phone subscriptions. Improvements in wireless technology in the future that will increase data transmission speed, lower cost (for both devices and services), and expand geographic access, in addition to policies and regulations that provide radio spectrum for wireless Internet, will facilitate increasing high-speed Internet use in the converging and belated adopters.

Growth in Internet use, and more importantly in high-speed broadband, will need to emerge from access via methods beyond fixed telephone subscriptions to facilitate the rise in Internet use across converging and belated adopters. Wireless Internet access (mobile data connectivity, satellite access, and fixed terrestrial wireless such as WiMax) is already proving to be an alternative, with mobile in the lead but other wireless options poised for rapid growth as well.<sup>8</sup>

## Conclusion

Much of the world has yet to tap to a significant extent the Internet's huge potential for generating economic and social benefits. As more people get connected, it will trigger massive implications for productivity and will open all kinds of new opportunities for individuals. We have illustrated this through the dynamics of the global Internet economy—the factors behind which are faster growth in emerging countries, rapid expansion of their consumer class, and developments in wireless technology.

All those factors suggest that we are at an inflection point. Internet adoption and intensity of use through broadband connections will accelerate, and the global composition of the Internet community and markets will change markedly over the next decade. This inflection point presents an opportunity for countries—and cities—to take decisive steps to gain the competitive advantage that can be derived from widespread use of broadband networks.

For countries that appear today to be converging adopters, the challenge is to accelerate the speed of adoption and reduce the lag between widespread Internet penetration and broadband penetration. For countries that are belated adopters, the urgent challenge is to shift gears and leapfrog to faster adoption of Internet and broadband.

The answer in both cases points toward the implementation of a comprehensive strategy combining investments in broadband infrastructure and skills with improvements in the policy and regulatory frameworks that affect the adoption of network technology. Key considerations to that effect should include the treatment of broadband networks, from the perspective of public policy, as basic infrastructure; the recognition that competition is one of the best drivers of technology adoption; and imaginative policies that facilitate access to spectrum and to existing infrastructure that can be shared by networks—thus reducing the costs of deployment and encouraging private investment.

When we look back from 2020 or 2025, we will see major differences between the emerging countries that took advantage of the opportunity of broadband networks to escalate their competitiveness and prosperity and those that failed to do so. Those differences will not be related primarily to starting positions or relative wealth—they will be due instead to decisive implementation of strategic plans and to inspired public-private partnerships that promote the widespread adoption of network technology.

## Notes

- 1 The adjustment factor we use is based on the Gini coefficient for income distribution. However, we dampen the effect of the income distribution adjustment as Internet use becomes more universal, because income distribution matters less (in the context of our Internet economy measure) as more of a country's population becomes connected. Internet economy =  $(GDP_{Pc} \times \text{PPP} \times \text{total Internet users}) \times \{1 + [\text{Gini coefficient} \times (1 - \text{Internet penetration ratio})]\}$ .
- 2 Nomura International, among others, has identified the US\$6,000 per capita income level that results in "burst of GDP & credit; higher spending and lower savings" across many economies over the past 50 years (Nomura International 2009, p. 17). Kharas 2010 has used the term *consumer class*, applied to per capita income levels above US\$10 per day.
- 3 Goldman Sachs Global Investment Research 2010.
- 4 Food accounts for well over half of total expenditures for national incomes below US\$1,500 per capita, but drops to one quarter for those above US\$3,000 and drops further at higher income levels. See Goldman Sachs Global Investment Research 2010.
- 5 Chapter 1.3 of *The Global Information Technology Report 2008–2009* details the stages of Internet connectivity and the key Internet adoption thresholds.
- 6 Qiang et al. 2009 showed that among ICT, including Internet access, broadband connectivity leads to the largest gains in GDP.
- 7 Coaxial cable Internet access also facilitated the transition to high-speed broadband in first adopters, but the cost of installation makes individual transition to cable Internet more costly unless users already subscribe to cable television service.
- 8 Comprehensive data on wireless access (at the country level) are not yet available, but the latest figures from the International Telecommunication Union (ITU) indicate that at the end of 2010, there were 940 million 3G mobile subscriptions with the possibility of data transmission at broadband speeds, compared with 555 million wired broadband subscriptions.

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## Appendix A: Stages of Internet connectivity

First introduced in *The Global Information Technology Report 2008–2009*, the stages of connectivity revolve around key adoption thresholds that show the progression from occasional or rare access to familiarization with the Internet, to widespread connectivity, and, finally to more regular, intensive use of Internet-based services. Chapter 1.3 of that *Report* detailed the stages of Internet connectivity and the key Internet adoption thresholds. In summary, the five stages are:

- **Proto-Internet:** In this stage are economies in which the vast majority of citizens have not come in contact with the Internet.
- **Early days:** This stage includes economies that have higher Internet usage rates but where the large majority of the population has yet to experience the Internet directly.
- **Familiarization:** Economies in this stage are fast becoming familiar with the Internet, but Internet subscription is still not widespread.
- **Extensive use:** This is a transitional stage, comprising economies whose populations are familiar with the Internet and are subscribing to Internet service on a wide scale, but have not yet shifted to broadband.
- **Intensive use:** Economies in the 5th stage are those in which broadband subscription is prevalent and Internet connections are predominantly high-speed.

Since the introduction of the stages of Internet connectivity two years ago, most economies across the world have progressed toward greater Internet adoption. The table illustrates how the number of economies concentrated in the least-connected stages (proto-Internet and early days) has fallen, with many of those economies moving to an Internet environment where citizens are logging in but have yet to establish subscription services. The growth of the number of economies in this middle stage, familiarization, highlights the rise in connectivity, but also emphasizes the challenge remaining for economies as they move beyond simple Internet familiarity to Internet subscriptions. The extensive use stage remains a transition point, as the high level of Internet subscriptions in these economies move to broadband. The number of economies in this stage has fallen and, as the average Internet speed per unit cost continues to rise, we expect this trend to continue as citizens across the world move directly into Internet subscriptions with broadband speeds. And since 2007, the number of economies in the intensive use stage has increased

**Table 1: Number of economies by stage of connectivity**

Stage of connectivity	2007	2008	2009
Intensive use	22	28	30
Extensive use	20	16	16
Familiarization	41	46	50
Early days	34	33	33
Proto-Internet	40	34	28

Source: ITU, 2010; authors' calculations.

significantly, demonstrating the progress being made in expanding access and upgrading the quality of connectivity in many economies.

We use these stages to describe the historic trend in connectivity since 1995. Economies in the proto-Internet and early days stages are the *belated adopters*. Those in the snapshots of familiarization and extensive use comprise the *converging adopters*, and the economies in the intensive use stage are those that are the *first adopters*.

## Appendix B: Economies in each stage of Internet connectivity and descriptive statistics

Belated adopters		Converging adopters		First adopters	
Afghanistan	Indonesia	Albania	Macedonia FYR	Australia	
Algeria	Kenya	Argentina	Malaysia	Austria	
Angola	Laos	Azerbaijan	Maldives	Belgium	
Armenia	Lesotho	Bahrain	Mauritius	Canada	
Bangladesh	Liberia	Belarus	Mexico	Cyprus	
Belize	Libya	Bosnia and Herzegovina	Moldova	Denmark	
Benin	Madagascar	Brazil	Morocco	Estonia	
Bhutan	Malawi	Brunei Darussalam	Nigeria	Finland	
Bolivia	Mali	Bulgaria	Oman	France	
Botswana	Mauritania	Cape Verde	Panama	Germany	
Burkina Faso	Mozambique	Chile	Paraguay	Hong Kong SAR	
Cambodia	Myanmar	China	Peru	Iceland	
Cameroon	Namibia	Colombia	Poland	Ireland	
Central African Rep.	Nepal	Costa Rica	Portugal	Israel	
Chad	Nicaragua	Croatia	Qatar	Italy	
Comoros	Niger	Czech Republic	Romania	Japan	
Congo (Brazzaville)	Pakistan	Dominican Rep.	Russia	Luxembourg	
Congo, D.R.	Philippines	Ecuador	Saudi Arabia	Malta	
Côte d'Ivoire	Rwanda	Egypt	Serbia	Netherlands	
Djibouti	Senegal	Eritrea	Slovakia	New Zealand	
Timor-Leste	Solomon Islands	Georgia	Suriname	Norway	
El Salvador	South Africa	Greece	Syria	Singapore	
Equatorial Guinea	Sri Lanka	Guatemala	Thailand	Slovenia	
Ethiopia	Swaziland	Guyana	The Bahamas	Korea, Rep.	
Fiji	Tajikistan	Hungary	Trinidad & Tobago	Spain	
Gabon	Tanzania	Jamaica	Tunisia	Sweden	
Ghana	Togo	Jordan	Turkey	Switzerland	
Guinea	Uganda	Kazakhstan	Ukraine	Taiwan, China	
Haiti	Zambia	Kuwait	United Arab Emirates	United Kingdom	
Honduras	Zimbabwe	Kyrgyz Republic	Uruguay	United States	
India		Latvia	Uzbekistan		
		Lebanon	Venezuela		
		Lithuania	Vietnam		

Averages	Number of countries	Internet users (per 100 population)	Internet subscriptions (per 100 population)	Broadband subscriptions (per 100 population)	Personal computers (per 100 population)	GDP per capita (US\$)	Urban Pop. (%)
First adopters	30	75	31	28	70	40,514	80
Converging adopters	66	39	9	7	20	9,317	63
Belated adopters	61	5	1	1	4	1,806	41

Sources: ITU, 2010; IMF, 2010; United Nations, 2010.

Note: These are illustrative classifications based on the latest available data, mostly reflecting the situation at the end of 2009.