

Technology, Media, and Telecom Practice

Briefing note

Offline and falling behind: Barriers to Internet adoption

In a little more than a generation, the Internet has grown from a nascent technology to a tool that is transforming how people, businesses, and governments communicate and engage. The Internet's economic impact has been massive, making significant contributions to nations' gross domestic product (GDP) and fueling new, innovative industries. It has also generated societal change by connecting individuals and communities, providing access to information and education, and promoting greater transparency.

However, not all countries have harnessed the Internet's benefits to the same degree. For this report, we examined the evolution of Internet adoption around the world, the factors that enable the development of a vibrant Internet ecosystem, and the barriers that are impeding more than 60 percent of the global population from getting online. Several key findings emerged:

- 1. Over the past decade, the global online population grew to just over 2.7 billion people, driven by five trends.** The worldwide Internet user population was around 2.7 billion people in 2013, with 1.8 billion joining the ranks since 2004.¹ This growth has been fueled by five trends: the expansion of mobile network coverage and increasing mobile Internet adoption, urbanization, shrinking device and data plan prices, a growing middle class, and the increasing utility of the Internet.
- 2. At the current trajectory, an additional 500 million to 900 million people are forecast to join the online population by 2017. However, these gains will still leave up to 4.2 billion people offline.** The rate of growth of worldwide Internet users slowed from a three-year compound annual growth rate (CAGR) of 15.1 percent in 2005–2008 to 10.4 percent in 2009–2013.² Without a significant change in technology, in income growth or in the economics of access, or policies to spur Internet adoption, the rate of growth will continue to slow. The demographic profile and context of the offline population makes it unlikely that these individuals will come online solely as a result of the trends that have driven adoption over the past decade. Estimates from multiple sources suggest that 500 million to 900 million people will join the online ranks by 2017, expanding the online population to 3.2 billion to 3.6 billion users.³ By these projections, between 3.8 billion and 4.2 billion people—more than half of the forecasted global population—will remain offline in 2017.

1 "World development indicators," World Bank, 2013 estimates, accessed 2014. Sourced from the International Telecommunication Union (ITU), "World telecommunication/ICT development report" and database, and World Bank estimates.

2 McKinsey analysis based on World Bank longitudinal data.

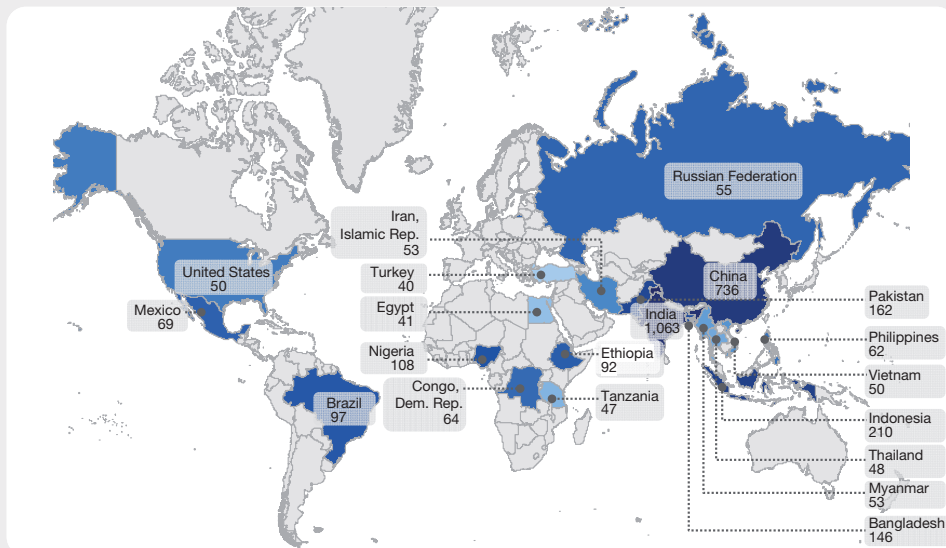
3 Cisco forecasts the online ranks will reach 3.6 billion users in 2017, while Forrester estimates a total of 3.5 billion. Microsoft estimates that the online population will reach 4.7 billion users by 2025. "Cisco's Visual Networking Index forecast projects nearly half the world's population will be connected to the Internet by 2017," cisco.com, May 29, 2013; *World online population forecast, 2012 to 2017 (Global)*, Forrester Research, August 2012; David Burt et al., *Cyberspace 2025: Today's decisions, tomorrow's terrain—Navigating the future of cybersecurity policy*, Microsoft, June 2014.

Exhibit 1

20 countries account for 3.2 billion offline individuals, ~75% of the 4.4 billion non-Internet users worldwide

Size of offline population, 2013

Millions



SOURCE: The World Bank

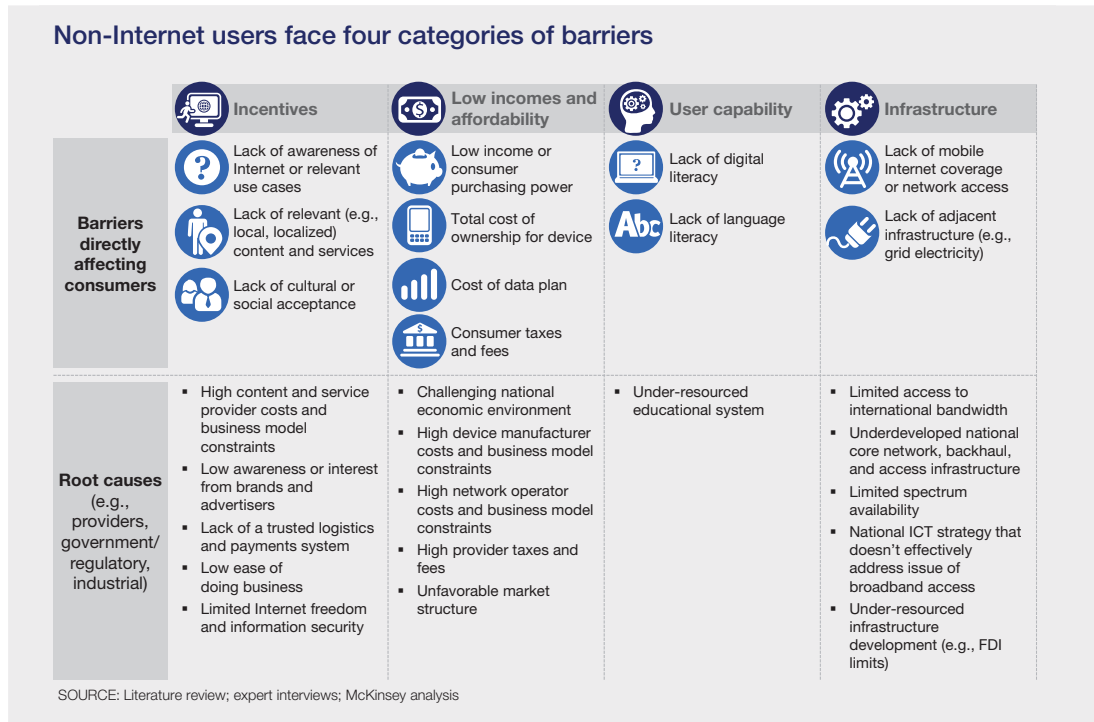
3. **About 75 percent of the offline population is concentrated in 20 countries (Exhibit 1) and is disproportionately rural, low income, elderly, illiterate, and female.** We estimate that approximately 64 percent of these offline individuals live in rural areas, whereas 24 percent of today's Internet users are considered rural. As much as 50 percent of offline individuals have an income below the average of their respective country's poverty line and median income.⁴ Furthermore, we estimate that 18 percent of non-Internet users are seniors (aged 55 or older), while about 7 percent of the online population are in that age bracket. Approximately 28 percent of the offline population is illiterate, while we estimate that close to 100 percent of the online population can read and write. Last, we estimate that 52 percent of the offline population is female, while women make up 42 percent of the online population.
4. **The offline population faces barriers to Internet adoption spanning four categories: incentives, low incomes and affordability, user capability, and infrastructure (Exhibit 2).**

Incentives. Despite the increasing utility of the Internet in providing access to information, opportunities, and resources to improve quality of life, there remain large segments of the offline population that lack a compelling reason to go online. Barriers in this category include a lack of awareness of the Internet or use cases that create value for the offline user, a lack of relevant (that is, local or localized) content and services, and a lack of cultural or social acceptance. The root causes of these consumer barriers include the high costs that content and service providers face in developing and localizing relevant content and services and their associated business model constraints, low awareness or interest from brands and advertisers in reaching certain audiences, a lack of a trusted logistics and payment systems (thereby limiting Internet use cases such as e-commerce and online banking), low ease of doing business in specific regions (thereby impeding development of local or localized content and services), and limited Internet freedom and information security.

Low incomes and affordability. In this area, the predominant barrier is the low income of individuals in the offline population. This barrier is exacerbated by the high costs associated with providing access to the Internet for these populations, which are disproportionately rural. The low incomes reflect the poor economic circumstances of large segments of the offline population, often including unemployment

4 This estimate is based on the simplifying assumption that the highest earners are members of the online population.

Exhibit 2



and the need for economic development, employment, and income growth opportunities in their regions. At the same time, there is often a lack of adjacent infrastructure (such as roads and electricity), thereby increasing the costs faced by network operators in extending coverage. Several other factors can contribute to high costs of service for device manufacturers and network operators, including taxes and fees, and, in the case of some countries, an unfavorable market structure.

User capability. This category includes barriers such as a lack of digital literacy (that is, unfamiliarity with or discomfort in using digital technologies to access and use information) and a lack of language literacy (that is, the inability to read and write). The root cause of such literacy barriers is often an under-resourced education system.

Infrastructure. Barriers in this area include a lack of mobile Internet coverage or network access in addition to a lack of adjacent infrastructure such as grid electricity. The root causes of these consumer barriers include limited access to international bandwidth; an underdeveloped national core network, backhaul, and access infrastructure; limited spectrum availability; a national information and communications technology (ICT) strategy that doesn't effectively address the issue of broadband access; and under-resourced infrastructure development.

5. These issues cannot be considered in isolation—we found a systematically positive and, in some cases large, correlation between barrier categories and with Internet penetration rates.

We measured the performance of 25 countries against a basket of metrics relating to each category of barriers to develop the Internet Barriers Index (Exhibit 3).⁵ We found that all factors correlate strongly and separately with Internet penetration, and all regressions indicate an elastic effect on Internet penetration—that is, improvements on each individual pillar of the Internet Barriers Index will have a disproportionately positive impact on Internet penetration. In addition, we found a systematically positive and, in some cases large, correlation between barrier categories. This implies that the factors

⁵ The Internet Barriers Index ranks 25 developed and developing countries based on their scores in four categories of barriers: incentives, low incomes and affordability, user capability, and infrastructure. To create the index, we defined a basket of standard metrics to quantify each category of barriers, normalized each metric to a scale of 100 points, weighted each of the metrics equally within each category to generate barrier category scores, and then normalized and weighted each of the category scores equally to generate the final index score. Our analysis indicated that the Internet Barriers Index has a strong ability to predict the Internet penetration within a country, explaining more than half the variance in Internet penetration across countries.

Exhibit 3

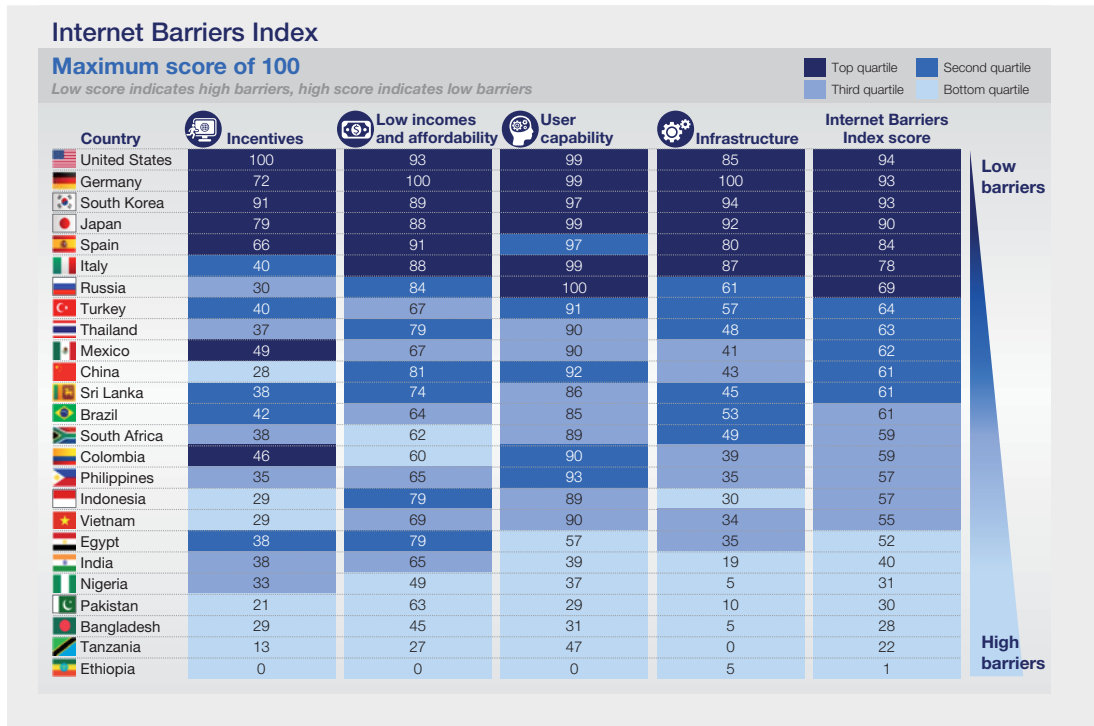
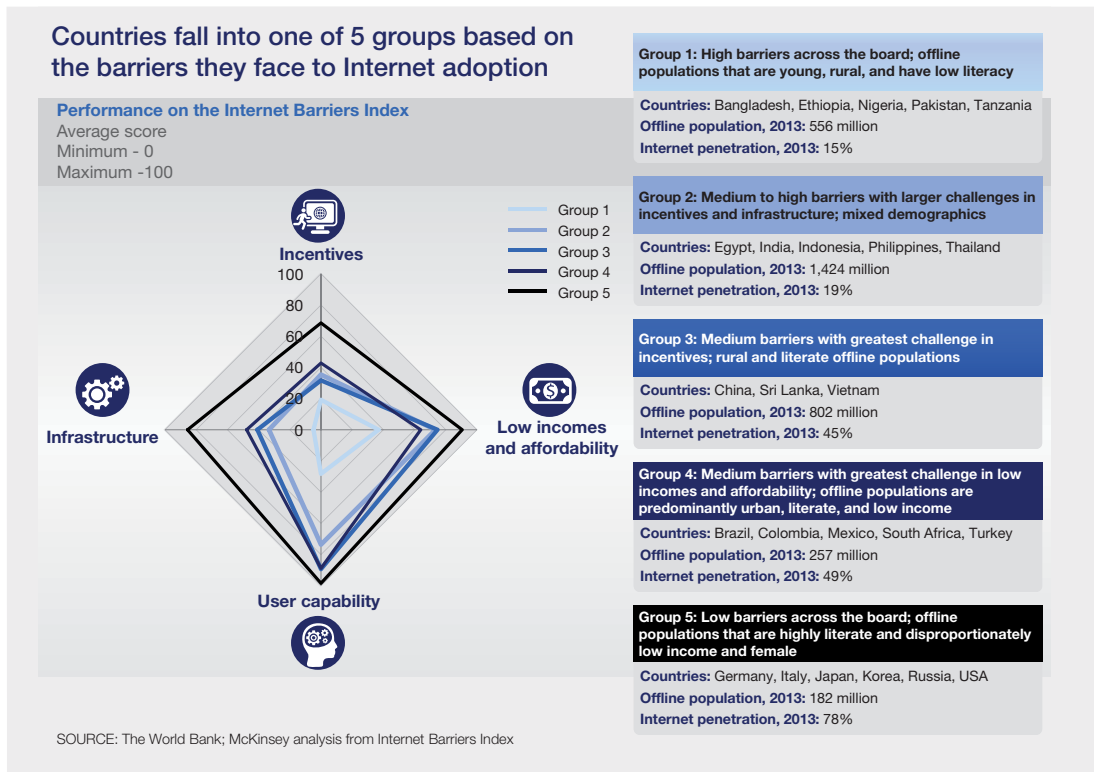


Exhibit 4



are not totally independent, and that countries with low Internet penetration tend to have multi-dimensional bottlenecks when it comes to increasing their Internet adoption. Further, it means that meaningfully addressing these barriers and boosting Internet penetration will require coordination across Internet ecosystem participants.

6. **Approximately 2 billion people, or nearly half the offline population, reside in ten countries that face significant challenges across all four barrier categories. An additional 1.1 billion people live in countries in which a single barrier category dominates.** Based on the combination and severity of the barriers they face (as indicated by the Internet Barriers Index), countries fall into one of five groups (Exhibit 4). These groupings provide insight into each set's common challenges, which could stem from similar root causes.

Group one: High barriers across the board. This group consists of five countries in Africa and Asia—Bangladesh, Ethiopia, Nigeria, Pakistan, and Tanzania—that are home to just over 550 million offline individuals and face entrenched obstacles to expanding Internet adoption. Each of the countries in this group performed poorly across all four barrier categories of the Internet Barriers Index; their scores in individual pillars fall primarily in the lowest quartile. The offline populations in these countries are predominantly young and rural and have low literacy rates. The aggregate Internet penetration rate across the group was 15 percent in 2013.

Group two: Medium to high barriers. Countries in this group include Egypt, India, Indonesia, the Philippines, and Thailand, each of which faces medium to high barriers to Internet adoption. The countries in this group rank in the lowest two quartiles in several categories in the Internet Barriers Index, with their greatest challenges lying in the incentives and infrastructure barrier categories. Home to an offline population of more than 1.4 billion individuals, this group had an aggregate Internet penetration rate of 19 percent in 2013.

Group three: Medium barriers, greatest challenges in incentives. Comprised of China, Sri Lanka, and Vietnam, this group is home to approximately 800 million offline individuals. The offline population in each country is largely rural and literate. With the exception of the incentives category, where both China and Vietnam scored in the bottom quartile, the countries in this group rank in the middle (second or third) quartiles across each pillar of the Internet Barriers Index. In aggregate, this group has an Internet penetration rate of 45 percent.

Group four: Medium barriers, greatest challenges in low incomes and affordability. This group consists of Colombia, Mexico, Brazil, South Africa, and Turkey and accounts for an offline population of just under 260 million individuals. With an aggregate Internet penetration rate of 49 percent, these countries are characterized by offline populations that are predominantly urban, literate, and low income. All of the countries in this group score in the middle (second or third) quartiles in the user capability and infrastructure categories of the Internet Barriers Index, and a couple countries rank in the first quartile in the incentives category. However, in contrast with those bright spots, low incomes and affordability remains a significant challenge; each of the countries in this group faces some combination of low gross domestic product (GDP) per capita, large proportions of their population with low incomes, and a high poverty rate.

Group five: Low barriers across the board. This group is composed of countries that face relatively low barriers compared with the other four groups, resulting in an aggregate Internet penetration rate of 79 percent. Countries in this group include Germany, Italy, Japan, Korea, Russia, and the United States. Despite the low barriers, these six countries are still home to aggregate offline population of approximately 180 million people. Interestingly, given the high Internet penetration rates in this group, the offline populations are disproportionately low income and female.

7. **Current initiatives, forthcoming innovations, and lessons from countries that have made headway are cause for optimism.** Nations around the world have recognized the transformational impact of bringing more of their population online and are moving aggressively on several fronts to do just that. Governments are setting ambitious goals for mobile Internet coverage and investing to extend fixed-broadband infrastructure and increase public Wi-Fi access. At the same time, network operators and device manufacturers are exploring ways to further reduce the cost of access and provide service to underserved populations. In addition, content and service providers are innovating on services that could improve the economic prospects and quality of life of Internet users.

Going forward, sustained, inclusive Internet user growth will require a multipronged strategy—one that will depend on close collaboration among players across the ecosystem, including governments, policy-makers, non-governmental organizations (NGOs), network operators, device manufacturers, content and service providers, and brands.

About the research

In exploring the barriers to Internet adoption for populations in different countries, this research report assesses challenges from the perspective of individual consumers rather than the perspective of companies. The report's analysis focuses on the level of Internet adoption as an indicator of a country's online development rather than Internet usage, which relates more to the intensity of engagement of a given online population. We have also sought to identify and characterize the primary barriers to Internet adoption, using available data and analysis to enrich the dialogue. This report does not provide a detailed review of the solutions that would address the barriers identified.

A large literature, mostly published in either academic journals or in reports commissioned by global institutions (for example, ITU, GSMA, World Economic Forum, and the World Bank) has addressed the question of diffusion of various ICT technologies. Especially in the last 15-20 years, research has focused on the diffusion of the Internet across countries, emphasizing differences in adoption speed and highlighting a rather persistent digital divide. In producing this report, we reviewed the available research and incorporated three important distinctions into our approach:

1. Much of the digital divide research examines the use of multiple different technologies (for example, mobile broadband, personal computers). In this research, we have focused singularly on understanding the factors that drive Internet adoption. The single output metric in our analysis is Internet penetration (Internet users per 100), as defined and measured by the ITU. The maximum theoretical limit for this output metric is 100 percent, but that assumes that all individuals, including new-born children, are capable of directly accessing the Internet. A more realistic estimate of saturation should take into account the age distribution of the population.
2. We found much of the academic research to be dated, conducted in the mid-2000's and looking at time periods from the late 1990's to early 2000's. Given Internet services and capabilities are still rapidly evolving and the recent emergence of mobile as the primary point of access for the majority of users, we believe this research provides an important update on barriers to Internet adoption facing today's offline population. For countries comprising the largest fringe of the digital divide (for example, India, Indonesia, Nigeria), the proportion of Internet users that are adopting purely via mobile, thus bypassing the co-diffusion dynamics of personal computers and fixed-line broadband, is large and growing.
3. Most of the existing research tends to concentrate on a subset of barriers to Internet adoption. For example, telecom-oriented reports focus on infrastructure and the price of access, or regulation and policies governing the telecom and Internet sectors. Our research demonstrates that at least four categories of barriers must be taken into account, even if they all correlate with each other. We believe this report thus captures a more comprehensive picture of the system dynamics at work and uncovers different insights (for example, country groupings) than would be revealed from looking at a single barrier category.