

Creating the Next Wave of Economic Growth with Inclusive Internet

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The economic impact made by the Internet over the past several decades, with its significant contributions to nations' gross domestic product (GDP) and its fueling of innovative industries, has been massive.¹ The Internet has also generated societal change by connecting individuals and communities, providing access to information and services, and promoting transparency.

This growth has so far benefited mainly developed nations, although to some extent it has also advanced urban areas in developing nations. Further growth of the online population is expected, especially in emerging markets. However, because of structural barriers, more than 4.2 billion people worldwide are likely to be still unconnected in 2017. These people, who are mostly in developing countries, will be missing out on the benefits of the Internet society.²

The longer it takes to connect this group of people, the larger the development gap—also known as the digital divide—will become. Countries with large offline populations should seek to understand the barriers to getting connected faced by these individuals, and should act decisively to lower or eliminate those barriers.

This chapter first outlines the benefits provided by the Internet and the factors driving its growth. It then discusses the barriers that prevent many people from becoming connected. It concludes by outlining a range of potential actions and examples of initiatives countries could consider in their efforts to overcome those barriers.

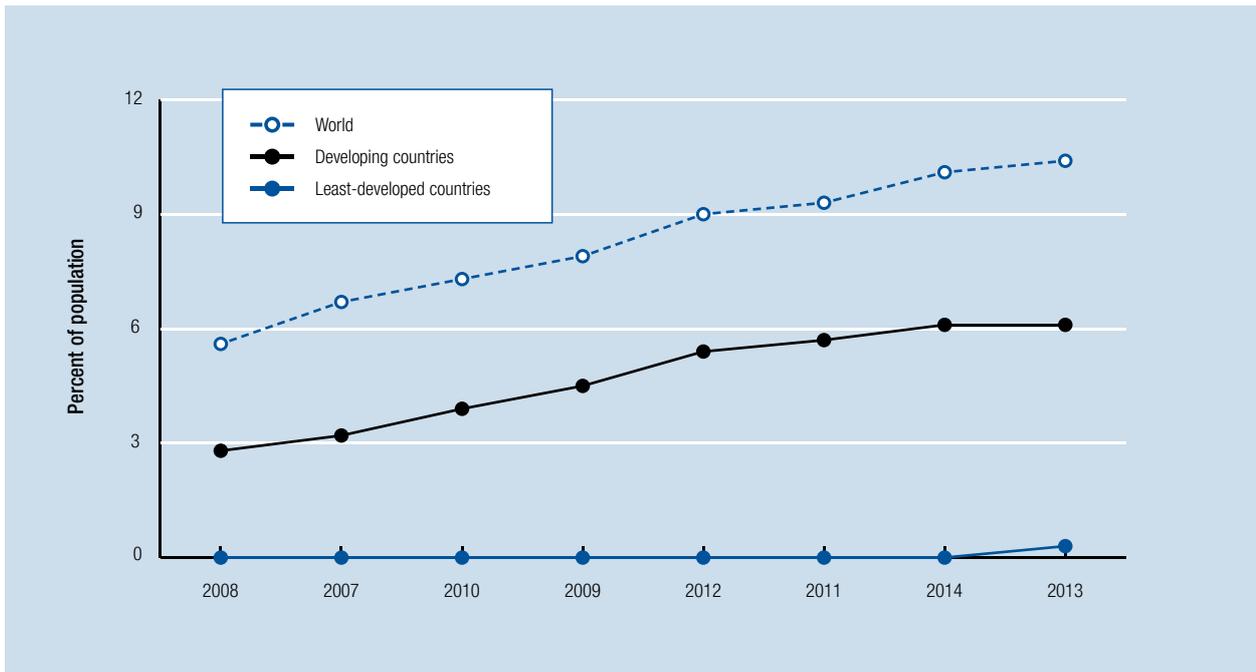
THE INTERNET HAS BROUGHT SIGNIFICANT ECONOMIC GROWTH

Since its emergence, the Internet has developed from a small collection of user communities to an integral element in the lives of 2.7 billion people around the world. In nearly every country and sector it has evolved into a powerful economic engine that has improved quality of life and transformed the way governments, businesses, and individuals connect and engage, and the ways in which they access critical information and services.

The potential of the Internet to accelerate a country's economic growth is widely recognized. It is estimated that in 2010, the Internet accounted for US\$1,672 billion of the global economy, or an average of 2.9 percent of total GDP. The contribution from developing or aspiring countries was small—only US\$366 billion.³ Of this amount, the BRIC countries (Brazil, Russia, India, and China) were responsible for US\$243 billion, almost two-thirds of the total, while the African continent's share was only US\$18 billion. The economic value generated annually by the Internet in aspiring countries is US\$119 per capita, compared with US\$1,488 per capita in developed countries.⁴

The views expressed in this chapter are those of the authors and not necessarily those of McKinsey & Company.

Figure 1: The widening digital gap: Fixed-line broadband penetration



Source: ITU, 2014.

The Internet clearly has great potential to foster further economic growth in many developing countries. Research by the World Bank in 2009 found that for every 10 percentage-point increase in the number of high-speed Internet connections in developing countries, there was an increase of 1.3 percentage points in economic growth.⁵ From 2004 to 2009, for example, it is estimated that the Internet contributed 10 percent or more to total GDP growth in Brazil, China, and India—and its impact in those countries has accelerated.⁶ The study believes that the Internet could transform agriculture, retail, healthcare, and other sectors in Africa and estimates that these transformed sectors will contribute up to US\$300 billion of the continent's annual GDP by 2025 (an enormous leap up from the US\$18 billion generated in 2010).⁷

To enable this growth, Internet penetration in developing markets must continue to expand. Of the approximately 7.1 billion people worldwide, there are still 4.2 billion non-Internet users, mainly in developing markets. Various forecasts estimate that at the current trajectory, 500 million to 900 million more individuals will gain access to the Internet by 2017.

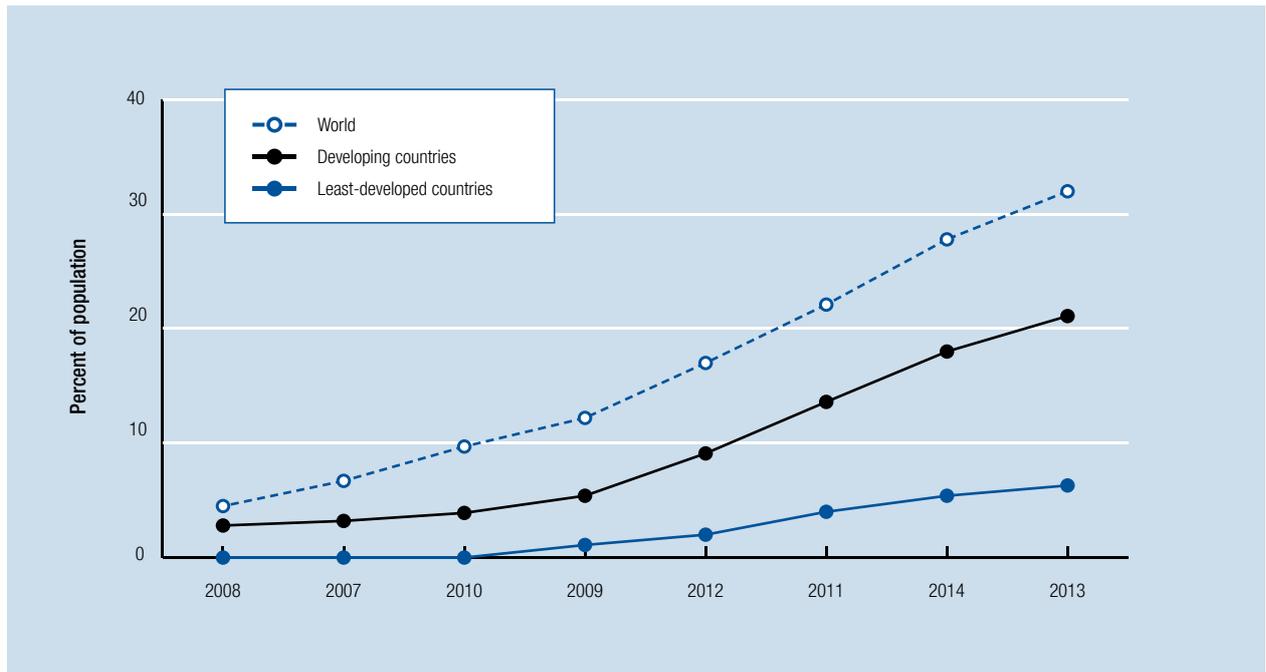
A recent McKinsey report identifies five factors that have been key to Internet growth:⁸

1. Expanding mobile network coverage and increasing mobile Internet adoption. In the early days of the Internet, access was established over fixed-line networks. It was the mobile network—often the only means of accessing the Internet in

developing countries—that facilitated the explosion in the number of subscribers worldwide. Mobile Internet connections rose from around 200 million in 2008 to 2.2 billion by 2013.⁹ Looking ahead, mobile networks are expected to continue to be prevalent, but fixed-line networks will also be extended. Many countries plan to build nationwide fiber networks to enable higher-speed Internet access. Both technologies will be complemented by public and private Wi-Fi networks. In addition, developing markets will—because they do not have to upgrade or dismantle old, expensive legacy networks such as fixed copper networks—be able to leapfrog into and benefit from new, cheaper, and more efficient transformational technologies such as mobile Internet, the Internet of Things, and the cloud, and will be able to power them with renewable energy.¹⁰

2. Shrinking device and data plan prices. Internet services tend to become more affordable over time. Their cost has fallen at the same time as incomes have increased in many locations. Take mobile phones. When introduced, only the privileged could afford them, but prices have fallen sharply in the course of three decades. Between 2012 and 2013 alone, the average price of a smartphone fell by nearly 13 percent worldwide, to US\$337. The price for mobile data plans has dropped at a similar pace. Fixed-line broadband service prices are also shrinking, but the drop is slower and they

Figure 2: The widening digital gap: Mobile broadband penetration



Source: ITU, 2014.

remain higher than mobile data plan prices in most countries.

- 3. Urbanization.** From 1950 to 2011 the world's urban population increased fivefold, from approximately 750 million to 3.6 billion. More than half of the total population worldwide now lives in urban areas. Proportions vary between regions: Africa and Asia are on the lower end of the spectrum, with urban dwellers representing, respectively, 40 percent and 45 percent of their total populations.¹¹ Not surprisingly, there is a high correlation between urbanization and Internet penetration, since both basic infrastructure (electricity, water, transportation) and Internet network coverage are often better in urban areas. Disposable incomes and education levels also tend to be higher in cities, factors that correlate with higher Internet penetration.
- 4. Growing middle class.** The middle class, with its rising disposable income, has grown globally—but especially in developing markets, where it expanded to encompass 25 percent of the total population in 2009 from 5 percent in 2005. Spending by the middle class worldwide reached more than US\$21 trillion in 2009. As affordability of the Internet has increased, it has promoted further Internet uptake.¹²
- 5. Increasing utility of the Internet.** Although Internet uptake is slower in developing markets than in developed ones, it is nonetheless beginning to transform society there. An increasing number of

services with content specific to local circumstances are emerging, and in some respects these markets are ahead of their developed counterparts, particularly when the Internet is accessed through mobile devices. In financial services, for example, Internet remittances were pioneered in Africa. Some green technologies, m-learning, and m-health services have also been tried for the first time in developing markets. The more affordable Internet access becomes and the more ICT-literate the population is, the greater the incentive for companies to offer services to these new target groups.

All five of these trends are expected—in themselves, and in correlation with one another—to continue to expand the reach and uptake of the Internet. But there is reason to believe they will not extend it far enough.

THE BARRIERS TO WIDER ADOPTION

The worldwide rate of growth in the number of Internet users is already slowing. Between 2005 and 2008, the three-year compound annual growth rate was 15.1 percent. Between 2010 and 2013 it fell to 10.4 percent. The fear is that, without corrective action, significant numbers of people—often the world's poorest—will remain unconnected, falling yet further behind the rest of the world as it moves ahead in the digital age.¹³ Figures 1 and 2 show that the digital gap is already widening between those living in the world's least-developed countries and citizens elsewhere.

McKinsey studied the offline population in 20 countries (selected for the size of their offline population) that together account for approximately 74 percent of the worldwide offline population.¹⁴ Four categories of barriers to Internet adoption emerged:

- **Infrastructure coverage.** Research shows that 64 percent of the offline population lives in rural areas. The business case for building networks in remote areas is a challenging one for telecommunications operators, because the cost of infrastructure is significantly higher where population density is low. Long distances, difficult terrain, and a lack of adjacent infrastructure such as electricity grids and roads are further considerations.¹⁵

The high cost of building the network means that Internet coverage in such areas is more likely to be achieved through mobile and satellite technologies than through fixed-line networks.

- **Low incomes and affordability.** Although globally incomes are rising and Internet access prices are falling, the costs of services remain insurmountable for individuals with very low incomes. McKinsey estimates that, in the 20 countries with the greatest number of offline people, low-income individuals account for 50 percent of the offline population—a total of approximately 1.6 billion people.¹⁶ Spending on Internet access, where it is available, takes second place to food, shelter, clean water, and energy. According to the International Telecommunication Union (ITU), broadband penetration grows rapidly only when the retail price falls below 3 to 5 percent of the average monthly income. For example, in the poorest countries of the Middle East and North Africa, the current price of mobile broadband is around 9 percent of the average monthly income. In several of these countries, for the poorest segments of the population, mobile broadband costs more than 40 percent of disposable income.¹⁷
- **User capability.** Another difficulty in connecting the unconnected is that language and digital literacy levels in many developing markets remain very low, despite gains made over recent decades. Indeed, based on an analysis of 2013 World Bank data, nearly 30 percent of offline individuals in the countries examined are illiterate.¹⁸ Although over 90 percent of the offline populations in China and Mexico are literate, in Ethiopia, Bangladesh, and Pakistan that figure is less than 50 percent. And even if people *are* literate in the conventional sense, poor ICT literacy prevents more of them going online. Today's devices may be much easier to operate than early personal computers, but research shows that non-Internet users in Africa,¹⁹ India,²⁰ and China,²¹ for example, cite their lack of skills as a major reason for not using the Internet.

- **Incentives.** The situation is not improved by the fact that developing nations often lack digital content—news stories, entertainment, e-commerce sites—that reflects local information and is available in local languages. One reason for this shortage of relevant content is the lack of local digital content developers. In addition, search, social media, and content sites often depend on advertising-funded business models, and these work less well if those using the services have little disposable income or if there are not enough subscribers to make a business case for the developers. Companies therefore have little immediate incentive to engage with these populations.

As a result, available content is inaccessible or can seem irrelevant or culturally inadequate to certain users, discouraging them from using the Internet. A recent survey shows that although respondents believed global providers offer the highest-quality content, they still favored local providers because the information was in their local language and they could understand it better.²²

Overcoming such barriers requires specific targeted efforts.

INITIATIVES TO CREATE AN INCLUSIVE DIGITAL SOCIETY

Countries have considered a range of initiatives to address the digital divide and bring the Internet to a broader population. These fall into two distinct categories. The first group comprises initiatives that facilitate investment and the deployment of networks in existing and new areas. The second group is aimed at increasing the unconnected population's demand for Internet services. A number of countries have launched initiatives from one or both categories, some of which we describe below. There is no single “best set” of initiatives, as market conditions vary across countries, but considering an integrated perspective across all categories could help bring about an inclusive Internet.

Initiatives that foster investment and the build-out of networks

Initiatives that facilitate investment and networks fall into three types, depending on their goal. They can aim to provide a stable regulatory environment, to lower the cost of inputs, or to leverage universal service funds. Each of these types is described below.

Providing a stable regulatory environment

Attracting private investors to build Internet infrastructure in remote places where the business case is challenging requires the presence of favorable conditions. According to the ITU, a stable, predictable regulatory environment that protects existing investments while creating room for new ones is among the most important.²³

Europe, for example, has fallen behind the leading countries in other regions of the world in terms of next-generation fixed and mobile infrastructure. The European Union has recognized that one of the reasons for this lag is a level of uncertainty around the regulatory framework that has limited the level of investment. Neelie Kroes, the former Vice-President of the European Commission responsible for the Digital Agenda for Europe, remarked that “Regulatory policy should clearly be an enabler, not an obstacle [for investments]. Regulation that is stable over time and consistent throughout Europe can underpin sustainable competition and efficient investment.”²⁴

Lowering the cost of inputs

Because the business case is harder to make in rural areas than it is in urban areas, initiatives that lower the cost of inputs and encourage operators are often needed. A few examples are outlined below:

- **Spectrum.** The way spectrum is assigned matters for network deployment costs. Both the selection of frequency bands and coverage obligations can affect telecommunications operators’ costs and investments.

Enabling the use of low-frequency bands is one way to lower the cost of a network. Lower-spectrum frequency bands have better propagation characteristics—that is, they enable better coverage—than higher-frequency bands. Operators thus need fewer base stations to cover large rural areas. Spectrum in the 700 and 800 MHz band range meets these requirements and is identified by the ITU as suitable for mobile broadband. Ongoing efforts to coordinate the allocation of this spectrum across the world will foster a larger market for equipment and devices, further lowering prices for operators and consumers. Emerging markets such as Brazil, Chile, Colombia, India, and Mexico have realized these benefits and have allocated, or plan to allocate, spectrum in these bands.²⁵

Another way to reduce costs through spectrum assignment is to include rural coverage requirements in new spectrum licenses, which might justify lower license fees. In Sweden, for example, one 800 MHz license required the connection of specific rural areas in return for a lower fee.

- **Rights of way.** One way to minimize the cost of network deployment is to give access to land and buildings in order to build fixed and mobile telecommunications networks in an expeditious, transparent, and coordinated manner. At the same time, operators should minimize the negative impact of the infrastructure on the environment and ownership rights. One option is to deploy telecommunications cables at the same time as building highways, railroads, and energy distribution

grids. This splits the costs of deployment, which can be high: around 40 to 60 percent of the total cost of the network. This is the approach taken in Morocco, where one telecommunications operator and the national railway company are cooperating on fiber build-out,²⁶ and in Bahrain, where telecommunications operators and construction companies are required to cooperate by publishing information relating to new projects, space for telecommunications equipment, and technical requirements, and by coordinating deployment activities and network sharing.²⁷

Coordinating the necessary approval processes and costs to municipalities is also important to avoid delays to network build-out and to keep costs down. For one recent project, acquiring the necessary permissions to lay a fiber cable from South Africa to Zimbabwe took more than two years.²⁸ To prevent such delays, telecommunications operators in Lagos State in Nigeria have signed a memorandum of understanding with the Ministry of Communication Technology promising to cooperate on network build-out and to address, among other matters, right-of-way issues.²⁹

- **Network sharing.** Enabling the sharing of active and passive networks between operators can help to lower capital expenditure. Tower construction, for example, can account for as much as half of a network operator’s capital expenses, while network maintenance represents up to 60 percent of operating expenses.³⁰ The sharing of masts and sites (passive network elements) is common in both developed and developing markets. More far-reaching, active network-sharing agreements, including sharing radio elements, are found largely in developed markets such as the United Kingdom and Spain, although a few examples have been seen recently in emerging markets such as Kenya and Malaysia.

Leveraging universal service funds

In some countries, universal service funds are being used to help pay for the build-out of rural networks. For example, in 2010, Saudi Arabia launched a Universal Service Fund Program with the aim of offering universal service access to all inhabitants. *Universal service* is defined as voice and Internet access, based on specified quality measures. The estimated cost of the program is US\$1.3 billion over seven years. Two districts are licensed at a time through competitive bidding. In the first two years the projects covered close to 230,000 inhabitants in nine districts.³¹

In Chile, the government provided public funding for a mobile broadband network through its Fondo de Desarrollo de las Telecomunicaciones (Telecommunications Development Fund), by means of a reverse or minimum subsidy auction. The government

identified 1,500 municipalities in rural areas and a maximum subsidy per area as the basis for bids. The operator with the lowest subsidy requirement won. Broadband penetration in Chile has subsequently increased from 10 to 47 percent of households.³²

Initiatives that foster demand for Internet services

Initiatives that foster demand for Internet services also fall into three types: those that reduce ownership costs, those that improve user capabilities, and those that generate incentives to go online. Each of these types is described below.

Reducing the cost of ownership

Even in areas where Internet infrastructure already exists, the cost of accessing it can be a barrier for those with low incomes. Initiatives adopted around the world to overcome this problem include enabling shared access, targeting efforts at specific segments, and providing favorable financing options. These initiatives can be managed by governments or private-sector players, or through public-private partnerships. Some examples are outlined below.

- **Shared access.** In Bangladesh and Ghana, Internet access has been established at community centers and libraries so that citizens do not have to pay for individual subscriptions.³³
- **Support for targeted segments of the population.** In Colombia, government institutions as well as municipalities and schools are brought online through the Vive-Digital program launched in 2010. Its aim is to establish a basic Internet infrastructure across the country. The program also includes targeted efforts to get small and medium-sized companies connected online. As a result, broadband connections grew by 180 percent two and a half years after the program was launched.³⁴ Argentina ran a similar project, Argentina Connected, whereby 1.9 million students were provided with Netbooks, enabling them to improve their ICT skills and get Internet access.³⁵
- **Financing options.** In Egypt, the Egypt PC 2010 Nation Online program, a public-private partnership between the government and telecommunications operators, was aimed at increasing the number of online individuals in the poorest population segments. It did so partly by offering favorable loans for end-user equipment.³⁶ Since its launch, the penetration of household fixed broadband has more than doubled, to 16 percent, and mobile penetration has risen fivefold, to 118 percent.³⁷

The key challenge of these initiatives is to ensure long-term viability. This can be done by thoroughly assessing the potential for Internet use and ensuring that the local population both have the financial means

and the physical access for continued Internet usage, and that they have gained the necessary knowledge and skills to participate online and use the Internet for their own benefit and the benefit of their country.

Improving user capabilities

A lack of ICT skills, in varying degrees and forms, is a challenge for developed and developing countries alike. In some markets, traditional illiteracy is the key barrier, whereas in others ICT illiteracy is a larger problem.

Traditional illiteracy is often the result of underdeveloped education systems, but where schools exist, they can also help build ICT literacy. Internet access can in turn be used to accelerate the development and reach of the traditional education network and improve literacy (although this of course requires ICT skills).

In many countries telecommunications operators and governments have the scope to contribute more to enhance ICT literacy. In India, for example, a program was launched in rural areas by a telecommunications operator using interactive voice response (IVR) after realizing that the reason the use of data services was low was that people did not know how to use them.³⁸ In Qatar, the government has ICT programs for different population segments (women, young people, those with special needs, small communities, low-skilled migrant workers, and the elderly) to ensure digital inclusion.³⁹

For digital inclusion to be sustained, however, it is essential to advance from basic connectivity to the establishment of local knowledge hubs or clusters formed around universities and companies. Silicon Valley in the United States, Bangalore in India, Zhongguancun in China, and the more recently established Konza Techno City in Kenya are examples of knowledge clusters.

Creating incentives to use the Internet

Even where literacy is high and networks exist, many people do not use the Internet because services are not in their local language, the content is not relevant to them, or they are not aware of the services' existence (although the fact that 57 percent of the urban African population accesses social networking sites proves that the demand does exist). To foster uptake in countries where large parts of the population remain unconnected, it is vital to develop new local services and increase awareness of existing ones. A few examples of relevant content that might help drive adoption are listed below.

- **Local entertainment.** The Internet content most used worldwide is social networking and entertainment.⁴⁰ To attract new users, this material should be easily accessible, based on local conditions, provided in local languages, and developed in formats consistent with the types of devices and applications being used—whether these take the form of radio, TV, IVR, local written

language, or intuitive applications. Prices for access need to be adapted to local circumstances.

- **E-financial services.** In rural areas, Internet access is often essential for access to financial services, and mobile banking is one of the most used mobile Internet services in the world, giving craftsmen, fishermen, and farmers new business opportunities. M-PESA in Kenya and EcoCash in Zimbabwe are examples of successful m-banking services.⁴¹ Several challenges remain to be addressed, however, before the international, large-scale adoption of such services can become a reality. Among these challenges are security, regulation, and interoperability.⁴²
- **E-government services.** Governments can help develop services that will enable citizens and businesses to interact with them in easier and more efficient ways. Examples are information portals, contact forms, tax filing, and social security services, as well as chats, tweets, and newsletters. Many governments in the Middle East, South America, and Africa—including Bahrain, Colombia, Côte d'Ivoire, Nigeria, Qatar, and Uruguay—have launched e-government services. In Colombia in 2012, 50 percent of residents and 78 percent of businesses engaged with the government through online channels.⁴³
- **E-health services.** The reach of medical services can be extended via the Internet. In Bangladesh, a private-public partnership program called Aponjon was launched in December 2012 to advise pregnant women in poor rural areas, with the aim of lowering maternal death. Following the success of the program, it has been extended to India. On Mfangano Island in Kenya, a nongovernmental organization called Organic Health Response, which is focused on the prevention of HIV and AIDS, gives citizens access to the Internet in exchange for enrolling in an HIV/AIDS testing program. As a result, 10 percent of the community has signed up for the program, and local HIV diagnostics has improved.⁴⁴
- **Cyber security.** As part of all of the above, it is vital to continue to work on improving the security of the Internet, not only to enable trust for both new and existing user segments, but also to enable the continued future growth of the Internet society.

A number of options are available for countries wishing to overcome the barriers to Internet inclusiveness. Taking advantage of those options will enable populations that have so far not been connected to get online so that they can benefit from the advantages the Internet can bring.

CONCLUSION

Despite great progress in Internet uptake and the enormous growth potential of Internet services, especially in developing markets, a large portion of the world's population still have no access to the Internet and their ICT skills are insufficient for them to take full advantage of the opportunities the Internet can provide. Governments may consider how to support this group so that they become part of the Internet society and benefit from projected growth. A number of possibilities for such support are outlined here. We believe coordinated actions based on these options and adapted to specific country circumstances can help to include the still unconnected among the beneficiaries of future ICT growth and bridge the digital divide.

NOTES

- 1 For the purposes of this article, we use the term *Internet* to describe Internet access and services enabled through this access such as email, VoIP, cloud, big data, and so on. The notion of *ICTs* is used to describe the Internet and the information and communication technologies industry as a whole.
- 2 McKinsey & Company 2014.
- 3 These countries included Algeria, Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Egypt, Hungary, India, Indonesia, the Islamic Republic of Iran, Kazakhstan, Malaysia, Mexico, Morocco, Nigeria, Pakistan, the Philippines, Poland, Romania, the Russian Federation, Saudi Arabia, South Africa, Taiwan (China), Thailand, Turkey, Ukraine, Venezuela, and Vietnam.
- 4 Nottebohm et al. 2012.
- 5 World Bank 2009.
- 6 McKinsey Global Institute 2011.
- 7 McKinsey Global Institute, McKinsey & Company in Africa, and the McKinsey TMT Practice 2013.
- 8 McKinsey & Company 2014.
- 9 ITU 2013.
- 10 Manyika et al. 2013.
- 11 UNDESA 2012.
- 12 Kharas 2010.
- 13 McKinsey analysis based on World Bank longitudinal data, available at <http://data.worldbank.org/>.
- 14 McKinsey & Company 2014; the 20 countries in the study are Bangladesh, Brazil, China, the Democratic Republic of Congo, Egypt, Ethiopia, India, Indonesia, the Islamic Republic of Iran, Mexico, Myanmar, Nigeria, Pakistan, the Philippines, the Russian Federation, Tanzania, Thailand, Turkey, the United States, and Vietnam.
- 15 GSMA (GSM Association) Intelligence, 2012 estimates.
- 16 *Low income* is defined here as incomes below the average of the national median and national poverty line.
- 17 Gelvanovska et al. 2014.
- 18 Calculations for this figure are based on McKinsey's analysis that characterizes the demographic profile and context of the offline population and 2013 data from World Bank (available at <http://data.worldbank.org/>).
- 19 McKinsey & Company 2013.
- 20 IAMA and IMRB International 2013.
- 21 CNNIC 2014.
- 22 Upstream 2014.
- 23 ITU 2009.

- 24 Kroes 2012.
- 25 Guisti 2014.
- 26 Gelvanovska et al. 2014.
- 27 TRA, no date.
- 28 The Economist 2014.
- 29 Opara 2014.
- 30 Capgemini 2009.
- 31 Intelcon Research and Consultancy Ltd. 2012.
- 32 Telegeography 2014a.
- 33 PIWA and UNDP, no date.
- 34 Vega 2013.
- 35 ITU 2012.
- 36 Arab Republic of Egypt, Ministry of Communications and Information Technology. 2007.
- 37 Telegeography 2014b.
- 38 GSMA 2014.
- 39 ictQatar, no date.
- 40 Cisco 2014.
- 41 Cisco 2014.
- 42 Bate 2014.
- 43 World Economic Forum 2013.
- 44 OHR, accessed 2015.

REFERENCES

- Arab Republic of Egypt, Ministry of Communications and Information Technology. 2007. "Egypt PC 2010: Nation Online Launched in Cairo ICT." Press Release, February 4. Available at http://www.mcit.gov.eg/Media_Center/Press_Room/Press_Releases/1335.
- Bate, F. 2014. "Mobile Money Grows in Africa, but Hurdles Remain." *Reuters*, July 31. Available at <http://m.moneyweb.co.za/2014/07/31/mobile-money-grows-in-africa-but-hurdles-remain/>.
- Capgemini. 2009. "Mobile Tower Sharing And Outsourcing: Benefits And Challenges For Emerging Market Operators." *Telecom & Media Insights* 43. Available at http://www.capgemini.com/resource-file-access/resource/pdf/tl_Mobile_Tower_Sharing_and_Outsourcing_.pdf.
- Cisco. 2014. Cisco® *Visual Networking Index Services Adoption (VNI SA) Forecast, 2013–2018*. Available at http://www.cisco.com/c/en/us/solutions/collateral/service-provider/vni-service-adoption-forecast/Cisco_VNI_SA_Forecast_WP.html.
- CNNIC (China Internet Network Information Center). 2014. *Statistical Report on Internet Development in China*, January. CNNIC. Available at <http://www1.cnnic.cn/IDR/ReportDownloads/201404/U020140417607531610855.pdf>.
- The Economist. 2014. "Cabling Africa's Interior: Many Rivers to Cross." July 5. Available at <http://www.economist.com/news/business/21606270-dogged-firm-roots-zimbabwe-has-brought-fast-broadband-landlocked-parts-africa>.
- Gelvanovska, N., M.Rogy and C. Rossotto. 2014. *Broadband Networks in MENA: Accelerating High-Speed Internet Access*. Washington, DC: World Bank. Available at http://www.worldbank.org/content/dam/Worldbank/document/MNA/Broadband_report/MNA_Broadband_Executive%20Summary_English.pdf.
- GSMA. 2014. *Digital Inclusion 2014*. London: GSMA. Available at http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/11/GSMA_Digital-Inclusion-Report_Web_Singles_2.pdf.
- Guisti J. 2014. *Global Perspectives*. GSMA presentation at the Ericsson conference on APT 700. March 5. 2014. Available at http://www.gsacom.com/downloads/pdf/John_Guisti_EricssonAPT700Forum_260214.php4.
- IAMAI (Internet and Mobile Association of India) and IMRB International. 2013. *Internet in India 2013*. Mumbai, India: IMAI. Available at http://www.imrbint.com/downloads/Report-BB55685%20IAMAI%20ICUBE_2013-Urban+Rural-C1.pdf.
- ictQatar, Ministry of Information and Communications Technology. No date. Digital Inclusion. Available at <http://www.ictqatar.qa/en/department/digital-society/digital-inclusion>.
- Intelcon Research and Consultancy Ltd. 2012. "Universal Broadband Service in rural Saudi Arabia: Innovations by USF & Operators Close the Access Gap." Presentation by Andrew Dymond. Available at <http://www.inteleconresearch.com/pages/documents/IntelconSaudiArabia.pdf>.
- ITU (International Telecommunication Union). 2009. *Trends in Telecommunication Reform 2009: Hands-on or Hands-off? Stimulating Growth through Effective ICT Regulation*. Geneva: ITU.
- . 2012. *Developing Successful Public-Private Partnerships to Foster Investment in Universal Broadband Networks*, September. Report was prepared by Matt Yardley, Partner at Analysys Mason, under the direction of the Regulatory and Market Environment Division of the Telecommunication Development Bureau (BDT). Available at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR12/documents/GSR12_BBReport_Yardley_PPP_7.pdf.
- . 2013. *Measuring the Information Society 2013*. Geneva: ITU.
- . 2014. *Measuring the Information Society Report 2014*. Geneva: ITU. Available at http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2014/MIS2014_without_Annex_4.pdf.
- Kharas, H. 2010. "The Emerging Middle Class in Developing Countries." Organisation for Economic Co-operation and Development (OECD) Development Centre, Working Paper No. 285, January.
- Kroes, N. 2012. "Enhancing the Broadband Investment Environment: Policy Statement by Vice President Kroes." European Commission Memo, Brussels, July 12. Available at http://europa.eu/rapid/press-release_MEMO-12-554_en.htm?locale=en.
- Nottebohm, O., J. Manyika, J. Bughin, M. Chui, and A-R. Syed. 2012. *Online and Upcoming: The Internet's Impact on Aspiring Countries*, January. McKinsey & Company, High Tech Practice. Available at http://www.mckinsey.com/client_service/high_tech/latest_thinking/impact_of_the_internet_on_aspiring_countries.
- Manyika, J., M Chui, J. Bughin, R. Dobbs, P. Bisson, and A. Marrs. 2013. *Disruptive Technologies: Advances that Will Transform Life, Business, and the Global Economy*. McKinsey Global Institute. Available at http://www.mckinsey.com/insights/business_technology/disruptive_technologies.
- McKinsey & Company. 2013. *iConsumers: Life Online*. McKinsey & Company, Technology, Media and Telecom Practice. Available at <http://www.mckinsey.com/search.aspx?q=life+online>.
- . 2014. *Offline and Falling Behind: Barriers to Internet Adoption*. McKinsey & Company, Technology, Media and Telecom Practice. Available at http://www.mckinsey.com/insights/high_tech_telecoms_internet/offline_and_falling_behind_barriers_to_internet_adoption.
- McKinsey Global Institute. 2011. *Internet Matters: The Net's Sweeping Impact on Growth, Jobs, and Prosperity*, May. McKinsey & Company. Available at http://www.mckinsey.com/client_service/high_tech/latest_thinking/impact_of_the_internet_on_aspiring_countries.
- McKinsey Global Institute, McKinsey & Company in Africa, and the McKinsey TMT Practice. 2013. *Lions Go Digital: The Internet's Transformative Impact in Africa*, November. Available at http://www.mckinsey.com/insights/high_tech_telecoms_internet/lions_go_digital_the_internets_transformative_potential_in_africa.
- OHR (Organic Health Response). No date. Programs, Technology, Broadband Internet. "Free Wi-Fi in the Heart of Lake Victoria." Available at <http://organichealthresponse.org/programs/technology/broadband-internet/>; accessed 2015.

- Opara, S. 2014. "Telecoms Infrastructure: Airtel Canvasses Collaboration among States." *Punch*, March 3. Available at <http://www.punchng.com/business/technology/telecoms-infrastructure-airtel-canvasses-collaboration-among-states/>.
- PIWA and UNDP (Panos Institute West Africa and United Nations Development Programme). No date. *E-governance and Citizen Participation in West Africa: Challenges and Opportunities*. Dakar, Senegal and New York: PIWA and UNDP. Available at <https://www.undpegov.org/sites/undpegov.org/files/UNDP-IPAO-Report-English.pdf>.
- Teleography. 2014a. *GlobalComms Database, country profile: Chile*. Available at <https://www.teleography.com/research-services/globalcomms-database-service/>.
- . 2014b. *GlobalComms Database, country profile: Egypt*. Available at <https://www.teleography.com/research-services/globalcomms-database-service/>.
- TRA (Telecommunications Regulatory Authority) Bahrain. No date. Presentation for Meeting on Regulatory Issues Related to the Deployment of Telecommunications Networks in New Property Developments. Available at: http://www.tra.org.bh/media/document/_%D8%A7%D9%84%D9%87%D9%8A%D8%A6%D8%A9NewDevelopmentsTRAFinal1.pdf.
- UNDESA (United Nations Department of Economic and Social Affairs). 2012. *World Urbanization Prospects: The 2011 Revision*. Available at <http://www.un.org/en/development/desa/publications/world-urbanization-prospects-the-2011-revision.html>.
- Upstream. 2014. "Western Brands Are Failing to Connect with Emerging Markets due to Lack of Local Understanding." Press Release, April 24. Available at <http://www.upstreamsystems.com/western-brands-failing-connect-emerging-markets-due-lack-local-understanding/>.
- Vega, D. M. 2013. "Colombia's Digital Agenda: Successes and the Challenges Ahead." In *The Global Information Technology Report 2013*. Geneva: World Economic Forum. 111–17.
- World Bank. 2009. *Information and Communications for Development 2009: Extending Reach and Increasing Impact*. Washington, DC: World Bank.
- World Economic Forum. 2013. *The Global Competitiveness Report 2013–2014*. Geneva: World Economic Forum.