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Online and upcoming: The Internet's impact on India

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Preface

In the four decades since its inception, the Internet has driven dramatic change. It has enabled flows of information, including entertainment, news, and financial and academic material. It has brought people closer together by enabling various forms of interpersonal communication, notably e-mail, instant messaging, video conferencing, and social networking. And it has allowed consumers to purchase virtually anything at any time, while providing producers with direct access to a wide range of markets. Furthermore, the Internet is a bustling industry, spurred by entrepreneurship and supported by a variety of industries and large enterprises. Online productivity tools and communications advancements provide benefits to almost all enterprises and governments. The Internet has helped governments to broaden their services to citizens and improve their delivery. In a very short period, it has become difficult for most of us to imagine a world without instant and continuous access to the Internet.

This report examines the impact of the Internet on India. It complements an earlier series in which we examined the Internet's impact on a group of developing countries that have both the scale and the dynamism to become significant players on the global stage in the near future (see *Online and upcoming: The Internet's impact on aspiring countries*, McKinsey & Company, January 2012). It also builds on our earlier assessment of the impact of the Internet on the advanced economies and several large developing economies, such as China, Brazil, Russia and India (see McKinsey Global Institute, *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, May 2011). As an ongoing body of work, our view of the Internet's impact on India is evolving. The insights and conclusions presented in this report are refinements of our earlier multi-country work, based on an in-depth assessment of India-specific data and multiple expert interviews in India. As data sources improve and the body of knowledge relating to the Internet expands in India, we look forward to continue to evolve our perspectives.

Our research focuses on the way the Internet affects India's economy currently, and its potential to do so in future. In our attempt to understand the impact of the Internet, we focus on how economic growth and prosperity have been affected; we also seek to discover how individuals, entrepreneurs, enterprises, and public sector entities have been transformed. In addition to assessing the Internet landscape and its impact on the various groups of participants, we examine the potential for India to utilize the particular strengths of its economy to enable businesses and individuals to derive greater benefits from the Internet. We do not offer prescriptive policies, but focus on opportunities and possibilities for India to accelerate its efforts to capture the Internet's benefits.

This is an independent McKinsey & Company report that draws on various sources: research from McKinsey's Technology, Media, and Telecom Practice; information from academic and public sources; research conducted with Google; and work from the McKinsey Global Institute (MGI), the business and economics research arm of McKinsey & Company. Without the contributions of the academics and researchers who are cited throughout the report, our effort would not have been possible.

To understand the trends in Internet activity in India versus other countries, we relied on several analytical approaches: (1) we constructed macroeconomic analyses for India, taking into account data related to Internet expenditure, Internet usage, the infrastructure, and various other environmental enablers of the Internet; (2) we conducted microanalyses of various Internet ecosystem participants and user groups, using publicly available data and interviews with company chief technology officers (CTOs); (3) we surveyed about 550 small and medium-sized enterprises (SMEs) in India; (4) we utilized data from McKinsey's proprietary Digital Consumer surveys in India in 2010 and 2012; (5) we constructed a forward-looking view on the potential size of the Internet user base in India; and (6) we conducted thought experiments to assess the ways in which the rapidly evolving supply-side enablers and consumer behavior could shape the Internet landscape. To test our conclusions, we interviewed industry experts in India and asked academics to review our findings. As a result, we are confident that the findings are directionally robust, despite the challenges of limited data availability. However, there is a clear need to conduct further research and analysis on the basis of enriched sets of data, given the growing importance of the Internet and its transformational impact.

The project was led by Chandra Gnanasambandam, a McKinsey principal in Bangalore, and Anu Madgavkar, a senior fellow at MGI in Mumbai, along with Noshir Kaka, managing director of McKinsey in India, James Manyika, a McKinsey and MGI director in San Francisco, Michael Chui, a senior fellow at MGI in San Francisco and Jacques Bughin, a McKinsey director in Brussels. Malcolm Gomes managed the project team of Shumi Jain, Milind Kopikare, and Immanuel Thomas.

We are grateful for the review, challenge and advice provided by our academic advisers for this research: we thank Martin N. Baily, the Bernard L. Schwartz Chair in Economic Policy Development at the Brookings Institution, and Rakesh Mohan, professor in the Practice of International Economics of Finance, School of Management, Yale University. We are also grateful for the insights of Rajan Anandan, Betsy Masiello, and Ramanjit Singh at Google.

The authors would like to acknowledge McKinsey's researchers who made significant contributions to the fact base: Shishir Gupta from MGI Economics and Dhruv Varma from McKinsey's research and information network.

Finally, we offer special thanks to the industry experts we interviewed during this project. For their perspectives on the evolution of the Internet landscape in India we thank Sunil Abraham, Director of the Centre for Internet and Society; Rajat Kathuria, Director and Chief Executive of ICRIER; Som Mittal, President of NASSCOM; and Subho Ray, President of the Internet & Mobile Association of India. For their insights into the Internet-related investments of their enterprises and the prospects for Internet innovation in India, we thank the many CTOs and technology company executives we interviewed. All references to specific companies in this report come from public sources.

Our aspiration is to provide facts and analyses to better understand some of the most important trends that are shaping the Internet in India. We hope our findings will enrich the dialogue about the ways that businesses, policy makers, and innovators can accelerate India's Internet transformation.

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1 billion

Internet users in 30 aspiring countries—
half of the global tally of Internet users

120 million

Internet users in India: the third largest
user base in the world

Across seven aspiring countries[1]
the average number of Internet users
for every 100 people is **34**
compared to **10** in India

The average number of fixed broadband subscribers
for every 100 people across the seven aspiring
countries is **7** compared to **1** in India

1 Our illustrative subset of seven of the "aspiring" countries, i.e., Argentina, Brazil, China, Malaysia, the Philippines, South Africa, and Vietnam.

1.9% average contribution of the Internet to GDP across all aspiring countries, versus **3.4%** in developed countries

1.6% contribution of the Internet to India's GDP, amounting to **$30 billion**

$12 billion
average estimated consumer surplus associated with Internet usage across the seven aspiring countries, versus **$9 billion** in India

Average international bandwidth capacity for every 10,000 people across the seven aspiring countries is **28 Mbps** versus **6 Mbps** in India

Contents

Executive summary

The Internet today connects more than two billion people worldwide. The Internet already has immense impact on the global economy, contributing an estimated $1.7 trillion, or just under 3 percent, of global GDP in 2010.[1] Yet half the number of Internet users lives outside the advanced economies, often in countries that are quickly developing, have significant economic potential and are socially and culturally diverse. India has about 120 million people online today and offers a striking example of the Internet's growth potential. India is adopting the Internet at a much more rapid pace than advanced economies and even many developing economies, yet 90 percent of its population is currently not connected.

This report assesses the impact of the Internet on India's economy, estimating its impact on GDP. Looking beyond that, we measure the Internet's broader impact in terms of consumer surplus and the development of Internet ecosystems. We also look at the ways in which various participants have benefited from the Internet already. We measure India's environment for e-commerce and entrepreneurship, and we analyze in detail the impact of the Internet on its small and medium-sized enterprises (SMEs). Finally, we assess the potential for the future impact of the Internet and what it would take for India to bring this potential into being.

As a basis for comparison, we use a set of 57 countries, both developed and developing, that include the G-20, many middle-income developing nations, and some populous but less-developed nations; these collectively constitute 91 percent of world GDP. Thirty of these countries are what we call "aspiring countries," defined as having the scale and dynamism to fuel economic performance in the global economy while driving significant domestic growth and offering prosperity to their own citizens. These aspiring countries have a collective GDP of $19 trillion, or 30 percent of global GDP. We focus our comparisons with India more closely on an illustrative subset of seven of the aspiring countries: Argentina, Brazil, China, Malaysia, the Philippines, South Africa and Vietnam. Of the set of more than 20 developed countries in our database, we focus our comparisons on five: Germany, South Korea, Sweden, the United Kingdom, and the United States.

Our report offers seven key findings concerning the impact of and outlook for the Internet in India:

1. **India's base of about 120 million Internet users is currently the third-largest in the world.** Though India's users spend less time online per capita than users in developed countries, their pattern of online behavior is rapidly converging. The Internet's role in communication, social networking, and informing and influencing India's consumers in categories such as apparel, books, financial services, and travel is already comparable with that of developed countries.

2. **India is likely to have the second-largest user base in the world, and the largest in terms of incremental growth, with 330 million to 370 million Internet users in 2015.** Given current downward trends in the costs of Internet access and mobile devices, India is on the verge of an Internet boom. In an evolution pattern unique to India, users who access the Internet only through a mobile or tablet device will constitute around 75 percent of new users and 55 percent of the aggregate user base in 2015, leading to increasing demand for content that is optimized for a small screen.

3. **India has the potential to double its economic contribution from the Internet in the next three years, from 1.6 percent of GDP at present to 2.8 to 3.3 percent by 2015.** Despite the large current base of users, the Internet currently contributes a modest 1.6 percent to India's GDP, in line with

1 For a detailed account of the Internet's contribution to GDP in several developed and aspiring countries, see *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011.

most aspiring countries. This could grow to 2.8 to 3.3 percent by 2015 if India achieves its potential for growth in the number of Internet users and Internet technology-related consumption and investment over this period, increasing the Internet's contribution to GDP from $30 billion today to nearly $100 billion in 2015. This would make the Internet-related economy larger than the education sector and as large as the health care sector, in terms of share of GDP at present. Currently, India's information and communication technology (ICT) exports are the most significant component of the Internet's impact on GDP. But private consumption, private investment and public investment have greater potential to grow in future.

4. **The impact of the Internet in India is constrained by current gaps and obstacles in the Internet ecosystem.** While India scores well on the availability of human and financial capital, it rates poorly on Internet infrastructure, Internet engagement, the e-commerce platform, the ease of Internet entrepreneurship, and the impact of e-governance. On most indicators of the strength of the Internet ecosystem, India ranks in the bottom quartile of our comparison set of 57 countries.

5. **Although the Internet ecosystem is becoming more vibrant, the benefits have been relatively concentrated.** India's Internet start-ups are scaling up through creative adaptations to overcome infrastructural and systemic bottlenecks. Yet, while large enterprises have gained from their early adoption of the Internet, there is scope among individual consumers, SMEs and the government sector to significantly increase engagement. Today, India's measurable consumer surplus from the Internet is estimated at $9 per user per month, at the low end of the range for aspiring countries ($9 to $26) and well below the range for developed countries ($18 to $28). Even by 2015, with overall Internet penetration likely to reach 28 percent, rural penetration is likely to be just 9 percent.

6. **India can achieve broad-based Internet impact by aiming for the digital inclusion of nearly 40 percent of its population, to reach a user base of 500 million by 2015, rather than the likely target of 330 million to 370 million.** Most of the additional 150 million to 160 million users would be individuals and small businesses in semi-urban and rural parts of the country. Extending Internet access to these segments of the population, and promoting the usage of many more online services, would enable India to derive much more of the intended benefits from government programs of inclusive growth in employment, education, health care, nutrition, and financial services.

7. **Concerted actions by policy makers and businesses in five areas can help India achieve an inclusive Internet transformation:** reduce the cost of Internet access across devices, content and applications; increase access to low-cost, high-speed connectivity in rural and semi-urban India beyond the top cities; promote widespread digital literacy through the introduction of devices and content tailored to the local context; devise Internet applications in new areas such as agriculture, health care, education, energy, utilities, and public information; and create a more favorable business environment for Internet entrepreneurs to support rapid innovation.

1. India's base of about 120 million Internet users is currently the third-largest in the world, and the pattern of online behavior is rapidly converging with that of users in more developed countries

India's large economy, with its young and increasingly urbanizing consumer base, offers strong growth potential for Internet usage. Weak infrastructure has kept India's Internet penetration low; at 10 percent, it is much lower than the average of 40 percent across aspiring countries. Even so, with about 120 million people online in 2011, India is the third-largest Internet user base in the world. Internet users in India spend 20 to 25 hours online per month, about the same as their counterparts in Latin America, but only a quarter of the amount spent by those in Asia Pacific countries such as China and Malaysia. However, the time spent on the Internet per user in India rose 24 percent from 2010 to 2012; more sophisticated categories of Internet use, such as social networking, online research, online transactions and entertainment, grew more rapidly than reading and browsing. The share of Indian digital consumers who use online media for search, awareness, and research to purchase products is already high across multiple categories: in apparel (26 percent), travel (51 percent), books (36 percent), and financial services (30 percent), the proportions are comparable with those in Germany, Japan and the United States.

2. India is on the verge of an Internet boom with a projected user base of 330 million to 370 million by 2015, which will be the second largest in the world, and the largest in terms of incremental growth

India's current Internet user base of about 120 million is likely to nearly treble by 2015, and will thereby account for approximately 12 percent of the global total (Exhibit E1). The projected growth in India's Internet users, an additional 230 million or so between 2011 and 2015, is likely to be the highest incremental growth in the world. In recent years, India's rate of growth of Internet users has been faster than that of many aspiring countries—for example, Malaysia's Internet user base grew 1.8 times from 2005 to 2011, and South Africa's grew 1.9 times, while India's grew more than 5 times.

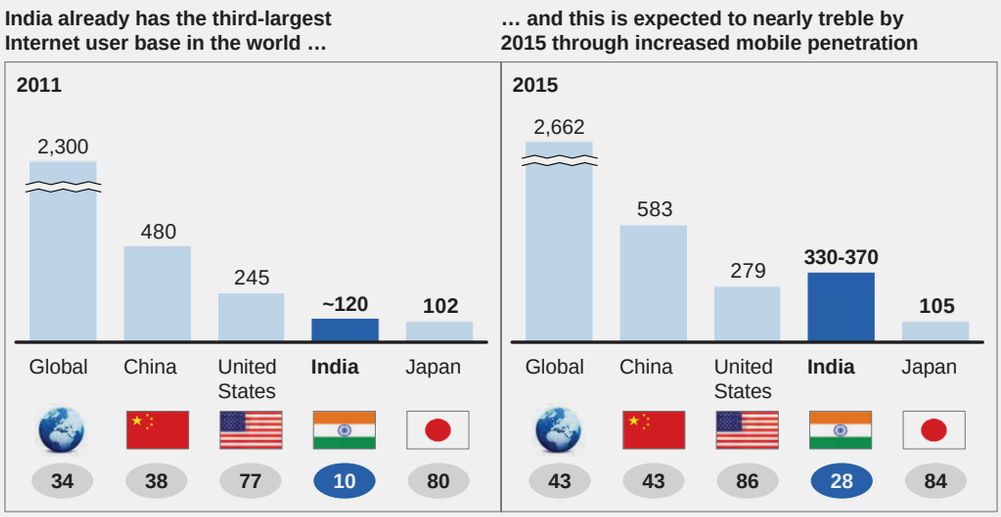
India's Internet revolution is being shaped by telecom players' strategies to reduce cost of access. Smartphone costs are falling rapidly as players achieve scale economies, while the proliferation of 3G/4G services in India is likely to reduce connectivity costs and overcome the challenge of limited fixed-line connections. As a result, nearly 75 percent of new users and more than half of India's base of Internet users in 2015 is likely to be mobile-only subscribers who will use Internet-enabled devices. By contrast, mobile-only users are likely to constitute a mere 10 to 15 percent of the market in India's regional counterparts, China and Malaysia. India's Internet market is therefore likely to require a unique approach to content and application design. Mobile-based users will demand limited textual content and more audio-visual content because of the small screen size of their devices. Furthermore, it will become essential for entrepreneurs and innovators to make their applications or services compatible for users with a basic mobile device, in order to target those in the rural population who might not be able to afford a sophisticated smartphone.

Exhibit E1

India's projected 330 million to 370 million Internet users will form the second-largest Internet population in the world by 2015

Internet penetration (%)

Total number of Internet users
Million



SOURCE: Internet World Stats (2010); Business Monitor International (BMI); International Telecommunication Union (ITU); McKinsey Digital Consumer survey; Public information; Pyramid Research; McKinsey analysis

3. India has the potential to double its economic contribution from the Internet, from 1.6 percent of GDP at present to 2.8 to 3.3 percent by 2015

We estimate that the Internet contributes an average 3.4 percent in developed countries and 1.9 percent of GDP in aspiring countries. In some aspiring countries, such as Taiwan and Malaysia, the Internet contributes to GDP at levels similar to those in developed countries. This is due to their strong net exports of ICT goods and services.[2] In line with other aspiring countries, the Internet's contribution to India's GDP — what we call its iGDP — is moderate today, at 1.6 percent, or $30 billion in GDP (see Box E1, "Improved estimates of Internet's share of India's GDP"). At 1.6 percent of GDP, India's iGDP is comparable in size to key service sectors, such as hotels and restaurants, and utilities.

While the Internet contributes only a modest share of India's GDP at present, there is tremendous opportunity for improvement. By 2015, the Internet has potential to contribute 2.8 to 3.3 percent to the GDP through an increase in Internet-related ICT expenditure , or about $100 billion in GDP (Exhibit E2). The lower end of the potential iGDP range would indicate that India will continue on its current trajectory to achieve 330 million to 370 million Internet users by 2015. India's iGDP could potentially reach the higher end of the iGDP range of 3.3 percent if Internet penetration got onto a higher trajectory to reach nearly 500 million users by 2015. This would make the Internet economy larger than the education sector and as large as the health care sector in terms of share of GDP at present. The potential increase in GDP would be achieved through growth in the consumption of Internet access devices and usage, increased levels of e-commerce, and greater investment in Internet infrastructure and services by both the public and private sectors. Opportunities for growth in the Internet's impact are therefore substantial and achievable, given the likely growth in India's Internet user base and the population's increasing propensity for digital consumption.

Furthermore, the Internet's effect on the Indian economy and the lives and well-being of Indians goes well beyond iGDP. Growth in ICT expenditure causes demand growth in other sectors, both upstream and downstream. We estimate this GDP multiplier to be 1.6 to 2 times, implying that the overall impact of the Internet on GDP growth is 1.6 to 2 times that of the underlying growth in expenditure over any period. Current levels of Internet-related expenditure are estimated to create about 6 million direct and indirect jobs. As the direct impact of the Internet on India's GDP has the potential to treble by 2015, an additional 16 million jobs could be created. Internet-based applications also increase the productivity of end users. SMEs in India that have a high usage of web-based technologies report almost double the revenue growth of those that do not use Internet-based business solutions.

2 For a detailed account of iGDP in several developed and aspiring countries, see *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011 and *Online and upcoming: The Internet's impact on aspiring countries*, McKinsey & Company, January 2012.

Box E1. Improved estimates of Internet's share of India's GDP

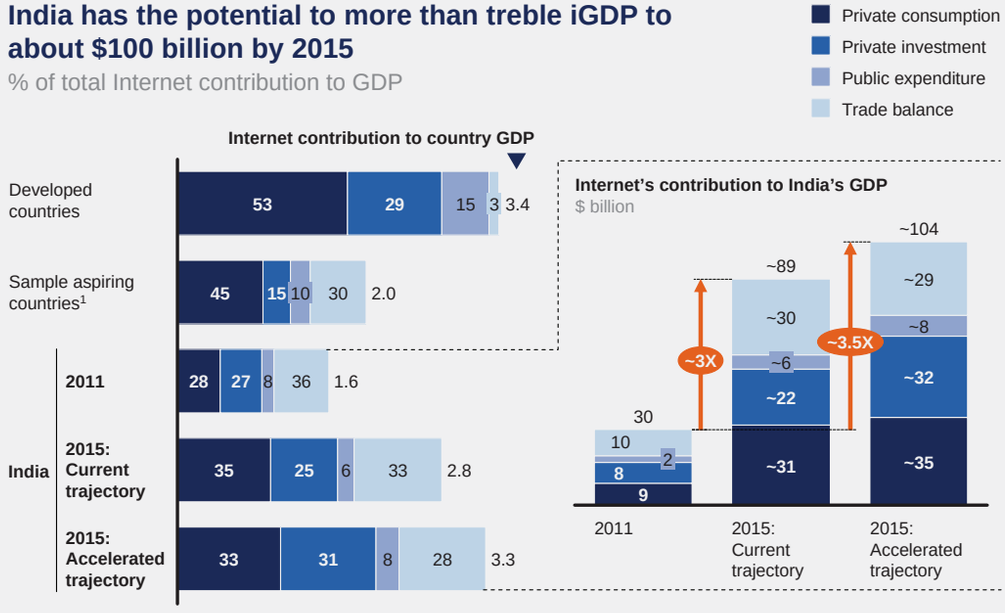
India's iGDP — or the Internet's economic contribution — is estimated by computing aggregate levels of ICT expenditure and estimating the share of Internet-related expenditure in the economy. iGDP constitutes individuals' consumption of Internet access devices such as personal computers (PCs), smartphones and telecom, and on online purchases such as books and music; investment by large and small enterprises in Web technologies such as cloud storage and e-business solutions; public sector or government investments, such as on broadband projects and e-governance services for citizens; and finally India's net exports of IT services and IT-enabled services that are directly enabled by Web technologies.

The Internet's estimated share of India's GDP at 1.6 percent relies on bottom-up India-specific estimates of the share of ICT expenditure linked to the Internet. In our previous work (*Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011), broader developed country benchmarks for the share of Internet in ICT expenditure were used to estimate this share, rating India's share of Internet-linked GDP at about 3.2 percent. The earlier estimation relied on an extrapolation of developed country benchmarks, while in this report we adapt the methodology to develop India-specific drivers of share of Internet. For instance, the amount of time spent online by individuals is derived from McKinsey's Digital Consumer survey undertaken in India; the share of Internet-related ICT expenditure by SMEs is derived from a primary survey of SMEs in India; and estimates of the Internet's contribution to India's large enterprises and IT exporters are based on interviews with Indian CTOs. Hence we believe these estimates of the Internet's share of India's GDP are the most robust available currently (see Appendix: Methodology and approaches for a detailed description).

Exhibit E2

India has the potential to more than treble iGDP to about $100 billion by 2015

% of total Internet contribution to GDP



1 Includes Argentina, Hungary, Malaysia, Mexico, Morocco, Nigeria, Taiwan, Turkey, Vietnam.
NOTE: Numbers may not sum due to rounding.
SOURCE: Gartner; IHS Global Insight; Organisation for Economic Co-operation and Development (OECD); ITU; International Data Corporation (IDC); World Health Organization (WHO); ICD; iConsumer US 2010; Euromonitor; H2 Gambling Capital; PhoCusWright; Pyramid Research; UNESCO; McKinsey analysis

4. The impact of the Internet in India is constrained by obstacles and gaps in the Internet ecosystem, compared with many peer countries

On most indicators of the strength of the Internet's foundation (i.e., the preconditions for future growth), India ranks in the bottom quartile of our set of 57 countries (Exhibits E3 and E4). The exceptions are human capital, where India has a large pool of technically trained workers, and the reasonably well-developed access to finance. On most other dimensions, India's Internet infrastructure and e-engagement levels are limited, and its Internet foundations have significant scope to improve. India's low levels of user adoption and engagement (ranked 49 out of 57 countries in Internet user engagement and accessibility) are due to the following obstacles:

- **Limited availability of Internet infrastructure.** India is ranked 49 out of 57 countries on Internet infrastructure and environment. For example, India has only approximately 6 percent of the number of secure Internet servers per capita that Brazil or South Africa has. Average bandwidth per capita in India is significantly lower than in many other aspiring countries. The penetration of PCs is only 47 per 1,000 people, which is much lower than in Argentina, Mexico, the Philippines, or Vietnam. Internet penetration among India's large rural population is just one-twelfth that of the urban population. Low availability of basic infrastructure, such as reliable electricity supply, is a key bottleneck in rural areas.

- **High cost of access and usage.** At $61 per Mbps (on a PPP basis), India has one of the highest median costs of broadband access among comparable aspiring countries — more than four times that of China, Brazil and Argentina, and 20 to 30 percent higher than that of Vietnam and Malaysia.

- **Lack of awareness and low digital literacy.** Only 35 percent of businesses in India offered online services such as Web presence, compared with an average of 56 percent in aspiring countries. In an online survey of India's SMEs in the organized sector, they cited the lack of education on using the Internet as among the top three reasons that prevent consumers from using the Internet.[3]

- **Narrow range of applications and services.** Internet applications are yet to scale up in a wide range of areas that impact society, such as agriculture, education, health care, and citizen services. Access to online government services across the country is low, with a large quantity of government data, such as land or health records, yet to be digitized, and large flagship Internet infrastructure projects such as the National Optical Fiber Network yet to become fully operational. India is ranked in the bottom quartile on government e-participation index, which measures the breadth and usage of online services offered by the government.

- **An unfavorable business environment.** India is ranked 48 out of 57 countries on ease of Internet entrepreneurship. Indian entrepreneurs face particular challenges in terms of the ease of starting a new business — India is ranked 50th among 57 countries on the number of procedures required to start a new business.

3 Based on a McKinsey survey of 554 SMEs in the organized sector in India in 2012; an estimated 8 million of the 35 million SMEs in India are in the organized sector.

Exhibit E3

Internet landscape and impact statistics

Top quartile | Second quartile | Third quartile | Bottom quartile

Focus countries for comparison against India	Internet users Million	Internet penetration % of population	Fixed broadband subscribers % of households	Mobile broadband subscriptions % of households	Median monthly cost of 1 Mbps $ PPP	Online retail share of retail %	Internet contribution to GDP[1] % of GDP	Internet contribution to GDP growth[1] % of GDP growth
Argentina	26	64	10	13	16	1.1	2.2	2.7
Brazil	79	41	7	11	17	3.1	1.4	2.4
Canada	28	81	30	15	5	0.9	2.7	10.2
China	486	36	9	2	11	1.1	2.6	3.4
France	50	78	33	36	8	3.8	3.2	17.6
Germany	67	82	32	36	4	3.8	3.2	24.3
Hungary	7	68	20	30	3	1.1	3.9	11.4
INDIA	**122**	**10**	**1**	**2**	**61**	**0.3**	**1.6**	**2.0**
Malaysia	16	55	7	27	50	4.4	4.1	2.3
Mexico	39	34	10	8	22	0.5	1.0	2.2
Morocco	16	49	2	10	–	0.5	0.9	1.2
Nigeria	52	33	<1	3	–	0.1	0.5	0.9
Philippines	23	25	2	7	60	0.4	–	–
Russia	61	43	11	17	5	2.1	0.8	0.9
South Africa	6	12	1	16	57	1.6	–	–
South Korea	40	83	36	91	–	12.3	4.6	16.0
Sweden	8	90	32	84	3	3.8	6.3	32.9
Taiwan	16	72	23	–	–	3.0	5.4	12.7
Turkey	36	49	10	18	9	0.8	0.9	1.5
United Kingdom	53	85	31	56	4	7.7	5.4	22.7
United States	250	81	27	54	5	4.0	3.8	14.9
Vietnam	27	31	4	13	41	–	0.9	1.6

1 Internet contribution to GDP calculated in 2010 for Argentina, Hungary, Malaysia, Mexico, Morocco, Nigeria, Taiwan, Turkey, and Vietnam; in 2011 for India; and in 2009 for all other countries. Internet contribution to GDP growth is calculated from 2005 to 2010 for Argentina, Hungary, Malaysia, Mexico, Morocco, Nigeria, Taiwan, Turkey, and Vietnam; from 2005 to 2011 for India; and from 2004 to 2009 for all other countries.

SOURCE: Internet World Statistics, 2010; Hungarian Central Statistical Office 2010; Economist Intelligence Unit Telecoms and Technology Report data for 2010, published in 2011; Morocco, Agence Nationale de Reglementation des Telecommunications, 2010; Malaysia Communications and Multimedia Commission data for 2010, published in 2011; ICT Vietnam Whitebook data for 2010, published 2011; International Telecommunication Union, World Telecommunication/ICT Development Report and database, 2010; World Bank population data, 2010; Cost of 1 mbps from Speedtest.net pulled in November 2011, PPP adjustment to US dollar using World Bank 2010 conversion rate; Euromonitor International, 2010; McKinsey analysis

Exhibit E4

Internet foundations statistics

Scaled to 100[1]

Top quartile | Second quartile | Third quartile | Bottom quartile

Focus countries for comparison against India	Human capital	Base infra-structure	Internet infra-structure	Internet access-ibility	Ease of Internet entrepre-neurship	E-commerce enable-ment	Financial capital	Business environ-ment	Global connected-ness
Argentina	17	22	31	24	19	30	5	32	37
Brazil	22	39	30	31	29	44	16	34	37
Canada	31	72	79	78	84	78	30	80	52
China	69	46	27	19	36	34	23	55	31
France	33	64	70	71	71	70	30	72	54
Germany	33	70	74	80	58	71	21	80	59
Hungary	22	42	57	58	64	51	10	46	46
INDIA	**39**	**27**	**17**	**15**	**29**	**30**	**25**	**44**	**30**
Malaysia	24	57	40	25	39	44	27	65	68
Mexico	15	29	23	35	33	36	10	40	43
Morocco	21	37	17	35	39	25	19	41	46
Nigeria	27	9	4	44	35	20	11	36	37
Philippines	12	18	21	9	13	20	15	29	44
Russia	41	31	27	41	48	34	16	32	41
South Africa	13	32	23	27	37	38	20	58	51
South Korea	39	68	75	56	51	64	19	61	38
Sweden	35	77	91	87	71	75	37	89	60
Taiwan	35	81	67	67	65	67	43	71	66
Turkey	18	43	43	24	43	35	13	47	40
United Kingdom	37	66	87	88	79	80	27	79	65
United States	85	75	76	80	76	81	81	79	53
Vietnam	40	32	24	11	30	21	16	43	39

1 These scores represent the percentile rank of each country on each indicator across a sample of 57 countries. The best-performing country on each score receives a score of 100, while the worst-performing country in our sample receives a 0.

SOURCE: World Economic Forum, Global Information Technology Report 2010-2011; Computer Industry Almanac; Pyramid Research; United Nations Conference on Trade and Development, Information Economy Report 2010; World Digital Media Trends; Euromonitor; International Data Corporation; World Bank; World Economic Forum, Global Competitiveness Report 2010-2011; IMD World Competitiveness Online; Capital IQ; UNESCO; ITU World Telecommunication; International Finance Corporation; Speedtest.net; Transparency International; Economic Intelligence Unit; postal operator websites; Telegeography; International Monetary Fund; FDI markets; Economist Intelligence Unit; Global Insight; CIA Factbook; CEPII; Ethnologue: Languages of the World; McKinsey analysis

5. While entrepreneurs have devised innovative business models, India's consumers, SMEs, and government sector have much to gain from increased online usage

India's young people have driven the rapid adoption of online services. Their engagement with online activities, such as e-mail, social networks, and search engines, follows a similar pattern to that of their counterparts in developed countries. Yet India's low Internet penetration — ranked 53rd in our list of 57 countries — has held back the rapid expansion of online services. The scope for growth is evident in the Internet's impact on consumer surplus.[4] Today, measurable consumer surplus is estimated to be between $9 and $26 per user per month in aspiring countries, with India figuring at the low end: its consumer surplus estimate of $9 per user per month is substantially lower than the $18 to $28 seen in developed economies. Compared with their counterparts in developed and aspiring countries, India's consumers could derive much more benefit from the use of free Internet services: from e-mail and browsing to information services and search, and from collaborative applications such as wikis, blogs, and social networks. The nascent e-commerce platform in India can also be improved in terms of Internet readiness and the enablement of online payment.

While India's large enterprises were among the first to adopt broadband and now lead the way in adopting more advanced Web technologies to increase revenue and reduce costs, SMEs have not yet fully leveraged ICTs and Web technologies. They are held back by a lack of education about how to use the Web and by the high cost of Internet access and technology solutions. However, SMEs across aspiring countries, and in India too, that have used the Internet state that they have increased revenue, reduced costs, and recorded higher productivity (Exhibit E5); they are also growing the fastest.[5] In the government sector, India is starting to offer better and more accessible public services through the Internet, but the impact on citizens has been limited, given that the low levels of Internet penetration reduce the impact of e-governance initiatives.

However, Internet entrepreneurs are adapting business models to overcome infrastructure bottlenecks. Entrepreneurial ventures such as Naukri.com use phone-based voice and text message services to supplement a Web-based model and provide greater ease of access. The use of online financial transactions is still in its infancy and will develop as the critical enablers—such as legal protection against fraud—become more robust. Meanwhile, online ticket-sales sites such as Redbus.in offer customers the facility of cash payment upon physical delivery of online purchases as an alternative to utilizing credit cards in a system perceived to be insecure. Flipkart.com, one of India's largest online retail players, has developed its own logistics operations to save on courier commission charges and reduce delivery time in Tier 2 cities.[6] The dramatically richer and more diverse range of Internet-enabled products and services required to reach the next 200 million to 300 million Internet users will act as a catalyst for even more creativity and entrepreneurship.

4 Consumer surplus is the value derived by consumers by being able to use Internet services at a price more than the most they would be willing to pay, less the negative value they ascribe to advertising interruption and private information collection while using Internet services. See the Appendix for details on the methodology of estimating consumer surplus.

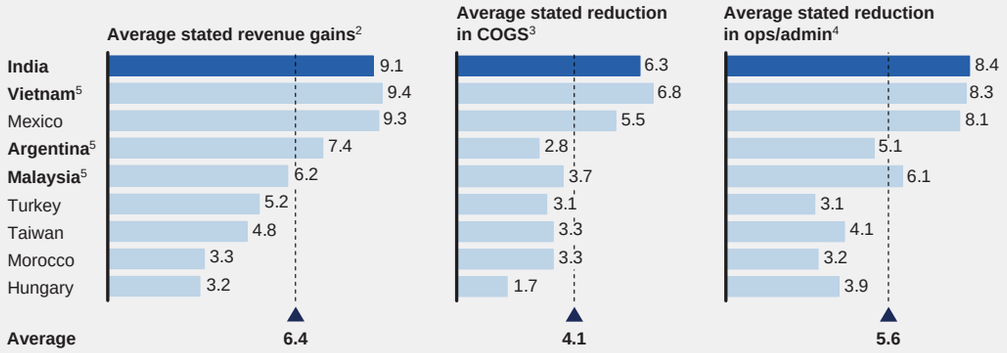
5 Based on a McKinsey survey of 554 SMEs in the organized sector in India in 2012; an estimated 8 million of the 35 million SMEs in India are in the organized sector. Aspiring countries data based on 2011 McKinsey survey of 2,500 SMEs across Argentina, Hungary, Malaysia, Mexico, Morocco, Taiwan, Turkey and Vietnam

6 We define Tier 2 cities as those having population of one million to four million; see *India's urban awakening: Building inclusive cities, sustaining economic growth*, McKinsey Global Institute, April 2010 (www.mckinsey.com/mgi).

Exhibit E5

Across nine aspiring countries, SMEs say the Internet has allowed them to gain revenue and reduce costs[1]

% (n = 554 for India, only in organized sector, n = 2,500 across all surveyed countries)



1 SME sectors have not been surveyed in Brazil, China, the Philippines, and South Africa.
2 Percentage of respondents answering "Yes" to "Current performance linked to the Internet: Have Web technologies made it possible for your company to increase your revenue (to an extent that could not have happened through other channels or technologies)?" multiplied by the average stated impact.
3 Percentage of respondents answering "Yes" to "Current performance linked to the Internet: Have Web technologies made it possible for your company to reduce your cost of goods sold (COGS)?" multiplied by the average stated impact.
4 Percentage of respondents answering "Yes" to "Current performance linked to the Internet: Have Web technologies made it possible for your company to reduce expenses related to administrative, operational and general costs (including marketing expenses)?" multiplied by the average stated impact.
5 Focus aspiring countries for comparisons against India.

SOURCE: 2012 McKinsey survey of 554 SMEs in India; 2011 McKinsey survey of 2,500 SMEs across Argentina, Hungary, Malaysia, Mexico, Morocco, Taiwan, Turkey, and Vietnam; McKinsey analysis

6. India can achieve a broad-based Internet transformation by aiming for the digital inclusion of nearly 40 percent by 2015

Even in 2015, when aggregate Internet penetration is projected to reach 28 percent, the penetration of India's rural population is likely to remain at a low 9 percent, compared with urban penetration of 64 percent. India's policy makers are advancing more equitable development, through programs to improve access to employment, education, nutrition, infrastructure, and financial services for both rural and urban populations. Accelerating Internet adoption through the country, along with providing basic services such as uninterrupted power, water and sanitation, could drive greater benefits from such inclusive growth programs and enable a larger proportion of India's vast population to enter the global economy. For example, financial inclusion in rural areas, aided by Web technologies, can channel government resources directly to the intended beneficiaries without leakage. Internet-based delivery models can dramatically raise the productivity of public education and health care systems. An increase in Internet usage among India's consumers and small enterprises in smaller towns, semi-urban and rural areas will lead to both faster growth in consumption and better access to export markets; it has already shown promise in improving the livelihoods of the rural population.

India's likely Internet penetration of 28 percent in 2015 will be far less than the projected global average of 43 percent. To achieve a penetration of nearly 40 percent by 2015, which would be similar to China's Internet penetration at that date, India would need to have notched up more than 500 million Internet users. This implies the significant digital enablement of semi-urban and rural consumers, for example, rural penetration in 2015 matching today's penetration levels of urban India. Such a trajectory would necessitate accelerating government investments such as the National Broadband Plan, which aims to add nearly 100 million broadband connections by 2014; AADHAR, a project that will create an estimated 600 million unique identifications for India's citizens, and can enable large-scale government-to-consumer e-payments; and the low-cost tablet computer, Aakash, which aims to play an enabling role in rural education.

7. Concerted actions in five areas can help India take advantage of its strengths and build a stronger Internet ecosystem

India has significant advantages that make it fertile ground for an Internet-enabled transformation: a youthful demographic profile that will produce a large future wave of early adopters of technology; a large pool of workers with technical education; and a strong culture of entrepreneurship and the ability to adapt business models for a resource-constrained environment. However, for the Internet ecosystem of India to mature, several foundational elements need to be fixed. India has five key areas to focus on: limited availability of Internet infrastructure; high cost of access and usage; lack of awareness and low digital literacy; narrow range of applications and services; and an unfavorable business environment. India can take concerted action in these five areas to put these foundational elements in place and significantly increase the impact of the Internet in a broad-based, inclusive manner:

- **Extend infrastructure for low cost, high speed connectivity to semi-urban and rural parts of India.** In order to increase the penetration to 40 percent, it is essential to extend the Internet infrastructure beyond the top tier cities. Mobile connectivity will play a large part in achieving this. As the 3G network expands and 4G is rolled out, it is essential to include semi-urban and rural areas. Accelerating existing government programs (such as the National Optical Fibre Network), promoting public-private collaboration, and a supportive telecom policy could potentially improve the pace of the roll out. For example, such initiatives in Peru have provided "last mile" connectivity to rural areas of the country.

- **Reduce the cost of Internet access and usage even further.** Providing an affordable means to access and use the Internet is a critical enabler to increase Internet penetration. As India looks to connect more of its rural population, it is essential to provide low cost access devices, affordable Internet connections and applications/services through rationalisation of tax structures, direct subsidies, conditional cash transfers, or regulated broadband tariffs. Device manufacturers can also play their part in making the Internet more affordable. For instance, cost of manufacturing, and hence the cost to customer, could potentially be reduced through low cost sourcing of parts that are identified using teardowns and cleansheet analysis.

- **Enable large-scale digital literacy to promote user engagement.** Lack of education about using the Internet and near absence of local language support in devices, applications and services is holding back the increase in usage. This shortfall becomes more acute as less educated users from rural areas gain access to the Internet. Hungary is an example of affordability being an insufficient stimulus to usage: though over 90 percent of the population can afford broadband Internet, only about half actually use it on account of the limited availability of local digital content, and low digital literacy. Sri Lanka's Ministry of Education is promoting digital literacy through the establishment of self-sustaining computer learning centers that provide training and Internet access after school hours. A cadre of "para-technicians" could be created, to act as intermediaries between the Internet on the one hand, and novice users on the other. As more rural and semi-urban users in India connect to the Internet, adoption could be accelerated by developing local language content, with image-based user interfaces and less textual content. Examples might include an India-specific mobile operating system, or a simplified weather information application for farmers.

- **Introduce Internet-based applications in all parts of the economy, including non-traditional areas such as agriculture, energy, education, utilities and health care.** As Internet penetration increases and more users have access to high-speed connections, it is essential to develop products and services that address a much wider range of needs. An example is Ghana's CocoaLink project, an outreach program for farmers to exchange expertise in the community. The availability of public sector information could open immense opportunities to create innovative and useful services over the Internet, with strong potential for impact: providing farmers with real time updates on prices, increasing efficiency of the power grids, and enabling transparent online procurement systems.

- **Create a favorable environment for Internet businesses to both start and scale up. India lags behind other countries in this regard.** Both the government and private sector have potential to improve the situation through focused actions—ease procedures, accelerate the pace of setting up businesses, provide tools and platforms that help SMEs and entrepreneurs to scale up and reduce

uncertainty in the legal regimes affecting online businesses. For example, centralizing the entire process for registering and starting a business (including all the documentation, permits and licenses) at a single online portal could provide a huge boost to the start-up ecosystem in India.

This list of initiatives is by no means exhaustive. Initiatives need focused action from three key sets of stakeholders. Policy makers could look to improve the overall business environment and enable the wider reach of Internet penetration. Private enterprises have immense potential to improve Internet infrastructure, incubate new businesses and promote digital literacy. And because the next 200 million to 300 million new Internet users will have many fundamentally different Internet usage capabilities and needs than present users, entrepreneurs will need to ramp up the supply of customized products and services.

It is important to note that the growth of the Internet anywhere—whether in developed or aspiring countries—is accompanied by an increase in threats and possibilities for misuse. There is substantial and increasing anxiety about piracy, cybercrime, cyberterrorism, and the invasion of privacy, which might become more acute as India adds millions of new users. These are very real concerns that require coordinated action. However, these issues are being tackled and need to be solved using means that do not hamper the growth of entrepreneurship and innovation that are so supportive of greater digital inclusion.

□ □ □

India stands on the verge of a major Internet discontinuity that has the capacity to transform large parts of its economy and society. Achieving large-scale Internet penetration and usage could enable India to double the contribution of the Internet to its GDP, and to share these benefits with nearly 500 million Internet users by 2015. All stakeholders would need to collaborate to achieve this goal. Tremendous developmental opportunities exist for individuals, entrepreneurs and enterprises, as well as for government and policy makers, and these opportunities should be explored and embraced.

India's Internet landscape

The use of the Internet in India is set to grow rapidly. India currently has about 120 million Internet users, making it the third-largest user base in the world; the number of users is set to increase threefold by 2015, and this will make India the second-largest national group, behind only China. The young and dynamic user population is driving the growth of online consumption and is using the Internet in sophisticated ways that are in line with developed countries. India's Internet market will have a uniquely Indian flavor, making local content development and innovation particularly important.

A large, dynamic consuming class

India has rising levels of urbanization, rapid growth in its consumer base, and one of the most youthful demographic profiles worldwide. The population's median age is 25.1 years, which is among the lowest in the world, and 58 percent of the population is under 30 years of age. The urban population is already sizable, at 377 million in 2011, or 31 percent of India's total population. By 2020, India is likely to have acquired an additional 112 million urban residents, and an urbanization ratio of 36.4 percent.[7] Average per capita GDP is low, at $3,000 in 2010 (at purchasing power parity, or PPP, 2005 prices), and an estimated 30 percent of India's population lives below the poverty line. Nonetheless India's "consuming class"—at more than 45.3 million households—is sizable, and is projected to grow to 94.3 million households by 2020.[8]

India's economy has grown rapidly, at 6.8 percent real growth per year between 2000 and 2010, supported by increasing foreign investment, growth in infrastructure investments, and the liberalization of sectors such as telecom and insurance. Among aspiring countries, India's per capita GDP is close to the lower end, but its pace of growth is among the most dynamic. For the purposes of this report, we have selected for comparison with India a set of seven aspiring countries that all have a significantly higher per capita GDP but are comparable in terms of the dynamism of their economies and likely evolution of their Internet landscapes (see Box 1, "How we define 'aspiring countries' and our comparison set of countries").

7 *India's urban awakening: Building inclusive cities, sustaining economic growth*, McKinsey Global Institute, April 2010 (www.mckinsey.com/mgi).

8 The "consuming class" is defined as households with annual household income greater than INR 200,000 or $13,605 (at PPP 2005 prices).

Box 1. How we define "aspiring countries" and our comparison set of countries

As a basis for comparison, we use a set of 57 countries, both developed and developing, including the G-20, many middle-income developing nations, and some populous but less developed nations, that collectively constitute 91 percent of world GDP. Within this set of 57 countries, we define as "aspiring" a group of significant and dynamic countries that we gauge can aspire to become developed countries within a reasonable time frame. Our quantitative definitions are:

- **Significant:** Nominal per capita GDP between $1,000 and $20,000 in 2010; nominal GDP in 2010 above $90 billion
- **Dynamic:** Nominal per capita GDP growth at a compound annual growth rate above 3 percent in the period 2005—10

The following 30 countries can thus be defined as "aspiring": Algeria, Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Iran, Kazakhstan, Malaysia, Mexico, Morocco, Nigeria, Pakistan, the Philippines, Poland, Romania, the Russian Federation, Saudi Arabia, South Africa, Taiwan, Thailand, Turkey, Ukraine, Venezuela and Vietnam.

For the purposes of this report, we have selected seven of these countries as a representative sample of peers against which to compare India. These countries have higher per capita GDP than India's but are comparable on many key elements of Internet foundation (that is, the preconditions for future growth) and Internet impact. They span key geographies (Africa, Asia, and Latin America) and levels of development, and their Internet ecosystem growth models offer relevant learnings for India. These countries are Argentina, Brazil, China, Malaysia, the Philippines, South Africa and Vietnam.

We also add to the comparison set five developed countries whose intrinsic strengths and Internet evolution patterns provide glimpses of the way forward for India.[1] These countries—Germany, South Korea, Sweden, the United Kingdom, and the United States—have either strong innovation potential or large consumption-led economies, both of which are attributes India possesses in some degree and that could form the basis for India's Internet growth in the coming decades. Among these, Germany, South Korea, and Sweden have strong innovation potential, which is defined as spending a high proportion of GDP on R&D, and having a large ICT-educated and creative pool of individuals with the potential to develop high-added-value ICT businesses. The United Kingdom and the United States are consumption-driven economies or have a low level of imports. The two countries have increased Internet consumer surplus and have enabled businesses to get online and address domestic consumer demand of Internet-related goods and services.[2]

1 See *Online and upcoming: The Internet's impact on aspiring countries*, McKinsey & Company, January 2012, for a more detailed discussion of segmentation of countries based on macroeconomic strengths and the resultant Internet opportunities.

2 See the Appendix for details on the methodology to estimate consumer surplus.

About 120 million Internet users with increasingly sophisticated usage

India's Internet evolution reflects the transition of its telecom and Internet infrastructure industry from state-controlled to private-sector led (see Box 2, "Brief timeline of the development of Internet infrastructure in India"). India's overall stage of development as an Internet market is still nascent, in terms of Internet penetration and high speed connectivity (Exhibit 1). Yet, India now has the world's third-largest national digital population, with approximately 120 million Internet users in 2011. The number of Internet users in India has grown fivefold since 2005. India's rate of growth of Internet users has been slower than China's, in line with that of Brazil, but faster than that of many aspiring countries. Malaysia's Internet user base, for example, grew 1.8 times from 2005 to 2011, and South Africa's user base grew 1.9 times in the same period.[9]

On average, India's Internet users spend 20 to 25 hours online per month, broadly in line with usage in Latin America, where the average Internet user in Brazil and Argentina spends 26 hours and 28 hours online respectively. Internet users in Asia are much more active, with an average of 96 hours per month for Internet usage, indicating the scope to increase India's usage levels.[10] Mobile Internet usage is growing at the rate of nearly 85 percent per annum, with nearly 75 percent of non-voice usage being devoted to entertainment, where video and music streaming are major growth activities. The share of Indian digital consumers who use online media for search, awareness and research to purchase products is already high across multiple categories. For apparel, travel, books and financial services, Indians' Internet engagement is comparable with that of users in Germany, Japan and the United States.

Box 2. Brief timeline of the development of Internet infrastructure in India

1995 to 1998: Introduction and early growth

The Internet was first introduced by the government-owned agency, Videsh Sanchar Nigam Limited (VSNL), in August 1995. Coincidently, the first mobile phone call in India was made in the same month. Internet services were initially largely a monopoly of the VSNL, and restricted to the four big metropolitan areas: New Delhi, Mumbai, Chennai and Kolkata. By the end of 1998, there were more than one million Internet users and cybercafés became popular in the metros.

1998 to 2009: Entrance of private players and widespread adoption by users

Following the introduction of a new ISP policy, the barriers for private players to provide Internet services were reduced drastically and many of them started offering Internet services in 1999—2000. By this time, the number of Internet users had grown tenfold since VSNL's days, reaching 10 million. The government introduced its first broadband policy, laying out its aim to connect every part of the country. By the end of 2009, there were more than 60 million Internet users in India, predominantly accessed through PCs.

2009 to present: The mobile revolution

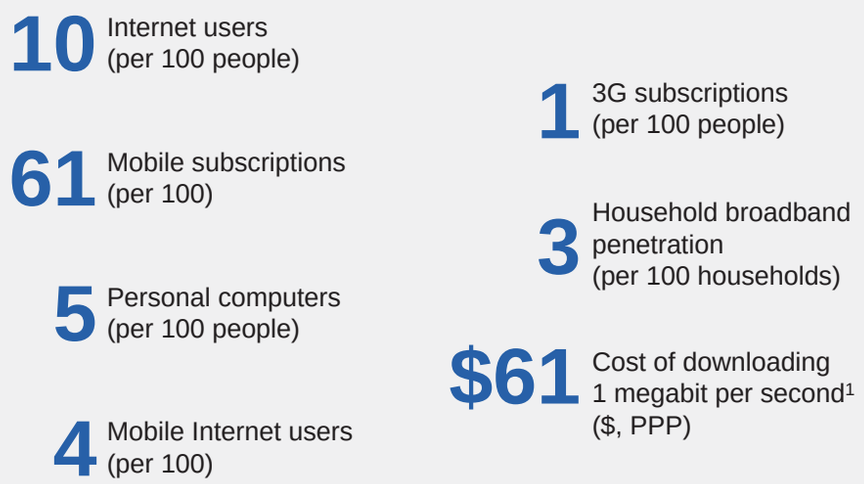
Although data services on mobiles were introduced in 2000, the huge growth in the user base did not occur until the introduction of 3G services that provided a huge boost to mobile Internet access. By the end of 2010, almost 40 percent of the 100 million users were accessing the Internet through a tablet or a mobile device. The introduction of 4G services in the cities such as Bangalore and Kolkata is likely to provide further impetus to mobile-based Internet. Today India's nearly 120 million-strong Internet user base is the third-largest in the world.

9 *Internet World Stats 2011*.

10 McKinsey Digital Consumer survey 2010/2012.

Exhibit 1

India's Internet landscape statistics



1 Cost of downloading 1 megabit per second from Speedtest.net pulled in November 2011; Purchasing power parity adjustment to $ using World Bank 2010 conversion rate.

SOURCE: ITU World Telecommunication/ICT Indicators Database; WEF Global Information Technology Report 2011; Computer Industry Almanac; BMI; McKinsey Digital Consumer/iConsumer Research; World Cellular Information Service; Pyramid Research; McKinsey analysis

The world's second-largest online user base by 2015

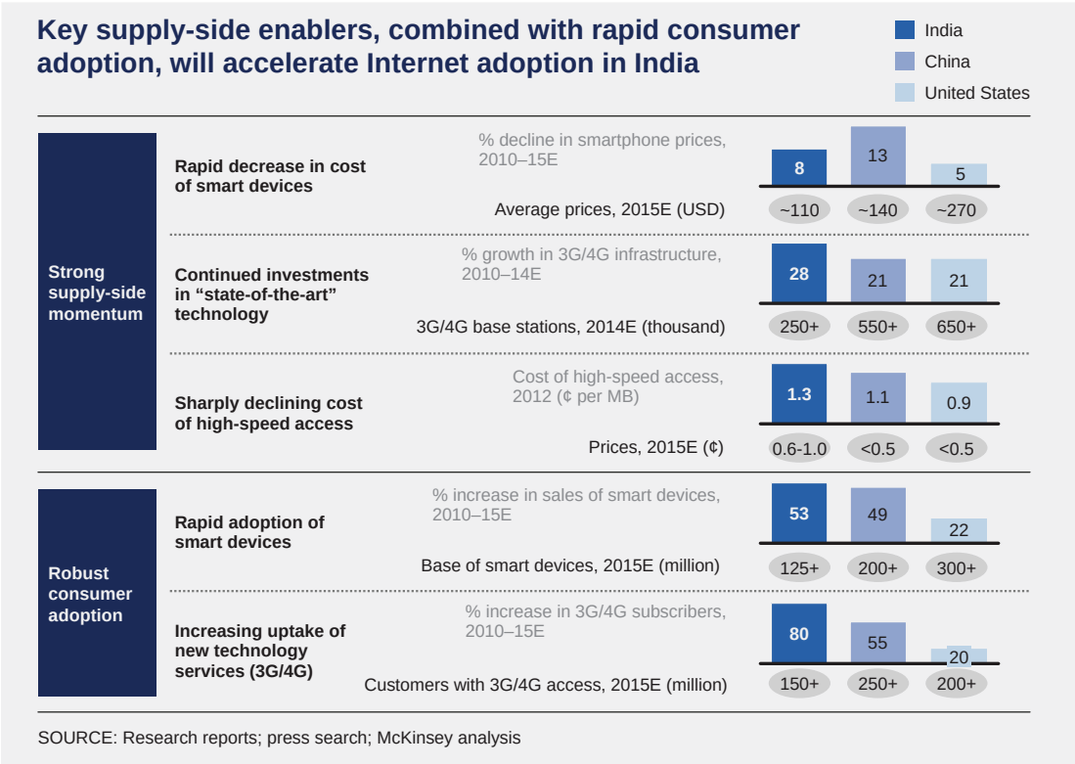
India's young and growing population provides an opportunity to build an Internet-oriented economy. By 2020, there will be 360 million Indians (26 percent of the population) between the ages of 15 and 30. Young people (those under 35 years) are nearly twice as likely as older people to use Internet-related technologies such as smartphones and voice-over Internet protocol (VoIP), and they show much greater propensity to transact online and use electronic social networking modes that ride on India's expanding 3G/4G telecom networks in urban centers. With India's strong local consumption base—and consumption constitutes more than half of India's GDP—the surge of young people will be disposed to support the strong growth of local e-commerce. Modern, organized retail is in its nascent stages, and land prices are escalating across urban centers; e-tailing models therefore have the opportunity to drive strong retail expansion and also promote consumption in smaller cities and towns.

India's fast growing Internet market relies to a greater degree on mobile telephony than in other countries. The rapid decrease in the cost of smart devices, the increasing availability of 3G/4G infrastructure, and the sharply declining cost of high speed access are providing strong momentum to the emergence of India's Internet user base. These supply side enablers, coupled with increased awareness of and growing demand for sophisticated services among India's young consuming classes, along with fierce competition, will enable more rapid Internet adoption in the future (Exhibit 2).

Our projections indicate that by 2015 India is likely to have a base of more than 100 million Internet-enabled smart devices and more than 150 million consumers with low cost, high speed Internet access. By 2015, India's 330 million to 370 million projected Internet users will constitute an estimated 12 to 13 percent of the global Internet user base, the second-largest national group of Internet users worldwide behind only China.[11] A significant portion of these users will access the Internet through a shared infrastructure, such as an Internet café, which provides scale benefits to accelerate the growth in users. Yet, just over half of them will use personal devices, notably mobile phones, to access the Internet.

11 Our estimates of India's Internet user base in 2015 are based on demographic data, behavioral trends from McKinsey's Digital Consumer survey, third party research, benchmarks from developed countries, and expert interviews.

Exhibit 2



SOURCE: Research reports; press search; McKinsey analysis

Emerging implications of India's unique pattern of growth

Internet access in India will largely develop through the use of mobile phones; nearly 75 percent of all new users and more than half of India's 2015 user base will likely comprise customers who use only a mobile phone or tablet. That is a much greater proportion than the 10 to 15 percent expected in China or Malaysia. The use of smartphones and 3G connectivity is likely to increase rapidly. McKinsey's proprietary Digital Consumer survey indicates that nearly half of mobile users want to upgrade to a smartphone and a third of these will look for 3G connectivity. This could provide a huge boost to mobile Internet adoption in India. The increased adoption of smartphones will also drive increased revenues, as the average smartphone user spends almost twice the amount that an average mobile user does on mobile Internet.

India's mobile-dominated Internet market composition implies some unique usage characteristics. Mobile-based users tend to consume more of the information and content that is designed for small screens with limited text and more audiovisual interactions, such as social networking updates, entertainment and chat, and are less likely to browse through and research content for many consecutive hours, as one might when using a PC. As mobile-based Internet access devices gain greater share, not all consumers—particularly those in rural areas—will be able to afford sophisticated smartphones. It is therefore very important that the new wave of applications and services, especially those targeted at rural users, take into account this changing Internet usage pattern and become more mobile-friendly.

A further issue is language. Just 12 percent of India's population speaks English; though this segment has driven Internet usage to date, India's linguistic and cultural diversity implies the potential for millions of Internet users whose first language is not English, but one of the country's over 20 other official languages. At present, not a single Indian language figures in the top 10 languages prevalent on the Internet, though Chinese, Arabic and Russian feature in the list. The next wave of Internet adoption in India will be dominated by local language speakers, which underscores the need for much more content and applications to be offered in local languages.

Economic impact of the Internet

Our study assesses the impact of the Internet on various groups of users. We classify users into four broad types: individuals, entrepreneurs, enterprises, and the government (see Box 3, "How we define principal groups of Internet users and Internet-related activities").

To assess and compare the Internet's economic impacts, we devised the iGDP Index to measure the contribution of the Internet to a country's GDP. We measure a country's e-commerce platform separately, because it plays a seminal role for consumers and retailers alike in a country's Internet ecosystem. The e-commerce platform index (eCP) assesses the health of a country's e-commerce ecosystem.

- **iGDP.** Using the expenditure method, the contribution of the Internet is measured as the proportion of GDP that can be attributed to the Internet in private consumption, public sector expenditure, private sector investment, and trade.[12] This measure is ICT-related, as it aggregates the expenditure on all goods and services that are related to the Internet: devices, access, the consumption of hardware, and online consumption.

- **eCP.** The e-commerce platform index demonstrates e-commerce enablement by scoring a country's online payment capacity, its parcel delivery systems, and Internet readiness.[13]

12 Internet contribution to GDP index components: private consumption (total consumption of goods and services by consumers via the Internet, or consumers' costs to obtain Internet access), private investment (private sector investment in Internet-related technologies), public expenditure (public expenditure on Internet is estimated by adding government, public health care, and public education expenditures on the Internet), trade balance (exports of Internet-related goods and services, plus B2C and B2B e-commerce, net of all associated Internet-related imports). See Appendix for further details.

13 E-commerce platform index components: online payment enablement (number of financial cards in circulation, volume of cashless payments, legal protection provided to the e-consumer), parcel delivery (reliability of postal system, cost of domestic shipping, percent of a population with delivery to their homes), Internet readiness (volume of secure servers, Internet penetration, domain registration cost).

Box 3. How we define principal groups of Internet users and Internet-related activities

Principal groups of Internet users

Four major groups of users are enabled or benefit by adopting the Internet.

- **Individuals** benefit the most from the Internet in many aspiring and developed countries. Access to free Web services, communication tools and entertainment often has minimal cost beyond access charges. In addition, the Internet creates social impact in aspiring countries by enhancing key components of development, such as education.
- **Entrepreneurs** have taken advantage of increased Internet use and improvements in infrastructure to create innovative new business models. They have brought new services, expanded products, and provided richer content to users by successfully implementing Web applications that are popular in developed countries, as well as new e-commerce and policy platforms.
- **Enterprises** are able to broaden their consumer reach, both within and outside their countries. The use of telecommunication and e-commerce have also created new sources of revenue. However, the Internet's impact has gone far beyond increased revenue to enable improved productivity and reduce costs.
- **Governments** can leverage the Internet to reach more user groups with improved results. Delivering government services through an online platform with supporting infrastructure access (such as kiosks or service desks in villages) enables productivity (as in resource reductions) and ensures improved access in rural areas. Positive social impact is created through enabling transactional services such as registrations and tax payments, and providing information about critical services such as public health and safety.

How we define Internet-related activities

We include all activities related to both the creation and use of Internet networks and services. This definition of the Internet therefore includes both the totality of Internet activities and that portion of the ICT sector that is Web-related.

We allocate these activities to four key categories:

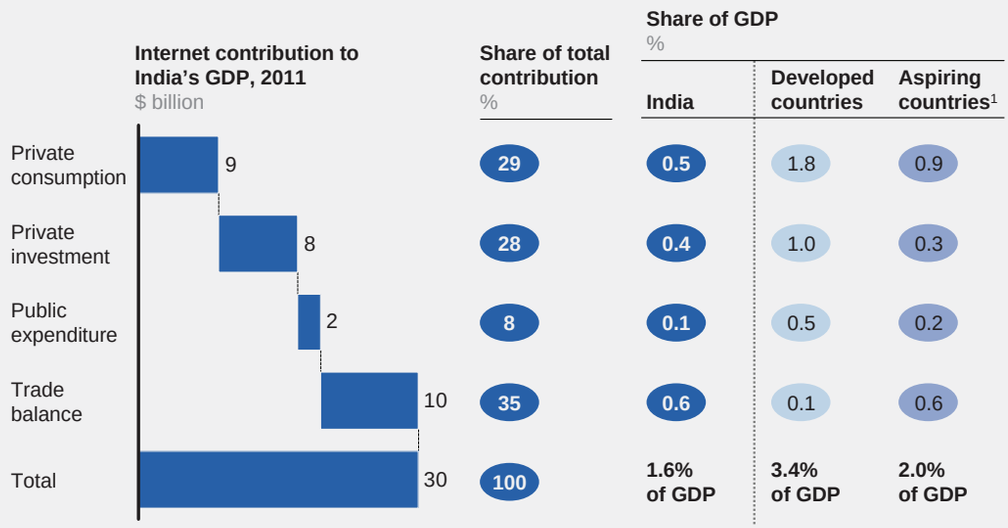
- Activities that use the Web for support, for example e-commerce, content creation and distribution, and online advertising
- Telecommunications on Internet protocol (IP) or linked to IP communication (mainly Internet service providers)
- Software and services activities linked to the Internet, such as IT consulting and software development
- Hardware manufacturers or maintenance providers of Web-specific tools, for example, computers, smartphones, network equipment, and servers

Large potential for iGDP growth and share of consumption

The economic impact of the Internet in India falls within the lower-middle of the range of our sample of developed and aspiring countries. India's iGDP ranks above that of Brazil and Vietnam but lags behind that of Malaysia, China and Argentina (Exhibit 3). We estimate that the Internet contributed 1.6 percent of India's GDP in 2011, comparable to the share of its hotels and restaurants sector (1.4 percent), although lower than that of mining (2.6 percent) and education (2.5 percent).[14] India's Internet share of GDP was three times that in Nigeria, a country with comparable GDP per capita, and 60 percent higher than that in Mexico or Turkey, countries with seven to eight times India's GDP per capita.[15] However, the Internet in India made less than half of the GDP contribution it made in South Korea, Malaysia or the United States. Countries such as Taiwan, Malaysia and Hungary have a high iGDP (4 percent to 5.5 percent) as a result of their significant exports of ICT hardware, such as computers, networking equipment, and phones.

Exhibit 3

The Internet accounts for 1.6 percent share of GDP in India, yielding $30 billion in total impact on GDP



1 Sample set of 9 aspiring countries: Argentina, Hungary, Malaysia, Mexico, Morocco, Nigeria, Taiwan, Turkey, and Vietnam.
SOURCE: Gartner; IHS Global Insight; OECD; ITU; IDC; WHO; ICD; iConsumer US 2010; Euromonitor; H2 Gambling Capital; PhoCusWright; Pyramid Research; UNESCO; McKinsey analysis

If India achieved developed country levels of share of the Internet in ICT expenditure through increased Internet-driven usage and applications, the Internet's contribution to India's GDP could potentially double, to about 3.2 percent even at today's levels of expenditure. Even if we apply aspiring country benchmarks, India has the potential to almost double its share of Internet-related GDP to 2.8 to 3.3 percent by 2015 (see Box 4, "Measuring current and potential iGDP for India" and Box 5, "The Internet's impact on India: Beyond the numbers").

14 IHS Global Insight 2011.

15 All iGDP comparisons pertain to 2010 data for countries other than India, where iGDP has been estimated for 2011. See *Online and upcoming: The Internet's impact on aspiring countries*, McKinsey & Company, January 2012, for details of aspiring countries' Internet share of GDP.

Box 4. Measuring current and potential iGDP for India

Measuring current iGDP

We estimate the GDP impact of the Internet using the expenditure method, which assesses the Internet's share of private consumption, public expenditures, private investment and trade balance. Across countries, we use consistent sources of data to compute total ICT expenditure and a broadly consistent methodology to estimate the share of Internet in ICT expenditure.

To assess India's Internet share, we have evolved a bottom-up methodology. For each category of expenditure, we estimate a share of the Internet on the basis of share of time spent on the Internet versus offline by technology users in private consumption and in exports, or the share of expenditure on Internet-related projects in private investment, public expenditure, and imports.[1] To estimate these shares, we rely on data from McKinsey's surveys of consumers and SMEs, interviews with CTOs of technology-consuming companies, and published data.

Based on the bottom-up, India-specific estimates of the share of ICT expenditure linked to the Internet, India's iGDP is 1.6 percent. The developed country benchmarks for Internet share of ICT are consistently higher than estimates for India, across categories of expenditure. India's iGDP would be 3.2 percent if developed country benchmarks were used. Thus, as the pattern of ICT spending of India's consumers, enterprises, government, importers, and exporters evolves to become closer to that of developed countries, there is substantial scope for India's Internet's share of GDP to increase across all these groups of users.

Estimating potential iGDP

To estimate a range for potential future iGDP for India, we developed two scenarios based on potential Internet penetration in 2015. On the current trajectory, wherein India would reach 330 million to 370 million Internet users by 2015, these efforts could enable India to reach an iGDP of nearly 2.8 percent. If India puts itself on an accelerated trajectory towards higher penetration to reach 500 million Internet users by 2015, the iGDP could be as high as 3.3 percent.

As penetration rises, the Internet's contribution to GDP in private consumption would increase through higher consumption of access devices and time spent online, and more active adoption of e-commerce. This growth in user adoption and demand would drive expansion in Internet-related investment by private enterprises and the government. India's reliance on imports for the hardware component of higher investment would reduce growth in iGDP, but its IT services export sector will likely use more web technologies to deliver products and services, making the net trade impact of the Internet positive in the 2015 timeframe.

1 For goods and services sold on the Internet, we recognized them at their full e-commerce value because they indicate the importance of the Internet industry as a link in the distribution chain even though certain Internet transactions might have occurred in the absence of the Internet.

Box 5. The Internet's impact on India: Beyond iGDP

iGDP is the Internet's direct impact on GDP, measured through consumption and investment. Though this is estimated to be 1.6 percent, or $30 billion (at PPP 2005 prices) for India, the Internet's effect on the Indian economy and the lives and well-being of Indians goes far beyond this.

Growth in ICT expenditure causes demand growth in other sectors, both upstream and downstream. We estimate this GDP multiplier to be 1.6 to 2 times, implying that the overall impact on GDP growth of the Internet is 1.6 to 2 times that of the underlying growth in expenditure over any period.[1]

The Internet economy creates jobs. Current levels of Internet-related expenditure are estimated to create about 6 million direct and indirect jobs in India, in the ICT sector and allied upstream and downstream sectors. As the direct impact of the Internet on India's GDP has the potential to triple by 2015, an additional 16 million jobs could be created.

Internet-based applications have been proven to increase the productivity of end users. For example, our estimates indicate that the Bhoomi programme—an e-government initiative to manage land records online in the state of Karnataka—has helped reduce the number of physical trips taken by the users by around 20 percent. Mobile banking, enabled through applications on handhelds, could potentially reduce transaction costs by as much as 70 percent.

Finally, the Internet increases consumer surplus, measured as the benefit consumers derive from using Internet-based products and services minus the costs associated with those services (both costs for paid services as well as the negative value associated with advertising interruption and personal information gathering associated with those services). Internet users in the United States are estimated to have about $66 billion of consumer surplus each year. Similarly, the average estimated consumer surplus associated with Internet usage in the seven aspiring countries is $12 billion, and for India, we estimate the average annual consumer surplus to be $9 billion.

1 Estimated using the Structural Analysis (STAN) Databases from OECD StatExtracts, March 2012

Private consumption accounts for a smaller share of the Internet's contribution to GDP in India, compared with that in its peer countries. India has strong potential to increase the penetration and monetization of the Internet in the consumer segment. Only 29 percent of India's iGDP was driven by private consumption, which is one of the lowest among both developed and aspiring countries. India's private consumption of the Internet was just 0.5 percent of total GDP, significantly lower than the range of 1.0 percent to 1.6 percent in Argentina, Malaysia and Vietnam.

A positive ICT-related trade balance and increasing Internet expenditure in the private sector provide positive momentum to India's iGDP, while the government sector contributes to a lesser extent. At 95 percent, exports constituted a substantial share of India's iGDP, but they were counterbalanced by technology imports, resulting in a net 35 percent of iGDP contributed from the trade balance. In contrast with the economies of China, Malaysia and Taiwan, which are dominated by hardware exports and also have strong positive trade balances in Internet expenditure, India's positive ICT trade balance is driven by its strong software and IT-enabled service exports. The Internet has facilitated the rapid growth of these exports by increasing worker productivity and efficiency, and enabling real time interactions between clients and service providers.

Private investment contributed about 28 percent to India's iGDP, which is less than the contribution from its trade balance but similar to the share of private investment in the iGDP of Malaysia and Taiwan. Many large enterprises in India's services sector, such as financial services and telecom, have made ICT investments in the past decade which, according to our estimates created more than six million jobs associated with the Internet, which represents 1.5 percent of all jobs. There is huge potential for the number of Internet-related jobs to increase to 20 million to 22 million by 2015, representing 4 to 4.5 percent of all jobs.[16] A significant share of the ICT investments has been devoted to Internet-driven architecture and applications, such as the e-enablement of branches, sales forces, and customer interfaces, and the automation of internal and

16 For a more detailed view of job creation across all sectors, look at *The world at work: Jobs, pay, and skills for 3.5 billion people*, McKinsey Global Institute, June 2012 (www.mckinsey.com/mgi).

partner and supplier workflows. India's government sector, too, has been making efforts to promote online services for its citizens, but large-scale adoption of these is limited by low Internet penetration and limited levels of digital literacy.

Nascent but rapidly growing e-commerce platform

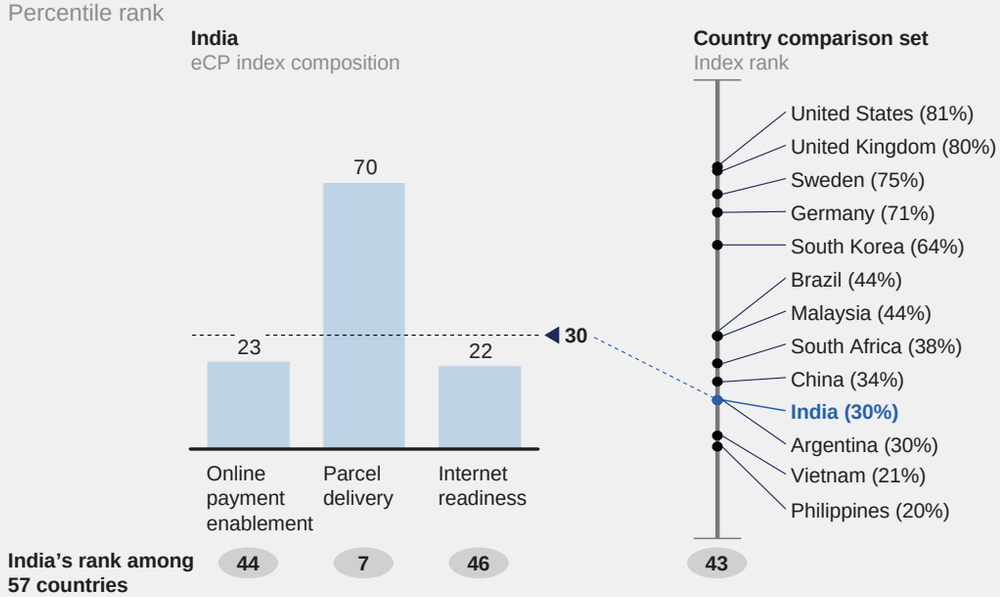
In line with private consumption's small share of India's iGDP, e-commerce in India is at a nascent stage. Our eCP index ranks India at 43 in our sample of 57 countries across the developed and aspiring world, with significant room for improvement in online payment enablement and Internet readiness (Exhibit 4). Two of the biggest obstacles cited by e-commerce ventures in India are inadequate online payment infrastructure and logistics solutions.

The average consumer in India has 0.3 financial cards, compared with the average consumer in Mexico who has one, in Brazil has four, and in the United States has seven. India has 2.6 cashless payments per year per capita, close to Morocco's level of 2.1. In contrast, cashless payments per year per capita in South Africa were 26.8. The credit rating infrastructure in India is perceived by e-commerce players to be inadequate, resulting in less cards being issued. The online payment platform needs to be significantly strengthened—Indian consumers have low levels of trust and confidence in making online payments. For example, consumers surveyed on the existence of legal protection for the e-consumer in India (1 = non-existent protection, 7 = a well-developed legal system) scored the country at 4.6, about the same as the score in Brazil (4.5) but lower than in Malaysia (5.1). The limited number of secure Internet servers in India constrains the volume of reliable transactions that can occur online. India has just three secure Internet servers per one million people, while Malaysia and Brazil each have more than 40. Lack of a robust logistics infrastructure across the country has forced online retail players to turn to third party and in-house logistics solutions. By developing e-commerce friendly features such as cash-on-delivery, reverse logistics, service level agreements, India Post could potentially provide a reliable and cost-effective alternative.

Exhibit 4

McKinsey's e-commerce platform index (eCP) indicates India has scope to improve in online payment and Internet readiness

Percentile rank



SOURCE: World Bank; World Economic Forum; ITU; EIU; IMD World Competitiveness Online; postal operator Web sites; expert interviews; McKinsey analysis

Certain categories have shown strong traction for e-commerce and have experienced sharp growth. Categories such as travel, consumer electronics and apparel are increasingly moving online (see Box 6, "Rise of e-commerce in India: Travel, electronics, and apparel"). Our estimates indicate that online travel transactions currently comprise 20 to 30 percent of total travel transactions and are likely to double in value to more than $10 billion by 2015. Online retail, in categories such as books, apparel, and consumer electronics, is also expected to grow significantly—by a factor of about 8 to 10—to reach a value of $8 billion to $10 billion by 2015. Online purchases of consumer electronics, for instance, represent only about 2 percent of the total consumer electronics market today but are likely to triple their share by 2015 and reach a value of $3 billion to $4 billion.

Box 6. Rise of e-commerce in India: Travel, electronics, and apparel

- **Online travel**, growing at more than 25 percent per year, has been driven by diverse online players ranging from the IRCTC (the online ticketing arm of the Indian Railways) to indigenous travel aggregator sites such as Makemytrip, Cleartrip, and Yatra. More recently, international travel aggregators such as Expedia and Kayak, as well as review sites such as Tripadvisor, have begun to make a strong push into India. Consumer traction has been driven by ease, convenience, lower prices, and better customer offerings.
- **Consumer electronics** has been among the fastest-growing online categories and is expected to grow by about four times through 2015, from a current market size of about $600 million to $700 million. Players range from online store-fronts of offline retailers (for example, Croma) to manufacturers' sites (for example, Sony, Samsung) and pure Internet players (for example, Flipkart, Infibeam). Large assortments, powerful product comparisons, and attractive pricing are the key value propositions for Indian consumers.
- **Apparel** is expected to be the fastest-growing online category in e-commerce in India, with revenue expected to grow by a factor of 10 to 15, from a current $15 million to $200 million by 2015. Pure online players (for example, Myntra, Jabong) are dominant, along with online store-fronts of offline retailers (for example, Shoppers Stop, Central). Convenience, cash-on-delivery, limited-period free returns, and attractive offers are driving the fast-growing consumer interest in the online purchase of apparel.

India's Internet ecosystem

To assess the health of a country's Internet ecosystem, we constructed two indexes:

- **e3** measures the current maturity of an Internet ecosystem according to three major drivers: environment, engagement and expenditure.[17]

- **i4F** measures the strength of the Internet's foundations—i.e., the preconditions for future growth—using the four key foundations of financial capital, business environment, infrastructure and human capital.[18]

Scope to improve Internet ecosystem maturity

The maturity of India's Internet ecosystem, as measured by our e3 Index, is in the lower range of our sample of 57 countries (Exhibit 5). In the e3 index, India is ranked 50th in our sample of 57 countries across the developed and aspiring world, with much room to improve Internet environment, engagement and expenditure. At a score of 19, India's overall e3 index is higher than a few countries such as Nigeria, Ghana and Bangladesh, and similar to the Philippines, yet it is lower or much lower than its remaining peer aspiring countries: Vietnam, South Africa, Argentina, China, Brazil and Malaysia.

Among the drivers of Internet maturity, India is weakest in its environment, or the level of Internet infrastructure. This weak infrastructure has held back growth in India's Internet user base. When asked "How would you assess general infrastructure (transport, telephony and energy) in your country?" (1 = extremely underdeveloped; 7 = extensive and efficient by international standards), Indians scored their country at 3.8, compared with 4.6 scored in South Africa and 5.5 in Malaysia.[19] India has low levels of Internet penetration and few secure Internet servers in comparison with other countries. Internet bandwidth available in India is also lower—at about 6.2 Mb/s per 10,000 people, compared with 68.4 in Brazil and 130.6 in Malaysia. India has just three high-speed-connectible households per 100 households, compared with 19 in Brazil and 22 in Malaysia. In 2011, India had only 47 personal computers per 1,000 people, compared with 193 in Latin America and 284 in Southeast Asia.[20]

17 Internet ecosystem maturity index components: environment (existing Internet speed and penetration), engagement (usage of Internet by individuals, enterprises, and governments), expenditure (Internet spending such as e-commerce and online advertising).

18 Internet ecosystem foundations index components: financial capital (availability of financing for Internet and ICT companies), business environment (country's attractiveness to business due to regulatory and societal effects), infrastructure (penetration and quality of Internet-enabling infrastructure), human capital (education and research).

19 *Global competitiveness report, 2010—2011*, World Economic Forum, 2010.

20 International Internet bandwidth (Mb/s) per 10,000 population (international Internet bandwidth is the sum of capacity of all Internet exchanges offering international bandwidth measured in megabits per second); the average PC penetration in Latin America is the average for Argentina, Brazil, Chile, Colombia, and Venezuela, and the average for Southeast Asia is the average of China, Malaysia, the Philippines, and Taiwan.

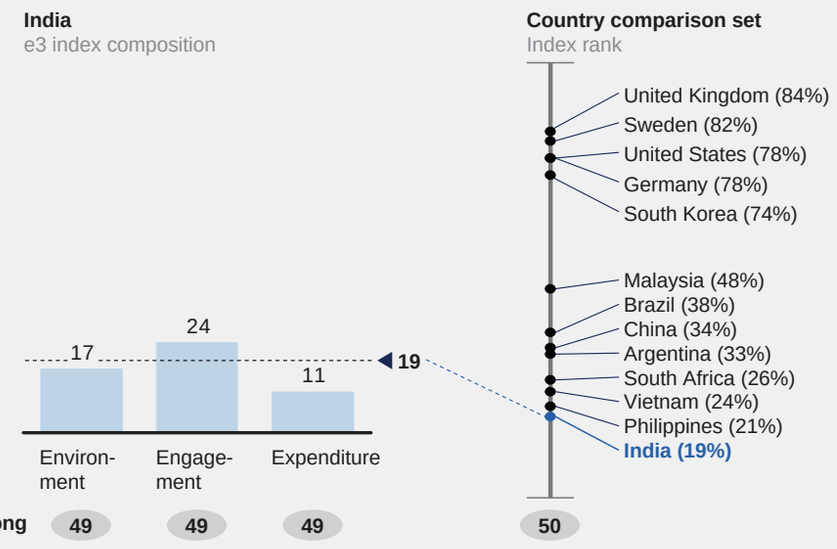
Overall Internet penetration in India is 10 percent, although urban penetration, at 27 percent, is nearly twelve times that of rural areas. Urban penetration has rapidly expanded because of the development and strong adoption of broadband services: the number of fixed broadband subscribers increased from less than 0.5 million in 2005 to around 11 million in 2011, with approximately 15 million active 3G subscribers. However, India is less urbanized than its peer aspiring countries, with just 30 percent of its population living in urban areas; the overall Internet ecosystem would improve substantially with higher penetration and greater accessibility in rural parts of India.

India's Internet engagement and expenditure are also limited. Usage is currently limited by low levels of access to PCs and broadband as well as the lack, until quite recently, of compelling applications and service offerings. The use of Web sites and other online technologies among small businesses has potential to expand. For example, only 35 percent of businesses in India have a Web site, compared with 48 percent in Vietnam and 68 percent in Malaysia. Expenditure on the Internet is also limited: only 0.3 percent of India's total retail spend occurs online, compared with 4.4 percent in Malaysia, 1.1 percent in Argentina, and 1.6 percent in South Africa. Low levels of e-commerce enablement are one reason for the small proportion of retail expenditure online. Though limited by current infrastructure availability, India's Internet ecosystem could grow more rapidly in the future as access costs fall (see Box 7, "A likely evolution path for India's Internet ecosystem").

Exhibit 5

India lags behind other countries on all elements of the Internet ecosystem

Percentile rank



SOURCE: WEF Global Information Technology Report, 2010–11; Computer Industry Almanac; Pyramid Research; UNCTAD, Information Economy Report 2010; World Digital Media Trends; Euromonitor; IDC; World Bank; McKinsey analysis

Box 7. A likely evolution path for India's Internet ecosystem

India's Internet ecosystem is likely to improve substantially through interventions that reduce cost and expand the size of the accessible market. Increasing the adoption of smartphones by reducing prices can partially replicate the effect of increased PC penetration on Internet adoption. The cost of smart devices for Indian consumers is already falling sharply as a result of players' achieving scale economies and low cost sourcing. During 2011, the average cost of smartphones fell by an estimated 20 to 25 percent and that of tablets by 15 to 20 percent. Our estimates indicate that, by 2015, low-end smartphones are likely to be available in India at $70 to $80 and Internet-enabled feature phones at $40 to $50, which are about 25 percent cheaper than in Malaysia or the Philippines but 50 percent higher than in Mexico or Argentina.[1]

The rapid expansion in the 3G/4G telecom infrastructure and the adoption of smartphones in India has the potential to mitigate the access constraints currently plaguing the Internet ecosystem. By 2015, India will have about 150 million subscribers on 3G/4G networks, potentially increasing the broadband penetration to about 13 percent, which is among the highest in aspiring countries today. An estimated 125 million smart devices in 2015 could address the low PC penetration (47 PCs for every 1,000 people). Further, the cost of high speed access in India fell more than 60 percent from 2009 to 2011. If we believe these trends, India's score on the e3 index would nearly double, to about 38 from the current level of 19, taking India to the 2010 level of Brazil and Turkey.

The domination of mobiles can significantly boost the size of the market and user access but could imply limited benefits for the average Indian user in comparison with peers in aspiring countries such as Brazil, Malaysia, or South Africa. Although mobile-based access to the Internet would be widespread, the use of financial, educational, health care, and social applications will be limited, because high-end smartphones would be unaffordable for India's huge rural population who are more likely to use entry-level, Internet-enabled phones that would provide only basic browsing capabilities. In the longer term, the capture of the Internet's value can be enhanced if India also enables increased access to affordable fixed broadband and PCs or through enhancing smartphone access.

1 Based on estimates available from Pyramid Research, 2012

Internet foundation weakened by poor infrastructure

The foundation for India's Internet ecosystem, as measured by McKinsey's i4F Index, is in the lower-middle range (Exhibit 6). India is ranked 33rd in our i4F index among a sample of 57 countries across the developed and aspiring world. India's i4F score is comparable with that of Vietnam and South Africa and lower than that of Malaysia, South Korea and China.

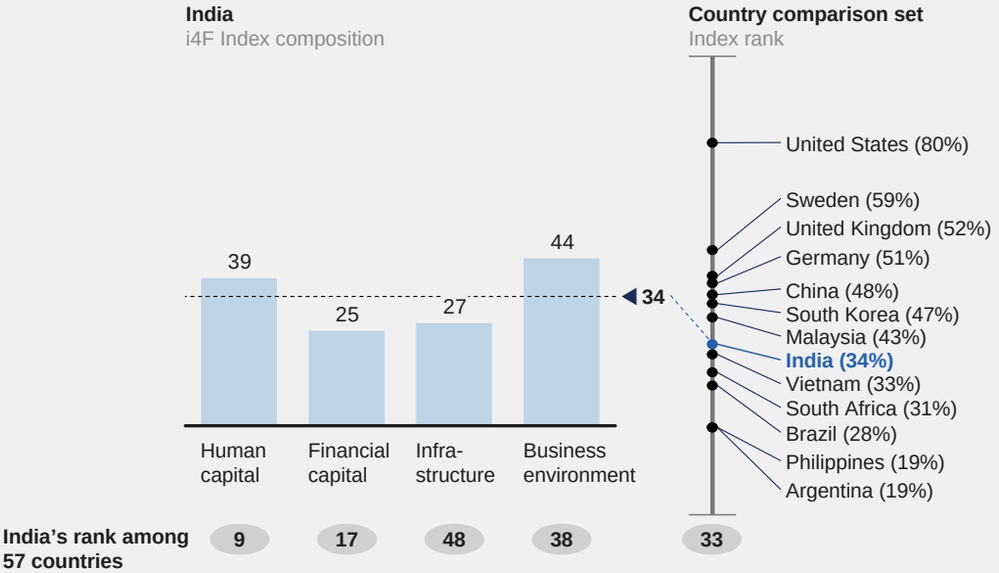
The four "foundation" elements of our i4F index are financial capital, business environment, human capital and infrastructure. India's financial capital rating is on par with that of the other aspiring countries, with its well-developed banking system and capital markets: at 3.4, India's rating on "ease of access to loans" is higher than the Philippines' 2.9 and Brazil's 2.8. Venture capital financing in India is at $750,000 per capita of such funding, sitting well in the comparators' range of $380,000 for Brazil and $810,000 for the Philippines (at PPP).[21] India has room to improve its business environment for Internet firms. On a rating of "ease of doing business" (10 being highest and 0 being lowest), India scores 3.4, ranking 52nd in our list of 57 countries. India has relatively more regulations and procedures governing new businesses: for example, India's rating on "burden of government regulations" (1 = extremely burdensome; 7 = not burdensome at all) is 3, placing it at 35th among the 57 countries. However, India performs better than many countries on human capital, given its large pool of college-educated workers who have a high proportion of scientific and technical education. The biggest area for improvement is infrastructure: both basic elements, such as electricity supply, and online components, such as secure servers. The quality of electricity supply, for example, is rated at 3.1 in India, compared with 5.1 in Malaysia. Although 70 percent of homes in rural India are electrified, the power supply is erratic.

21 2011 prices for India, 2010 prices for others.

Exhibit 6

India's Internet foundational elements can be strengthened, especially in infrastructure

Percentile rank



SOURCE: WEF Global Competitiveness Report 2010–11; IMD World Competitiveness Online; Venture Expert; Capital IQ; World Bank; UNESCO; McKinsey analysis

Impact on principal user groups

Despite obstacles and gaps, the Internet has helped add value to various stakeholders. Entrepreneurs have devised creative business models to reach more customers. E-commerce, still in its infancy, is growing rapidly, riding on the young demographic of India's Internet users. As more people engage online, they derive increasing value from online products and services (such as ticket bookings and reviews). The Internet has enabled small enterprises to increase revenue, reduce costs and improve productivity, while large enterprises use online channels to build scale. The government is beginning to offer a plethora of services over the Internet, an approach that also increases transparency and efficiency.

Consumers likely to derive more value in future

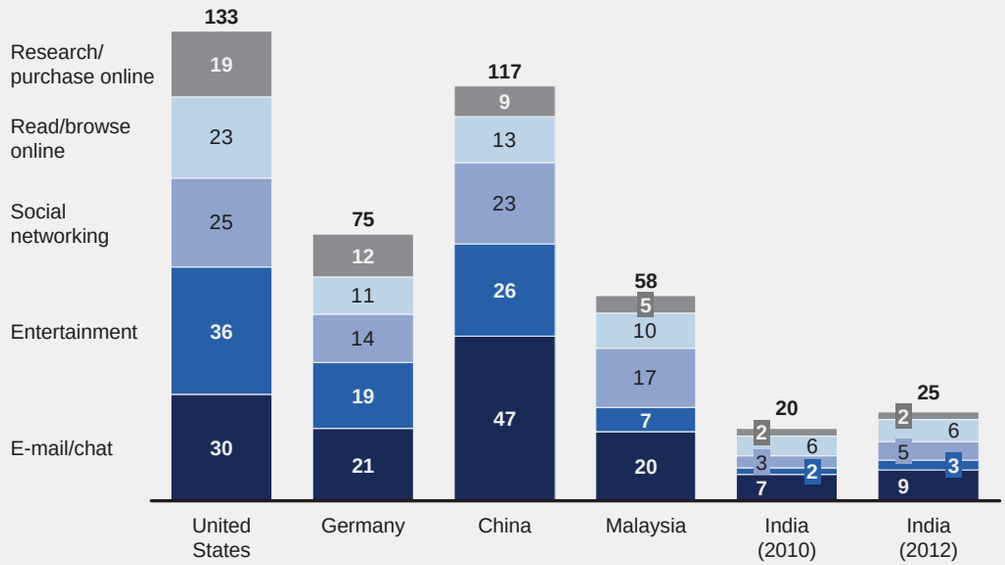
Low levels of online activity (20 to 25 hours per month), including on e-commerce, correlate with India's low consumer surplus from the Internet. Consumers in most Southeast Asian countries spend far more time online than those in India, with the examples of Vietnam (96 hours per month), Indonesia (88 hours per month), Singapore (81 hours per month), and the Philippines (81 hours per month) suggesting a large potential for growth in India. We estimate that each Internet user in India derives $9 of surplus per month, less than in Malaysia ($16) and Argentina ($13) or Vietnam ($13). In aggregate, India's consumer surplus from the Internet is estimated to be $9 billion per year, but the ratio of its annual aggregate consumer surplus to GDP is only 0.5 percent, which is lower than in many developed and aspiring countries. This is in line with the low share of private consumption in India's iGDP. India's consumer surplus is likely to grow more rapidly in the future, given that emerging trends indicate that online commerce, including online research for offline purchases, is a significant source of value for Indian consumers.

As India's younger population of early adopters takes to the Internet, usage is increasing and usage patterns are shifting dramatically, with more time spent online and increasing sophistication in the Internet activity. Our Digital Consumer Research indicates that consumers below the age of 35 represent around 85 percent of the smartphone, VoIP, and social network markets in India, compared with about 60 percent in developed countries and 75 percent in aspiring countries. India's young Internet users are displaying an increasing appetite for online research, transactions, social networking and entertainment. Time spent on the Internet by users in India rose 24 percent from 2010 to 2012, and more sophisticated categories of Internet use, such as e-mail/chat, social networking, and entertainment, grew more quickly than reading and browsing (Exhibit 7). Downloads of applications for mobile phones have multiplied eight times in two years, with social networking and music being the major categories. Social networking is the single biggest use for smartphones, after voice, with the number of Facebook users in India jumping from less than 10 million in 2009 to in excess of 50 million in 2012.

Exhibit 7

India's consumers are spending more time online and are shifting from traditional to more sophisticated activities

Hours per month



NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Digital Consumer Research (2010/2012); iConsumer surveys

Entrepreneurs innovating despite weak environment

McKinsey's "ease of Internet entrepreneurship" index (ENE) is based on three components: the ease of starting a new business; the ease of financing a new business; and Internet accessibility.[22] India is ranked 48th in our sample of 57 countries across the developed and aspiring world, on par with some peer countries, such as Brazil and Vietnam, but lower than China, South Africa and Malaysia. India scores well on the availability of financing opportunities, but less so on the ease of starting a new business and on Internet accessibility (Exhibit 8). Factors within each of these categories can be improved to spark more entrepreneurship. India's Internet readiness for entrepreneurship would improve by reducing the time taken and the number of procedures required to start a new business and the time taken to enforce contracts. For example, in India it takes an average of 29 days to start a new business, compared with 22 days in South Africa and only 18 in Malaysia. Indian entrepreneurs would take an average of 1,420 days to enforce a contract, while their counterparts in Malaysia would take 585 days and those in Vietnam only 295 days. The other major barrier to India's Internet entrepreneurship readiness is Internet accessibility, which is limited by India's low PC and Internet penetration. Internet accessibility is depressed by the costs associated with bandwidth and domain registration. Registering a domain in India costs $41, compared with $29 in Mexico and $24 in the United States (all figures in PPP terms).

While India has scope to improve its ENE index rating, Indian entrepreneurs are already forging ahead, devising innovative business models to overcome the challenges of the Internet ecosystem and reach a wider set of customers, thus capturing the nascent e-commerce opportunity. Many of these entrepreneurial start-ups have achieved scale in their Internet businesses, despite low Internet penetration and the weak infrastructure for online payment, by devising solutions that utilize mobile phones or cash-on-delivery (see Box 8, "Examples of Indian Internet companies with innovative business models").

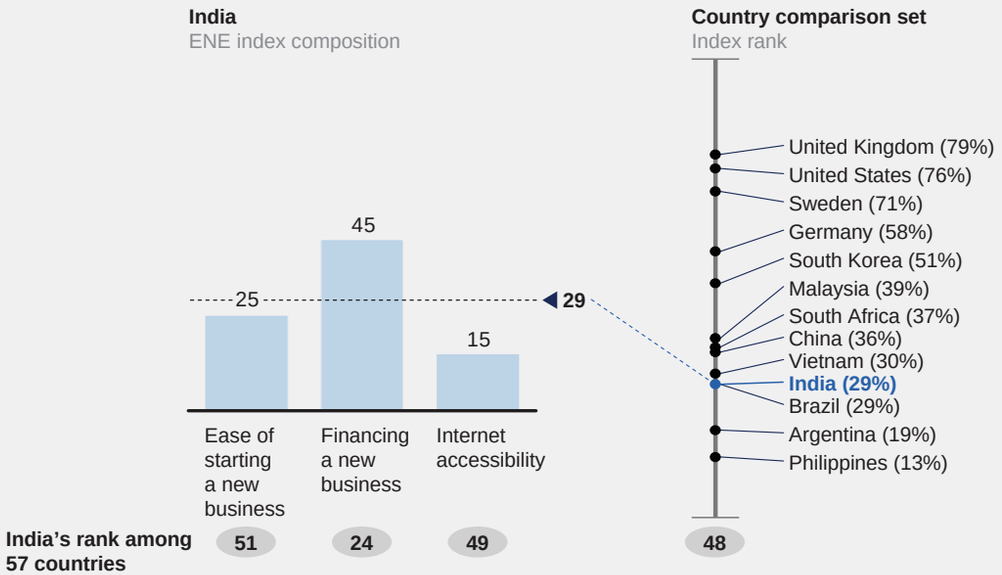
22 Ease of Internet entrepreneurship index components: ease of starting a new business (industry-agnostic view of the overall business ecosystem in a country); ease of financing a new business (availability and attractiveness of financing for ICT start-ups, as well as the cost of financing a new business); Internet accessibility (extent and cost of Internet access for both enterprises and their target consumers).

India's strong cultural orientation toward private enterprise is a key strength for the evolution of the Internet ecosystem. More can be done in terms of R&D investment: India's R&D spend, at 0.76 percent of its GDP in 2007, is lower than that of many technology leaders such as South Korea, Sweden and the United States.[23] Yet many engineering and management schools act as incubation centers, and the number of Internet-related start-ups from India's technical schools is rapidly increasing. Provided with the basics—access to financial capital, a cheap physical infrastructure, and a business-friendly environment—this growing pool of entrepreneurs has the potential to develop a large number of successful Internet-based businesses.

Exhibit 8

India's Internet entrepreneurship index has scope to improve by addressing business environment and Internet accessibility challenges

Percentile rank



SOURCE: World Bank; Computer Industry Almanac; ITU; Capital IQ; WEF Global Competitiveness Report 2010–11; IFC; Speedtest.net; Transparency International; McKinsey analysis

Box 8. Examples of Indian Internet companies with innovative business models

- **Naukri.** A leader in the Indian online job market, Naukri.com uses phone-based services to circumvent low Internet penetration. Naukri.com offers free SMS-based job notifications, call centers with value-added services, and an Insta-hire service that enables recruiters to send messages to people in Naukri.com's database.
- **Tutorvista.** An online business in the education space, Tutorvista.com provides virtual tutoring to students, taking advantage of India's large pool of human capital. Tutorvista uses VoIP and virtual whiteboards to reach students in many countries at an affordable service cost. As of 2008, it had served over 500,000 students in more than 29 countries, drawing on a pool of well-educated Indian tutors, including those seeking flexible working schedules.
- **Flipkart.** A pioneer in e-commerce in India, Flipkart.com has popularized the concept of online retail. To surmount the obstacles of inbound and outbound logistics, Flipkart started its own logistics operations with 1,500 employees. In response to Indian consumers' low propensity to use cashless transactions, the company rolled out cash-on-delivery, increasing its user base by 25 percent within 90 days.
- **Redbus.** Launched in 2006, Redbus.in is an online bus-ticketing portal with a current customer base of nearly two million. It reaches customers primarily through the mobile platform. Faced with customers' reluctance to use online payment methods, Redbus introduced cash-on-delivery in major cities.

23 *World Development Indicators*, World Bank, 2007.

Significant scope for increased adoption of the Internet among small enterprises

Although a significant 17 percent of India's GDP comes from its 35 million SMEs, these businesses constitute a substantially untapped pool for Internet impact. So far it has been the large corporations—which, in India, are generally national players with consumers and suppliers spread over a large geographical area—that are investing heavily in Web technologies and reaping productivity improvements, particularly in the services sector. Many of these companies were early adopters of the Internet and broadband; they found that Web-based solutions helped them reduce the cost of customer acquisition, provide better customer value propositions, and optimize their supply chains (see Box 9, "Leveraging technology for competitive advantage in India's large enterprises").

Box 9. Leveraging technology for competitive advantage in India's large enterprises

- **ITC e-chaupal.** ITC, one of the largest consumer companies in India and a leader in the tobacco and foods segments, has reduced its procurement costs for agricultural produce by 2 to 5 percent through a Web-enabled system that links farmers to the company. It has set up a network of rural hubs, equipped with PCs, printers, connection lines, and power supply. Farmers access information on crop pricing, weather, and farm extension services, all delivered through this Internet-linked system. Farm produce is also auctioned through the e-chaupal portal, achieving better price discovery, greater transparency, and higher returns to producers.
- **ICICI Lombard.** ICICI Lombard, the largest private sector general insurance company in India, has partnered with popular Web sites and technology companies to offer insurance products online. The company's online insurance channel offers customer convenience and greater information transparency. The online channel has enabled consumers to avoid paying high commissions to agents, improved company profitability through a higher margin product mix, and helped drive long-term customer loyalty and retention.
- **Tata Motors.** One of the largest vehicle manufacturers in the Asia Pacific region, Tata Motors used e-sourcing as a key instrument to drive higher company profitability through cost savings of nearly $80 million between 2002 and 2007. By holding online auctions, Tata Motors has reduced the time taken to source components and has tapped a significantly increased number of potential vendors. The e-sourcing platform also eliminated many irregularities that plagued the conventional process.

Unlike India's large enterprises, the SMEs have been slower to adopt the Internet. Just 8 million of India's 35 million SMEs are in the organized sector, and Internet sophistication of those in the unorganized sector is extremely low. According to a McKinsey online survey of SMEs in the organized sector, broadband penetration among India's SMEs was 81 percent, which is comparable to 86 percent in Malaysia and 84 percent in Vietnam.[24] Within those businesses that have broadband, the average Indian SME provides 63 percent of its employees with access to broadband, while counterparts in Malaysia provide access to 69 percent of employees, and in Vietnam 76 percent. Yet usage of the Internet for business applications by Indian SMEs is relatively low. Just 43 percent of surveyed SMEs in India use the Internet as a sales channel, and 41 percent purchase online, while only 36 percent of the SMEs are using e-business solutions such as online versions of customer and supply chain management (CRM and SCM) solutions. Nearly 45 to 55 percent of all SMEs use these services in Vietnam.

Although India's SMEs are at an earlier stage of ICT investment, they are quickly discovering the benefits of Internet-based technologies to accelerate growth and improve profitability. SMEs leveraging Web technologies have observed many benefits—Web expenditure and employee access to broadband are correlated with higher revenue growth for SMEs in India as well as in other aspiring countries (Exhibit 9).[25] SMEs in India report strong productivity gains of 13 percent that are attributable to Web technologies. The average Indian SME believes Web technologies have enabled revenue to increase by 9 percent and cost of goods sold to fall by 6 percent. India's SMEs attribute these outcomes to a variety of Web-

24 All results discussed in this section are based on 2012 McKinsey online survey of 554 SMEs in the organized sector in India. Only 8 million of the 35 million SMEs in India are in the organized sector.

25 The correlation does not necessarily imply that these Web technologies are in fact driving the growth.

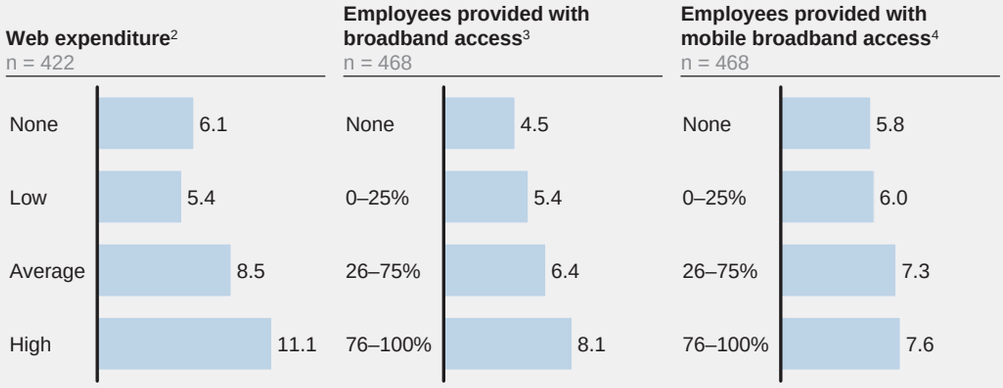
based technologies: most attributions are to electronic messaging, and then equally to having a Web site, participating in social networks, using cloud-based solutions, and employing online marketing and e-business solutions. For example, nearly 2.4 million SMEs in India are using the online B2B marketplace Alibaba.com, through which they predominantly source raw materials from factories in China. In the financial sector, NJInvest is a popular online platform for independent financial advisors that cuts down process time and costs by providing support for tasks such as registering the sale of mutual funds. NJInvest's platform also enables analytics support, a consolidated view of all the accounts, and support to optimize the portfolio.

SMEs in India would capture more value from the Internet if constraints such as digital literacy, accessibility, and trust were addressed. The SMEs could also utilize emerging trends such as social technologies to increase their market reach and employee productivity.[26] India's SMEs cite the cost of equipment (i.e., computers, routers) and low bandwidth as the most important barrier to its greater adoption, while high cost of Internet access and mobile data plans, and the lack of education about using the Internet are also cited as prominent reasons. SMEs feel India can accelerate the Internet development curve chiefly through increasing the availability of e-mail and deploying higher speed networks. Almost half the SMEs surveyed also felt that it is important to develop recognizable national "trust symbols" for Web sites and e-commerce platforms to signal improved Internet security, as well as identity protection for consumers that would be available through such devices as 128-bit encryption and SSL security. For example, US companies can obtain a Verisign or McAfee security badge to give customers more confidence that their data are safe. In addition to developing these trust marks, India also needs to enhance the security of the online payment platform.

Exhibit 9

SMEs in India that use Web technologies and provide their employees broadband access demonstrate higher growth

SME stated growth[1]
%



1 Excludes all respondents who did not know their company's growth rate; Only SMEs in organized sector.
2 Low Web expenditure is less than 10% of total expenses. Average is 11–30% of total expenses. High is greater than 30% of total expenses. "What percentage of your expenses are digital, i.e., linked to Web technologies (electronic messaging, intranet, extranet, WiFi, Web sites, Web 2.0 tools, servers/routers, Web connection for employees, Enterprise Resources Planning (ERP), e-commerce, e-marketing, e-supply chain)?" Excludes "I don't know" responses.
3 "Do you have a broadband Internet connection available to your employees?" If so, "What percentage of your employees have access to it?"
4 "Do you have access to wireless Internet through a mobile broadband connection?" If so, "What percentage of your employees have access to it?"

SOURCE: 2012 McKinsey survey of 554 SMEs in India; McKinsey analysis

26 *The social economy: Unlocking value and productivity through social technologies*, McKinsey Global Institute, July 2012 (www.mckinsey.com/mgi).

e-government capabilities constrained by low digital literacy and access

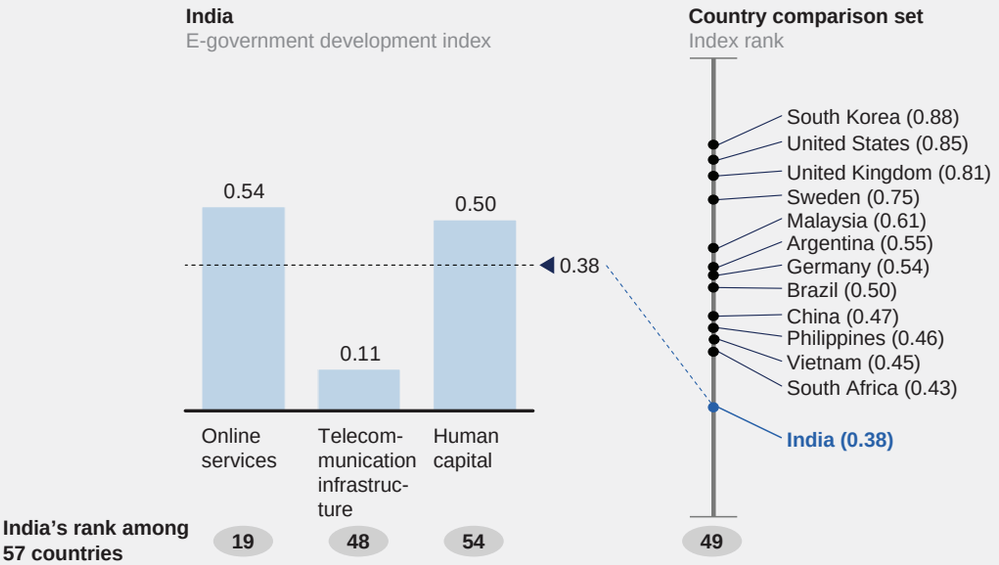
According to the UN's measure of e-government development, India ranks in the lower range of countries worldwide. India's e-government is ranked 49th in our sample of 57 countries across the developed and aspiring world (Exhibit 10). India ranks higher than Nigeria and Bangladesh, but significantly lower than in Vietnam, South Africa, the Philippines and Brazil.

Various Indian government agencies, such as the Ministry of Finance and the Ministry of Personnel, Public Grievances and Pensions, offer online services. These services provide tools to file taxes, access educational services such as school registration, register for government documents such as driving licenses, and update medical records. The e-filing of taxes is a particularly successful example, with the government simplifying the process and reducing the time involved. Nearly 40 percent of filings occur through this mechanism today, and 55 percent of SMEs we surveyed stated they used this service (Exhibit 11). [27] Though more such government services are moving online, the low Internet penetration and limited awareness and educational levels among the poor are obstructing widespread adoption. Despite India's large numbers of college educated workers, the literacy rate across the entire population is low, and levels of secondary school enrollment have room to grow, particularly among poorer segments of the population and in rural areas. Weak Internet infrastructure also constrains the development and implicit effectiveness of India's e-government.

Exhibit 10

Though India offers services online, it lags behind other countries on the e-government development index due to the lack of Internet accessibility

Percentile rank



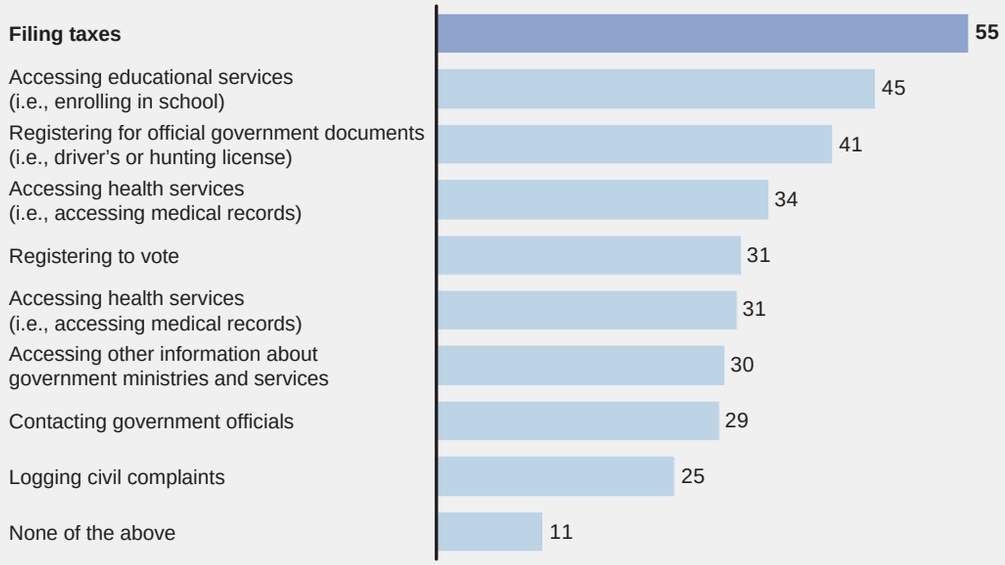
SOURCE: World Bank; Computer Industry Almanac; ITU; Capital IQ; WEF Global Competitiveness Report 2010–11; IFC; Speedtest.net; Transparency International; McKinsey analysis

27 2012 McKinsey survey of 554 SMEs in the organized sector in India. Only 8 million of the 35 million SMEs in India are in the organized sector.

Exhibit 11

Filing taxes is the most popular e-government service among SMEs in India

% of respondents using each e-government online service in the last year
(Sample size for India = 554)



SOURCE: 2012 McKinsey survey of 554 SMEs in India; McKinsey analysis

A vision for broad-based Internet inclusion

As India implements numerous measures in support of inclusion in various sectors—banking, employment, health care, education—the Internet has huge scope to improve the effectiveness of these programs, especially as rural Internet penetration increases. This inclusive transformation can be supported through concerted actions by policy makers, businesses, and entrepreneurs.

Need for a broad-based digital inclusion

India's focus on inclusive growth underscores the importance of achieving broader and deeper Internet impact in the coming years. Given current patterns, India's projected Internet penetration will be only 28 percent in 2015, far lower than the projected global average of 43 percent. At that date, India's rural penetration is likely to be a mere 9 percent, compared with urban penetration of 64 percent.

India's policy makers are making a concerted thrust toward more equitable development, through programs that will increase the access of both rural and urban populations to employment, education, nutrition, infrastructure and financial services. Regulations in the financial sector are increasing the numbers of bank branches in rural and semi-urban areas. Financial inclusion programs are being rolled out on a huge scale by India's largest state-owned banks, with the poorest segments of the population now gaining access to bank accounts. India's national rural employment guarantee program provided nearly two billion person-days of work to nearly 50 million rural households in 2011–12.[28]

India will need a wave of digital inclusion to make all these efforts more efficient and better targeted toward the intended beneficiaries. For example, financial inclusion in rural areas, aided by Web technologies, can help channel government resources directly to the intended beneficiaries without leakage. Internet-based models can dramatically raise the productivity of public educational and health care systems. An increase in Internet usage among India's consumers and small enterprises in smaller towns, semi-urban, and rural areas will lead to more rapid growth in consumption and better access to export markets.

There is thus a compelling economic and social rationale for widespread Internet enablement—in terms of connectivity, devices and applications—to support these inclusion programs. This could be enabled by accelerating government investments that facilitate mass digital inclusion in projects such as AADHAR, India's Unique Identification Authority, which is creating an estimated 600 million unique identifications for India's citizens, and the National Broadband Plan, which aims to add nearly 100 million broadband connections by 2014 (see Box 10, "India's infrastructure and e-governance initiatives"). Initiatives such as HarVa—which is setting up rural BPOs, employment and skill-building programs—demonstrate the potential for digital inclusion to enhance rural livelihoods.[29]

28 *Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) Implementation Status Report 2011—12*, released by the Ministry of Rural Development, Government of India.

29 See "India: The Impact of Internet", 2011, R Kathuria and Mansi Kedia, ICRIER, IAMAI and DIT for case studies

Box 10. India's infrastructure and e-governance initiatives

- **National Optical Fiber Network (NOFN).** Through a combination of fiber-to-home and fiber-to-kerb, the Indian government is planning to create a nationwide optical fiber cable network. The initiative aims to connect more than 200,000 villages. The initiative, one of the flagship projects to enable rural connectivity, is yet to become operational.
- **National Knowledge Network.** More than 800 educational institutions, research facilities and government agencies are connected through the National Knowledge Network. The high speed network, which was conceptualized in 2008, aims to connect nearly 1,500 institutions across India. Besides providing high speed Internet access and basic services such as email, the network would also enable specific services such as e-learning, virtual libraries, grid computing and e-governance.
- **AADHAR (Unique Identification Authority of India).** A 12-digit unique ID is to be generated for every Indian citizen. The number will identify a record in the centralized database that contains the person's demographic and biometric information (including photograph, ten fingerprints, and iris scan). The database will be used to provide a plethora of applications and services over the Internet to advance financial and social inclusion by enabling the distribution of subsidies and the opening of bank accounts for the rural population.
- **eSeva.** Several state governments have introduced e-governance initiatives to make it easier for citizens to transact with the government. For example, the e-government initiative of the state of Andhra Pradesh, eSeva, consists of a chain of computerized centers that provide multiple government services through a single window. The initiative rides on a variety of channels, such as online, ATMs, and mobile phones. It has achieved a utilization rate of 120,000 transactions per day.[1]

1 Pratap Vikram Singh, "eSeva centres in Andhra Pradesh: Journey of seven years," www.e.letsonline.com, June 1 2009.

Concerted action required in five areas

India has the intrinsic strengths for an Internet transformation, but concerted actions are required to address key gaps in the Internet ecosystem. Consumers, entrepreneurs, enterprises and the government can build a stronger Internet ecosystem driven by India's young Internet-savvy population and strong local consumption, strong entrepreneurship and innovation, and a large pool of technically trained human capital. Yet, five key areas must be addressed in order to capitalize on these strengths, viz., (1) limited availability of Internet infrastructure (India is ranked 49 out of 57 countries on Internet infrastructure and environment); (2) high cost of access and usage—at $61 per Mbps on a PPP basis, India has one of the highest median costs of broadband access among comparable aspiring countries; (3) lack of awareness and digital literacy (lack of education on using the Internet is among the top three constraints to user adoption as cited by SMEs); (4) limited range of applications and services (India is in the bottom quartile on government e-participation index); and (5) an unfavorable business environment (India is ranked 48 out of 57 countries on ease of Internet entrepreneurship).

Beyond the existing initiatives, taking concerted nationwide action in these five areas can help India make significant progress in addressing these obstacles and thereby move closer to the goal of broad-based Internet inclusion.

- **Extend infrastructure investments deeper into the country.** Infrastructure initiatives need to be extended beyond the top cities into Tier 2 and Tier 3 cities, and deeper into the semi-urban and rural parts of the country, that are home to 70 percent of the population and represent an estimated 50 percent of total household consumption.[30] The challenge is not trivial—India's rural population is dispersed across more than 600,000 villages, organized in more than 6,000 sub-districts called blocks, administratively controlled by nearly 600 small towns known as district headquarters.[31] Infrastructure expansion efforts could extend to semi-urban and rural areas by accelerating existing government initiatives such as the NOFN that is planned to connect all settlements with a population of over 500, and the Draft National Telecom Policy that aims to provide 175 million broadband connections by 2017.[32] A relook at the terms of deployment of the Universal Service Obligation Fund (USOF) could offer a potential means to carry out such initiatives. Public—private partnership ventures offer the means to expedite such a roll out. In Peru, for example, a series of public—private initiatives, based on providing subsidies to private players selected through competitive bidding, has helped nearly 6,500 rural communities to achieve "last mile" connectivity.[33]

- **Reduce the cost of access to and usage of the Internet.** Mobile connectivity will be the primary driver of the increase in Internet penetration over the next four to five years. It is critically important that users have access to affordable Web-enabled mobile devices and can afford Internet connectivity and content. Average smartphone prices in India are around $367 (PPP adjusted), compared with $200 to $300 in Brazil and China, countries with twice or three times India's per capita income (in PPP terms). India has one of the highest median costs of accessing bandwidth ($61 in PPP terms for 1 Mbps) among the set of comparable countries. In China, for instance, it would cost $11 in PPP terms. It has been suggested that for broadband to achieve widespread adoption, the cost of access should go as low as $3.5 per month.[34] Further, the cost of content and applications would need to fall to be accessible to the wider population. For example, pricing of apps for users in India is at global levels and comparatively expensive given India's low per capita income. A variety of mechanisms could be considered to ensure lower cost for the end consumer—for example, direct subsidies, conditional cash transfers, differential spectrum pricing policies, and regulated broadband tariffs. The mechanisms adopted should be those that create the fewest market distortions and can be practically implemented to reach targeted beneficiaries.

- **Increase digital literacy.** SMEs cite lack of education about using the Internet as the top factor constraining the adoption of Web technologies. Low Internet penetration in rural and semi-urban areas implies that large sections of the population lack familiarity with the use of PCs and Web-based devices. The Internet ecosystem in India still has a long way to go to provide local language and text-to-speech support for its contents, devices and applications. The list of top ten languages on the Internet does not include even one Indian language, despite the large populations who speak the country's major languages. Entertainment services, such as local language music and videos are immensely popular among new users and could be used as a means to impart education and awareness about usage of the Internet. If promoted vigorously, digital literacy may precede traditional literacy and could become the primary source of literacy for millions. There is also a need for simpler and more intuitive mobile applications and services with simple graphical interfaces, and strong local language support, such as an India-specific mobile operating system, or an agricultural application for farmers with an image-based user interface. Para-technicians (analogous to paramedics)—with working knowledge of computers and the Internet—could potentially act as intermediaries to increase the adoption of such technologies among first time users. This need offers a potential opportunity for innovators; it could significantly improve usage among new mobile Internet users.

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30 We define Tier 2 cities as those with population between 1 million and 4 million and Tier 3 cities as those with less than 1 million population. See McKinsey Global Institute, *India's urban awakening: Building inclusive cities, sustaining economic growth*, April 2010 for details.

31 According to the 2001 Census Data, Office of The Registrar General & Census Commissioner

32 Draft National Telecom Policy 2012, Department of Telecommunications, http://www.dot.gov.in/ntp/NTP-06.06.2012-final.pdf

33 Robert Stephens, Jorge Bossio and Jean-Christophe Ngo, "Expanding the frontiers of telecom markets through PPP in Peru", Gridlines, Public-Private Infrastructure Advisory Facility (PPIAF)

34 Ajit Balakrishnan, "Give TRAI's broadband plan a hand," *The Economic Times*, June 28, 2010.

- **Introduce Internet-enabled applications into new areas of the economy.** India needs to extend the benefits of the Internet into sectors of the economy that have so far not been touched. For example, applications for agriculture, such as farm extension services and supply chain solutions for farm produce, would promote Internet usage by a large proportion of the rural economy. Applications for utilities, such as logistics management at ports, and octroi and toll collection on roads, and for the energy sector, such as smart grids and power monitoring, would raise the productivity of infrastructure assets. Telemedicine and digitization of patient records would enable high quality health care services to reach millions; likewise, better educational outcomes can be achieved for a large part of the population through Internet-based teaching aids and school performance management. The wide availability of public sector information could accelerate this process. For example, the provision of all state and central governments' budget and expenditure details in a single database and format, as opposed to each agency and state having its own Web site, could enable the creation of applications that increase transparency and identify ways to reduce inefficiency and duplication. Sharing government data in a machine-readable format (such as XML or CSV) rather than scanned documents or PDF would facilitate this process.[35] The Indian government's Public Information Infrastructure (PII) project seeks to improve the availability of public information through a series of initiatives around improving connectivity and providing a single platform for applications.[36] However, it is equally important to ensure that the new users are aware of these applications and services and use them. To this effect, efforts such as pre-loading a set of basic applications on to mobile devices could be potentially explored.

- **Create a favorable business environment for Internet-based enterprises.** None of the enablers mentioned above will materialize without a thriving culture of Internet companies. Much can be done to promote the environment for Internet start-ups, to facilitate their growth to a modest size, and to support the achievement of global scale for a few of them. For example, India's rating on "burden of government regulations" (1 = extremely burdensome; 7 = not burdensome at all) is 3, placing it at 34 among the 57 countries. In India, it is estimated to take an average of 29 days to start a new business, compared with 22 days in South Africa and only 18 in Malaysia. Government regulations can ease the procedures, the time required, and the cost of setting up a company or registering an Internet domain. Private enterprises can innovate to create shared services platforms to help small companies achieve scale advantages in support functions, such as HR, accounting, and payroll, and thereby allow SMEs to focus on their core competencies. A combination of government, private players, and industry associations can facilitate the move to clearer and predictable legal and copyright protection and the creation of "trust symbols" and secure solutions in areas such as online payments. It has been well understood that having a clear and unambiguous copyright protection and intellectual property regime can improve the development of Internet technologies and potentially improve funding into entrepreneurial ventures.[37]

35 Betsy Masiello and Derek Slater, "Embracing an Innovation Stimulus Package", July 12, 2012.

36 Public Information Infrastructure, Government of India, http://www.iii.gov.in

37 See Josh Lerner, *The Impact of Copyright Policy Changes on Venture Capital Investment in Cloud Computing Companies*, 2011 and *The Impact of Copyright Policy Changes in France and Germany on Venture Capital Investment in Cloud Computing Companies*, 2012. See Michael A. Carrier, *Copyright and Innovation: The Untold Story*, 2012

Learnings possible from other aspiring and developed countries

India is not alone on this journey. Countries around the world are experimenting with diverse approaches to develop their Internet foundations that are tailored to local contexts and take advantage of unique local strengths (see Box 11, "International examples of efforts to build a stronger and deeper Internet foundation").

Box 11. International examples of efforts to build a stronger and deeper Internet foundation

- **Community Telecommunication Cooperatives (CTCs)** were established by the Argentine government to provide telephone services to thinly-populated rural areas. ENTel, the state telephone monopoly, had provided services to profitable urban areas but avoided the expense and complexities of doing the same in rural areas. A special regulation allowed the creation of CTCs to provide telephone services by setting up "last mile" infrastructure in areas that ENTel declared to be unprofitable. Today, in addition to telephony services, CTCs offer Internet, broadband and WiFi among other services, creating a 350-strong federation to encourage synergies.
- **South Africa** has been proactive in supporting the development of submarine cables, as it is insulated from most international data traffic, and many of its neighbors' Internet ecosystems are not yet mature. As a result, its cable capacity is expected to reach 13.8 terabytes per second by the end of 2012. While the country scored a modest 26 percent on McKinsey's maturity of the Internet ecosystem index in 2010, South Africa is positioning itself to have a more mature Internet ecosystem in the future by investing in one of the core ecosystem foundations.
- **Korea On-line E-Procurement System (KONEPS)** is a cyber-market built by the government of South Korea for the entire public procurement system, to improve on the speed, efficiency, and transparency of the earlier paperwork-intensive system. This highly successful intervention had around 21 million users by the end of 2011, saving annual transaction costs of nearly $8 billion. In addition, the system has encouraged increased participation from SMEs, with nearly 75 percent of contracts by value being awarded to SMEs in 2010, up from 55 percent in 2003. The initiative has been strongly supported by the government and has fostered a number of innovations such as e-bidding from mobile devices and integration with radio-frequency identification (RFID) chips.
- **Bolsa Familia**, an initiative of the Brazilian government that uses prepaid cards for every individual, has increased Brazil's GDP by $2.5 billion by improving distribution efficiency and reducing administration costs. It is the largest and most successful cash transfer program in the world, reaching 46 million people as a direct subsidy to pay for education, health care and other services. Throughout the disbursement process—starting from data collection, family registration, eligibility determination and verification, transfer of funds and final disbursement—a centralized system tracks the entire distribution system, connecting all the centers in the municipalities through a single network.
- **Africa Virtual University** is a pan-African non-profit that has trained more than 40,000 students since 1997. Established by the World Bank, it is now an intergovernmental organization involving 14 African governments in a network of 53 partners across 27 countries. The university has increased student productivity by 10 percent every year, spending $40 million with a combined impact on current GDP of $150 million for countries in Africa.

Implications for stakeholders

This list of ideas and initiatives is not exhaustive. It is merely indicative of the kinds of actions, involving public, private and individual stakeholders that could lead to higher iGDP for India. The scale of the opportunity offers scope for government and private enterprises to collaborate.

The initiatives fall into three broad categories, according to their most likely sponsors:

- **Policy makers** hold the key to setting up an effective business environment and aiding the progress of programs of inclusion. An ecosystem in which a business can start and scale up quickly, and then maintain itself is absolutely critical to push forward the other initiatives. Digital inclusion will accelerate flagship programs in agriculture, energy, employment, education and health care to help set up India for more equitable development.

- **Private enterprises** could play a critical role in building the infrastructure to connect people to the Internet. By utilizing their dominant position in the telecom sector or via public—private partnerships, they are well-suited to provide access at an affordable rate to the rural population. In addition, they could play a key role in helping to incubate and mentor new Internet-driven ideas, and promote digital literacy and awareness.

- **Innovators and entrepreneurs** have the potential to improve the supply of products and services that will become available as Internet penetration increases, and the semi-urban and rural populations gain access to high-speed connections. Existing solutions need to be tailored for these groups, local language support being one of the most significant requirements. The breadth of these offerings should be expanded to focus on areas such as agriculture, utilities, education, and health care. As the proportion of users accessing the Internet through a mobile phone increases, it is essential that applications and services are optimized for low-end mobile devices as a majority of the rural population will not be able to afford a smartphone.

□ □ □

India's Internet boom is a significant discontinuity that offers immense potential for new or renewed types of business, economic and social activity. As technology advances, formidable computing power will be embedded in increasingly affordable hand-held devices. Thus, the Internet has the potential to reach diverse sections of the Indian population, from young urban entrepreneurs to rural farmers. All stakeholders in "online India", across the spectrum of entrepreneurs, enterprises, consumers and policy makers, can play an active role in achieving and accelerating the full potential of the Internet.

Appendix: Methodology and approaches

1. Qualitative metrics that define our set of "aspiring" countries
2. The Internet's contribution to GDP (iGDP index)
3. The Internet's contribution to GDP growth
4. Consumer surplus
5. E3 Index
6. i4F Index
7. Ease of Internet entrepreneurship (ENE)
8. e-commerce platform (eCP)
9. e-Government development index (e-Gov)

1. Qualitative metrics that define our set of 'aspiring' countries

For the purpose of this report, we have defined "aspiring" countries as those significant and dynamic enough to aspire to become "developed" countries within a reasonable time frame.

- **Significant:** Nominal per capita GDP between $1,000 and $20,000 in 2010, and nominal GDP in 2010 above $90 billion
- **Dynamic:** Nominal per capita GDP has grown at a compound annual growth rate above 3 percent in the 2005 to 2010 period

2. The Internet's contribution to GDP (iGDP Index)

There are three methods for calculating the GDP contribution of a sector:

- **Production method** measures the value companies add by producing goods and services
- **Revenue method** measures the gross revenue of institutional sectors, including employee pay
- **Expenditure method** measures the total spending by consumers and government on goods and services

None of these methods account for the Internet's value to the overall economy of a country or society. The production method is the most common method used to calculate a sector's contribution to GDP. However, calculating the Internet's contribution to GDP using the production method would have required unreliable estimates of Internet-related revenue and margins for all companies in all sectors. We decided to use the expenditure method, based on Organisation for Economic Co-operation and Development (OECD) data.

To calculate the Internet contribution to GDP, we assessed the contribution of Internet-enabled goods and services to each of the four categories. To the extent possible, in order to provide comparable figures, we have used the same data sources for each category across all countries. The categories are:

- **Private consumption:** This is the total consumption of goods and services by consumers via the Internet or that are needed for Internet access. This includes personal computers and smartphone sales (pro-rated by Internet activity), B2C e-commerce, residential broadband subscriptions, and revenue from mobile Internet use. Private consumption from the Internet is driven primarily by online use and the purchase of goods and services.[38]
- **Private sector investment:** This is private sector investment in Internet-related technologies[39] (telecom, extranet, intranet, cloud, Web sites, and so on).
- **Public expenditure:** This includes Internet spending for consumption and investment by the government (software, hardware, services, cloud, and telecom pro-rated by Internet activity).[40]
- **Trade balance:** This is the export of goods (including Internet equipment) and services, plus B2C and B2B e-commerce, from which were deducted all associated imports.[41]

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38 PC sales: Pyramid Research, IDC, 2011. Smartphone sales: Gartner, 2010. Smartphone time spend online: iConsumer US, 2010. Online retail: Euromonitor, 2010. Online gambling: H2 Gambling Capital, 2010. Online travel: PhoCusWright, World Travel and Tourism Council, 2010. Internet mobile revenue: Pyramid Research, 2010. Broadband revenue: Pyramid Research, 2010. Internet penetration: ITU, 2010.

39 Input-output tables: OECD Stat Extracts, 2010. GFCF expenditure: Global Insight, 2010.

40 ICT spending by vertical (government, health care, education): Gartner, 2010. Share of public spending in education: UNESCO, 2010. Share of public spending in health care: World Health Organization, 2010.

41 Input output tables: OECD Stat Extracts, 2010. Import and export expenditure: Global Insight, 2010. E-commerce B2B and B2C import and export data: IDC, 2010; Gartner, 2010.

For each component of the contribution to GDP, we examined the assumptions regarding the underlying portion that relates to the Internet. We undertook a detailed, bottom-up analysis for each area of ICT spend:

- For private consumption, we allocated the share of Internet in ICT expenditure based on the percentage of time spent online by PC and smartphone users, available from the McKinsey India Digital Consumer survey 2012. We recognized goods and services sold on the Internet at their full e-commerce value because they indicate the importance of the Internet industry as a link in the distribution chain, even though certain Internet transactions might still have occurred in the absence of the Internet.

- For private sector investment, we separately estimated the share of Internet in the ICT investments of large enterprises and SMEs and computed the weighted average of the two according to their shares of overall sales revenue. For large enterprises, we interviewed industry experts in key verticals such as financial services, telecom, and manufacturing to estimate the share of ICT investments that are Internet-related and allocated their expenditure on hardware, software, services, and telecommunications accordingly. For SMEs, we allocated the expenditure on hardware, software, services, and telecommunications based on the responses from the SME survey. For communication equipment (in both large enterprises and SMEs), we allocated the expenditure as Internet-related according to its percent of semiconductor contributions, the information being derived from McKinsey's iSuppli database, and expert interviews.

- For public expenditure, we allocated the share of Internet in ICT expenditure in line with the IT project expenditure pattern of the central government's Department of Information Technology, and that of a few representative state governments, and allocated the expenditure as hardware, software, services, and telecom.

- For trade balance, we estimated the export- and import-related iGDP separately. For software and services exports, we conducted expert interviews to determine the share of Internet-related work in the typical work pattern of IT exporters in India by category of player, as in application development and management, infrastructure, and business process outsourcing services players. For hardware exports, we based our estimates on the percent of India's hardware manufacturing that is Internet-related, from McKinsey's iSuppli database. For the import and export of telecommunications and communications equipment, we allocated the expenditure based on the percent of semiconductor contributions to India's import and export, drawn from McKinsey's iSuppli database and expert interviews. For import-related iGDP components other than telecommunication and communication equipment we used the same ratio as for private-sector investments, in view of the high share of ICT imports in the private-enterprise segment.

All exchange rates we used were taken from the OECD Stat Extracts database.

3. The Internet's contribution to GDP growth

The Internet's contribution to GDP growth is defined as the increase in Internet contribution to GDP divided by the overall increase in nominal GDP during the same period.

4. Consumer surplus

McKinsey & Company conducted an online survey of 4,500 consumers in the spring of 2010 in France, Germany, Russia, Spain, the United Kingdom, and the United States. Consumer surplus was assessed from consumer use of and benefit from 16 Internet services, clustered in three broad categories: communication (such as e-mail, social networks); entertainment (gaming, podcasts); and information services (search, comparison). The survey was representative of the online population and included socio-demographic elements, Internet use, stated services interest, and willingness to pay as well as a conjoint-analysis—based trade-off of services with price and privacy risk.

We used three methods to triangulate consumer surplus in all the aspiring countries we studied, including India:

- **Method 1 (main method):** Scaling these results to aspiring countries involved three significant reductions. First, the maturity of the Internet ecosystem (variables from the McKinsey e3 Index) was used to pro-rate for consumer utility potential in a country. The per-user consumer surplus was then adjusted for strength of e-commerce ecosystem. Understanding that less-developed e-commerce ecosystems will allow for less consumer surplus, the information services survey categories' consumer surplus contribution was reduced by 5 percent of the difference between the surveyed countries' e-tail/retail ratio, and that of the studied aspiring country. We assessed traffic patterns of the top five global search engines (covering more than 80 percent of global search volume) for source and loss of traffic, and the top 30 Web sites where consumers go after their search, and found that e-commerce accounts for 1 to 5 percent of searches worldwide.

- **Method 2:** The per capita GDP (adjusted for PPP) was used to pro-rate the consumer surplus in a country.

- **Method 3:** The maturity of the Internet ecosystem (variables from the McKinsey e3 Index) was used to pro-rate the willingness to pay (WTP) in a country. The difference between WTP and consumer surplus was estimated, using the average revenue per subscriber (ARPS) for fixed Internet (broadband and narrowband).

We believe our scaling methodology provides a conservative estimate of consumer surplus for aspiring countries, as the three methods of pro-rating likely double-count the needed scaling effect. We look forward to other statistically significant, robust surveys of consumption habits and their associated economic benefits in our studied countries, so that our estimates can be refined.

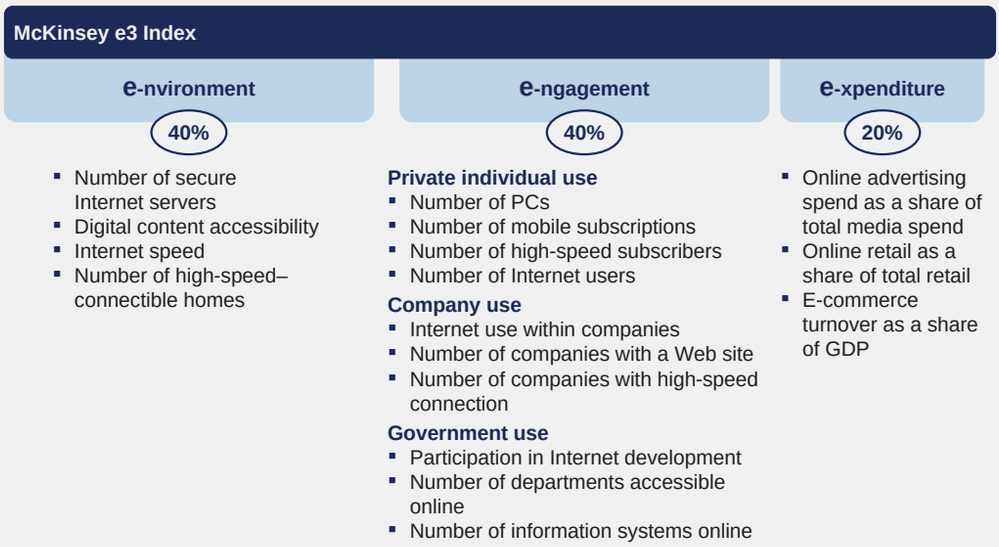
5. e3 Index

The e3 Index measures a country's Internet connectivity based on three components (Exhibit A1):

- **e-nvironment:** quality of infrastructure, as indicated by Internet speed and penetration
- **e-ngagement:** use of the Internet by individuals, companies and governments
- **e-xpenditure:** Internet expenditures, including advertising and e-commerce

Exhibit A1

McKinsey's e3 Index measures the accumulation of means and Internet usage in a specific country



SOURCE: Netcraft; World Bank population estimates; WEF Global Information Technology Report; Pyramid Data Tracker; Computer Industry Almanac; ITU Union ICT indicators; World Digital Media Trends; Euromonitor International; UNCTAD Information Economy Report; McKinsey analysis

To evaluate these components we measured them across 17 indicators, most of which were informed by the World Economic Forum's Global Information Technology Report and International Data Corporation (IDC). The average of these indicators creates a score for each component, which is then multiplied by the weight assigned to the component to calculate total e3 score.

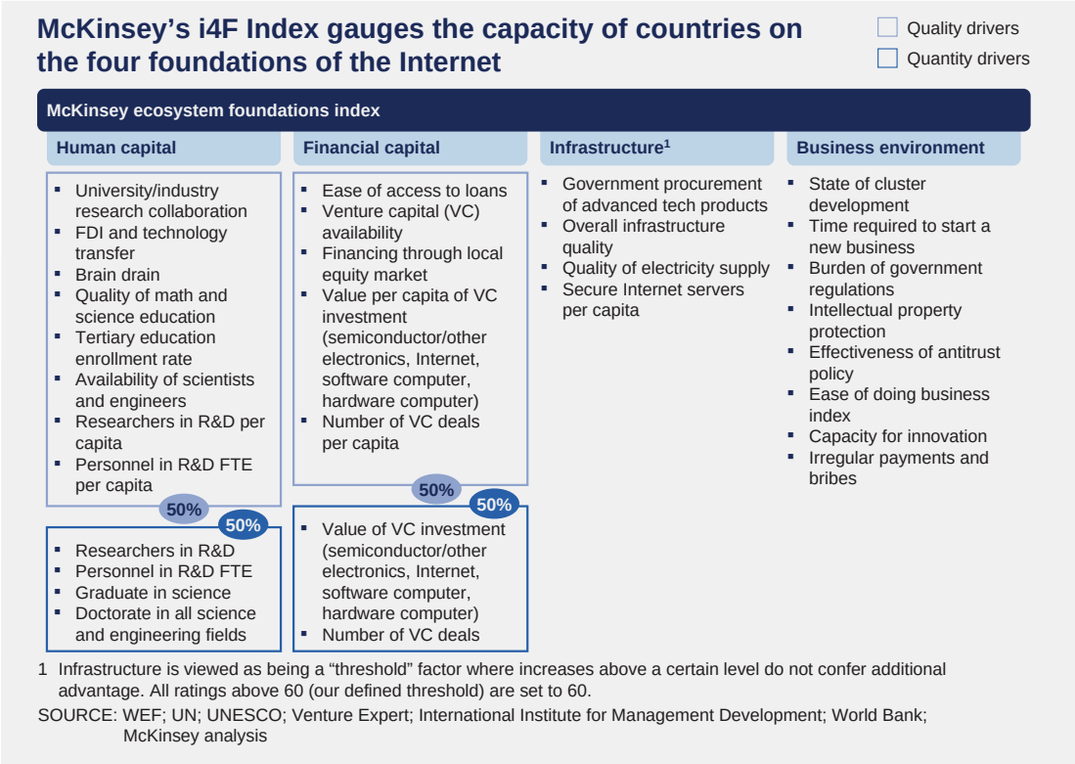
It is important to note that e3 is a relative ranking of selected countries. A country's e3 score will vary according to the set of countries (aspiring, developed) against which it is measured. This index therefore offers a comparison value that is specific to a particular set of countries and is not an absolute measurement.

6. i4F Index

The i4F Index measures a country's Internet-enabling ecosystem and is based on four components (Exhibit A2):

- **Human capital:** measures education and research; the score derives from the quality (50 percent) and the quantity (50 percent) of human capital
- **Financial capital:** measures availability of financing for Internet and ICT companies; the score derives from per capita availability (50 percent) and global financing opportunities (50 percent)
- **Infrastructure:** measures the penetration and quality of Internet-enabling infrastructure
- **Business environment:** measures a country's attractiveness to business, as reflected in regulatory and societal effects

Exhibit A2



1 Infrastructure is viewed as being a "threshold" factor where increases above a certain level do not confer additional advantage. All ratings above 60 (our defined threshold) are set to 60.

SOURCE: WEF; UN; UNESCO; Venture Expert; International Institute for Management Development; World Bank; McKinsey analysis

These components were measured across 31 different indicators, most of which were informed by the World Economic Forum's Global Competitiveness Report, IMD, and the World Bank database. Each component is scored on the average of its indicators, and the four components determine the index score at equal weight. We maximized the infrastructure component value at 60 percent, because infrastructure is not a differentiating parameter once a country has reached a certain level of infrastructure development and quality.

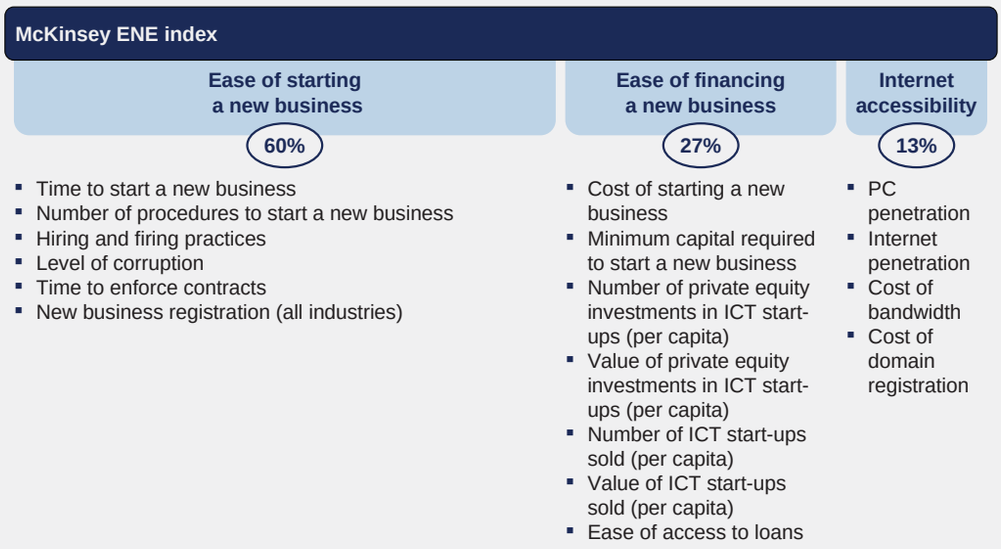
7. Ease of Internet entrepreneurship (ENE Index)

The ENE Index measures the ease of starting successful Internet-related entrepreneurial ventures and is based on three components (Exhibit A3):

- **Ease of starting a new business:** an industry agnostic view of the overall business ecosystem in a country
- **Ease of financing a new business:** measures the availability and attractiveness of financing for ICT start-ups, as well as the cost to finance a new business
- **Internet accessibility:** measures extent and cost of Internet access for both enterprises and their target consumers

Exhibit A3

McKinsey's Ease of Net Entrepreneurship (ENE) Index measures the ease of successful Internet-related entrepreneurial ventures



SOURCE: World Bank; Computer Industry Almanac; ITU; Capital IQ; WEF Global Competitiveness Report 2010–11; IFC; Speedtest.net; domain name registration Web sites; Transparency International; McKinsey analysis

To evaluate these components we measured them across 17 indicators, most of which were informed by the World Bank, Capital IQ, and the World Economic Forum Executive Opinion Survey. The average of these indicators creates a score for each component, which is then multiplied by the weight assigned to the component to calculate total ENE score.

To determine the weights for each category, we optimized for the highest correlation between ease of Internet entrepreneurship and the number of Internet-related businesses that are registered each year. The number of Internet-related businesses that are registered every year is estimated using country specific data (for example, Eurostat) and World Bank information.

It is important to note that ENE is a relative ranking of selected countries. A country's ENE score will vary according to the set of countries (aspiring, developed) against which it is measured. This index therefore offers a comparison value that is specific to a particular set of countries and is not an absolute measurement.

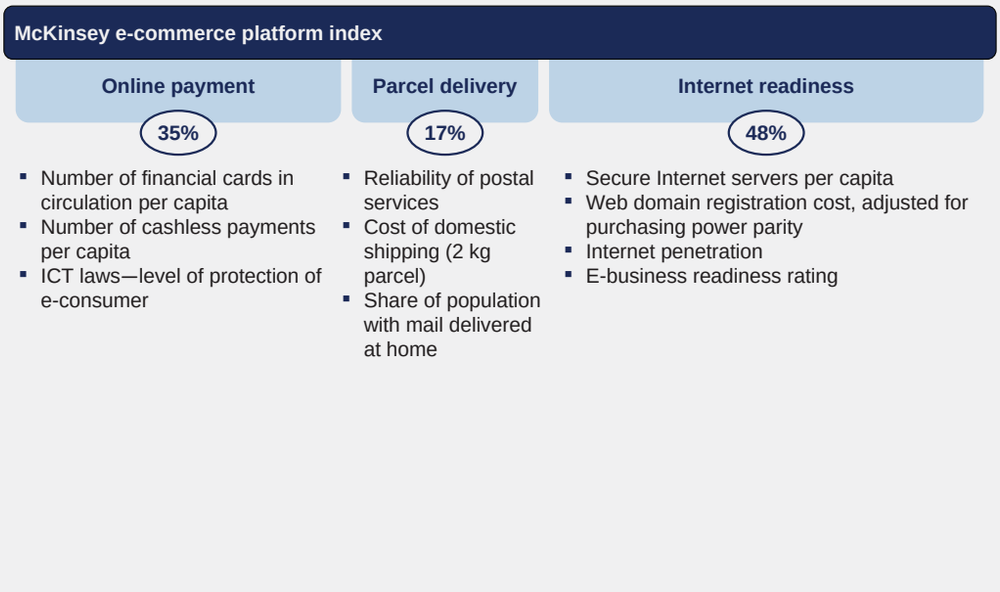
8. E-commerce platform (eCP Index)

The e-commerce platform index (eCP) scores a country's B2C e-commerce foundations on the basis of three components (Exhibit A4):

- **Online payment enablement:** ease and security for consumers wishing to pay online
- **Parcel delivery:** reliability, cost, and reach of parcel delivery
- **Internet readiness:** network readiness for e-commerce

Exhibit A4

McKinsey's e-commerce platform index measures the development of B2C e-commerce foundations



SOURCE: IMD World Competitiveness Online; WEF Global information technology report 2010–11; postal operator Web sites; Universal Postal Union; ITU/ICT Indicators Database; EIU; McKinsey analysis

Our measure of online payment enablement is composed of the number of financial cards in circulation, the volume of cashless payments, and the legal protection provided to the e-consumer. The "parcel delivery" measure is based on the reliability of the postal system, the cost of domestic shipping, and the percentage of a population with delivery to their homes. Internet readiness accounts for a country's volume of secure servers, the degree of Internet penetration, domain registration cost, and the general readiness for e-business.

We ranked 57 countries according to these factors, weighting each category as indicated in Exhibit A4. We calculated the weights to maximize the correlation between the 57 countries' e-commerce platform index score and the amount of online retail per capita in each country. As a result, a country gets an e-commerce platform rating on a scale from 0 to 100 percent. A country with a high e-commerce platform index is considered to have high e-commerce enablement.

9. E-Government development index (eGov Index)

The E-government development index or eGov measures the willingness and capacity of a country to utilize e-governance for ICT-led development. It is based on the following three components (Exhibit A5):

- **Online services:** measures the extent, content and usability of online services provided by the government
- **Telecommunication infrastructure:** measures the reach of telephony and fixed broadband services
- **Human capital:** measures literacy and education rate among the population

Exhibit A5

E-government development index is a composite measurement of the capacity and willingness of countries to use e-government for ICT-led development

E- government development index

Based on a comprehensive survey of the online presence of all 193 UN member states, which assesses the technical features of national Web sites as well as e-government policies and strategies applied in general and by specific sectors for delivery of essential services

It is calculated as a weighted average of three normalized scores of the most important dimensions of e-government: scope and quality of online services, development status of telecommunications infrastructure, and inherent human capital

Online services	Telecommunications infrastructure	Human capital
▪ How extensive the online presence is ▪ How good/bad the Web sites are (design and user friendliness, extent of content offered) ▪ Score is equal to the actual total score less the lowest score divided by range of total score values for all countries	▪ Internet users ▪ Number of fixed telephone lines ▪ Number of mobile subscribers ▪ Number of fixed Internet subscriptions ▪ Number of fixed broadband facilities	▪ Adult literacy rate (⅔ weight) ▪ Combined primary, secondary, and tertiary gross enrolment ratio (⅓ weight)

SOURCE: ITU; UNESCO; UNDP Human Development Report, World Bank; UNCTAD; IMF; UN; McKinsey analysis

The eGov index for every country is the e-government development index used by the United Nations Public Administration Network. A country's eGov score is the average of its score on each of the components. Each of these values is based on a survey of 193 member countries of the UN.

It is important to note that eGov is a relative ranking of selected countries. A country's eGov score will vary according to the particular set of countries (aspiring, developed) against which it is measured. This index therefore offers a comparison value that is specific to a set of countries and is not an absolute measurement.

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