KPMG
cutting through complexity

IAMAI
Internet And Mobile Association Of India

ON OMIDYAR NETWORK

India on the Go:
Mobile Internet Vision 2017
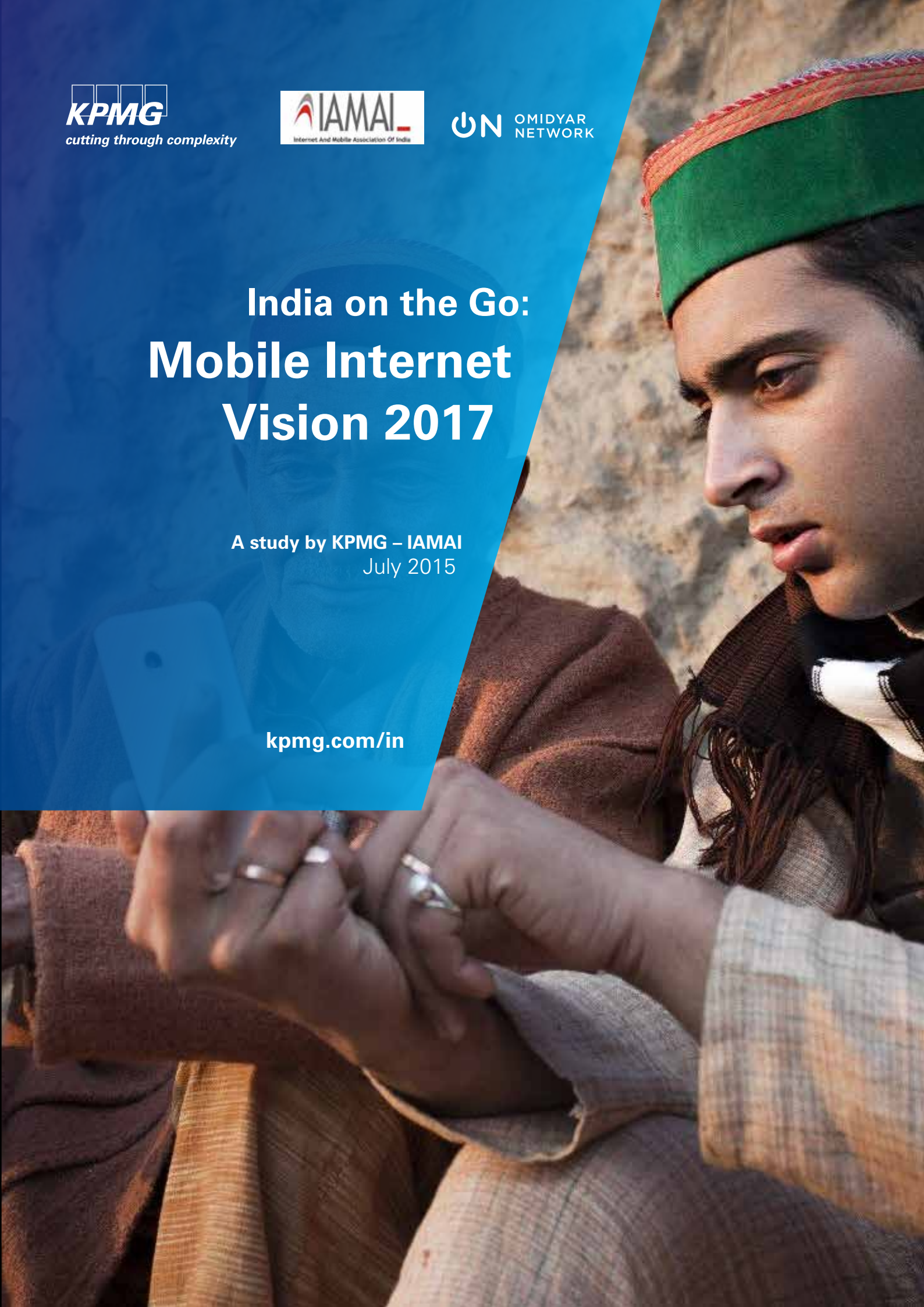
A study by KPMG – IAMAI
July 2015

kpmg.com/in

Table of Contents

Message

by KPMG

Akhilesh Tuteja
Partner and Head Technology

Ashvin Vellody
Partner
Management Consulting

The number of Mobile Internet users in India is expected to grow to 314 million by the end of 2017 with a CAGR of around 28 per cent for the period 2013-2017. This impressive growth would drive India to become one of the leading Internet markets in the world with more than 50 per cent of Internet user base being mobile-only Internet users. The key factors that would lead to this growth are initiatives by the government, collaborative ingenuity of Mobile Internet ecosystem and innovative content and service offerings from mobile based services players. Increase in smartphone penetration and increasing demand for Internet based services such as chat, social media, video and music through the mobile medium suggest a paradigm shift in content consumption preferences that is, in turn, would accelerate the growth in Mobile Internet usage. This report covers the developments, challenges and opportunities in the Mobile Internet landscape and provides insights and recommendations to enable the Mobile Internet ecosystem achieve its potential. In addition to this, we have brought in a wider perspective on mobile led services (mServices) and their positive impact on the Indian society at large.

We have identified headwinds and tailwinds impacting various players in the Mobile Internet ecosystem. The challenges identified in this report cover infrastructure issues, policy regulations, limited teamwork within the ecosystem, all of which ultimately impact availability and reliability of Mobile Internet. However, the existing opportunities outweigh the issues in the ecosystem. We believe that this is no time for battening down the hatches and weathering the storm. Rather, it is time to make the best of the potential opportunity afforded by connecting the population of 1.26 billion.

Finally, the report puts together insights and encourages a way of thinking for various stakeholders to take cognizance of in order to enable connectivity, create opportunities and pave the way forward. We have identified key focus areas for action and some short term fixes for long term issues in order to enable a faster growth in the Mobile Internet ecosystem.

I encourage you to study this report to understand the opportunity at hand as various strata of society come into the fold of connectivity. I welcome feedback on our findings and recommendations within this report.

Message

by IAMAI

Dr Subho Ray
President
Internet and Mobile Association of India

It gives me immense pleasure to present the research report 'India on the Go: Mobile Internet Vision 2017'. This report provides a detailed analysis of the state of the three major stakeholders: telecom companies, Internet content and services companies and handset manufacturers who collectively shape the Mobile Internet ecosystem. The opportunity and challenges that each of these segments face are discussed threadbare and recommendations made for future course of action.

There are 159 million Mobile Internet users in India and the report projects this to double by 2017. Given that mobile is going to be the primary mode of accessing Internet, the stakeholders need to nurture and grow the ecosystem collectively and synergistically. Since Mobile Internet is the most potent instrument for realisation of Digital India mission, the report suggests that the government too has a very important role in nurturing the ecosystem.

Given the dynamic nature of the ecosystem, the authors of the report are very conscious that views and suggestions made in the report are relevant to the context of today and are likely to change with changing circumstances.

On behalf of IAMAI I would like to thank all those industry leaders who found time to share their views for preparing this report. A special thanks to the KPMG team for their hard work, perseverance and patience. The report reflects the thorough and meticulous work put in by the KPMG team led by Ashvin Vellody and Varun Gulati. Thanks are also due to my colleagues at IAMAI, Mehul Gupta and Nilotpal Chakravarti who worked as the connector between industry and the researchers. I also thank the sponsors of this report, Webaroo Inc., One97 Communications Ltd and Omidyar Network for their support.

We hope the readers will find the report informative and of value to them.

Executive summary

The advent of the Internet has radically transformed the world of communications, information exchange, entertainment and business. India has the third largest Internet user base in the world out of which more than 50 per cent are mobile-only Internet users[1]. However, the Internet penetration in India at 19 per cent is quite low compared to other developed and developing economies[2]. The number of Internet users was 278 million in 2014 and the number of Mobile Internet users was 159 million by October 2014. The number of Internet users is estimated to reach 302 mn by December 2014[3]. There is a significant opportunity for growth in penetration and usage base in India. With a growing Internet penetration, India is likely to become one of the largest Internet markets in the world and this growth could be mainly driven by the growing number of mobile device connections.

The proliferation of mobile phones in India seems to be bridging the digital divide by connecting millions of people. The number of people who own mobile phones is greater than the number who own personal computers[4]. This reinforces the belief that the mobile handsets could have the single most important role in bringing Internet access to the unconnected sections of the population.

The Indian government is committed to setting up a robust digital infrastructure and to promote adoption of Mobile Internet and related products and services. In 2014-15, the Government budgeted INR 500 crore for building infrastructure as per the National Rural Internet and Technology Mission with an additional INR 100 crore budgeted for improving e-governance[5]. This is a step towards increasing the wireless Tele-density in rural areas which is still low at 43.27 per cent as of March 2014[6]. As the majority of the population resides in the rural regions[7], it is imperative to provide Telecom services to these regions to increase the overall penetration.

While the rural growth story will likely be written by 2G, urban India, demands high speed technologies such as 3G and 4G. Many Telecom operators are investing in developing 3G and 4G networks to cash in on this demand. It is estimated that there were approximately 42 million 3G subscribers in India by the end of year 2013 and the number is projected to reach 284 million by end of the year 2017[3]. To increase user adoption, several Telecom operators reduced their 3G tariffs by 80-90 per cent in the second half of the year 2013 and brought 3G prices comparable to 2G prices[8]. 4G user base is also expected to grow at an annual growth rate of 344 per cent and a CAGR of 103 per cent from 2013 to 2018[9].

The Mobile Internet ecosystem comprises of telecom operators, handset manufacturers, and content and service providers. Telecom operators are responsible for the overall quality and reliability of the network which operates as the backbone of a mobile service. Many Telcos have made heavy investments in the last decade for setting up the network infrastructure. Initiatives such as USOF levies and joint ventures between the government and the operators are focussed towards development in the rural areas. The target is to achieve a rural tele-density of 100 per cent by the year 2020[10].

Many handset manufacturers are making their contribution towards the Mobile Internet growth by churning out affordable handsets supporting vernacular content. The median price of handsets has dropped significantly making Internet enabled devices affordable for the masses. Several domestic handset manufacturers are contributing to the increasing trend of smartphone usage by selling high end phones at lower price points[11]. Smartphones seem to deliver a better user experience and can accelerate the adoption of Mobile Internet. India has become the third largest smartphone market in the world. The number of smartphone users is expected to reach 369 million by the year 2018[12].

Meaningful and compelling content can be an important driver for enabling adoption of Mobile Internet. The role of the content and service providers is thus of paramount importance. Traditional services like voice, SMS are gradually being replaced by mobile data services. Indian mobile content usage is dominated by email, social networking, chat, games and news[13]. While these categories gained popularity because they fulfill multiple needs of consumers, the positive social and economic impact of the Internet is probably manifold. The mobile data services would help to tackle key issues plaguing education, health, finance, agriculture and governance in

1   Avendus-India Mobile Internet: The revolution has begun, 2013

2   Internet Live stats, eMarketer; KPMG in India Analysis

3   IAMAI-IMRB Mobile Internet in India 2014 Report, KPMG-FICCI M&E industry report 2014 and 2015

4   Avendus-India Mobile Internet: the revolution has begun report, 2013

5   India Annual Union Budget announcement 2014-15, 10 July 2014

6   TRAI Performance Indicator Report, July 2014

7   Indian Census 2011, http://censusindia.gov.in/

8   http://www.moneycontrol.com/news/cnbc-tv18-comments/telecom-data-wars-idea-cuts-2g-3g-data-tariffs-by-90_987659.html

9   Cisco VNI report 2014, Industry discussions

10 http://www.trai.gov.in/WriteReadData/userfiles/file/NTP%202012.pdf

11 KPMG-FICCI M&E industry report 2014 and 2015

12 KPMG-FICCI M&E industry report 2015

13 Nielsen mobile consumer report, a global snapshot 2013

India. From giving access to financial transactions to the people who do not have a bank account to providing health services in the rural areas, a simple mobile phone is being touted as one of the greatest mediums of change.

While benefits are broadly appreciated by several players, there are multiple challenges that the ecosystem faces. Leading Telecom operators pay almost 28-29 per cent of their revenue as license fees, charges and levies[14]. With high spectrum cost, several Telecom operators find themselves cash-strapped in making heavy investment for network infrastructure upgrade. The uncertainties around regulatory and policy primarily concerning M&A guidelines, spectrum management and tax regulations further add to the operators' woes.

The content and service providers despite being a source for cutting edge innovation face significant challenges such as slower and overloaded telecom networks, experimentation with monetization models and underdeveloped billing and customer care systems. Customer's apprehensions around security of payment platforms and data privacy are areas which also need to be addressed.

Though the ecosystem is marred with several deep seated problems, it is the availability and reliability of Mobile Internet connectivity that can trigger an accelerated adoption rate for Mobile Internet. In India, the users face slow speeds, signal disruptions, and call drops. Even the best content and app may not appeal to a user if the network backbone does not support the intended user experience. Development of infrastructure, deployment of high end network technology, small cells in congested and rural areas, central QoS body for off-deck content, supportive regulatory policies can lead to improved data connection and thereby better user experience.

Reliable accessibility is the killer app which will bind the ecosystem together, increase adoption and enable innovations in business models around voice and data services. It is, therefore, essential that the government participates in developing the infrastructure through public-private partnership. The government must also focus on creating a friendly and transparent business

environment for the industry stakeholders to operate in. Further, the ecosystem can reap substantial benefits by creating standards for technology platforms. Cross-Platform, cross-device and cross-region compatible technology platforms could help in interoperability between different systems and services possibly leading to delivery efficiency.

There seems to be limited collaboration between the different pillars of the ecosystem; each component is trying to take the challenges of demand, supply and customer satisfaction head-on by itself. Even with shared interests and problems, the Mobile Internet value chain still remains loosely connected and even disjointed in few cases. To overcome various challenges, the business models of various players in the ecosystem would need to be redefined. A sustainable and effective business practice may require collaboration at different levels of the value chain.

Better collaboration, right partnership and the right service package can accelerate the market growth and help in evolving the ecosystem further. Collaboration between telecom operators and handset manufacturers to offer bundled services could prove beneficial to the customers. The telecom operators and the content and service providers can use each other's strength to effectively benefit from the market. The Telecom incumbents should assess their capabilities and determine how to leverage them in working with the other players of the ecosystem. Similarly, the content and service providers should consider the extensive network, marketing and billing capabilities of the Telecom operators for launching vernacular and innovative products.

In conclusion, Mobile Internet penetration in India is growing fast and holds a promising future with every player in the ecosystem having their own important role to play and contribution to make. While the sector faces challenges, the opportunities present outweigh the issues. Collaboration amongst the stakeholders with the government providing a supportive business environment can facilitate in ironing out the problems and put the ecosystem on a phenomenal growth trajectory.

---

14 http://articles.economictimes.indiatimes.com/2014-05-28/news/50149676_1_vodafone-india-ceo-marten-pieters-outstanding-loans

SECTION

01

Mobile Internet in India

India and the Internet

The Internet user base in India has grown from strength-to-strength, year-on-year and lately powered by mobile, has changed many a thing for the average Indian. Over the last decade, the preferences for communication, financial transactions, information exchange, search and even shopping have changed radically in India. This shift has been driven by use cases afforded by Internet technologies and more importantly due to penetration and adoption of Mobile Internet.

This section reports the state of Internet (including Mobile Internet) in India, components of Mobile Internet ecosystem and the ecosystem's contribution to the Indian economy.

Internet penetration in India

Even as the Internet and especially Mobile Internet growth are attaining new heights each year, Internet penetration in India, up until now, has remained relatively unimpressive. India's Internet penetration stands at a mere 19 per cent, accounting for 8.33 per cent of the total global Internet user base. However, even with relatively lower Internet penetration, India has the third largest Internet user base in the world and is expected to become the second largest this year[15]. When compared with key developed markets (almost nearing saturation) or other comparable developing markets such as Brazil and China, India has a long way to go with a sizeable portion of the population still devoid of Internet access.

Internet penetration

Country		Internet Penetration 2014
Australia		89.6%
USA		86.8%
Japan		86.0%
Brazil		53.4%
China		46.0%
India		19.2%

Source: Internet Live stats, eMarketer; KPMG in India Analysis

Internet connection growth led by wireless connections

The Internet penetration in India has increased from 13.7 per cent in 2013 to 19.19 per cent in 2014[16]. The increase in Internet penetration is due to the increasing number of Internet users and connections in India. As of October 2014, the total Internet user base in India was approximately 278 million[17]. It is estimated that the number of Internet users in India will touch 302 million by December, 2014 and 503 million by 2017 [17]. By the end

15 KPMG-FICCI M&E industry report 2014, IAMAI-IMRB Mobile Internet in India 2014 Report, www.Internetlivestats.com

16 http://trak.in/tags/business/2014/06/05/india-lowest-Internet-penetration-at-17-4-highest-user-growth-asia-pacific and http://www.Internetlivestats.com/Internet-users-by-country

of 2013, India was home to approximately 174 million Internet connections shared between wireless and wireline connections[17]. Driven predominantly by wireless access, this number is estimated to reach 429 million by the end of 2017. By the end of 2013, wireless connections constituted about 86 per cent of the total Internet connections in India and they continue to grow at a faster

pace compared to the growth rates of wireline connections[17]. Given the projected growth rates, wireless connections are expected to increase their share in the total number of Internet connections to 93.7 per cent by 2017.

The Internet penetration, connections and user base may continue to grow in India driven largely by the growing penetration of mobile devices.

India Internet connections 2013-17 (P)
(In millions)
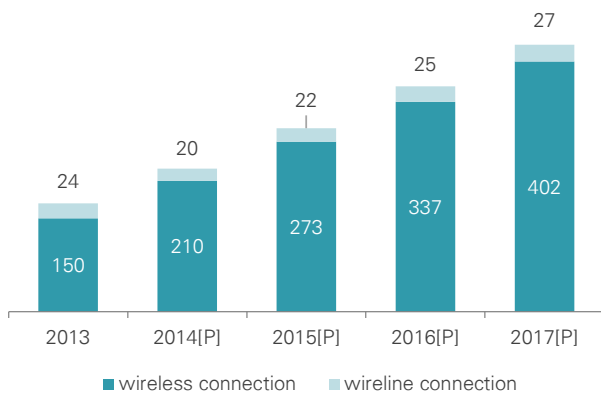
Source: IAMAI Internet In India 2014, Industry Discussions, KPMG-FICCI M&E industry report 2014 and 2015

Internet users in India 2013-17(P)
(in millions)
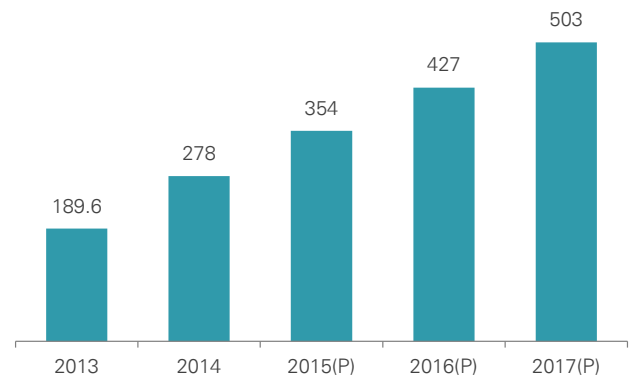
Increasing mobile phone penetration

The global mobile phone penetration (connections per 100 citizens) was measured at 93 per cent in Q1 of 2014. In India, the mobile phone penetration was measured at

73 per cent as of March 2014 falling well below the world average[18]. While the mobile phone penetration in India is on the rise with a steady growth rate, the country still has a long way to go in comparison with other developing and more mature Internet markets.

Global mobile phone penetration (as of Mar 2014)
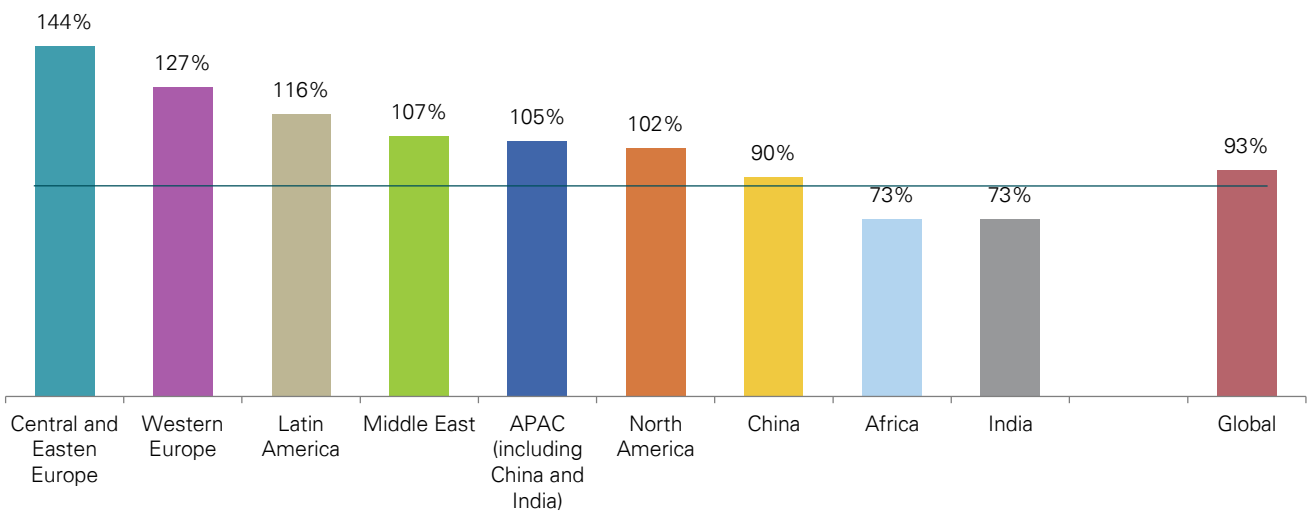
Source: Global mobile phone penetration (Source: Ericsson Mobility Report June 2014), KPMG in India analysis, 2015

17 IAMAI Internet In India 2014 and Industry Discussions, KPMG-FICCI M&E industry report 2015

18 Ericsson Mobility Report June 2014

Mobile phones awaiting a rural fortune

Growing mobile phone user base, especially Internet enabled mobile phones is the key propeller for growing penetration of Mobile Internet. India's current mobile phone user base is predominantly composed of basic phones and feature phones with steadily growing per centage of smartphones. Smartphone shipments surpassed the feature phone shipments in the first quarter of 2014[19]. As more consumers access Internet enabled smartphones in the future, the Mobile Internet usage and adoption is expected to improve.

However, the mobile penetration in Rural India leaves much to be desired. The contribution to mobile penetration in India comes majorly from the urban areas where wireless Tele-density has reached 142.39 per cent. On the other hand, the rural wireless Tele-density still shows poor performance at only 44.32 per cent as of September 2014[20]. To increase the overall figures for Tele-density, the penetration of mobile devices in the remote rural markets has to increase.

Mobile Internet – Taking connectivity to the masses

In India, the number of people who own mobile phones is greater than the number of people who own desktops or personal computers. Thus, it is only logical that in India, Internet finds its way to reach the masses through mobile devices. In fact, in India more than 50 per cent of Internet users are mobile-only Internet users[21].

The number of users accessing Internet via their mobile devices is growing continuously and it has become a key driver for increasing the overall Internet subscriber base in the country. The number of Mobile Internet users in India was approximately 159 million in 2014. This number is expected to continue to grow rapidly and reach 314 million by end of year 2017 registering a CAGR of 27.8 per cent for the period 2013-2017[22].

Mobile Internet users in India 2013-17 [E]
(in millions)
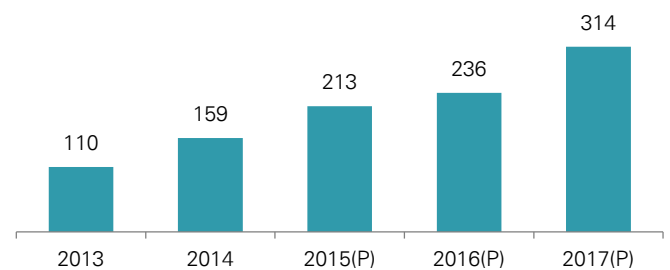
Source: IAMAI-IMRB Mobile Internet in India 2014 Report KPMG-FICCI M&E industry report 2015

> Mobile Internet is referred to as any form of Internet accessed through any mobile device. While GPRS, 3G, 4G/LTE, naturally, fall under the ambit of this definition, Wi-Fi connections from fixed-line as well as dongles would also fall in this category if accessed through a mobile device.

Adoption of high speed Mobile Internet fueling growth

High speed Mobile Internet has become the need of the hour as many services such as social media and mobile video/TV that are popular with the consumers are pushing demand for high speed Internet. These services are able to deliver the expected user experience to the customers only over high speed and consistent data networks.

19 IDC press release, June 2014
20 TRAI Performance Indicator Report, July 2014

21 Avendus-India Mobile Internet: the revolution has begun report, 2013
22 IAMAI estimates, FICCI-KPMG M&E industry report 2014 & 2015, KPMG in India analysis, 2015 and Industry Discussions

The Indian market, as of June 2014, had an estimated 114 million, 67 million and 4 million 2G, 3G and 4G users respectively. 3G user base stands strong constituting about 36 per cent of the overall Mobile Internet user base, while 4G is only beginning to set its foot in the market with a 2 per cent share as of June 2014[22]. However, 3G and 4G LTE are expected to drive higher adoption of Mobile Internet in the future.

2G user base in India is projected to decline in the coming years as more and more customers are expected to migrate from 2G to 3G. The 3G user base in India is rapidly gaining market and is projected to grow at a CAGR of 61.3 per cent from 2013-17. There were approximately 82 million 3G subscribers in India by the end of year 2014 and the number is projected to reach 284 million by end of year 2017[23]. To increase user adoption, many Telecom operators reduced their 3G tariffs by 80-90 per cent in the second half of year 2013 and brought 3G prices comparable to 2G prices. The objective of converging tariffs is to propel the first time smartphone users to subscribe to 3G network and move existing 2G users to 3G. Further, 4G user base is expected to grow at an annual growth rate of 344 per cent and a CAGR of 103 per cent from 2013 to 2018[24].

India 3G subscribers 2013-17[P]
(In millions)
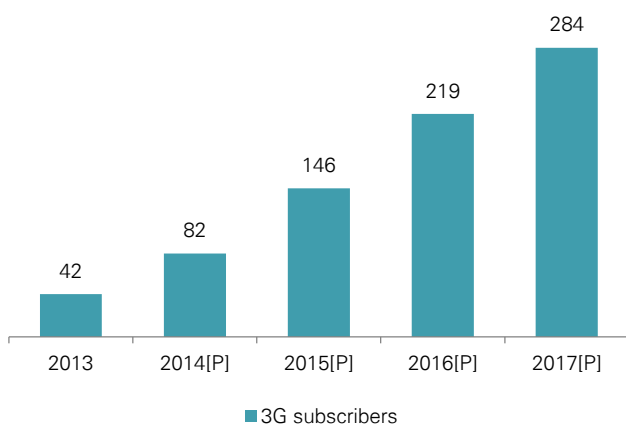
Source: KPMG-FICCI M&E industry report 2014

It has also been observed that the growth in 3G and 4G subscriptions in many regions of the globe is being driven by increasing smartphone penetration. Smartphones entering the partially tapped rural markets could also contribute to the growth in 3G and 4G user base in India.

Rural India – The engine of growth for Mobile Internet

Rural India is slowly but steadily moving towards a more Internet friendly and exploratory mind-set. Up until now, the rural market had largely been untapped although it offers good potential for high Mobile Internet growth. As of 2014, the Active Internet User (AIU) base in rural India was 6.7 per cent of the overall rural population of 905 million and accounted for 61 million users. 4.4 per cent of the total rural population used a mobile device to access the Internet; a figure that stood at a meagre 0.4 per cent in the year 2012[25].

The rural growth story in the coming years will likely be written by 2G technologies. 3G and 4G may continue to be primarily an urban phenomenon for the next few years. Increased Internet enabled device penetration, decreasing handset prices and data plans tariffs are helping to create a suitable environment for a rapid growth of Mobile Internet in India, with rural India set to take the lead.

As of June 2014, nearly 50 per cent of the AIU in rural areas accessed Internet using mobile phones, Community Service Centers (CSC) and Cyber Cafes. 38 per cent of the Active Internet Users use Mobile phone as the main access point[26].

Rural India-Internet access points
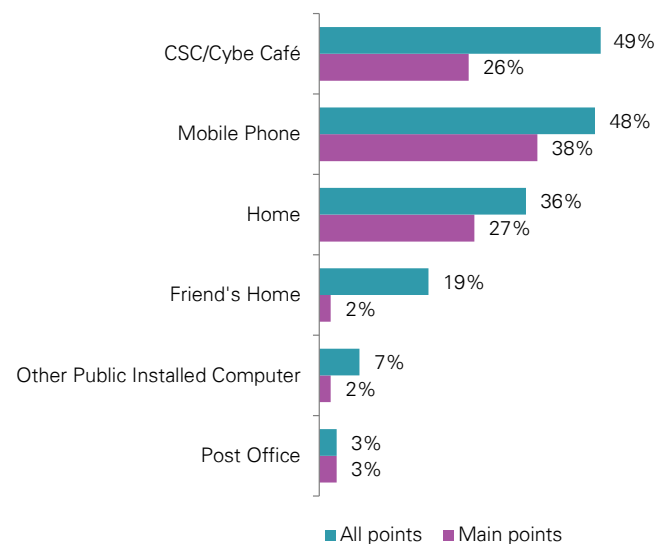
Source: IAMAI-IMRB Mobile Internet in India Report 2014

23 KPMG-FICCI M&E industry report 2014
24 Cisco VNI report 2014

25 IAMAI-IMRB Mobile Internet in India Report 2014, KPMG in India analysis, 2015
26 IAMAI-IMRB Mobile Internet in India Report 2014

The Mobile Internet ecosystem

The Mobile Internet ecosystem includes the handset manufacturers, technology providers, content and service providers and telecom operators delivering service to the end consumers with the policy and regulatory environment impacting the entire ecosystem. The Mobile Internet landscape in India looks promising with focus and investments seen across several aspects of the value chain.

Handset manufacturers

Telecom operators

Technology providers

The Mobile Internet ecosystem

Content and service providers

Policy and regulatory

Source: KPMG in India analysis, 2015

Telecom operators

During the last decade, heavy investments had been made to set up the mobile infrastructure in the country especially in the rural areas. Joint effort from the government and operators and initiatives such as the USOF levies are aimed at making the development of rural telecom infrastructure possible even when the investments may not be economically favourable for the telecom operators. FDI deregulation over the years with 100 per cent permitted from last year has fuelled investments in the Indian telecom sector. NTP 2012 Policy is another such initiative focussed on investments in network infrastructure in the rural areas with the target to achieve rural Tele-density of 100 by the year 2020[27]. Further, the operators are focussing on setting up the broadband infrastructure as ARPU from data services is witnessing growth[28]. The uptake of Mobile Internet will likely depend

on development of mobile broadband infrastructure. Currently 96,000 of the 736,000 telecom towers in India are 3G enabled and most of them are restricted to urban areas[29].

Despite the heavy investments, the sector does face few challenges. The main challenges are a) Spectrum Pricing and b) Inadequate Spectrum availability. Nonetheless, the overall outlook of the sector remains favourable with announcements made during the latest Budget session for projects (100 smart cities, e-kranti, etc.) that would require heavy investment in telecom infrastructure.

Handset OEMs

Recent trends in the handset market project a favourable picture for Mobile Internet services in India. Leading handset manufacturers are launching Internet enabled phones in the Indian market at affordable prices. The growth of Mobile Internet users in the coming years could ride on the back of increasing penetration of Internet enabled devices, notably affordable smartphones and tablets. The median price of a handset in India dropped from INR 8,250 in 2012 to INR 7,000 in 2013 and continues to decline[30].

Compared to feature phones, smartphones tend to deliver a better user experience. Smartphone sales have increased and India is already the third largest smartphone market in the world[31]. India had approximately 116 million Internet enabled smartphones by the end of 2014[31]. The number is expected to reach 369 million by the year 2018[32]. This growth portends higher Mobile Internet adoption rate in the future.

Technology providers

Mobile technologies form the backbone of mobile service delivery. Middleware infrastructure technology is crucial for driving the adoption of applications. For example mCommerce, mPayments applications depend on advanced technologies to deliver their true potential. Given the variety of devices in the market, middleware technology is playing a huge role in developing and integrating compatible application interfaces. With mobile network data load projected to increase 50 to 100 times over the next three years, advanced technologies may play a vital role in ensuring superior customer experience[31].

27 http://www.trai.gov.in/WriteReadData/userfiles/file/NTP%202012.pdf

28 Industry discussions conducted by KPMG in India

29 http://www.tele.net.in/telenet-magazine-archives/item/13927

30 http://in.reuters.com/article/2015/02/04/micromax-india-sales-samsung-idINKBN0L808M20150204

31 KPMG-FICCI M&E industry report 2014 and 2015

32 KPMG-FICCI M&E industry report 2015

Content and service providers

Content and services refers to delivery of content (audio, video, etc.) and services over Internet with telecom service providers having limited distribution control, rights and responsibilities in terms of content delivered. The telecom service providers only provide a conduit in the form of Internet network for content delivery. The content market comprises communications, social networking, information, chat, gaming and other entertainment based content. Relevant content is a key driver for adoption of content services.

The adoption of smartphones which enables access of rich content has played its part in revolutionizing data usage. Due to better experience offered by 'Appification' of content, many Telecom operators have experienced a decrease in revenues from mVAS services but at the same time are experiencing increase in data usage and therefore data revenues[33]. Nonetheless, the Mobile Internet ecosystem is evolving with the evolution in the content and services space and both Telecom operators and handset manufacturers stand to reap the benefits.

In India, where numerous vernacular languages are used, content in these languages becomes a critical factor for mobile inclusion. Demand for localized content may drive the next phase of growth as Mobile Internet reaches deeper rural pockets. Content and service providers/aggregators are endeavouring to offer content in these languages to meet the needs of the expanding mobile user base in India. About 42 per cent of total Internet users in India access local language content[34].

The focus on creating, aggregating, packaging and efficiently delivering digital mobile content in the form of audio, graphics, video and textual information is growing. There is growing evidence of investments by various private players and the government in the content market. The government is primarily focussing on promoting content development for services with a larger social impact such as in mEducation, mHealth, mFinance and mAgriculture.

The ecosystem's contribution to GDP and employment

In 2013, the Internet 'sector' contributed to USD 60 billion or an equivalent of almost 2.7 per cent of India's GDP. Further, it is estimated that by 2020, the contribution of the Internet economy to the Indian GDP would be over 4 per cent. By 2018, it is expected to create 15-20 lakh jobs[35].

As per a study by IAMAI and ICRIER, an increase of 10 per cent in Internet subscribers delivers, on an average, 1.08 per cent increase in productivity and output due to the network effect of Internet penetration. Further, the same study also suggests that mobile penetration by 10 per cent, on an average, contributes to 1.5 per cent increase in GDP[36]. The GDP numbers by themselves do not fully convey the benefits of Internet and Mobile Internet to consumers, businesses, society and the Government. As the reach of Internet increases, the network effect of increase in penetration could change the way consumers and businesses communicate and transact among each other thereby helping in lowering the transaction costs.

The subsequent chapters in this report focus on exploring the potential benefits of increase in Mobile Internet penetration and services that can be offered through usage of data services through mobile in more detail. The report also provides a perspective on the challenges faced by the Mobile Internet ecosystem that stand in the way of realizing the potential afforded by increasing mobile penetration. Finally, in the last chapter, an attempt has been made to put together key recommendations for various ecosystem players to remove the obstacles.

33 Industry discussions conducted by KPMG in India
34 http://techcircle.vccircle.com/2014/06/13/42-of-Internet-users-in-india-use-local-language-for-accessing-content-imrb/

35 IAMAI-BCG: India@Digital.Bharat
36 IAMAI-ICRIER – India: The impact of Internet

SECTION

02

Indian Mobile Internet ecosystem

Key Insights

- India has the world's second largest telecom subscriber base only after China, with 933 million subscribers of which 97 per cent are mobile subscribers;

- The focus of telecom operators is shifting from traditional VAS services to mobile data services. Data revenues are growing Q-o-Q and are already substantially higher than the VAS revenues;

- The key challenges faced by the telecom industry revolve around government and regulatory support. Issues that are dampening positive transformation include:

  – Inefficiencies in spectrum and license fee management;

  – High USOF levy;

  – Restrictive business environment.

The Indian telecom sector

Across the globe, the telecom industry is in the middle of a transformational change, steered by increase in data traffic. Several Telecom operators are investing in developing 4G networks to cash in on the change as fast as possible. The operators seem bullish on offering reasonable tariffs to get their subscriber base to shift to higher speed mobile data services that are likely to generate higher Average Revenue Per User (ARPU).

The Big Macro

Over the past decade, the Indian telecom industry has observed many positive developments. India has attained the second largest subscriber base after China with the total number of subscribers at about 933 million of which mobile subscribers constitute almost 97 per cent[37]. Also, the number of Internet users is expected to have touched 302 million in December 2014 while the number of Mobile Internet users is estimated to have reached 173 million by the end of 2014[38].

The operators have been increasingly focussing on data services. Revenues from data services have steadily increased compared to mobile value added services.

GSM operators' ARPU from data usage was INR 16.19 against ARPU of INR 4.83 from other VAS for the quarter Jan-Mar 2014. For CDMA players the difference is even higher with data usage ARPU at INR 39.05 versus INR 2.86 from other VAS[37].

The amendments in the National Telecom Policy (NTP) in 2012 highlight the positive intentions of the Government to build stronger infrastructure, improved Tele-density, connectivity and regulatory environment. While the Government endeavours to bring about growth and positive change that can aid in improvement of Mobile Internet infrastructure, there still exist a few challenges that affect the operations and bottom lines of the various ecosystem players.

The government in India is expected to further build on the initiatives proposed in NTP-2012. From their positive, industry friendly campaigns, there is hope of improvement in the telecommunications sector and in the business environment in India. According to the Union Budget presented in July 2014, a basic custom duty of 10 per cent has been imposed on specified telecom products such as 2G, 3G and 4G network gear[39]. The imposition of customs duty on these specified telecom products may create a favourable environment for domestic manufacturers. However, since a large portion of the equipment used may not be subjected to import duty, the move is not expected to make a significant impact.

The Tailwinds

Data – key driver of new revenue streams

Data is likely going to be the key revenue stream for the Indian telecom players in the coming years. Decreasing voice revenues along with rising operational costs is putting pressure on telecom operators' bottom line. In such a scenario, data services can promise a favourable revenue stream. Adoption of high-speed networks (3G and 4G LTE) may bring about a positive impact. The users in the mature markets have shifted to higher value data services. It is expected that users in India will follow the trend.

Supply-side factors such as network expansion, development and deployment of 3G infrastructure and the widening of broadband wireless network may also drive investments in broadband services. The bidding patterns by Telecom operators in the recent auctions in

---

37 TRAI Performance indicator reports July 2013, July 2014 and KPMG in India analysis, 2015

38 IAMAI-IMRB Internet in India 2014, Mobile Internet India 2014

39 http://articles.economictimes.indiatimes.com/2014-08-11/news/52687248_1_inverted-duty-10-customs-duty-dot

Feb 2014 indicate an enhanced focus on data. The fact that almost 80 per cent of airwaves in the 1,800 MHz band were successfully auctioned shows the operators' intent to use this band for high-speed 4G services[40]. Content services such as Internet TV, VoIP, online messaging are also on a high adoption curve. With the roll out of high-speed networks, the usage of such services is expected to increase. The three pillars of the ecosystem-telecom operators, content providers, and handset manufacturers could benefit from the increased adoption of data services. Innovative operating models between content providers and Telecom operators can result in up-selling services, provide higher QoS and enhanced customer experience.

'Digital India': Focus of government

The Government of India seems committed to set up a robust digital infrastructure in the country, to bridge the digital divide and to promote adoption of Mobile Internet and related products and services.

In 2014-15, the Government budgeted INR 500 crore for building infrastructure as per the National Rural Internet and Technology Mission with an additional INR 100 crore budgeted for improving e-governance[41]. This is a progressive step towards bringing a digital revolution or e-Kranti in India. A budget of INR 7,060 crore was declared to set up 100 smart cities. INR 100 crore have been set aside to launch Kisan TV for providing real time information to farmers on new practices/technologies, organic farming etc[42]. These new investments are expected to open up avenues in areas of aggregation and delivery of content for Telecom operators in 250,000 villages[43]. To reach 250,000 villages, the initiatives would also require expansion of infrastructure in OFC, towers and other network elements. Once the mobile infrastructure is expanded to the deeper rural pockets, multiple Mobile Internet services may also find their way to these users.

Foreign direct investment rolling in

Foreign Direct Investment (FDI) in telecom surged 4x in 2013-14 primarily due to the government's approval of 100 per cent FDI cap in August 2013 up from an earlier 74 per cent[44]. Further, high expectations from the new government in 2014 elections increased India's attractiveness as an investment destination. The Indian telecom sector attracted USD 1.3 billion in foreign investments during the financial year 2013-14 against USD 304 million received in 2012-13[45]. Higher FDI in the industry will help in lowering the financial burden on the players to a certain extent by funding the high CAPEX demands of the sector.

And the Headwinds

Call for innovation in operating model

Telecom operators in India have stretched financial profiles as a result of heavy investments in license fee for spectrum. Also, the working capital requirements are high. Leading telecom operators paying out almost 28-29 per cent of their revenues as license fees, charges and levies. This ratio is much higher as compared to the same ratio for their counterparts in other countries[46].

With declining revenue growth rates and a stretched financial profile, several telecom operators are unable to ramp up their investments for expanding the infrastructure for 3G and 4G LTE high-speed broadband. Under such circumstances, the investment to enhance consumer service, expand coverage to rural areas, deploy 3G/4G networks, buy additional spectrum would have to be derived from low profits made by the operators. For these reasons, the development seems sluggish.

Further, the operators are in stiff competition with the content and service providers as well. Revenues from voice calls and SMS are declining. People seem to be shifting from services provided by operators to services provided by content providers since these services are often offered for little or no price to the customers. Hence, growth in data services due to proliferation of content and service providers in inevitable. Under such circumstances, it is important for Telecom operators to reinvent their operating models. Collaboration with the content and service providers could provide them an opportunity to up sell their products, strike deals to roll out bundled services in the market and offer platforms for payments for usage of content services.

Regulatory and policy environment

The Indian telecom industry is facing challenges due to regulatory and policy uncertainties primarily concerning M&A guidelines, spectrum management and tax regulations. India falls behind other countries when it comes to a stable and transparent regulatory environment which is a major hurdle for growth of telecom business in India. Areas that need immediate attention are inadequate spectrum management, USOF levies and EMF rules and guidelines.

40 http://www.livemint.com/Politics/ZP475ScKzCYbaOHqVa0qqL/Spectrum-auction-redraws-Indias-telecom-landscape.html

41 India Annual Union Budget announcement 2014-15, July 10 2014

42 http://www.thehindubusinessline.com/economy/budget/union-budget-2014-live/article6195629.ece

43 http://www.livemint.com/Politics/iCE5nZ2VaKZ3XUCvoigDZJ/Budget-2015-Rs1000-crore-fund-for-tech-start-ups-entrepre.html

44 http://www.dot.gov.in/investment-promotion/fdi-policy-telecom

45 http://www.business-standard.com/article/economy-policy/telecom-sector-investments-surges-4-times-to-1-3-billion-114070900637_1.html

46 http://articles.economictimes.indiatimes.com/2014-05-28/news/50149676_1_vodafone-india-ceo-marten-pieters-outstanding-loans

High spectrum prices and limited spectrum availability

In India, spectrum auctioning and related pricing by the government are currently done with an objective to maximize revenues from the auction. In such a scenario, the telecom operators tend to offset high spectrum acquisition costs either by passing the cost to the end customer or taking on debt to sustain operations. Further, Telecom operators share a per centage of revenue with the government in the form of spectrum usage charges on quantum of spectrum held and the geographic area of operations. With spectrum being allocated through auctions, Telecom operators and TRAI argue that the annual usage charges should only cover the administrative costs that the government incurs and hence a rationalization of charges is required. Also, the process of re-auctioning for license extension brings in uncertainty limiting investments by telecom players in other areas of business.

Limited spectrum availability

The Indian government when compared with those in other developed countries has distributed very small portions of identified spectrum to mobile service providers in almost all frequency bands. Over 60 per cent of relevant spectrum has not yet been allocated hindering Telecom operators' ability to manage high density urban areas or expanding to rural areas. Comparable international markets such as Indonesia have over six times more spectrum available per user[47].

The existing regulations prohibit operators from spectrum trading and mandate regulatory fees for spectrum sharing. The restriction inhibits optimization of the spectrum profile by Telecom operators or management of their spectrum deficiency in urban or rural areas.

There is also a need for Indian telecom market to align with an internationally recognised band to facilitate roaming and interoperability across devices. Further, making maximum bandwidth available in the internationally harmonized digital dividend band for mobile operators would play a key role in expanding broadband coverage in India. Digital dividend spectrum has fine propagation characteristics and suitable to provide mobile broadband coverage in rural areas. It can deliver cost-effective indoor coverage in cities and rural coverage with fewer base stations.

Restrictive M&A policy

India, with about 10 to 12 Telecom operators operating in country's 22 telecom circles, is one of the most competitive markets across the world[48]. Not only does it lead to lower spectrum available per operator but also high degree of competition leads to lower profitability for the players. Hence, consolidation or horizontal integration can be the next step to protect financial sustainability.

Consolidation can help in improving margins, operating profitability and the cash-flow situation for the operators. For customers, consolidation may mean greater stability, improved infrastructure and better network coverage. The current policy for M&A has some gaps limiting M&A entry and exit and imposes a cap on the spectrum held in a circle and is not in line with industry expectations.

High USOF levy

The Universal Service Obligation Fund (USOF) in India is one of the key elements that put an additional pressure on the already strained financial profiles of Telecom operators in India. USOF is an initiative by the government of India to deepen mobile penetration in the commercially unviable rural and remote areas. It comprises of funds collected from telecom operators. The USOF levy rate at 5 per cent is one of the highest levied in the world[49].

Though Telecom operators request a reduction in USOF, current rural Tele-density numbers suggest that the Telecom operators have been hesitant to expand into rural markets without USOF support[50]. The government may consider bringing in a phased reduction. However, if reduced, it is likely to be linked to a mandated adherence to rural network expansion targets for the Telecom operators.

47 GSMA The Mobile economy India report 2013
48 KPMG in India analysis, 2015. Industry discussions conducted by KPMG in India
49 http://www.voicendata.com/voice-data/news/217110/telecos-single-tax-structure-mts-india

50 A GSMA The Mobile economy India report 2013

The handset market

Key insights

- India is the third largest smartphones market in the world. Annual smartphone shipments grew at a staggering 80 per cent to reach 79 million units in 2014;

- The mobile user base in India is migrating from feature phones to smartphones. Easy access to low cost smartphones from domestic manufacturers is the main catalyst to this process;

- Increasing demand for Internet enabled services and continuous decline in Internet usage charges may be key contributors to growth in smartphone adoption in the next few years;

- The uptake of tablets may continue to grow, though sluggishly.

Smartphones are the frontrunners in total mobile device shipments globally. The share of smartphones in total mobile units shipped increased from 41.7 per cent in 2012 to 55.1 per cent in 2013. Further, in 2013, the smartphone shipments across the globe grew by 38.4 per cent from 725.3 million units in 2012 to 1 billion in 2013. The growth is expected to continue and the number of smartphone shipments is expected to reach 1.7 billion units by 2018[51].

Global smartphones shipments
(in billion)

Year	Value
2012	0.725
2013	1
2014 (P)	1.2
2018(P)	1.7
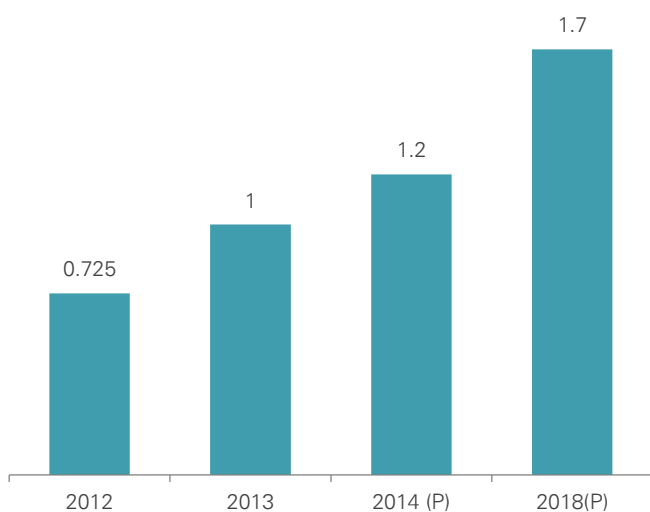
Source: IDC press release, January 2014

Smartphone shipment growth is expected to taper to 8.3 per cent in 2017 and 6.2 per cent in 2018 in developed markets such as the U.S.[52]. While developed markets would witness smartphone saturation, developing markets likely continue to grow and as a result may attract manufacturers' interest and attention more than ever before. Developing markets such as APAC and Latin America are not a premium play market for handset manufacturers because of which the average smartphones prices are expected to drop from USD 355 in 2013 to USD 260 by 2018[52]. This continuous drop in prices may entice users to migrate from feature phones to smartphones.

The Big Macro

India, with its mobile subscriber base of 935.4 million[53], presents a lucrative market for mobile device players. India has witnessed a steady increase in consumer awareness in context of mobile devices supported by increased purchasing power leading to increase in demand for mobile phones. The total number of mobile phone shipments touched 257 million units in 2014[54], luring many international device players to make an entry in the domestic market.

Total mobile phone shipments in India
(in millions)

Year	Value
2013	247
2014	257
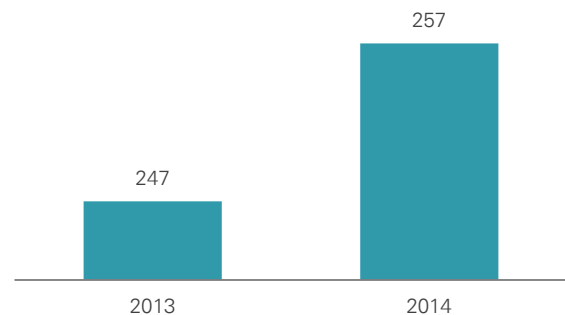
Source: CMR's India Monthly-Mobile Handsets Market Review, CY 2013, Monthly Mobile Handsets Market Review, CY 2014

The Tailwinds

Smartphones on the road to market dominance in India

Smartphone shipments in India grew by about 80 per cent Y-o-Y in 2014 to reach 79 million units. This two-digit growth observed in smartphone sales in India indicates that smartphones have become the device of choice for Indians[55].

51 IDC press release, Jan 2014, IDC worldwide smartphone 2014-2018 forecast and analysis report

52 IDC estimates, Feb ruary 2014

53 TRAI Press Release, October 2014

54 http://cmrindia.com/india-mobile-phone-shipments-clock-257-million-handsets-in-cy-2014-3-of-10-phones-sold-are-smartphones/

55 IDC Press Release, February 2015, KPMG in India analysis, 2015

Total smartphone shipments in India
(in millions)
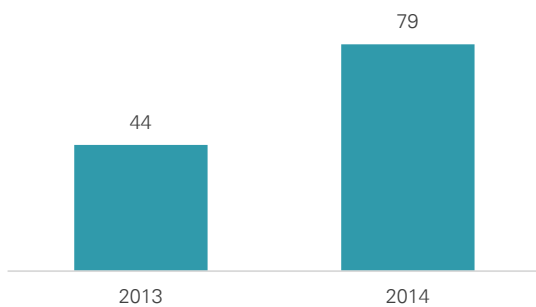
Source: IDC press release, February 2015

Smartphone sales are expected to continue their growth trajectory in the Indian market at a projected CAGR of 53.8 per cent from 2013 to 2017. This growth rate is much higher than that witnessed in other developed and developing markets[56]. It is likely that this growth is supported by sophistication being weaved into smartphone devices in the form of attractive and innovative Internet enabled and software features. The utility of Internet based services is supported by a steady increase in screen resolution and screen sizes for streaming online video, entertainment and gaming content. This adoption of these cases is possibly driving the need for Mobile Internet services in India; thus completing the smartphone utility cycle.

CAGR smartphone shipments 2013-2017(P)

Source:KPMG in India Analysis 2015, IDC Worldwide Mobile Phone Tracker-2013

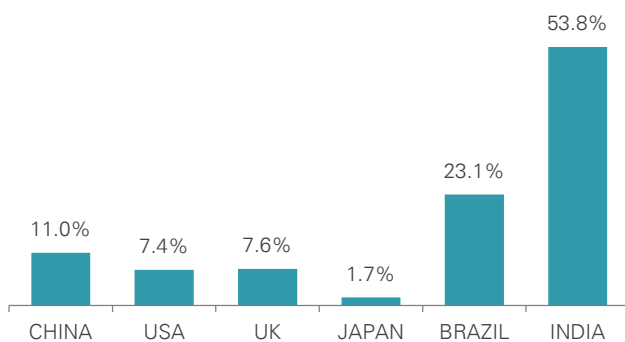With 122 million smartphone users in 2014, India is the third largest smartphone market in the world after China and U.S. Although the overall smartphone user base is high, the smartphone penetration is low (17 per cent) in the country[57]. Low penetration rates means there is a good scope for growth in the future in India.

The 'Make in India' initiative launched by the Government of India would further encourage handset manufacturers to invest in manufacturing of handsets in India. Through this initiative, the Government aims to increase the ease of doing business in India by simplifying complex rules and cutting down the bureaucratic red tape that delay investment decisions. Manufacturing of handsets in India could help in bringing down the costs of the handsets thereby making the handsets affordable for the masses with lower incomes. The sentiment already seems positive with various companies considering manufacturing handsets in India. The 'Spice Group' has announced that it will invest INR 500 crore to set up a mobile phone manufacturing plant in Uttar Pradesh. A memorandum of understanding was signed between the Spice Group and the Government of Uttar Pradesh[58]. Lava International has also confirmed investments in two plants in UP[59]. A leading global handset manufactuer also reinforced its commitment to make in India, by announcing expansion of its plant in Noida[60].

Top 5 countries by number of smartphone users (2013)
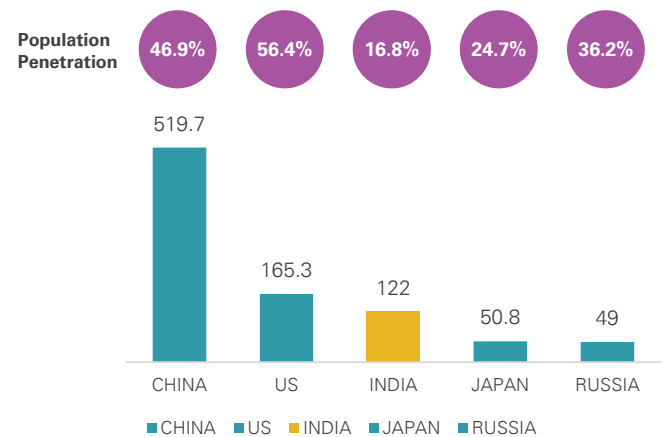
Source: eMarketer, Dec 2014, Google: Our mobile planet

Migration from feature phones to smartphones

Steady decline in prices of smartphones because of an immensely competitive Indian market seems to be narrowing the price gap between smartphones and feature phones, and is making smartphones affordable to larger Indian population. As a result, feature phone shipments are on a slow but steady decline[61].

56 IDC press releases, June 2013, March 2014, February 2015

57 KPMG in India analysis, 2015 & Industry discussions conducted by KPMG in India

58 http://www.dnaindia.com/scitech/report-spice-group-announces-rs-500-crore-investment-to-build-mobile-manufacturing-unit-in-up-2056177

59 http://articles.economictimes.indiatimes.com/2015-02-12/news/59083792_1_nokia-plant-lava-international-chennai-handset-factory

60 http://indianexpress.com/article/business/business-others/samsung-launches-budget-4g-phones-says-still-on-top-in-india/

61 IDC Asia Pacific Quarterly Mobile Phone Tracker Q4 2014

Smartphone vs Feature phone: Market share in India
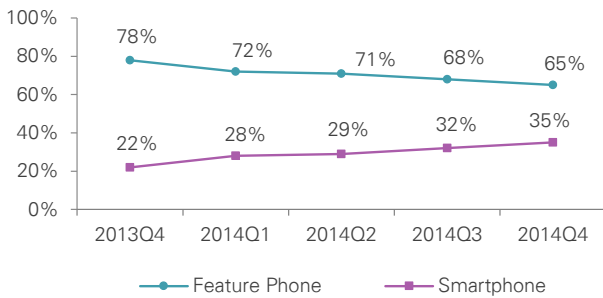
Source: IDC Asia Pacific Quarterly Mobile Phone Tracker Q4 2014

Migration of users from feature phones to smartphones in India is a leading indicator of potential increase in Mobile Internet penetration in the coming years. Users are expected to adopt Mobile Internet based services in their daily lives given that affordable Internet enabled smartphones are easily available and the data plans are becoming pocket friendly. Increased adoption of content services is also an important reason for growth in the number of smartphones.

Declining growth rates of feature phone shipments may not mean that feature phones will leave the market anytime soon. Even today, 50 per cent of mobile phone markets in emerging economies like China and Japan comprise of feature phones due to the low price point[62].

Domestic handset vendors driving low cost smartphone sales

An important reason for high growth rates of smartphones in the Indian market is the contribution of domestic players which serve the low cost smartphone segment. These vendors are enabling consumers to buy a smartphone at almost the same price as a feature phone and with better capabilities.

Smartphone vendor share in India Q4 2014
Market share-2014
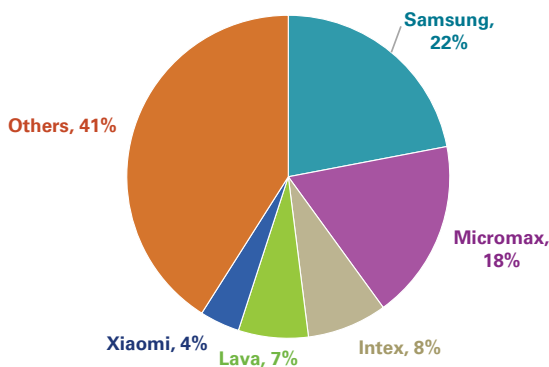
Source: IDC Asia pacific quarterly mobile phone tracker, February 2014

The India market is price sensitive and other external market influencers such as rising competition in handset manufacturing and the establishment of local manufacturing units to beat increasing import taxes are contributing to the declining trend in device prices. Despite a reasonable increase in purchasing power, increasingly low cost devices are occupying more space on the mobile devices pie in India. In 2014, 47 per cent of all mobile phones purchased were priced below the INR10000 mark; with an average price of the mobile phones hovering around INR 6202[63]. Availability of affordable mobile devices portends an encouraging future for Mobile Internet adoption in the country.
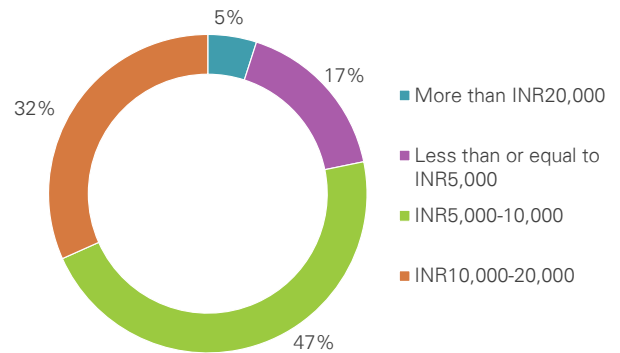
Source:IAMAI-IMRB Mobile Internet India 2014

Tablets staking claim to a portion of the pie

The Indian tablet market experienced a 15 per cent Y-o-Y decline in growth in 2014 after having showcased a solid growth of 56 per cent Y-o-Y in 2013[64]. Due to failure to comply with regulations introduced by Bureau of Indian Standards last year, the unbranded tablets were wiped off the market thereby resulting in the fall in numbers[65]. The market is expected to grow in 2015 due to the impetus provided by the Digital India campaign as well as potential demand that may be generated from Government aided education projects. It is also expected that growth would primarily be driven by tablets with 8-9 inch screen size since the phablets and phones with relatively bigger screen sizes would impact the market for small screen tablets. 3G connected tablets posted a double digit growth last year[65]. Growth is expected in the shipments of 3G and 4G enabled tablets in the coming year which portends growth in Mobile Internet data usage through these tablets[66].

62 Avendus: India's Mobile Internet: The revolution has begun
63 IAMAI-IMRB: Mobile Internet in India 2013
64 IDC press releases, June 2013, March 2014, February 2015

65 http://www.livemint.com/Industry/mOIRaah4KO10W4shI4izOL/IDC-reports-15-fall-in-Indian-tablet-shipments-in-2014.html
66 KPMG in India analysis, 2015

India tablet shipments
(in millions)

Source: IDC press releases, June 2013, March 2014, February 2015

Even though tablet shipments are lower in comparison to shipments of contemporary smartphone devices the tablets are staking a claim to a portion of the overall market of the Internet enabled mobile devices. While the market for tablets may grow in 2015, the overall penetration of tablets in India is relatively low compared to penetration in China and other countries. In 2015, only 3.2 per cent of the Indian population will use a tablet compared with over 45 per cent in Australia, 24.1 per cent in China and 20.1 per cent in South Korea[67].

Phablets and wearable devices slipping in

Technology innovations are allowing for the entry of phablets – devices with tablet like screen size and smartphone like efficiency. Leading global players have entered this market with innovative products. Such devices promise to deliver the benefits of both device types in one power packed and convenient to use device.

The latest entry into the device market is wearable devices such as GEAR and Watch. India is barely on the radar for adoption of wearable devices and this is also evident in the low adoption numbers. But the future for these devices seems promising. These devices are expected to ride on the use cases made possible by virtue of Mobile Internet and aimed at delivering better user ex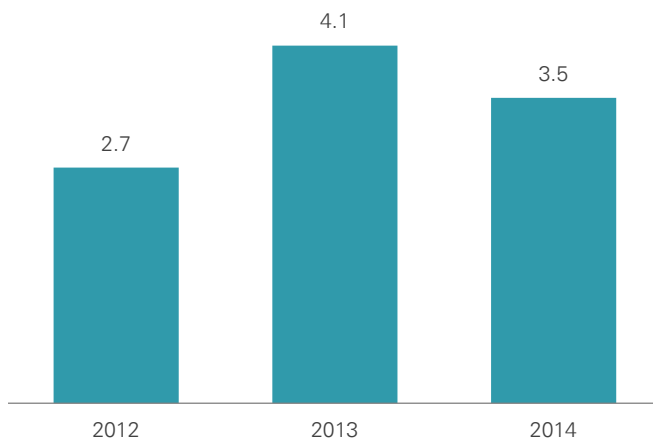perience, enabling device to device communication, and offering advanced location based services. With an increase in the usage of such services, upsurge in Mobile Internet usage is bound to happen.

And the Headwinds...

New domestic entrants increasing the supply of mobile devices

China has been the manufacturing hub of the APAC region for some time and when it comes to mobile handsets, this trend has continued[68]. However, with rising production costs in China; which have increased by over 20 per cent[69], and increased import prices, manufacturing in India might be an economical alternative in the near future. Since the Indian consumer is extremely price conscious, currency fluctuations impacting prices could also directly affect sales volumes.

Several Global handset manufacturers are considering setting up manufacturing units in India. Leading manufacturers in India are considering investing in local production and assembling units in the near future. Import prices too are on the rise. The import tax is 7 per cent for all handsets prices above INR 2000 INR and is significantly higher than the 1 per cent tax levied for local manufacturing[70]. These economics of business, therefore, make a compelling case to set up local manufacturing units for the handset manufacturers.

Maintaining the demand and supply balance in a changing business environment can be tricky for various ecosystem players and it is no different for mobile device players. With an increase in number of device manufacturers in India, the competition is intensifying which is forcing low cost device players to further reduce the prices. This increase in supply is good for the customer since it offers choices at lower prices, however, it puts a burden on the bottom line of the device players. In addition to this, there is always pressure to constantly innovate and to reduce time to market for new product offerings.

While the opportunity to manufacture in India seems lucrative, dynamic regulatory environment, lack of clear regulations for manufacturing, under developed high end electronics manufacturing ecosystem create a tough environment to set up manufacturing operations in India. Further, setting up a manufacturing facility involves large capital investments/setup costs which when coupled with increased raw material prices and the constantly changing tax rates does not provide stable environment for business. The government in India with its emphasis on improving the regulatory space and promoting a manufacturer friendly environment may help ease some of the burden for device manufacturers who may be willing to invest in home-grown manufacturing units.

67 eMarketer, Press Trust of India Press Release, January 2015
68 Industry discussions conducted by KPMG in India
69 ISI Emerging Markets, Internet Securities Inc.
70 http://telecom.economictimes.indiatimes.com/news/corporate/industry/uniform-import-duty-may-increase-price-of-entry-level-phones-nokia/30570603

Bundling of services – failed model in India?

Unlike in the developed markets where the device manufacturer gets into a strategic tie-up with the telecom operators to provide bundled services, in India such models have met with limited success. Under such contracts, an operator and handset manufacturer get into a partnership to offer both handsets and mobile connections at discounted rates with a lock-in period. Often penalty clauses are introduced to discourage breach of contracts.

India has primarily been a prepaid-intensive telecom market with a monthly churn rate of 4 to 5 per cent[71]. Hence, bundling of post paid services with the sale of handsets does not appeal to the Indian masses[72]. Further, bundle options, as of now, are limited to high end handsets which may not be appealing to the price sensitive Indian consumer. This not only poses a challenge in the adoption of bundled plans but also fuels the grey market for high end handsets[73]. However, there is potential for adoption if consumers are offered enough handset choices with personalized bundling options.

Incompatibility of 4G LTE devices

LTE or Long Term Evolution is the predominant 4G technology. There are two different standards for LTE namely, LTE FDD and LTE TDD. While the global 4G market uses LTE FDD, in India, LTE TDD is being deployed. Indian telecom operators have received official license to operate on LTE TDD over 2300 MHz band. Although, the Government of India has awarded license over 1800 MHz as well which was hailed as a welcome move. However, there have been no deployments over it[74].

The devices used for LTE FDD are incompatible with LTE TDD network. This means that many of the internationally launched 4G enabled mobile devices fail to work in India. In order to address this, a few device manufacturers such as Samsung have introduced Dual mode LTE devices. Seamless handover between FDD LTE and TDD LTE is critical for end user experience. Further, spectrum in 2300 MHz is not suitable for carrying voice and would need to be used primarily for data[75].

Going forward, while LTE TDD adoption may increase in India, the telecom operators may find it difficult to source devices across two different technologies. Players operating across two bands would need to set up cross-functional ecosystem for both.

Content and service providers

Key insights

- Better network infrastructure and increase in the number of devices can facilitate adoption of Mobile Internet. However, the content and service providers delivering compelling content and useful information can drive accelerated adoption of Mobile Internet;

- Social Media, Chat and Video are key content categories that are consuming maximum user time on mobiles;

- Paradigm shift in content consumption patterns from on-deck to off-deck content with increasing number of users of smartphones. Additionally, SMS based mobile content is gradually being replaced by mobile data services based content delivery;

- Off Deck services are gaining popularity. Innovative models need to be developed for content monetization in a price sensitive market like India;

- Availability of vernacular content by content/services players could aid in Mobile Internet adoption.

Content that addresses customer needs can facilitate increase in adoption of Mobile Internet. Users may have access to high speed Internet, however, they may consume data services only if meaningful and compelling content is available. Indian mobile content usage is dominated by email, social networking, chat, games and news. These categories gained popularity because they fulfil multiple content needs of consumers of either staying connected to friends on a social network, for entertainment or to get live cricket updates on-the-go, etc.

Activities performed on smartphones (India)
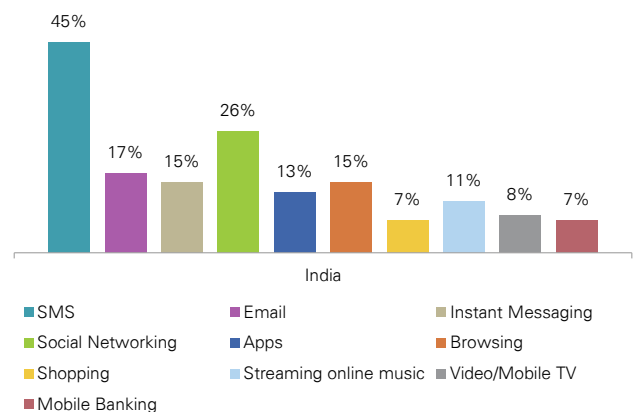
Source: Nielsen mobile consumer report, a global snapshot 2013

---

71 http://www.businessworld.in/news/business/telecom/does-bundling-make-sense-in-india/1271490/page-1.html

72 Industry discussions conducted by KPMG in India

73 Industry discussions by KPMG

74 http://www.telecomcircle.com/2014/05/lte-in-india/

75 http://www.trai.gov.in/WriteReadData/Recommendation/Documents/Recommendations_Final31122014.pdf

The advent of mobile value added services (mVAS) industry in India aims to address these needs of the Indian customers. The overall mVAS market in India was approximately INR 33,280 crore by the end of 2013[76] and is expected to generate revenues amounting to approximately INR 74,050 crore by 2017. The market is forecasted to grow at a CAGR of 22 per cent through 2013-2017[77].

Traditionally, the mVAS revenues in the Indian market came primarily from "on-deck" services that are offered by Telcos through their portals. In the on-deck mode, VAS providers supply content, platforms and technology solutions to telecom carriers. Telecom operators have complete ownership of the end consumer from relationship management to billing and hence retain majority of the revenue share. Under the off-deck model, VAS providers move to Web-based delivery of content directly to subscribers, thereby precluding the Telecom operator's intervention. The model of delivery is largely driven by deeper penetration of smartphones and app stores such as iOS App Store and Google Play. Off-deck platforms offer tighter integration with the hardware and operating system of the device and are able to make search and payment native to the device, thereby, offering a better user experience. Off-deck app stores present a reasonably priced model for content distribution for content providers.

The Telecom operators retain 60-70 per cent of the revenues under the on-deck model whereas the off-deck platform providers give away approximately 70 per cent of the revenue to content providers while retaining 30 per cent[78].

On-deck mVAS

mVAS in India

The contribution of on-deck mVAS and data revenues to telecom operators' revenue is significant. Data revenues for telecom operators which come from accessing off-deck content on mobile applications are however, growing at a much faster rate than the growth observed for on-deck mVAS revenues.

The Indian consumers were first introduced to mVAS services based on SMS based ABC (astrology, Bollywood and cricket) alerts and caller tunes[79]. These services do not require higher bandwidth or modern handset specifications. While these services are still popular, the market has evolved and other categories have emerged. Entertainment

services powered by media (music and video) downloads, and informational updates now take up most of the users' time on on-deck mVAS. Not surprisingly, Infotainment services are the largest contributor to Telcos' mVAS revenues[80]. As the penetration of the feature phones and smartphones increases in India, the market is likely to see higher adoption of new content categories.

The telecom players face challenges with regard to on-deck mVAS services in India and globally as well, as illustrated below:

Operator favouring business model

Telecom operators provide the conduit to the customers and retain control over the content pipe and share of revenue. This is an impediment to innovation and profitability of mVAS players. Further, the off-deck app platforms such as Apple Store, Google Play, etc, that have a dual role of content aggregators as well as technology enablers offer a lucrative business model to mVAS players to consider off-deck platforms for content delivery.

Dearth of consumer focussed vernacular content

Poor penetration and limited adoption of mobile content by rural India can be attributed to limited availability of localized content in vernacular languages. Further, innovation in terms of relevant use cases that could be adopted by various target segments seems to have been ignored due to other challenges, as mentioned above.

Road ahead

Metamorphosis of SMS-based services into Mobile Internet-based mVAS

Plain and simple informational mVAS are soon anticipated to reduce in popularity, as the users graduate towards consuming enriched and transformational education, health, finance and agricultural information. Utility-based mVAS such as mobile payments, education, healthcare alerts, etc. require Mobile Internet. The adoption of these services and related content could increase in the future. A large section of the country's population lacks access to formal banking. Mobile Internet has the potential to enable financial inclusion of this unbanked large population through mFinance. In addition, Mobile wallet and mobile P2P transfers based services are expected to contribute to mVAS revenues.

---

76 IAMAI-IMRB Mobile Value Added Services Report 2012

77 TechNavio's, the Mobile Value Added Services Market in India Report 2014-2018, IAMAI-Wipro Future Thought of Business: mVAS report

78 Industry discussions conducted by KPMG in India

79 Industry discussions conducted by KPMG in India

80 IAMAI-Wipro, beyond the tip of the iceberg report 2013

mEducation holds immense opportunities to enable access to affordable basic education to the masses especially in rural areas. mHealth in the near future is expected to facilitate the government to provide healthcare services to the remote corners of the country especially through remote diagnostics, chronic disease management, and maternity care. Mobile Internet may play an important role to deliver basic information to farmers across the country by way of mAgriculture which may facilitate delivery of information such as weather forecasts, crop advisory and latest market prices. mAgriculture is expected to play a significant role in overcoming infrastructural limitations and supply chain inadequacies in the agricultural sector.

Next-gen sophisticated mVAS solutions

Improvement in data connectivity infrastructure and adoption of smarter handsets is expected to bring more sophisticated, complex and rich media based mass mVAS offerings to the market. Advanced location-based services in the form of Navigation assistance, emergency or disaster relief, real time map assistance are likely to become popular with users in the future.

Off-deck content

As mentioned earlier, off-deck delivery of content presents content providers with the opportunity for a direct relationship with the consumer.

Off-deck distribution: Telco's need to adapt

As more and more compelling content is being made available through off-deck mode, the on-deck mVAS revenues of telecom operators are quickly depleting. It is in telecom operators' interest to embrace this change by facilitating off-deck content consumption. As the market matures, it is expected that many Telcos may offer solutions that allow consumers to easily purchase digital services with direct-to-bill options from the off-deck app stores.

While this is expected to bring in challenges such as incorporating third-party content, it may soon make business sense for telecom operators to offer these services.

Off-deck content a popular choice

Off-deck content services are popular because these are innovative and serve the perceived needs of their consumers, thereby, filling the gap in existing services.

Social media, gaming and data messaging apps are the primary content categories driving growth and adoption of off-deck mVAS in India. SMS is losing popularity as users move to data based chat/messaging services. Messaging apps being virtually free to a consumer, coupled with interesting interactive features have tickled the fancy amongst the youth in Indian.

Challenges with off-deck content delivery

Do Indian consumers really want to pay for apps?

For many app content providers, content monetization is a choice between a paid app or free app with in-app purchases or a completely free app with advertising support. These models currently co-exist in the Indian market.

App monetization models

Paid app download

Freemium

In-app advertising

In-app purchases
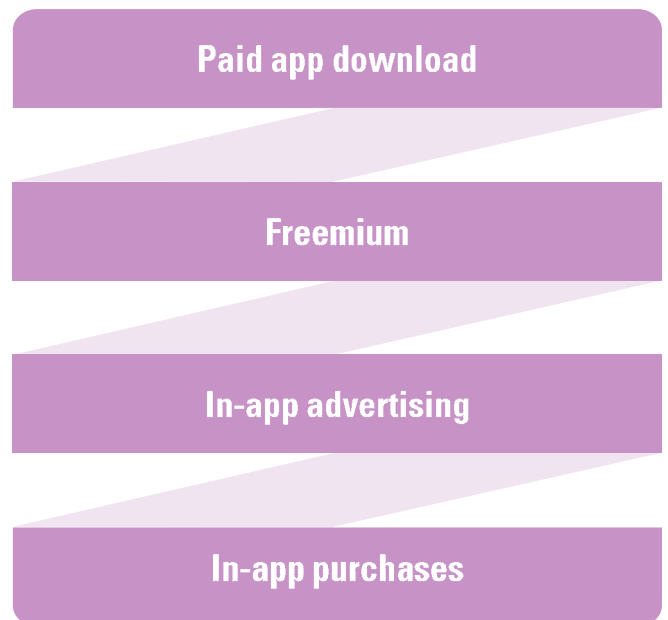
Source: KPMG in India analysis, 2015

Customers' apprehensions around providing billing information and details of their payment instruments (credit card/debit card) on mobile devices are a significant challenge in app monetization. Further, many market researches have pointed to the fact that Indians prefer accessing content for free as opposed to paying for consumption of content. Also, it is difficult for content providers to get customers to pay for micro transactions. In the future, we can expect to see content providers monetizing a large part of their app user base by plugging

into Telco billing solutions for micro-transactions and using mobile advertising effectively, provided Telcos offer a favourable and economical solution.

Apprehension on consumer privacy

Mobile apps can potentially collect a plethora of personal consumer information such as contacts, location, photos, preferences, affiliations, emails, social networks information, etc. Given the continued growth in number of mobile apps downloaded by customers, data privacy becomes a huge challenge that needs to be addressed and regulations need to be laid out. Only 61 per cent of overall apps available on the top app stores have a privacy policy (privacy policy on app listing page, in-app or on the developer's website)[81].

July 2012

per centage of all apps with a privacy policy	**61.3%**
per centage of Free apps with a privacy policy	**69.3%**
per centage of Paid apps with a privacy policy	**53.3%**

Source: Future of privacy forum (FPF) mobile apps study report June 2012

Road ahead

Vernacular content can be key

The linguistic diversity of India is vast and it must reflect in the Mobile Internet services in the country. Indian consumers seek diverse vernacular content at affordable prices. Content tailored to local tastes, preferences and offered in vernacular languages may gain popularity and result in higher penetration of on-deck as well as off-deck content in rural and suburban parts of India.

Mobile TV and Video Media applications powered by high speed 4G can be the future

Smartphones users are already spending a lot of time on video based apps including mobile TV. According to Cisco VNI Report 2014, 4G connections may be approximately 12 per cent of the total mobile connections in India.

The smartphone data traffic is expected to grow 25.6 fold from 2013 to 2018. As a result of these advancements the growing Indian market may witness significant mobile video traffic growth from 22.7 petabytes per month in 2013 to 777.8 petabytes per month by 2018. Video is projected to contribute to 68 per cent of global mobile data traffic and 62 per cent of India's mobile data traffic by 2018, up from 44 per cent in 2013[82].Mobile videos are also expected to gain more ground in comparison to other media formats because of the vernacular nature of content delivered via this medium. Users with access to higher speed Mobile Internet consume higher video content[83].

The next few sub-sections in subsequent pages of this report provide a perspective on the developments across major content categories adopted by users in India.

Social media

It is estimated that in 2013, over 86 per cent of Internet users in India visited a social networking site[84]. India is amongst the fastest growing markets and recorded the highest growth rate across the world for social media in 2013 at 37.4 per cent. eMarketer estimates social networking penetration in India to reach approximately 10.5 per cent of the total population by end of 2014 and 17 per cent by 2017 against global penetration crossing 31 per cent mark[85].

India is the second largest market in the world for both Facebook and LinkedIn and was expected to become the third largest market for Twitter by end of 2014[86]. Even with the large user base, India still has one of the lowest social media penetration rates across the world indicating an immense potential for further growth.

Social media apps capture a significant time share on mobile devices

Social networking is one of the favourite activities on mobile apps for Indians. 57 per cent of mobile users in India access social media on their devices[87]. Even on smartphones, social networking apps account for one of the most regularly used apps by Indians with 29 per cent of users accessing them on a regular basis[88]. Indians spend an average of 2.5 hours daily on social media which is a significant amount of time spent by users on a single activity.

---

81 Future of privacy forum (FPF) mobile apps study report June 2012
82 Cisco VNI report, 2014
83 Ericsson consumer lab on device measurements, 2014
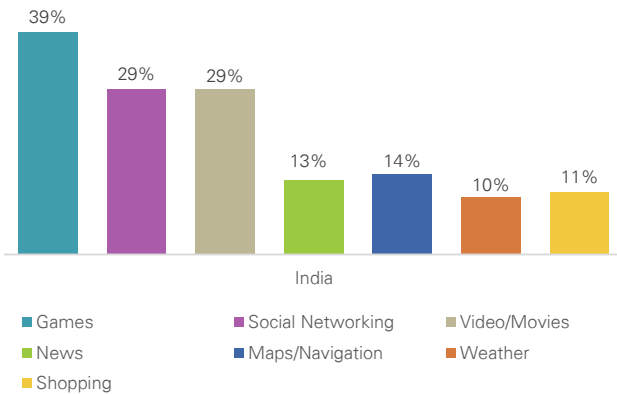84 KPMG-FICCI M&E industry report 2014

85 eMarketer press release, November 19 2013
86 India@Digital. bharat-BCG in India, Jan 2015
87 We are social 'Social, digital & mobile in 2014' Report
88 Mobile consumer report, Nielsen 2013

Apps used regulary by smartphone users in India

39% Games
29% Social Networking
29% Video/Movies
13% News
14% Maps/Navigation
10% Weather
11% Shopping

India

■ Games   ■ Social Networking   ■ Video/Movies
■ News   ■ Maps/Navigation   ■ Weather
■ Shopping

Source: Mobile consumer report, Nielsen 2013

Challenges

The benefits of social media are undeniable; it could potentially enable viral spread of information intentionally or unintentionally. Studies suggest that the highest concentration of online security threats is on mass audience sites, including social media[89].

Concerns over privacy and IP protection

Social network presents a convenient media for various perils such as libel, plagiarism, defamatory content and/ or infringement of intellectual property rights. Content filtering and monitoring mechanisms may adversely impact the adoption of social media and hence may not be recommended. However, some countries deal with this by creating their own social networking channels. For example, China fosters to suppress public dissent and monitor online activities to identify troublemakers. A few privacy rights groups have also raised concerns over sharing of data related to users with government agencies and third parties.

Monetization of buzz

Many social networks are facing challenges converting users into revenue. Some social networks in India are on their way to garner the largest user bases compared to those in other economies, however, they generate much lower revenue per user outside of US. Social media companies are facing difficulties in converting young mobile users in India with very limited disposable income. Although, India is a huge market for mobile ads, more advanced models such as converting the social networks into ultimate social shopping engines remain a challenge on mobile devices.

mCommerce – Business on the go

eCommerce industry is showcasing staggering growth in India and mCommerce is the following suit, enabling Indians to shop anytime and anywhere. mCommerce is any transaction with a monetary value which is conducted in a wireless environment by using mobile devices.

It has seen huge success across other parts of the world especially in the western markets but in India mCommerce is still limited to basic transactions, purchase of travel tickets and payment of some utility bills. Major eTail companies in India are promoting mCommerce by offering special discounts on purchases made from their mobile apps. Many of these companies have reported more than 50 per cent of their online orders coming from mobile handsets[90]. Analysts expect the mCommerce market in India to grow at a CAGR of approximately 71 per cent over the period 2012-16. The network-based segment of m-Commerce applications in India will have revenues of USD1.26 billion and close to 72.5 million subscribers by end 2018[91]. Categories like ticketing, utility payments, recharge and travel are apt for the mobile platform. Shopping for products via mobile or mTailing is catching on and is soon expected to become a conventional channel for retailers.

mCommerce, as a use case, is expected to have good potential, especially in a country such as India where mobile penetration exceeds Internet penetration In India, regulators like RBI and TRAI, several banks, mobile service providers and handset manufacturers are coming together to take mCommerce to the "unbanked" population.

mCommerce awaiting a fortune in rural India

mCommerce has the potential to take eCommerce to the masses and to the isolated segments of sub-urban and rural India. India has limited penetration of organized retailers concentrated mainly in Tier I/II cities, mobile devices presents the opportunity to become the primary access channel for consumers seeking quality products and services in smaller towns or villages. mCommerce may grow at a fast pace as it could be instrumental in serving the needs of enormous sections of remote rural areas that were previously unapproachable.

---

89 Cisco 2013 Annual Security Report
90 http://trak.in/tags/business/2015/02/18/indian-ecommerce-growth-mcommerce/
91 TechNavio's analysts forecast and Frost and Sullivan

Compelling mCommerce use cases keep consumers coming back for more

Entertainment

The distribution of content for Entertainment through Mobile Internet is at a nascent stage in India. However, India may skip a few steps in evolution of Entertainment content market given that various global content and service providers operating in India have learnt from mature markets and are endeavouring to offer interesting content in the form images, video on demand (VOD), audio, eBooks and games, data files anywhere and anytime. Mobile devices are becoming more powerful and affordable and offer capabilities to access content in various formats with better user experience. Further, content creators in the ecosystem balance the demand and supply side. Various formats of entertainment content may drive growth in Mobile Internet traffic in India and the launch of 4G services may also promote growth of long format video content, thereby positively impacting the Mobile Internet traffic growth trajectory.

While the subscriber base for VOD, digital music, entertainment channels is increasing, the content industry seems to be dabbling with various revenue models based on subscription, engagement based advertisement and traffic consumption. However, the content consumption behaviour is evolving from accepting forced-fed content to searching and consuming mood or need based content with consumers now opening up to pay for quality content.

Ticketing

Mobile ticketing and specifically travel ticketing is playing a major role in taking mCommerce. Indian Railways (IRCTC) offers its services now via an official mobile app which enables customers to check train schedule, timing, booking, etc. on their mobile devices anytime and anywhere. Almost all airline companies and many road transport companies have launched their mobile applications in the Indian market for various mobile platforms to service their customers. Another key ticketing category, movies and events ticketing is picking up with growing acceptance of mobile apps.

mTailing

Leading online retailers are increasingly enjoying higher traffic and transactions coming in from mobile phones in India[92]. Indian consumers are migrating to their mobile devices for purchasing items like books, electronics, clothes and even footwear. eTailing companies are luring customers to shop through their mobile apps and mobile websites also by offering higher discounts to increase adoption.

Challenges dampening mCommerce growth in India

mCommerce market is facing some teething issues with technical, regulatory and social matters.

Limited reliable wireless broadband

The primary challenges are unreliable connectivity, low transmission speeds and poor quality of service. India still has a large proportion of consumers accessing the Internet using 2G. There is a pressing need for improved telecom infrastructure with ever increasing demand for better connectivity across geographies within India. Users have been deprived of better customer experiences due to network issues. Failure of online transactions due to poor connectivity issues has led to trust deficit. Over a period of time, improved customer experience and improved connectivity can help breakdown the mental barriers of consumers against adopting mCommerce.

Safety concerns

Regulatory restrictions in the Indian market are preventing advanced payment technology solution providers from entering the Indian market. Many industry players still see a large per centage of consumers preferring the cash-on-delivery (COD) option when they purchase products on their mobile device. Customers are still apprehensive about the safety of online/mobile transactions and privacy of personal and business data over Mobile Internet.

Online classifieds

The Internet provides a platform to buyers and sellers for easy interaction with one another while allowing users to independently post and search ads. The online classifieds market in India is currently moving away from fixed PCs and laptops to mobile devices, as Indians are increasingly accessing the Internet primarily through mobile devices. In developed markets, consumers usually are engaged using fixed devices like PCs and laptops because they learnt to use the Internet on these devices, however in India, online classifieds players have noticed the opposite because people are getting introduced to the Internet, especially in Tier II cities and rural areas through mobile devices.

---

92 Industry discussions conducted by KPMG in India

Indian online classifieds market size

(in INR billion)
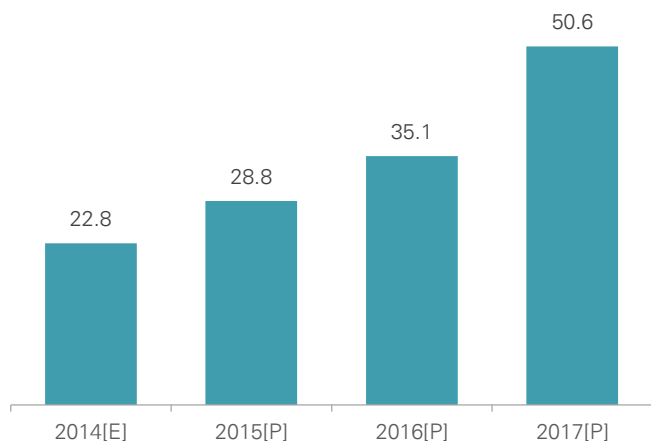
Source: KPMG-FICCI M&E industry report 2014

The primary categories under online/mobile classifieds are jobs, matrimonial, automobiles, education, real estate, and other assorted ads. In the early years, verticals such as jobs and matrimonials spearheaded the shift of consumers from newspapers/magazines to the online channel. The next phase in the evolution of customers' preferences has been characterised by migration of customers/users to horizontal classified platforms that act as one consolidated destination to address their multiple needs.

Important players in the industry are observing greater user engagement and higher conversion rates from mobile users compared to website users. Further, the core user base has been observed to be shifting to mobile platforms. Leading horizontal classifieds players in India are witnessing almost 60-70 per cent of their traffic and about 50 per cent of the transactions via mobile devices[93]. A key driver for these shifting preferences to mobile is the fact that SMS/calls become easier from a buyer's perspective when browsing through ads on mobile which enables instant transactions.

Mobile Internet is undoubtedly playing a vital role in the sustained growth of online classifieds in India. Industry players are accepting the significance of mobiles and making investments in creating a mobile first business orientation to online classifieds. Mobile apps are being launched by key industry players and mobile focussed messaging is being promoted across print and television media.

Challenges with online classifieds

The growing horizontal classifieds sector is faced with an interesting cultural challenge in India. Indians inherently retentive, perhaps, due to the sentimental value they attach to things they own. As a result, many Indians avoid selling used items even if they may have discontinued using these items. To entice consumers to consider selling certain goods is a cultural change. Online classifieds organizations are striving to bring comfort amongst consumers on its usage, which is evident through TV commercials and digital campaigns.

The online classifieds industry faces another challenge in terms of adoption by masses since the primary language of communication has been English while many vernacular languages are prevalent in India. The major players in online classifieds segment are also facing challenges in monetisation of their platforms and have been focussing on acquiring critical mass up until now.

Mobile gaming

The mobile gaming market in India was estimated around INR 10.7 billion by the end of 2014[93] and is poised for further growth in the coming years. The industry is expected to grow at a CAGR of 19.8 per cent in the period 2014-2017 and touch INR 18.4 billion by the end of year 2017[93]. During this period, its share of the overall gaming pie will also increase from about 45.5 per cent in 2014 to 51.9 per cent[93]. Mobile games are the fastest-growing gaming segment in the global markets too with revenues ready for 2x growth between 2013 and 2015 from USD 13.2 billion to USD 22 billion[94].

Gaming market in India 2014[E]-2017[P]

(in INR billion)
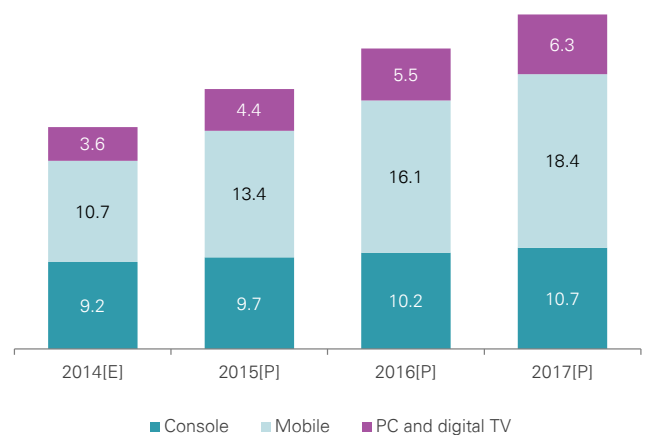
Source: KPMG-FICCI M&E industry report 2015

93 KPMG-FICCI M&E industry report 2015, KPMG in India analysis, 2015

94 http://timesofindia.indiatimes.com/tech/personal-tech/gaming/Mobile-games-revenue-to-double-between-2013-and-2015-Gartner/articleshow/25010085.cms?referral=PM

The growth of the mobile gaming industry in India is primarily being driven by favourable demographics of younger population, proliferation of gaming developers, rising disposable incomes, and the increasing number of smartphone and tablet users. Almost about 90 per cent of the mobile gaming market in India is grabbed by Android OS based phones[95].

Smartphone OS market share in gaming 2013
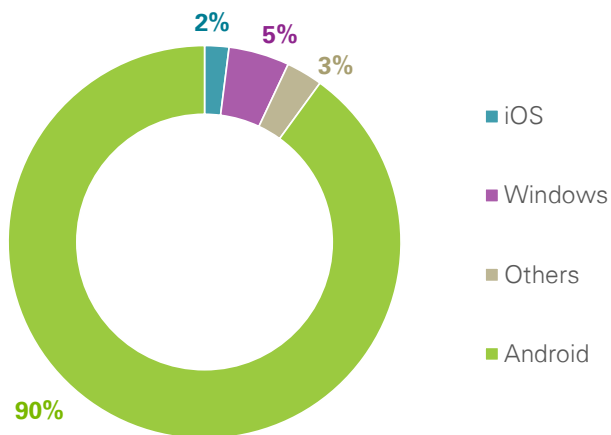

- iOS — 2%
- Windows — 5%
- Others — 3%
- Android — 90%

Source: KPMG-FICCI M&E industry report 2014

Connected mobile social games – The new addiction

The casual 'gamers' access mobile games while waiting, travelling, etc. This segment of gamers is responsible for high growth rate of mobile gaming vis-a-vis PC and console gaming. The need to stay connected with friends and relatives by way of social networks has already been highlighted in previous sections of this report. Entertainment by playing mobile games and the need to stay connected has led to a remarkable amalgamation between mobile gaming and social networking. Youth, who have grown up with mobiles, Internet, instant messaging/texting, and Facebook, want to connect with friends and family while gaming too.

Social games that need a Mobile Internet connection (to connect to user's social network regularly) are keeping Indians hooked onto their mobile phones for hours every day. Growing number of users of these connected mobile social games is likely to result in heavy Mobile Internet usage generated from mobile gaming in the coming years. Significant timeshare of these games makes the category lucrative for content developers as monetization becomes easier for the developer by way of ads as well as in-app purchases.

Monetizing the vast user base remains a challenge

Although mobile games are a good example of a successful content category, monetization remains a key challenge in India as the market is very price sensitive. Only a marginal per centage of consumers intend to download payable games, while a large per centage prefers free mobile games. The mobile gaming revenues in India are largely driven by ads. The Freemium model has not picked up so far, however it does hold a potential opportunity in India to turn a popular game into a continuing revenue stream. One of the most important tasks for a game developer is identify a suitable revenue model for Indian customer: free (ad-supported), freemium (free download with in-app purchase options) or paid (one-time fee for a full-featured app).

Mobile advertising

The mobile advertising market in India is observing a steady growth rate and its share in the overall digital advertising pie is increasing. With mobile penetration growing, mobile devices have become an important channel for brands to market their products and services.

Mobile advertising in India is expected to constitute 14.5 per cent share of the total digital advertising spend by end of 2017. The mobile advertising industry is projected to grow at a 47.8 per cent CAGR for the period 2014-17[97].

Digital advertising market in India
(in INR billion)

2013	2014[E]	2015[P]	2016[P]	2017[P]
23	28	36	48	66
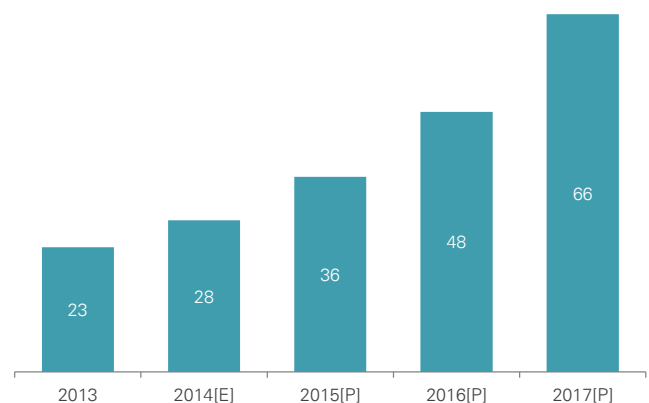
Source:IAMAI-IMRB Digital Advertising 2014 Report Internet In India 2014, Industry Discussions, KPMG in India analysis, 2015

The total mobile ad spending worldwide increased from approximately USD 9 billion in 2012 to USD 18 billion in 2013. The total spending in 2014 is expected to reach about USD 31.45 billion which is 75 per cent growth over last year[97]. Facebook and Google account for majority of the growth in the global mobile ad market[98].

95 http://timesofindia.indiatimes.com/tech/tech-news/Androids-market-share-in-India-over-90-IDC/articleshow/22793647.cms; KPMG-FICCI M&E industry report 2015
96 http://timesofindia.indiatimes.com/tech/personal-tech/gaming/Mobile-games-revenue-to-double-between-2013-and-2015-Gartner/articleshow/25010085.cms?referral=PM

97 IAMAI-IMRB Digital advertising in India 2014
98 eMarketer press release, 19 March 2014

Mobile Internet ad spending worldwide 2013-17[P]
(in USD billion)

Year	Value
2013	17.96
2014[E]	31.45
2015[P]	45.85
2016[P]	61.4
2017[P]	77.67

Source: eMarketer press release, 19 March 2014

Growing economies such as China and India are anticipated to contribute progressively towards mobile advertising growth globally because of the large and expanding middle classes in these countries which presents an attractive market for global and local brands. Factors that are actively contributing to the growth in the Indian market include accessibility to wide array of Internet enabled mobile devices across a broad price range.

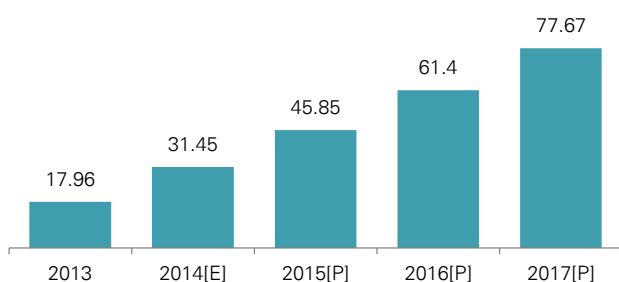Mobile advertising in the future may be about native advertising, wearable technology, mobile real-time bidding enabled with high speed Mobile Internet connectivity. The industry may observe native ad formats that fuse with the app without coming in the way of user experience. Real-time bidding (RTB) may feel at home on mobile devices as they enable enhanced and more focussed customer targeting with a higher degree of accuracy. RTB empowers advertisers to bid more intelligently in a more cost effective way. The next phase of innovation may be driven by focussed platforms that could leverage the power of programmatic buying for achieving campaign objectives.

Location based advertising may be enabled by user information and the physical context that mobile devices bring to the table. This could help advertisers connect with the right target audience at the right time with the right ad.

In-app ads chief contributor

In-app ad format captures the lion's share of mobile spends in India. Currently, about 75 per cent of the mobile advertising market is grabbed by two ad formats – in-app ads (40 per cent) and mobile video/TV, SMS, MMS ads (35 per cent)[99].

Simple text based or image-based display ad formats such as banners, have now made way for modern formats like native ads, rich media ads such as mobile video, etc. Introduction of high speed Mobile Internet has enabled this shift. These rich formats are also a result of innovations and advancements in technology. Rich media formats such as HTML5 delivered through touch devices powered by higher mobile data speeds are allowing consumers to interact with the ads thereby making the user experience better.

Budget 2014 brings mobile advertising under the ambit of service tax

The Indian government announced in the budget session for 2014-15 that 12.36 per cent service tax would be levied on online and mobile advertising which was exempted earlier[100]. This means that the online and mobile media costs for advertisers would increase which is likely to directly impact the media budgets of businesses that market their products and services on mobile. This might affect the small to medium budget media houses.

99   IAMAI-IMRB Digital advertising in India 2014
100 http://forbesindia.com/article/india-budget-2014/india-budget-2014-service-tax-to-be-levied-on-online-mobile-ads/38206/1

SECTION

03

# Mobile led services (mServices) for a larger social impact

Key Insights

- Investments in mServices are growing and these services stand to offer the promise of creating a social impact in the areas of healthcare, agriculture, financing, governance and education;

- Existing mServices are SMS and IVR based which limit delivery of interactive services and holistic user experience;

- mServices present robust use cases for the mobile. Increasing adoption of these services portends a favorable future for Mobile Internet adoption;

- Experience key benefits that Mobile Internet based mServices bring to the table include extended reach, improved delivery efficiency and in many cases low cost solutions for positive social impact;

- An immature ecosystem poses a big hurdle for growth and penetration of mServices;

- Lack of enabling regulatory environment and policies, and limited availability of vernacular content also hinder adoption of mServices.

Mobile based services or mServices are defined as electronic services that are delivered to the consumers via mobile technologies using mobile devices. mServices can help realize large scale social and economic benefits particularly for the rural population of India. These services could potentially help in tackling key issues plaguing education, health, finance, agriculture and governance in India.

Traditionally, these services have been SMS or IVR based solutions. However, increasing Mobile Internet penetration and availability of affordable data enabled devices are expected to drive the development of advanced mServices, enable richer functionality and provide improved service delivery to the rural population of India. Countries across the globe have benefited from delivering mobile led services by leveraging Mobile Internet and not solely relying on SMS based services delivery.

This section highlights the macro trends for mServices, major initiatives in India and barriers to success and adoption of mServices.
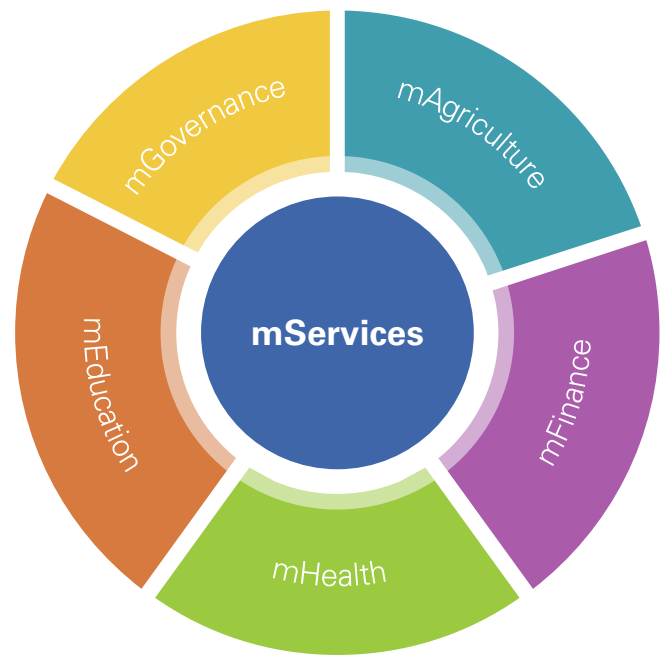
Source: KPMG in India analysis, 2015

mAgriculture – Giving conventional agriculture a make over

mAgriculture solutions are aimed at addressing key challenges in the agriculture sector in India such as productivity loss, poor market and price discovery mechanisms, and limited availability of loan and insurance facilities to small farmers in remote rural areas. The importance of mAgriculture services is evident from the survey results published by Quarterly Journal of International Agriculture in 2012. About 87.2 per cent of the surveyed farmers in India felt that they were more closely connected to the markets after using mobile phones for agricultural information while 71.7 per cent of the farmers felt that they had better access to the price information. Approximately 34.6 per cent of the surveyed farmers also reported increased yield[101].

If traditional mServices showcase such value for Indian agriculture, we can only imagine what services driven by Mobile Internet could do. Mobile Internet could open up opportunities by providing farmers with key services and information needed to improve crop production, provide a wider range of information and eventually improve their standard of living.

The right set of policies and solutions could enable Indian farmers in realizing the potential offered by mServices. As

---

101 How mobile phones contribute to growth of small farmers, Quarterly Journal of International Agriculture, 2012

the overall ecosystem develops, the Indian market may also see a shift from basic SMS and IVR based mobile solutions to more interactive, participatory and rich media solutions powered by Mobile Internet.

Potential benefits of mAgriculture services to farmers

Better access to relevant information

Enhanced understanding of market and price dynamics

Managing supply chain inefficiencies

Improved access to finance and insurance products
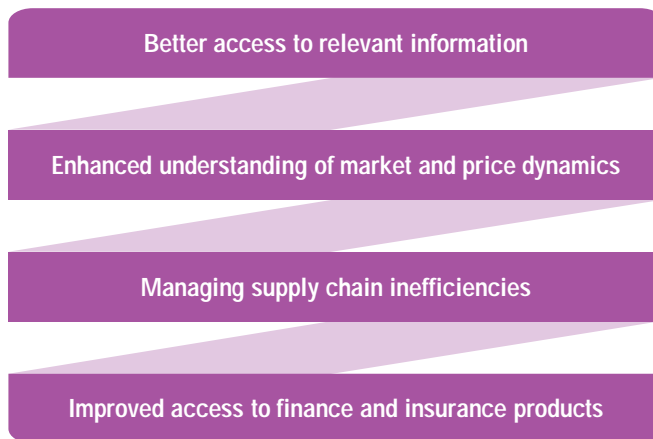
Access to weather, calamity information and agricultural advice

A mobile device connected to the Internet directly supports a farmer's need to timely information on weather and disease and thus enables better disaster and risk management thereby helping in minimizing damage to crops. Accurate information made available by mAgriculture solutions on timely basis helps farmers in preparing for the calamities and educates them on future course of action. Further, forecasts on weather could help farmers in leveraging weather patterns to improve productivity.

For example, the Toto Agriculture project enables farmers with weather information delivered through SMS, MMS, IVR and videos. The platform can handle millions of SMS messages on a daily basis. Another app iPest1 offers a mobile field guide to educate farmers on common pests and their behaviour.

Enhanced understanding of market and price dynamics

mAgriculture services provide farmers with access to real time vital information about the quality and demand of crops without having to travel long distances for transactions. Further, the mobile solutions can potentially help in bringing down price volatility by almost 50-60 per

cent, raise farmers' earnings by as much as 15 per cent and reduce consumer prices by 5 per cent[102].

Mobile Internet enabled agricultural services enable price discovery mechanisms and disintermediation thereby helping farmers to avoid unnecessary middlemen and to improve their net margins by selling their produce at good prices. Farmers equipped with new information on market prices can execute mutually beneficial transactions in existing trade relationships.

Many such successful use cases have been observed across the globe. For instance, Drumnet in Kenya facilitates improved access to agriculture inputs with a wide-ranging system of price negotiation, contracting, etc. This has resulted in an increase in farmers' income by approximately 32 per cent. Another solution Dialog Tradenet in Sri Lanka, enables farmers to access new prices on agricultural commodities, reducing information arbitrage. Its users have reported realization of 23 per cent premium on sales due to access to timely market price information[103].

Managing supply chain inefficiencies

Supply chain for agriculture in India is fragmented with various ecosystem players such as suppliers of raw materials, middle men, retailer, etc. Further, inadequacy in communication infrastructure linking these ecosystem players can lead to inefficiencies in supply chain. mAgriculture solutions can help in managing supply chain inefficiencies such as mismatch between supply and demand and in reducing wastage of crop due to lack of information and poor logistics tracking and traceability. mAgriculture solutions that leverage Mobile Internet equip farmers with real-time visibility into supplier networks and help in sourcing of quality raw materials by connecting them to the right suppliers. Further, some solutions help in connecting farmers to retailers directly and help in tracking movement of produce from farms to shops.

Improved access to micro-finance and insurance products

mAgriculture solutions across the world have made it convenient for rural areas to access finance and insurance products. Applications such as m-pesa in Kenya and SMART Money and G-Cash in the Philippines are perceived as secure and convenient ways to transact.

102 GSMA The mobile economy India report 2013

103 How mobile phones contribute to growth of small farmers, Quarterly Journal of International Agriculture, 2012

Kenya's Kilimo Salama, a venture between Syngenta Foundation for Sustainable Agriculture, UAP Insurance, and Safaricom, allows farmers to insure against crop failure. An automated weather system detects irregularities in the weather and the payment is automatically made to the user's m-pesa account.

Insurance provides the farmers the comfort of investing in high yield agricultural inputs without the risk of incurring disproportionate financial loss in the event of a natural calamity such as a flood or drought. Users of Kilimo Salama's agricultural insurance products have enjoyed an increase in production by an average of more than 50 per cent, or about USD 150 a year[104].

GSMA's mFarmer Initiative was launched in 2011 in partnership with USAID and the Bill and Melinda Gates Foundation. Handygo mKisan is a project in India selected as part of the GSMA's mFarmer initiative and was launched in India in early 2013. mKisan is designed to be a wide-ranging service offering information, advisory and alerts on crops, livestock, market prices, pest and disease, and a farmer helpline as well. It experiments with video based content and knowledge sharing tools. Alliances have been established for content with CABI, International Livestock Research Institute (ILRI) and Digital Green for this project. CABI provides support through actionable agriculture content and subject matter specialists, ILRI supports content and information on livestock and Digital Green takes care of video content on agriculture and livestock. The platform allows farmers to select a subject matter (e.g. weather/pest related issues), record a query, answer a query, listen to the solution to an answered query, etc via a dial in call center. Handygo promotes mKisan in six major states of the country in their regional languages and targets over 1 million mobile subscribers[105]. The service currently has over 340,000 on-going subscriptions with highest activity observed at the start and end of crop season[106].

Barriers to success

SMS to Mobile Internet based mAgriculture services

The main beneficiaries of mAgriculture in India have largely been segments of farmers within areas with developed infrastructure. The poor and those living in distant areas are yet to be completely tapped. Data network penetration in rural areas plays a key role here. Moreover, the cost of accessing these services acts as another barrier to successful adoption and usage of mAgriculture services. As a result, many mAgriculture solutions in India are SMS based and very few applications are based on advanced Internet/data based technologies. Data services based applications that have been successful in other parts of the world are yet to pick up in the Indian market because of limited network penetration; however, these services showcase immense potential for the future.

Training

Mobile technology and innovative mAgricultural offerings may make tools and information available to the farmers, however, the farmers remain unaware of existence of these services. Even if they are aware, they face challenges in using these services effectively due to inadequate training and lack of understanding of the service or interface. Regular trainings can be a way to help ensure that the offerings available in the market are used effectively for the intended purpose by the intended audience.

Content

In India, for as long as the last 30 years, increasing the farm production has been the focus area for services providers and policy makers. Today, agriculture in India has moved on from the green revolution stage. The primary concern for farmers has moved from improving farm productivity to realising better ROI. As a result of this, the market need has shifted from receiving production related technical information to access to new market prices and relevant buyer information. However, relevant content across several vernacular languages is not available in India.

The basic drivers for adoption of a mobile-based solution are efficient service delivery, contextual content, and updated content with timely delivery. To address the information needs of farmers, relevant vernacular content is a key constituent of mobile services. The extent to which content is customized and localized to a farmer's condition influences its adoption. Additionally, content needs to be updated over a period of time and services launched in the market must focus on addressing relevant farmer needs.

104 Mobile application for agriculture and rural development, World bank 2011

105 The mobile development Intelligence portal

106 http://www.cabi.org/projects/project/19242

mFinance – Means to financial inclusion

Large portion of the population in India still lacks access to a sustainable substitute to the cash economy and other informal financial services. The 2011 census in India pointed out that almost 41.3 per cent of the country's population does not have access to formal financial services. Primary reasons behind this are inadequate number of bank branches in rural areas, lack of financial literacy especially amongst rural population, complex banking products and services, high service charges and lastly the minimum transaction limits set up by banks that entirely ignores the needs of the poor population whose day to day requirements are limited to micro-transactions.

In the recent past, banks have launched mobile websites and banking apps for provisioning their services through mobile. The Government has done its bit by introducing IMPS to facilitate easy and real time funds transfers between accounts using mobile technologies. The players in the Mobile Internet ecosystem have also launched various mobile money solutions such as airtel money, m-pesa, Idea MyCash, MoneyOnMobile, mWallet, Mobile Money, mRupee, Oxicash, etc.

Adoption of these services in the market can be seen already, with mobile-based financial transactions growing both in volume as well as value. The data from RBI payment indicator report signals a sharp rise in mobile transactions in the country. Customers are now making utility payments such as electricity, telephone, water bills and insurance premiums using online and mobile platforms which is reflected in the growing popularity of online and mobile based services and drop in paper clearing. Paper clearing transactions in May 2014 observed a 3 per cent drop by volume and 36 per cent reduction in overall transactions value as compared to May 2013[107].

Payment systems India by volume
(in INR million)

	May-13	May-14
Mobile banking	**6.9**	**10.9**
Mobile wallets	**7.0**	**13.6**
IMPS	**0.4**	**3.3**
Paper clearing	103.4	99.9
RTGS	6.7	7.8
Credit and Debit cards	592.7	674.9

Payment systems India by value
(in INR million)

	May-13	May-14
Mobile banking	**11.9**	**38.8**
Mobile wallets	**2.0**	**4.4**
IMPS	**1.9**	**24.2**
Paper clearing	7926.2	5110.3
RTGS	71678.9	72092.0
Credit and Debit cards	1836.9	2121.7

Source: RBI Payment Indicator reports July 2013, July 2014 and KPMG in India analysis, 2015

Mobile banking usage grew impressively by 57.9 per cent in volume of transactions in the month of May 2014 with the value of these transactions growing by 226 per cent when compared against transactions in May 2013[107]. The

---

107 RBI payments indicator reports July 2014, July 2013, KPMG in India analysis

value of transactions is growing faster than the volume which reflects the increasing trust amongst customers in mobile transactions.

Increasing adoption of mobile wallets is evident from the increasing subscriber base and improving transaction volume using mobile wallets. Transaction volume for mobile wallets grew by 94 per cent for May 2014 compared to May 2013 and the value of transaction grew by 121 per cent[108]. This clearly indicates that mobile wallet as a financial instrument is gaining the trust of Indian customers.

IMPS, the interbank electronic instant mobile money transfer service through mobile phones promoted by NPCI, has also been able to grab a small but extremely fast growing pie of the market because of the high convenience factor associated with the service. IMPS transactions in May 2014 when compared against May 2013 observed an increase of 768 per cent by volume and 1145 per cent by value[108]. However, in absolute terms, the number of IMPS transactions is still a very small portion of the overall pie when compared to other transaction systems, and due to the low base effect, the per centage growth rate for IMPS may seem high.

Although the high growth rates of mobile transactions paint a rosy picture, it is important to note that in terms of absolute numbers and actual share of the market, mobile based transactions still have a long way to go to achieve the desired scale. Moreover, many of these services have higher adoption rates in urban areas and may not be the most effective services for addressing the financial inclusion problem.

Benefits of mFinance

Extending reach

Enabling micro-transactions

Access to micro financing products and services
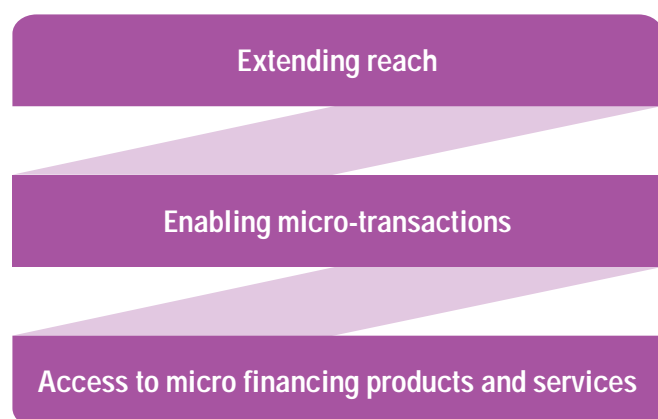
Source: KPMG in India analysis

Extending reach – Towards financial inclusion

80 per cent of villages in India do not have access to a bank within a 2-kilometre radius; however majority of the population in these villages has a mobile phone[109]. In this debilitating state of financial inclusion mobile-based financial services hold the potential to fill gaps. Internet enabled mobile devices can facilitate delivery of financial services to the poor and spearhead India towards the goal of achieving financial inclusion and driving economic development. It is estimated that mobile financial services can serve as many as 250 million people by 2020, taking the adult financial inclusion rate to 65 per cent[110].

Enabling micro-transactions

mFinance and especially mobile money services are allowing poor customers in rural areas to conduct micro-transactions; a pressing need of the market. In India, largely a cash economy, almost 67 per cent of retail transactions are conducted in cash[111] and mobile money presents a practical option to substitute such transactions with mobile based banking solutions, thereby enabling micro transactions at low transaction costs.

Access to micro-financing services for poor

Mobile money is enabling a vast array of valuable services such as micro-loans and micro-insurance which are quite relevant to the poor rural population. With limited number of formal bank branches in the vicinity of a village, the rural population can still have access to these banking services via a mobile device. A mobile phone can act as a virtual bank card, a point of sale terminal (POS), an ATM and a banking terminal with instant access to the bank account and the capability to make payments and transfer funds.

Regardless of the potential, there are only about 20 million registered users for mobile financial services in India, out of which only a small proportion use mobile payment and transfer services on a regular basis[110].

Mobile money is the use of mobile phones for financial transactions. Mobile money can be used for funds transfer, bill payments and deposits and withdrawals using electronic currencies issued by banks and non-bank service providers such as telecommunications companies or Internet. The services include not only mobile wallets but also mobile banking and mobile commerce services, which together have the potential to propel India towards financial inclusion.

---

108 RBI Payment Indicator reports July 2013, 2014
109 World bank statistics
110 GSMA The mobile economy India report 2013
111 Mobile Money: Enabling Policy Solutions, GSMA, 2013

Mobile money is still in a nascent stage in India. It is gaining popularity and it is estimated that the mobile money market could reach about USD 350 billion by next year. Each year, domestic migrants in India send approximately USD12 billion back to their families in remote areas of the country[112].These people can leverage mobile money to transfer funds anytime, from anywhere and at a reduced cost.

Banks have enabled traditional mobile banking in Indian cities by offering mobile apps to customers. However, in rural areas where very few people have access to banks. The 'unbanked' sector presents a huge opportunity for non-bank based mobile money solutions as traditional bricks-and-mortar banking infrastructure is too expensive to serve the rural areas.

Barriers to success

The ecosystem needs to develop

mBanking and mobile money are yet to realise their potential in India. India has a number of telecom operators and the backbone required for interoperability which is imperative for adoption of such payment models is a challenge that needs to be addressed. Vision and efforts of telecom operators, financial service providers, as well as regulatory bodies, need to be fully synchronized in order to pass on real benefits to the consumers.

The evolving regulatory environment

The regulations in India require telecom operators to work with banks for providing mobile money services. While the Government has been doing its bit by issuing guidelines in favour of furthering financial inclusion, a few regulations pose a hurdle for the large unbanked Indian population to adopt mobile money services.

The KYC norms

In November 2014, RBI issued guidelines on extending licenses for operating Small Finance Banks and Payment Banks. The guidelines have been issued with the objective to further financial inclusion by providing small savings accounts and payments/remittance services to migrant labor force, low-income households and unorganised entities[113]. The customers of these Payment Banks may be able to avail of mobile banking services.

This is a welcome move by RBI since it will enable existing Pre-paid Payment Instrument (PPI) issuers which, among

others, include telecom companies, to apply for licenses to set up Payment Banks. However, the KYC (Know Your Customer) norms which were earlier applicable to full-access wallets offering cash-out features would still apply for operating Payment Banks[114]. This is a major hurdle as these norms may make it difficult for entities intending to offer services to the masses in hinterlands who may fall short on fulfilling KYC norms. However, RBI seems to be working towards removing these hurdles and have announced a few relaxations on the KYC for PPI issuance.

Restrained distribution networks

The business case for providing mobile money services to the unbanked population in the remote rural and suburban areas of India may not be attractive to the commercial banks because of which adequate investment in order to these services in rural areas may not make economic sense[115]. Rural customers are high risk customers for banking in comparison to richer urban population that is much easier to reach at a lesser cost and also offers larger ticket size.

On the other hand, telecom operators also face challenges in expanding their services and fully leveraging their reach. While mobile customers can top up airtime recharge at a number of retail locations, the telecom operators are not allowed to use these established sales outlets as financial agents. While a Business correspondent (BC) can be a BC for more than one bank, at the point of customer interface, a retail outlet or a sub-agent of a BC shall represent and provide banking services of only one bank[116]. The challenge posed by this rule is that this retail outlet agent can be an agent under one bank and not for many. Also, these retailers are not granted the status of a BC and wallets with cash out facility can only be fully utilised with the operator's retailers who have been granted the status of a BC. The RBI guidelines on Payments Banks extend the scope of activities of Payment Banks to BCs but are subject to guidelines on BCs.

Another issue that may be noted here is that RBI mandates that the distance between the place of business of a retail outlet/sub-agent of BC and the base branch should ordinarily not exceed 30 kms in rural, semi-urban and urban areas and 5 kms in metropolitan centers[116]. This has been introduced with a few to ensure adequate supervision over operations and activities.

112 New York Times article by Richard Shaffer, 4 December 2013
113 http://rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=32615
114 http://www.livemint.com/Money/TwIUI1uh2Gpa3JVKbWqQ2O/RBI-answers-payments-small-banks-queries.html
115 MMAI and GSMA Paper – Mobile money: The opportunity in India 2013
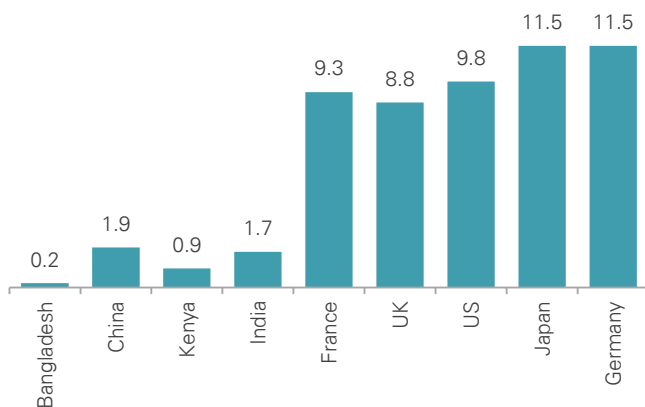116 http://www.rbi.org.in/scripts/BS_ViewMasCirculardetails.aspx?id=8136

mHealth – Towards affordable rural healthcare in India

Healthcare spends across the world were estimated at USD 4.2 trillion in 2012, consuming an average of 10 per cent of GDP in OECD countries and increasing at an average of 5 per cent every year[117]. However, it is interesting to note that the top 20 healthcare consuming countries contain less than 20 per cent of the global population. These countries consume close to 90 per cent of the global healthcare spend indicating that worldwide healthcare still does not reach the people that require it most, i.e. the developing countries.

Increase in government and private investments coupled with technological advancements are setting the pace for innovations in this sector in India. However, with an Infant Mortality Rate of 44 per 1000 live births, the Maternal Mortality Rate of 190 per 100,000 live births and a low life expectancy of 66 years, India still falls short of the average for Low Middle Income Countries (LMIC)[118]. Further, scarcity of doctors and qualified nurses is an issue that India is grappling with for a long time with an estimated additional requirement for 4 lakh more doctors by 2020-50,000 required for Primary Health Centers (PHCs), 0.8 lakhs for Community Health Centers (CHCs). Also, the Planning Commission concedes that there is a pressing need for necessary infrastructure for qualified staff to run PHCs and CHCs and to provide a certain expected quality of healthcare services in rural areas[119].
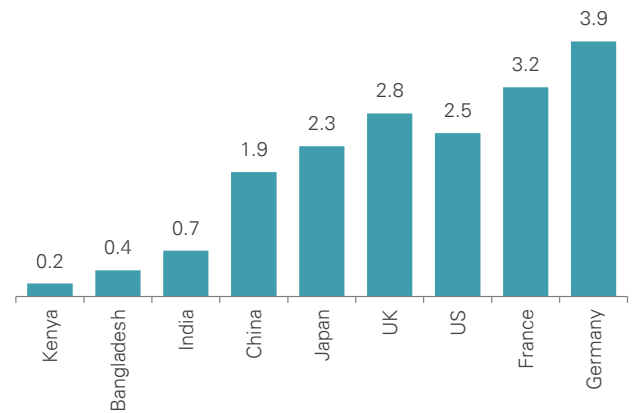
Nurses
(per '000 population)

Bangladesh 0.2
China 1.9
Kenya 0.9
India 1.7
France 9.3
UK 8.8
US 9.8
Japan 11.5
Germany 11.5

Source: http://data.worldbank.org/indicator/SH.MED.NUMW.P3

Doctors
(per '000 population)

Kenya 0.2
Bangladesh 0.4
India 0.7
China 1.9
Japan 2.3
UK 2.8
US 2.5
France 3.2
Germany 3.9

Source: http://data.worldbank.org/indicator/SH.MED.PHYS.ZS

The proliferation of mobile devices and better network connectivity can help lay the foundations for strong and robust mHealth services in developing countries such as India where almost everyone has access to mobile phones but not healthcare services. mHealth solutions in India can help deal with key problems such as maternal and child healthcare to reduce infant mortality rate, reducing incidences of communicable diseases, etc.

The need, advancements in technology and investments by various players presents a strong case for mHealth growth in India. However, currently the challenges faced by the ecosystem to take these solutions to masses residing in the deepest rural pockets of the country seemingly outweigh the potential. mHealth solutions in India are still at a nascent stage and success stories are few and far spread out in number and geographic reach. Still there is no denying that in India, with large portions of its rural population connected via mobile devices, the mHealth sector has immense potential for growth and outreach.

The existing mHealth solutions in the Indian market are informational and SMS based. This is soon expected to change as data networks reach more people in rural regions in the coming years. We will see more content developers designing applications to serve the need of delivering healthcare services over Mobile Internet networks. It is believed that the mobile revolution in healthcare in India could be powered by services delivered over robust high speed Mobile Internet networks to patients in remote rural areas of the country. However,

---

117 Touching Lives through mobile health-GSMA
118 Improving the evidence for mobile health – GSMA

119 http://www.newindianexpress.com/magazine/India-has-just-one-doctor-for-every-1700-people/2013/09/22/article1792010.ece

for a mobile health solution to be adopted by masses in India, consumers should have the willingness to pay for the solution, the solution should be affordable, and its functionality should either be preventive, curative or diagnostic in nature and must address a problem to create some tangible value.

The global adoption of mHeath services is currently better compared to the adoption rates in India. Many mHealth initiatives in India today are related to telemedicine, patient appointments and health and wellness alerts using an application or as mVAS content in the form of text messages. Globally, these services are relatively more advanced and are enabled by high speed Mobile Internet, instant messaging and use of the Internet for treatment videos. With increasing penetration of smartphones and investments in improving Mobile Internet connectivity, the environment for smooth functioning of such services is bound to become better.

It is estimated that global revenues for mHealth services alone will touch US $23 billion in 2017[120]. The Indian mHealth market was estimated at USD 7.5 million in the year 2012, and is expected to grow at a CAGR of 20 per cent to USD 18.7 million by 2017[121].

Benefits of mHealth

Enhanced awareness and reach

Access to skilled resources

Increased delivery efficiency

Reduction in number of patient 's visits to hospital(s)

Source: KPMG in India analysis

Enhanced awareness and reach

For a country like India, affordable healthcare is a necessity. Across the length and breadth of rural India, citizens face problems ranging from lack of funds to afford adequate healthcare, minimal or no access to basic healthcare facilities, lack of awareness and knowledge related to the human body, symptoms, diseases and

lack of proper medication. In many cases, cultures and societal norms too act as barriers that prevent people from accessing skilled medical help when needed. mHealth solutions which would help educate citizens on healthy living behaviors and habits, would help understand symptoms of communicable and non-communicable diseases, and provide expert medical advice in a vernacular language that can help build a healthier nation at relatively low costs. India's pressing problems such as tuberculosis, malaria, rise of health problems due to excess consumption of alcohol and tobacco, female infanticide, malnutrition and inadequate care of pregnant women can be impacted positively through mobile solutions that increase awareness and enhance reach.

Access to skilled medical personnel

Given the geographic expanse of the country, there are many areas that are devoid of basic healthcare facilities and clinics/hospitals. Additionally, even in areas with basic healthcare facilities, there is a severe dearth of skilled medical personnel, ranging from doctors, nurses, pharmacists and surgeons. mHealth solutions, especially if adopted and implemented, as they have been in other developing nations, can enable access to skilled medical staff from the comfort and security of their homes at an affordable price. Personalized interactions with medical staff can, in the long run, help change the mindset that goes against medical treatment and still relies heavily on home remedies. Video chats with skilled healthcare professionals enabled by high speed 3G/4G networks in future can fulfill this need.

Increased delivery efficiency

A pressing problem that the government and low cost medical facilities face is that patients do not return for subsequent check-ups, may not take medications as prescribed and may not adhere to the medical procedures advised by doctors. This happens at the consumer end due to various reasons ranging from lack of funds, long distances between medical facilities and homes and also lack of awareness and acceptance. Existing mHealth applications address this need in India wherein regular reminder SMSes are sent to users prompting them to take their medication as planned. mHealth solutions can help in such situations by making patient records available to doctors on duty, by offering features such as sending reminder alerts for medication and for requesting patients to come for follow-up visits depending on the requirement. Further, mHealth

120 Touching Lives through mobile health-GSMA

121 http://www.ibef.org/industry/healthcare-india.aspx

enabled with Mobile Internet can help in delivering videos or images related to various diseases to patients' mobile phones to educate them.

Reduction in number of hospital visits

Due to lack of knowledge and awareness, several people travel long distances to hospitals only for a mental satisfaction of having met a doctor face to face. Further, since the number of doctors is limited, this scenario puts an additional burden on doctors' schedules and adds to costs of hospitals. mHealth solutions, especially in the case of already diagnosed diseases can enable patients to share tests results with doctors through mobile phones in real time and obtain feedback over a phone, thereby, determining that secondary visits only take place at the doctor's request. This also helps the patient because of the personalized attention made available over the telephone. If required, a video call with the doctor can be made from the comfort of patients' home/ community centers without having to travel.

Operating models in India

mHealth services in India primarily operate by way of 4 popular models-Tele-consultation, Tele-medicine, Health intimation SMS alerts and Health & wellness smartphones apps. Tele-consultation and Health intimation SMS alerts are non-data based services and also the more popularly used ones. Tele-medicine and Health & wellness smartphone apps are data based services and hence require Mobile Internet to function.

Popular Operating Models

- Tele-consultation
- Tele-medicine
- Health & Wellness apps
- Health intimation and alerts
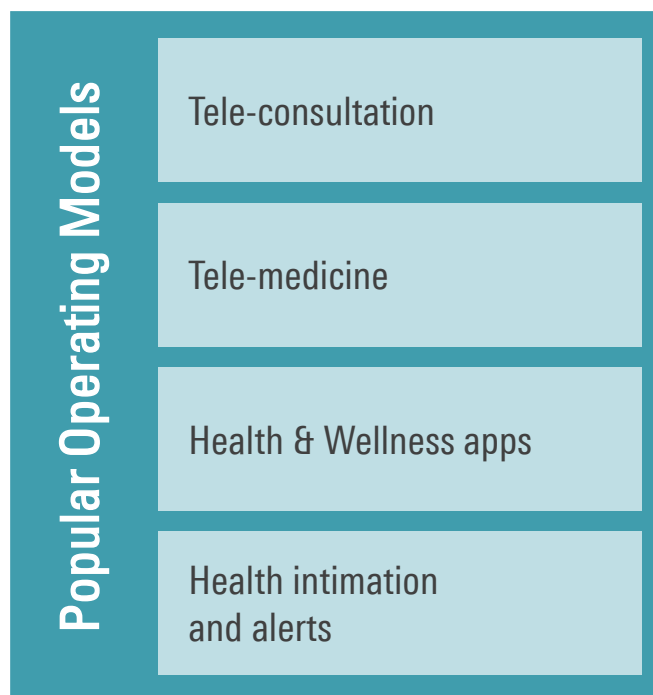
- **Tele-consultation** – These services offer the first level of consultation services involving Triage services usually over a phone call. These services act as health call centres or health help lines. This is one of the most popular category of services within the mHealth domain.

- **Tele-medicine** – This category involves services such as consultation with a doctor over live video conferencing, report submissions via mobile networks, online feedback, suggestion on non-prescription drugs, etc. There are examples of apps in this category which when used with a compatible gadget can enable professionals to conduct tests on the patient and transmit the data to a central hospital server for the doctors to analyze. This is helpful in diseases such as diabetes.

- **Health and wellness apps** – These apps form a major part of the market and focus primarily on general wellness. Smartphone users who are the customers of these services have on an average 5-6 health & wellness apps on every smartphone in the developed markets. The market for this service category is good and there are more than 500-600k such mobile apps available on the app stores[122].

- **Health intimation and alerts** – The alert services are usually SMS based wherein the patients are sent regular alerts reminding them about a doctor's appointment or scheduled medicine doses, etc. These services are essentially helpful in remote areas where users have only basic phones and limited healthcare facilities.

Barriers to success

Technology

For mHealth solutions, technology is key as patient data has to be collected in a user friendly manner and the data has to be securely stored, displayed and integrated with various other medical devices for real time updates. mHealth solutions prevalent in India are based on multiple platforms, are in various phases of technical maturity and have their own data transmission and storage formats. These solutions are the result of scattershot approach to introducing mHealth services by various Mobile Internet ecosystem players. Hence, hospitals and healthcare service providers face challenges due to issues in interoperability since data used and available with one service provider may not available for use by other

healthcare service providers. So, in this scenario, health records for each patient leveraging the mHealth solution would have to be created afresh. A common technology platform which would enable interoperability and sharing of healthcare data across systems could lead to increased adoption and success of mHealth services in India.

Additionally, more advanced solutions would need further technological advancements for improving displays and user interfaces. Further, Mobile Internet based solutions need to be developed as Mobile Internet reaches deeper rural pockets enabling more interactive platforms and resulting in increased adoption of such services. Last but not the least, significant work needs to be done in the information security space. For the initiative to be really successful, as in other developed countries, there needs to be a focus on information security and data privacy, both from a government and policy creation perspective and from a technology standpoint as these solutions include collection, distribution, sharing, storing of sensitive patient data.

Content – varied levels of literacy demands vernacular content

The level of literacy is not uniform across India and different languages are spoken across the country. This poses a problem to the widespread adoption of such mobile based solutions unless vernacular content is available. A huge population of illiterate people also means that such solutions may not get adopted due to complex content and operations. Adoption may only increase if people understand the messages being communicated to them and the way to get the message across is to communicate in a language they are used to thinking in.

mEducation for quality and affordable education across the country

India has a lower rate of higher education enrolment at 18 per cent compared to these rates for similar economies such as Brazil and China.

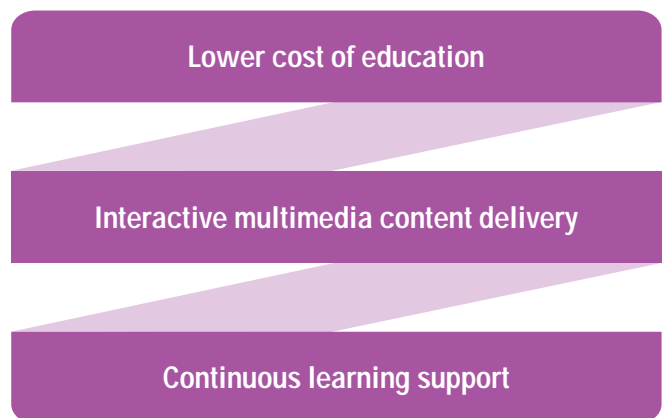### Rate of Enrollment for Higher Education-2013
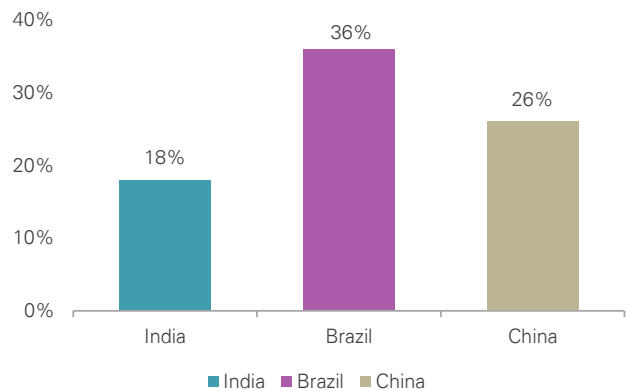
Source: British Council-Understanding India: The future of higher education and opportunities for international cooperation-British Council-February 2014

Scarcity of teachers and mediocre quality of teaching methods add to the problem. Demand for skilled staff continues to increase at universities providing higher education and in areas of innovation and infrastructure. These challenges are impacting the country's research-focus groups both in terms of quantity and quality.

Mobile Internet can help by providing access to basic education and vocational learning to a wider audience in rural areas where it is not accessible. mEducation initiatives offer personalized on-the-go learning solutions facilitated by skilled personnel at relatively low costs. The mEducation market globally is estimated to be worth USD70 billion by 2020[123].

Benefits of mEducation solutions

Lower cost of education

Interactive multimedia content delivery

Continuous learning support

Source: KPMG in India analysis

---

123 Transforming learning through mEducation-GSMA

Low cost of education

Setting up schools in remote areas entails high capital investment. Further, gaining access to qualified and committed teachers in these areas is another challenge. In areas where schools have been set up and teachers are available, parents do not send their children to schools for higher education as it is considered an additional burden on their pockets. Low tariffs for mobile data plans, low handset prices and low enrolment plans offer a case for wider adoption of mEducation solutions at low costs.

Interactive multimedia content delivery and creation

mEducation helps improve the quality of teaching tools and aids as technologically advanced rich media formats can be delivered over high speed Mobile Internet. The use of videos and info graphics help in better understanding of languages and new concepts.

Continuous learning support

Unlike in brick and mortar teaching institutions, mEducation allows for teaching anywhere anytime through a mobile device. Focussed initiatives also enable students to use mobile as a medium for continuous learning with the help of skilled teachers.

Barriers to success

Technology barriers

There is a need for user friendly interfaces and improved displays for clear reading and understanding. Low penetration of Internet enabled smartphones in rural regions may pose a problem as education solutions require an advanced Mobile Internet based solution. Screen size, key size, technology obsolescence, dynamic

software and OS updates act as deterrents to widespread adoption of these solutions. Low battery lives and poor network connectivity also pose a problem as rich multimedia learning tools require both continuous network connectivity and also prolonged battery life. Lack of standardization in asset formats across devices and high speed connectivity for continuous streaming are areas that require focus.

Content quality and recency

For an education-focussed solution, quality of content, study options offered and number of languages in which the content is made available make a difference to adoption. It becomes important to determine that the content offered addresses the educational needs of different target user groups. The Indian education system is grappling with the availability of updated course content in keeping with developments in various subjects. Although many mobile education solutions give content providers the flexibility to update the curricula and course content conveniently the unavailability of updated course content defeats the purpose of introducing such features in such solutions and the ultimate motive of offering quality education to intended audience.

Regulatory support

There is scope for improvement in the governance framework and guidelines for companies offering mEducation. Currently, there is no guideline for quality and resolution of visuals, kind of language or type of content that can be published. This can potentially lead to poor quality of content delivery ultimately impacting user experience.

mGovernance – On track for inclusive development

mGovernance is the delivery of public information and services to citizens and businesses through mobile devices and applications. mGovernance focusses on facilitating information exchange between stakeholders, to aid in extending the reach of public service initiatives and programmes. The ubiquitous nature of mobile phones, increased penetration, and improved connectivity are drivers for the growth of mGovernance initiatives in India. The government aims to achieve collaborative, transparent and effective governance through mGovernance solutions especially in remote rural areas. Governance schemes offered through mobile channel also act as powerful tools for communication with citizens in times of crisis or grave risks (such as health hazards, natural calamities or emergency evacuations).

The National Mobile Governance Initiative was launched by the Department of Electronics and Information Technology with the aim to make public services and schemes under the Government of India accessible to every citizen. Under this initiative the 'Mobile Seva' portal was launched in December 2013 followed by an app store. Mobile Seva is an innovative platform that enables citizens to directly interact with government departments primarily through SMS. The app store hosts apps for Android and java based phones. 203,444 applications have been downloaded so far from 370 applications that the app store supports (309 live and 61 demo applications)[124]. The initiative supports various technologies including Mobile E-Governance Service Delivery Platform, IVR, SMS Services, mobile apps, location Based services and mobile payments[125]. Currently, 1,085 Central and State Government Departments and agencies use the Mobile Seva platform to provide SMS based services, and over 115 crore SMS notifications (including push and pull) have been sent as of now[124].

Mobile Seva platform was among the second place winners of 2014 UN Public Service awards along with Bahrain, Brazil, Cameroon, Republic of Korea and Spain[126]. These UN awards celebrate public service initiatives leading to innovation in governance mechanisms for sustained development.

Benefits of mGovernance in India

Extended reach of government services

Improved productivity of government personnel

Improved delivery efficiency of information and services

Source: KPMG in India analysis

Extensive reach of government services

Factors that contribute to the success of any public administration service or framework include economic management, structural policies, social inclusion, equity and public sector management to name a few. In order to achieve these public administration goals in a country with the world's second largest population[127], the government needs to ensure that every citizen has access to all its services and schemes. The penetration of mobile phones into the remote locations of rural India presents an opportunity for the government to improve planning, execution and monitoring of public services through Mobile Internet.

Improved productivity of government personnel

Some mGovernance solutions enable public service personnel to enter data into back-end systems through their mobile phones in real time and on-the-go. This reduces/eliminates the effort they would otherwise be spending on data entry/operational activities at office, thereby, freeing up time to perform jobs that add value. Additionally, with mGovernance services available on their handsets, citizens could avoid going to government offices every time they need information. This would enable government executives to spend lesser time on jobs such as attending to information requests.

mGovernance solutions for data collection can also help in reducing data errors and duplication. A mobile platform with standard data frameworks can help build a robust and thorough database of national records accessible anytime, anywhere which can be put to use for further analysis as required.

124 https://mgov.gov.in/, data as on 7 August 2014
125 http://www.futuregov.asia/articles/2014/jan/10/india-unveils-mobile-governance-initiative/
126 http://www.ndtv.com/article/india/indian-government-s-initiative-mobile-seva-wins-un-award-546831
127 https://www.cia.gov/library/publications/the-world-factbook/rankorder/2119rank.html as on date 18 May 2015

Delivery efficiency of information and services

mGovernance services allow government departments to deliver information or services to users at a lower cost. Citizens are benefited as they receive relevant information as and when required. Further, mGovernance platforms offer scale by enabling delivery of important information such as sensitive security alerts, environmental alerts, etc. to a large audience quickly and at the same time.

Barriers to success

Digital divide

We may boast of a high mobile penetration, yet the reality is that not every citizen has a mobile phone which creates a digital divide in the country limiting the reach of mGovernance to 100 per cent of Indians.

Is the Indian market ready for mServices?

Due to the proliferation of mobile phones in India, the need for various solutions available on mobile devices has increased over time. However, the success of these services depends not only on the market need but also on the readiness of the market. It has already been established that the market need

User awareness and training

A large per centage of India's population is illiterate especially in rural regions. Additionally, lower computer literacy levels also pose problems for users to utilize their mobile devices beyond making voice calls. For mobile governance services to gain traction across the country, special training and awareness camps may need to be provided especially in areas with lower literacy levels.

Technology

There are many technological challenges and roadblocks to the smooth running of mGovernance initiatives including connectivity, management of large volumes of data, effective maintenance of the app store, regular testing and bug fixing for all applications, data overload, cross platform application development, management and security of payment gateways, and security and identity management of individuals.

for mServices in India is high but the degree of readiness of the Indian landscape to offer these services is low primarily due to a weak policy environment, dearth of skilled resources, lower degree of collaboration between the ecosystem players and limited availability of quality content.

Factors contributing to degree of market need

- External Reach;
- Social Enablement;
- Productivity Boost;
- Service Delivery Efficiency.

Factors impacting degree of market readiness

- Maturity of ecosystem players;
- Regulatory/Policy Environment;
- Skills/Content Availability;
- Enabling Technology.

SECTION

04

The way forward

Key insights

- Ecosystem players need to focus on enabling the technology landscape, adopting effective and sustainable business practices, and developing skilled human capital. The government and regulatory bodies need to provide their support by creating a favorable regulatory and policy environment;

- Creating a robust technology backbone requires significant investments by telecom operators. Public-Private partnerships (PPP) could provide for collective and sustainable growth. The Indian government may have a key role to play and steer these initiatives;

- Encouraging policy environment such as subsidies for companies developing vernacular content, mVAS revenue sharing, spectrum management may help in creating a conducive environment for Mobile Internet growth;

- Telecom Operators and content providers should collaborate with each other and reinvent their operating model, bundle their services for reaping the benefits of data growth in the market.

The Digital India Programme was introduced with the objective to transform the country into a digitally empowered society. The Programme aims to integrate various government agencies/departments for interoperability and to improve public accountability through delivery of government services electronically. The Government aims to achieve collaborative, transparent and effective governance through this Programme and to provide real time information through online and mobile platforms. To achieve this, the Government has identified nine pillars of growth including broadband highways, universal access to mobile connectivity, public Internet access, eGovernance, ekranti, Information for all[128]. Mobile, Internet and social media technologies could provide that backbone to connect, collaborate and stay relevant. As highlighted in Section 1, the number of people who own mobile phones in India is greater than the number of people who own desktops or personal computers. Further, affordable Internet enabled handsets are enabling the increase in penetration of Internet through mobile. The positive impact of this has already been discussed in the previous section. It is evident that Internet will find its way to the masses through mobile devices.

It is estimated that the number of Internet users in India will touch 503 million by 2017[129]. As discussed, the Digital India Programme aims to increase the reach of Internet to the masses and the network-effect of Internet may provide incentive enough to increase penetration due to the direct increase in value in terms of empowerment of masses. To get every citizen connected, the challenges faced by the stakeholders in the Mobile Internet value chain need to be addressed. The previous sections highlight Mobile Internet ecosystem dynamics and the role of various players involved. The issues on the demand, supply and regulatory side need to be resolved to benefit from the realized and unrealized potential of connectivity on-the-go for India.

The foundation for solution roadmap

A four pillar approach

The proposed solution roadmap aims to achieve, primarily, two objectives a) 'Connectivity for all' and b) 'Wider adoption of services'.

It is pivoted on Four pillars – Connectivity, Affordability, Availability and Speed and Reliability of the Mobile Internet services. The ecosystem players have to work together to address the challenges around these focus areas.
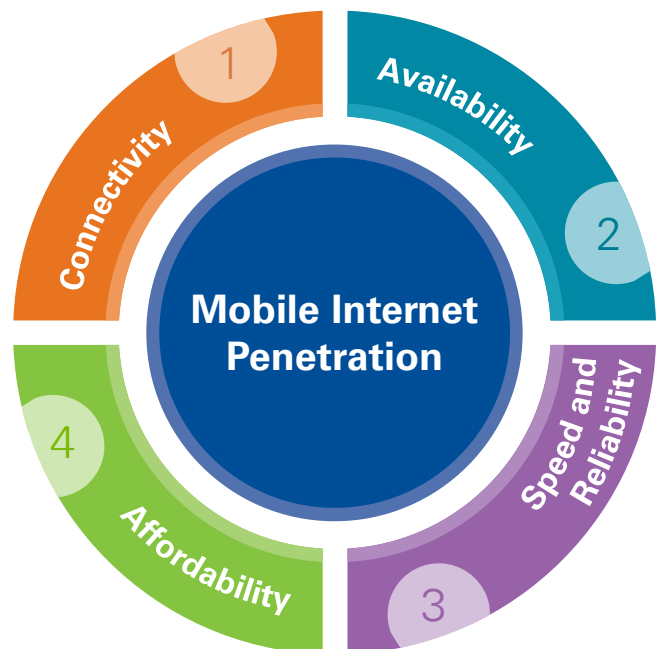
Source: KPMG in India analysis

128 http://deity.gov.in/sites/upload_files/dit/files/Digital%20India.pdf
129 IAMAI Internet In India 2015, Industry Discussions, KPMG in India Analysis, 2015

Constant and reliable connectivity for all – access itself is the killer app

The number of Mobile Internet users in India is high in absolute terms when compared with those in many countries in the rest of the world. However, it is important to understand that the Internet penetration still remains low. Many industry leaders have brought up the need for a killer app or a use case which can result in higher adoption of Mobile Internet. KPMG in India believes the killer app that India has been waiting for is not an app but reliable connectivity itself. In a country where many people do not even have access to the Mobile Internet infrastructure, providing access to the technology in itself could present great opportunity. Constant and reliable connectivity is the killer app that glues the ecosystem together, may increase adoption and enable innovations in business models around voice and data services. 'Connectivity for all' and the ability to be always online may open up new channels of creativity not only in the way entrepreneurs innovate and develop new business opportunities but also in the way Mobile Internet is put to use. Mobile Internet can empower businesses and consumers by disrupting traditional models of sales and marketing, customer service, and community interactions. The network effect created by connectivity through mobile could further nudge and then push people to adopt Mobile Internet thereby increasing the penetration in India.

Wider adoption of services

Providing access to Mobile Internet has to be complimented with applications that cater to the users' need. While access remains a major concern across rural and suburban India, low adoption rates plague Mobile Internet service providers in the urban regions. Lower adoption rates can be explained by the below mentioned points:
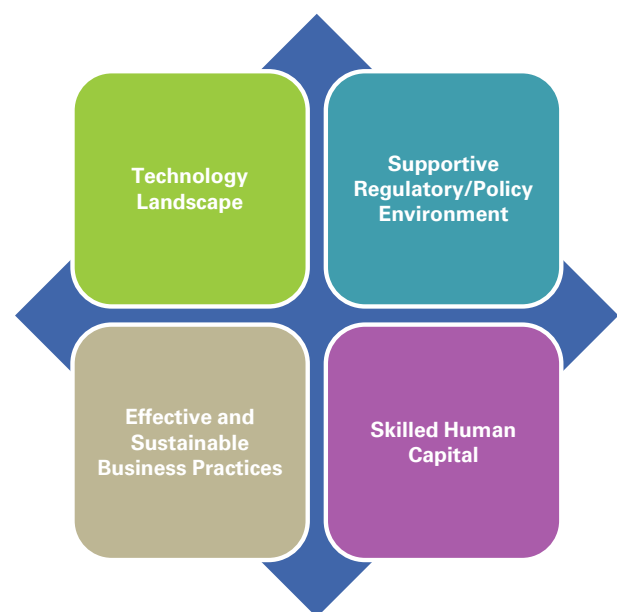
- Low 'perception of need' amongst Indian users who do not find enough value in the content or services offered over Mobile Internet could be the primary reason.

- Affordability of the services remains unfavourable. Even with dropping data service tariffs, large portion of Indians still cannot afford the data packages.

- Low quality of service in terms of speed and reliability of connection is a major reason which often results in users opting out of Mobile Internet services.

- Lastly, a major reason also is lack of relevant content/ services for different demographics groups. For example enough context relevant use cases of Mobile Internet services for students, teachers and senior citizens are not available. One size fits all approach to providing Bollywood music, astrology, chat, social media services may not ensure uptake of data services through mobile.

Key focus areas for recommendations

We have identified four key focus areas that need to be addressed at the earliest to enable the Mobile Internet ecosystem achieve its potential.

The four focus areas identified are as below:

Technology Landscape	Supportive Regulatory/Policy Environment
Effective and Sustainable Business Practices	Skilled Human Capital

Source: KPMG in India analysis

Soultion area	Proposed solution	Stakeholder involvement		
		Telecom players	**Handset manufacturers**	**Content and service providers**
Enabling technology landscape	Using small cells to provide connectivity	✓		
	Supporting vernacular content and increasing device support for the content providers		✓	
	Creation of common technology platforms for cross-delivery of mServices and interoperability	✓	✓	✓
	Data Compression for efficient bandwidth management			✓
Effective and sustainable business practices	Public-Private-Partnerships (PPPs) as a route to mobile infrastructure development	✓		
	Collaboration between Telcos and handset manufacturers for affordable bundled services	✓	✓	
	Mutually beneficial operating models between content providers and telecom operators for use of extensive network, marketing and billing capabilities of the Telecom operators for launching innovative products/services by content providers	✓		✓
	Analytics on telecom customer data can be used for up selling and cross selling personalized content services	✓		✓
	Enhanced collaboration between mServices players and other businesses to enable widespread adoption of mServices solutions	✓	✓	✓
	Upgrade SMS based mServices to data based, interactive and engaging apps	✓	✓	✓
	Interoperability of mobile finance solutions across telecom operators and content providers	✓		✓
	Zero-rating access models	✓		✓

Soultion area	Proposed solution	Stakeholder involvement		
		Telecom players	**Handset manufacturers**	**Content and service providers**
Supportive regulatory/ Policy environment	Favorable regulatory framework for spectrum management-auction reserve prices, annual spectrum usage charges, spectrum availability, spectrum license renewals	✓		
	Amend the M&A Policy to promote telecom industry consolidation	✓		
	Encourage entrepreneurs by presenting enabling policy environment			✓
	Progressive regulatory framework for Content providers			✓
	Encourage 'Make in India' for handsets		✓	
	Institute and regulate data standards	✓	✓	✓
	Strengthen the customer data security and privacy policies			✓
	Suitable policy environment for mFinance players-KYC norms and BC policies in mFinance	✓		✓
Develop human capital	Developing Human Capital in Mobile R&D, User Experience (UX) and Applications Design		✓	✓
	Collaboration amongst industry players and with NGOS to train illiterate users on usage of Mobile Internet	✓	✓	✓
	Structured programme to focus on increasing awareness of Internet	✓	✓	✓

Source: KPMG in India analysis, 2015

Enabling technology landscape

Supporting vernacular content

There is a pressing need for a holistic approach towards content development in vernacular language and addressing ambiguities surrounding Indian fonts and input methods. To make the rural population adopt the m-governance services it is necessary that the content be in a language understood by the masses. The growing demand in the market for mServices (mHealth, mEducation, etc) can be tapped into by appreciating the linguistic diversity of India and taking initiatives to make Mobile Internet services available to a broader audience of varied linguistic proclivities. 85 per cent of Active Internet Users access Internet in English. As mentioned in previous sections, English is not the preferred language for content consumption in rural areas. 45 per cent people prefer accessing Internet only in local languages[130]. Limited availability of content in local languages may not be encouraging enough for people in rural areas and with lower income levels to adopt Internet for purposes beyond entertainment.

Vernacular languages have high number of characters compared to English which has only 26 letters. This higher number of characters needs to be mapped to the phone keys. Though there are proprietary solutions available for vernacular support, there is no industry agreed standardization in this domain leading to multiple fragmented solutions. Collaboration may result in inter-operability and standardization of these solutions. The regulatory bodies should push for standardization of keypad layouts for Indian languages. Further, illiterate people as well as people unfamiliar with Internet usage are more likely to use Internet if content is delivered in voice and/or image-based graphics format through single-touch Mobile Internet access.

Content providers play an important role in driving the data growth by introducing innovative products in the market. There are thousands of different types of mobile devices with different operating systems. The mobile phones also come in different shapes and with multiple screen sizes. For a content developer, it becomes imperative to make choices between the varieties of mobile devices and configurations available. Making multiple versions for each device and OS type leads to increased development and support costs.

A plausible solution can be development of a content delivery platform (CDP) which may make life easier for content providers. Using a CDP, they may be able to deliver the same content and support multiple devices. This can save time and resources for the content providers. As content is put across multiple channels it could also increase the ROI of the providers. From the customer's point of view, the same content could be available over mobile apps, desktop web and mobile web making customer experience richer.

Data compression for efficient bandwidth management

While demands for favourable policy environment, open Internet regulations, net neutrality seem legitimate, the content and service providers can also contribute towards improvement in access by implementing data compression and caching techniques that would help in making telcom networks operate efficiently[131]. A few tech giants are already working towards implementing data compression in apps used by a wider audience. This is aimed at reducing bandwidth usage probably leading to savings for consumers and more importantly at optimizing cost of delivery for operators without impacting user experience. Compression of data in the form of pictures and videos would mean users would be able to spend more time accessing Internet without having to worry about rate limits[132].

Using small cells to provide connectivity

Indian telecom operators are looking for commercially viable models that can enable them to tap the rural population. Profitably monetizing the data traffic is an important factor to consider for building the 3G and 4G network in the hinterlands.

Telecom operators can consider the option of creating hot spots and indoor coverage by using small cells. Small cells may not only increase capacity but also improve coverage and open up new vistas for revenue generation. Femto Cells, Pico Cells, Micro Cells and Macro Cells are part of the small cell technology. They offer CAPEX and OPEX saving for the Telcos. These cells can be used in highly congested urban areas or in extending service to isolated patches of rural areas. Small cells can also be used for LTE capabilities over 'unlicensed' spectrum to increase capacity and speed typically in higher density user environment.

130 IAMAI-IMRB: Internet in India 2014

131 Darrell M. West: Digital divide: Improving Internet access in the developing world through affordable services and diverse content

132 http://businessetc.thejournal.ie/zuckerberg-keynote-mobile-world-congress-1331759-Feb2014/

Rural India is the next frontier and public access macrocells can be installed in the remote areas. The cost benefit of small cells makes it economically feasible to provide network in smaller communities. Small cells are much less costly than macrocells and provide an opportunity for telecom operators to extend their service and also reduce macrocell traffic. SoftBank Mobile has installed more than 3000 public access small cells in rural Japan[133].

Benefits of Small Cells

- Reduced total cost of ownership

- Enhanced customer experience

- Innovative business/operating models

In the Indian context, where growth, spectrum availability and network traffic have become major concerns; small cells can pave the way for creating architecture for providing high quality service and sustainable business models.

Building common technology platforms for interoperability and cross-delivery of mServices

The ecosystem players can focus on creating standards for technology platforms for efficient delivery of mServices (mEducation, mHealth, mFinance, mAgriculture and mGovernance) across various devices, telecom networks and geographic regions. These would enable easy distribution of the existing solutions to a much wider audience. Cross-Platform, Cross-Device and Cross-Region compatible technology platforms could help in interoperability between different systems and services leading to delivery efficiency in the future. Implementing a standard technology platform can also reduce redundant investments in the industry.

Effective and sustainable business practices

In addition to a robust and ubiquitous network there is need for sustainable and commercially viable business models and practices.

Invest in expansion of the technology and infrastructure backbone

Underdeveloped telecom infrastructure in the country is a hindrance to availability of Mobile Internet access to a wider population. Investment in infrastructure development thus becomes imperative. Urban regions have the basic infrastructure in place but struggle with inconsistent service quality. On the other hand, several suburban and rural regions do not have even the basic Mobile Internet infrastructure available because business economics for telecom players do not seem attractive.

Telecom companies are the only entities that have been investing in infrastructure required to provide voice and data services in India as of now. However, the financial strain because of high spectrum fees and other levies make further investments difficult for them. Telcos try to make most of their limited infrastructure investments. Technology upgrade in urban areas and network setup in rural regions with unattractive financial returns are unfortunately left out in the process.

Public-Private-Partnerships (PPPs) as a route to infrastructural development

Increasingly, Internet access is being accepted as a necessity, an essential right of an individual and not a luxury. This heightens the need for participation from the government in developing the base infrastructure for providing Internet access to citizens of the country. Also, as discussed earlier in the report, Mobile Internet can be the channel for delivering services that can have a positive social impact in the areas of education, finance, health, agriculture and governance. This in itself is an important incentive for the government to consider providing Mobile Internet access across the country.

Penetration of high-speed Internet technologies such as 4G-LTE services require higher infrastructure investment. The utopian idea of 'Mobile Internet for all' is stalled since

133 http://mobileworldcapital.com/en/article/91

Telcos are unable to invest in building the infrastructure. It is thus recommended that the government support the telecom infrastructure development in the country through public-private partnerships. Public-Private-Partnerships (PPP) can be considered for various phases of the infrastructure development from design through to maintenance with risks and rewards both shared between the private and public entities. It is recommended that, to start with, PPPs be formed to share the onus of building and deploying the critical and costly infrastructure. Such partnerships are expected to bring down the financial burden on Telcos, and make investments in the untapped markets commercially viable.

PPPs are largely intended to attract public investments to build infrastructure. Various PPP models are possible by varying the level of involvement of the government in different stages of the development process, financing routes and ownership of the end infrastructure.

Recommended PPP model for India telecom infrastructure development.

Phases in infrastructure investment	Government	Private owned telecom players
Design		✓
Build	✓	✓
Operate		✓

In the initial stages, PPP is required in the Build stage, which arguably is one of the most capital intensive phase in building a mobile infrastructure.

PPPs would not only help to expand the infrastructure to untapped regions but also potentially result in reduction of service prices, the benefit of which can be passed on to the end consumer making Mobile Internet services affordable/economical. This may facilitate the penetration of Mobile Internet to the poorer section of the population in India.

There are many international case studies to learn from which have been successful in using the PPP model.

Cases of PPP in building infrastructure from across the globe

Multinationl PPP in Africa

- Multinational PPP operating in Africa was set up with the objective to develop 10,000 kms of international bandwidth Fibre optic cable in Africa across country borders;
- The project involves the governments of many south and eastern African countries including Kenya, South Africa, Uganda, Rwanda, Namibia, Tanzania, Zambia and more;
- The project is funded by the World Bank, private telecom companies and the Governments of these countries. The total worth of the project is about USD 248 million;
- 96 per cent shareholding of the project lies with the African telecom companies while 8 per cent is with the international development partners.

Multinationl PPP in Kenya

- A Multinational PPP was set up by the Government of Kenya to lay 5,000 kms of submarine Fibre optics cable to connect the country to the rest of the world;

- The public-private-partnership is led by the Government of Kenya (20 per cent share) and including 15 network operators and ISPs. 85 per cent of the private share equity is held by the Kenyan players while 15 per cent was invested by Etisalat;
- The project was completed in 2009 and cost USD 130 million in total.

Cooperative PPP model

- The Republic of Burundi launched a cooperative model in 2012 between the private players and the government. 5 Telcos came together to form an entity responsible for the development and operations of the network;
- Telcos and ISPs who are the private players and the government have both made equal parts investment worth USD 10 million each in the PPP. The entity is also funded by the World Bank;
- The government does not own the developed network to enable self-regulation and the ownership lies with the private players.

Collaboration between Telcos and Handset manufacturers for 'affordable' bundled services

Better collaboration between telecom operators and handset manufacturers could prove beneficial to customers in a number of ways. Bundled services offer beneficial proposition for all players in the value chain – telcos, handset makers and customers. Bundled services enable customers to purchase high-end smartphones and data services at a much lesser cost for a pre-defined lock in period. Monthly EMI based schemes for a predefined lock-in period enable customers to buy high end smartphones which otherwise may have been unaffordable.

Bundled services benefit Telcos since high end smartphones offer better features would help in increasing the usage of data services[134], customer lock-in thereby reducing churn and present an opportunity to build stronger customer relationships. Bundling helps retain high ARPU customers which otherwise has become a difficult task due to implementation of Mobile Number Portability.

Telcos and handset manufacturers can consider offering attractive 3G/4G tariff plans on affordable 3G/4G enabled handsets in the price range of INR 5000 – INR 15000 with an option to spread out payments across months. In such a scenario, the masses wouldn't have to pay an upfront amount for handsets. The operators stand to gain from mass adoption of 3G and 4G services with a predictability of revenue while handset manufacturers get an opportunity to increase the penetration of smartphones in India – a win-win for all[135].

Bundled mobile services in USA

Many leading telecom operators such as in USA offer bundled mobile services where mobile data services are also part of the contract. For example, Samsung Galaxy S5 16GB smartphone is offered at a much lesser price as part of a bundled contract based service wherein the price of the phone is dropped from about $650 to $100-$0 under a services contract with the telecom operators.

Source: Prices on www.amazon.com as on 18 Aug 2014

Building enablers for growth and adoption of mServices

The current SMS based mServices setup should be upgraded to support Mobile Internet based solutions for enhanced user experience. Some use cases already exist in data based mServices, however, more focussed effort is needed. Overall development of the ecosystem and collaboration among stakeholders could be a major factor behind large scale adoption of mServices. Growth across areas of the ecosystem is important to set the right foundation and to ensure long term growth.

Enhanced collaboration between mServices players and other businesses to enable widespread adoption of mServices solutions

mServices have taken off across the world because of availability of enabling platforms/ecosystem. The phenomenal success of mobile money in Kenya has been the outcome of the entire ecosystem contributing towards the adoption of the service. This included efforts not only from the operators but also from supporting businesses such as retail merchants, utility companies that created key use cases for mobile money to flourish. The mobile money model in India has failed to replicate the same success as different parts of the ecosystem are at varying levels of maturity. The Indian ecosystem requires better collaboration between mobile money providers and other businesses such as retail merchants and utility companies to enable mobile money transactions. The network effect may lead to customers choosing mobile money as their preferred choice for day-to-day transactions.

Upgrade SMS based mServices to data based interactive and engaging apps

Although SMS based mServices address the needs of the Indian customer a dearth of investment by players in Mobile Internet based mServices limits the quality of content that can be delivered. Many users would be happy to receive rich media content and fingertip banking. However, only a limited number of data based mobile applications are available in the market to fulfil these needs. For example, even though there are many data based mHealth apps in the market successful models till date are call based with popular services such as 'Medicall Telemedicine'.

Investments in data based services in India are limited primarily because investors do not see a large enough

---

134 Industry discussions conducted by KPMG in India

135 http://www.businessworld.in/news/business/telecom/does-bundling-make-sense-in-india/1271490/page-1.html

market that is ready to consume this kind of content especially in rural areas where Mobile Internet penetration is still limited due to variety of reasons discussed earlier. In the future, with increase in the Internet penetration, we can expect organic growth in adoption of these applications. The process may be expedited by additional effort from the application and content developers.

Another approach that can be considered may be to launch an initial set of data based applications in mFinance, mAgriculture, mHealth, mGovernance and mEducation with the government's support under a government-led PPP model.

Interoperability can open mobile money and other mServices for everyone

Interoperability of mobile money solutions across telecom operators, banks and various businesses is imperative for widespread adoption in India. Inability to interoperate mFinance solutions pushes users to resort to other means of payment such as cash if the recipient is on a different network.

In India, where there are multiple telecom operators with substantial user bases, financial regulations inhibit interoperability among the services. To promote inclusion, any mFinance service must be agnostic of the operator or bank that is directly involved in delivering the service. Indian Telcos and banks have to come together to offer interoperable mobile money services. This is true for other mServices as well since it could lead to enhanced reach of the service and ease of use.

Collaborative operating models between the ecosystem players

There is a shift in the preference for communication with more and more customers using data driven services. Operators are introducing advanced technologies that support high speed data connections. Players such as the content companies are providing third party solutions for messaging and voice calls. With increasing smartphone adoption, more and more customers are enjoying the superior data-driven services. However, each player in the ecosystem is plagued with problems.

The content providers use the networks of the operators without having to pay any charge/fee for it. Unlike the operators, they are also not bound by any interconnect charges and can easily switch calls over the web. In the

recent past, Indian Telecom operators have approached TRAI seeking a better level playing field with the content/ services companies. However, one may also argue that content is what drives demand for the data services provided by operators. Data may be the next growth leg for the Indian Telecom sector. Relevant content can fillip data growth with 90 per cent of Internet access envisioned to come from mobile. Further, data revenues could push EBITDA margins higher due to lower variable costs. EBITDA margins for voice segment of the industry are at 25-30 per cent while those for data are at 70-75 per cent[136]. As of now, India has one of the lowest data consumption per user rates in the world and this suggests a potential upside for telecom players.

Data usage per subscriber per month MB
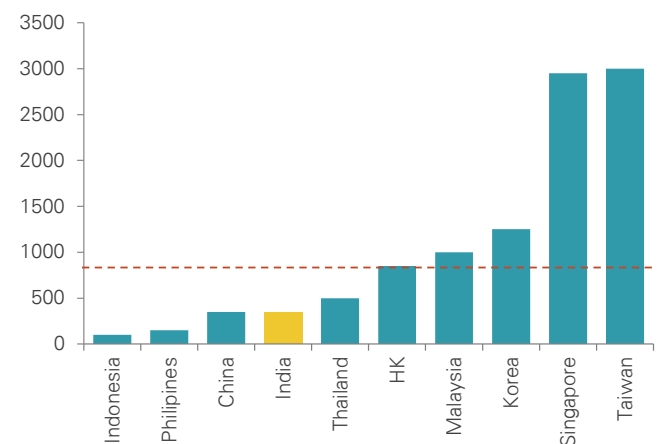
Source: Morgan Stanley Research June'14

One way to counter the perceived 'threat' from content providers could be to institute restrictive access policies. In such a scenario, the operators could restrict the use of content services on their network and allow usage of only home grown content services. However, regulation of Internet may undermine innovation and demand for connectivity. Further, competing directly with content providers might not be a sustainable solution for the operators. The users may still be able to access the services by latching to a Wi-Fi network. Last but not the least, telecom operators also need to understand that building innovative mobile applications and consumable content is a competency area that will require time, effort and resources to build.

The content providers are also facing challenges such as slower overloaded networks, monetization models and underdeveloped billing and customer care systems.

---

136 Morgan Stanley: Decoding India's Data Story June 2014

Since, there is limited collaboration between the different pillars of the ecosystem; each component is trying to take the challenges of demand, supply and customer satisfaction head-on all by themselves. Even with shared interests and problems, the telecom value chain still remains loosely connected and even disjointed in few cases.

The answer to the problems lies in right partnerships and the right service package. Transformation of the business models of the key players is required for a sustainable data services driven growth and in developing the overall ecosystem. To help grow the ecosystem, the players have to come together as no single player has all the resources to address all challenges on its own. The Telecom incumbents should assess their capabilities and determine how to leverage them in working with the other players of the ecosystem. Similarly, the content providers could use the extensive network, marketing and billing capabilities of the Telecom operators for launching innovative products. Handset manufacturers can increase their adoption by having built in app platforms which in turn may also help content to reach to the masses.

Operators have the network advantage. The operators stand an opportunity to increase their revenues by merely providing the conduit for data usage while at the same time not permitting any unlawful services through their networks. Analytics on the Telecom customer data is a great opportunity which can be used for up selling and cross selling. Telecom operators also have extensive billing systems and a well-connected distribution network. Content providers collaborating with Telecom incumbents can introduce targeted solutions with a quicker go-to-market, can utilize a mature billing system and offer their customers an enhanced experience with the ability to select QoS bands.

By collaborating with the content providers the operators can take advantage of the highly innovative products and disruptive technologies that the content providers bring to the market. They can re-bundle their service offerings and up sell products. Many players have realized this and have been working around pricing and collaboration models.

	Compete	**Collaborate**
Telecom operators	- Restrict use of competing content services; - Impact on customer retention; - Customer latching to WiFi networks for accessing apps leading to lower data usage.	- Improved customer retention; - Bundled and Innovative packages; limited data and unlimited voice; - Launch of innovative products.
Content and service providers	- Underdeveloped billing and CRM system; - Poor telecom network quality leads to negative perception of the app.	- Accessibility to extensive distribution network; - Customization and localization of app; - Mature Billing & CRM systems; - Improved Time To Market; - Significant improve in quality of service.
Handset manufacturer	- Multiple stand alone devices; - Different standard of Mobile handsets with Indian language keys; - No interoperability and standard format between devices.	- Accelerated growth of smart phones by embedding relevant applications; - Handset supporting Internet browsing in vernacular languages; - Standardization of keypad layouts for Indian languages.

'Zero-Rating' access models

The operators and content providers can explore another opportunity to collaborate with each other by introducing zero-rating access services to improve Mobile Internet access among the people who lack financial resources[137]. Zero rating practices allow usage of certain applications (perhaps could be applied to mServices) without having the usage charged towards data access. People with limited financial resources who would not otherwise pay for Internet services would be able to access Internet without incurring additional data usage charges. One may argue that zero rating practices may violate the principles of net neutrality. However, such services may actually provide incentive enough for the disenfranchised to explore the Internet for the first time which otherwise they may not choose to browse. Further, it could open a gateway to the world of Internet usage for other services by making them realize benefits of connectivity. Various global telecom players are already working with content providers to create content for zero-access models for broader user base in developing markets. However, the debate around who pays (operator pays or content provider pays) for the access continues[138].

Supportive regulatory/Policy environment

The government and regulatory bodies are expected to play an important role in creating a suitable and sustainable environment for the Mobile Internet industry and in enabling the industry players to achieve their potential.

Spectrum management

Telcos face restrictive policies related to spectrum auctioning, availability, maintenance, liberalization, harmonization, trading and sharing. The government and regulatory bodies should consider revaluating these policies to make the policy environment for Telcos more favourable. The policies could address some key areas as listed below:

1. Reduction of auction reserve prices comparable to international standards;

2. Releasing more bandwidth on several frequency bands as over 60 per cent of relevant spectrum is yet to be allocated[139]. For example the government could consider releasing portions of 2100 MHz band to Telcos which is currently held by the department of defence;

3. Rationalization of annual spectrum usage charges;

4. Bringing in automatic spectrum licence renewals giving more confidence to Telcos on business operation continuity;

5. Consider auctioning liberalized spectrum in the first go itself instead of re-auctioning sold spectrum for liberalization;

6. Consider TRAI's recommendation on allowing bilateral sharing of any category of similar spectrum in a circle, including airwaves allotted at administrative prices, with a more liberalized cap on bandwidth that can be pooled in[140];

7. Consider TRAI's recommendation to allow sharing of 3G spectrum to further bring down 3G tariffs;

8. Providing maximum bandwidth available in the internationally harmonized broadband bands such as 700 MHz to enable enhanced rural coverage at low costs;

Brazil – Spectrum sharing for broadband wireless access

In 2008, Brazil's National Telecommunication agency (ANATEL) issued 4 licences for 3G wireless deployment per licensed area. The regulator in Brazil allowed the Telcos to share passive as well as active network infrastructure including towers, spectrum to provide services in areas with a population of less than 30,000. Spectrum sharing is being used as an efficient tool in Brazil to extend 3G coverage in rural areas while all sharing agreements are done only with ANATEL's authorization.

Source: SATRC Report on Spectrum sharing and trading, April,2012

Guatemala – Spectrum trading

Guatemala allows active spectrum trading in a free environment. Spectrum trading was allowed in Guatemala in 1996-1997 wherein non-public spectrum was released to private players with exclusive control over use of bandwidth. The released spectrum could be sold, leased, subdivided or aggregated among the players freely at their own will with a 15-year validity. The 15 year validity could also be renewed on request.

Source: http://www.itu.int/osg/spu/ni/spectrum/guat-rsm.doc

137 Darrell M. West: Digital divide: Improving Internet access in the developing world through affordable services and diverse content

138 http://www.fiercewireless.com/europe/story/zero-rated-deals-ott-providers-can-no-longer-assume-carrier-will-pay/2014-02-11

139 http://www.lightreading.in/lightreadingindia/news-analysis/285840/indian-mobile-ecosystem-lacks-maturity-gsma

140 http://articles.economictimes.indiatimes.com/2014-07-21/news/51830713_1_share-airwaves-total-spectrum-mhz

USA – Flexible spectrum usage, sharing, trading and liberalization

USA's spectrum policy released in 2003 allows flexible use of spectrum by telecom operators along with liberalized practices. The Telcos are allowed flexible use of the auction allocated spectrum as long as the use is consistent with international agreements of USA, is in public interest, does not deter investment in communication services and does not result in interference that is detrimental. USA market allows for spectrum sharing and trading as well.

Source: DoD Strategic Spectrum Plan-Feb, 2008

Amend the M&A Policy to promote industry consolidation

Mergers and acquisitions are expected to bring consolidation in the currently fragmented Indian telecom sector with more than twelve competing players. As a result of mergers and acquisitions, consolidation of spectrum holdings can enhance the bandwidth availability. The existing M&A policy released by the DOT although directed towards encouraging consolidations does not support easy entry and exit. One of the biggest deterrent is the requirement of the acquirer to pay the government the difference between the entry fees paid for the start-up spectrum (which was hugely discounted) and the market price (based on the last auction price)[141].

The policy also does not put forward any mechanism of exit for the Telcos after spectrum trading is done. Telcos are locked in for three years. It is recommended that the government evaluates the existing contents of the M&A policy to identify gaps and introduce amendments.

Encourage entrepreneurs by presenting enabling policy environment

Policy definition/regulation should follow innovation and should be aligned with the rapid developments in the technological and mServices environment. Policy-makers are in a position to shape and improve the effectiveness of mServices. Considering that mServices are in a nascent state, the Government must focus on enabling the ecosystem. The government can provide a favourable policy environment to the industry players by giving tax subsidies, incentives, rewarding performance and business innovation, etc. The enabling policies could also enable provision of subsidies to players for creating vernacular content for mServices solutions. A favorable policy environment can increase investments in the mServices sector leading to innovation in this space and consequently higher penetration and adoption of relevant use cases.

The Government agencies can relook in to their internal procedures for licensing and approvals to increase ease of doing business and by providing clear and simple guidelines. Further, entrepreneurial venture support by either offering easy financing options or by easing the regulations around finance could also encourage more entrepreneurs to develop relevant solutions. The recent Union Budget announcement on setting up SETU (Self-Employment and Talent Utilization) for supporting all aspects of startup businesses including mentorship programmes is a step in the right direction.

Progressive regulatory framework for content

As established earlier, content services can help in driving growth of data revenues and hence any restrictive regulations may stifle innovation and undermine ease of market entry for new players in India. While the regulatory bodies have been considering regulations on web-based calls and chat platforms, it is in the interest of all ecosystem players to maintain a regulatory approach that would avoid any licensing or registration requirements. Further, content providers are investing in relevant and innovative content services which might get consumers to realize the value of Internet and would aid the Government in its quest to make mGovernance and Digital India initiatives successful. Any regulations that may favour one component of the Mobile Internet ecosystem while violating the principles of net neutrality should be decided upon with expert due diligence.

'Make in India' for handsets

The prices of handsets are coming down thanks to entry of domestic players who have introduced handsets at various prices points significantly lower than those offered by premium players. With an annual median household income of USD 3168[142], even handsets available for as low as USD 125 may be well above the affordable range for many Indians[143]. The

141 M& A Policy guidelines-http://www.dot.gov.in/sites/default/files/DOC200214_0.pdf
142 http://www.business-standard.com/article/economy-policy/india-s-median-per-capita-income-lowest-among-brics-gallup-113121600968_1.html
143 http://www.mckinsey.com/insights/marketing_sales/can_india_lead_the_mobile-Internet_revolution

Government agencies could help in improving the ease of doing business in India and introduce favourable regulations/incentives for handset manufacturers to set up manufacturing plants in India. This would help in slashing the prices of Internet-capable devices further and bring these devices well within the range affordable for millions of Indians. The 'Make in India' initiative is a progressive step in the right direction.

KYC norms and BC policies in mFinance

A favourable policy environment would help in increasing the penetration and adoption of mFinance services in the Indian market. As per an existing mandate, Telcos are required to meet the Know Your Customer (KYC) norms for their partner banks for full service wallets operations. A part of the problem would be addressed by the introduction of Payment Banks. The regulators can play an important role in creating a policy environment that would promote investments, efficiency in operations and commercially viable business models.

The government could consider:

1. Harmonizing the KYC requirements between Telcos and banks;

2. Reconsidering the regulations such as a Business Correspondent (BC) must be present within 30 kms of the partner bank branch. Removing this restriction would enable Telcos to increase the geographical expanse of mobile money services;

3. Revaluation of transaction and cash withdrawal limits across various wallets that promote mobile wallets as the first choice for day-to-day transactions.

Institute and regulate data standards

In order to enable interoperability of Mobile Internet services across different devices, operating systems, telecom networks and geographic regions, defining common data standards is vital. Data standards are likely to improve the usability, reliability and accessibility of Mobile Internet.

It is recommended that the government work with technology partners to define and document common data standards (such as EDI) for capture, storage, representation and exchange of data over Mobile Internet with an overarching regulatory framework. The standards should also provide guidelines for app development and adherence. Requirements and suggestions of industry stakeholders must be reviewed by the government to draft platform, technology and vendor neutral recommendations.

Documenting data standards is particularly important to Mobile Internet's application to mServices for better data management, data security and interoperability.

Strengthen the data security and privacy policies

Every individual has the right to protect and preserve his/her personal data and information. With the growing use of Internet over mobile, data protection has become more important than ever. General privacy laws have been defined for Indian citizens that can be applied to Mobile Internet data security and privacy. However, currently, there are no mobility specific statutory or constitutional data privacy laws to safeguard sensitive user information.

Data security and privacy policies play a pivotal role in prevention and management of online fraud. The government must consider creating a detailed privacy law aimed at protecting customer privacy by regulating the manner in which personal data is collected, processed, stored, transferred and destroyed.

Develop Human Capital

Developing human capital in mobile R&D, User Experience (UX) and Applications Design

There is need for IT human capital in India due to continued migration of skilled resources to various developed nations. Building good quality human capital in the Indian mobile industry through focussed education, training and skill development in the areas of R&D, UX design, product management and applications design is crucial for the overall development of the industry. Because of significant expansion of the Mobile Internet sector in the recent years, developing skilled manpower can be key to supporting the future growth. The government could place special focus on promoting education and training in disciplines related to the Mobile Internet ecosystem. Availability of skilled manpower in R&D could enable India to progress from an importer and assembler of mobile hardware to a strong manufacturing base of sophisticated and advanced mobile technologies.

Train illiterate users on usage of Mobile Internet

Close observation of the user demographics reveals that usually the relatively prosperous population in India uses Mobile Internet. A typical user in India up until now has primarily been young, middle class and educated instead of old, poor and illiterate. Other than the obvious factors such as affordability and perception of need, lack of user training is also a significant factor that limits a large chunk of this population in India from leveraging Mobile Internet services. The relative complexity of Mobile Internet services in comparison to SMS or voice calls necessitates educating customers on how to make effective use of the services available. This is especially applicable to rural and suburban regions. The focus areas for training can cover accessing Internet on a mobile, explaining features and functionalities of various applications. The focus areas can include non-technical trainings on making users aware of availability of a specific service and its significance to them.

User training can facilitate increase in adoption of Mobile Internet. To address this, industry players will need to come together, focus their energies and invest in user trainings. This can also be done in collaboration with NGOs especially for creating awareness of mServices.

Focus on increasing awareness of Internet

About 17 per cent of the users in the urban areas are unaware of Internet. The situation in rural areas is more abysmal where Internet unawareness is about 84 per cent[144]. This simply means that a large portion of the population simply does not find any value in using Internet. Further, Even if adequate investments are made in other areas, the penetration of Internet and hence Mobile Internet specifically may not increase if Internet is perceived as not being useful by the vast majority of population. The next wave of growth of Mobile Internet penetration can come from increase in adoption by senior citizens, rural population and the female users. The needs of the Internet unaware sections across various demographic groups are different. Hence, to increase awareness and drive adoption focussed efforts are required which are in line with the perception and needs of these sections. The ecosystem players including the Government agencies need to come together with structured communication and outreach programmes to communicate the potential benefits of Internet to the unaware population. Awareness and education programmes on uses of mobile banking, mHealth and mobile initiatives undertaken by the Government to support masses could be imperative in improving need perception of Mobile Internet and hence increase adoption.

---

144 IAMAI-IMRB: Internet in India 2014

Conclusion

Mobile Internet penetration in India is growing fast and holds a promising future with every player in the ecosystem having their own important role to play and contribution to make. There are definitely a few challenges that the industry is facing that are dampening its growth and widespread adoption. Having said that, in the future, collaboration amongst industry stakeholders can put the Mobile Internet penetration on phenomenal growth trajectory and result in widespread social impact across demographics and geographies in India. Government and regulators have a unique role to play and are required to foster a supportive business environment for industry players across service categories to propel overall reach and adoption of Mobile Internet.

KPMG
cutting through complexity

KPMG in India, a professional services firm, is the Indian member firm of KPMG International and was established in September 1993. Our professionals leverage the global network of firms, providing detailed knowledge of local laws, regulations, markets and competition. KPMG in India provide services to over 4,500 international and national clients, in India. KPMG has offices across India in Delhi, Chandigarh, Ahmedabad, Mumbai, Pune, Chennai, Bengaluru, Kochi, Hyderabad, Goa and Kolkata. The Indian firm has access to more than 8,000 Indian and expatriate professionals, many of whom are internationally trained. We strive to provide rapid, performance-based, industry-focussed and technology-enabled services, which reflect a shared knowledge of global and local industries and our experience of the Indian business environment.

KPMG is a global network of professional firms providing Audit, Tax and Advisory services. We operate in 155 countries and have 162,000 people working in member firms around the world.

Our Audit practice endeavors to provide robust and risk based audit services that address our firms' clients' strategic priorities and business processes.

KPMG's tax services are designed to reflect the needs and objectives of each client, whether we are dealing with the tax aspects of a cross-border acquisition or developing and helping to implement a global transfer pricing strategy. In practical terms that means, KPMG firms' work with their clients to assist them in achieving effective tax compliance and managing tax risks, while helping to control costs.

KPMG advisory professionals provide advice and assistance to enable companies, intermediaries and public sector bodies to mitigate risk, improve performance, and create value. KPMG firms provide a wide range of Risk Consulting, Management Consulting and Transactions & Restructuring services that can help clients respond to immediate needs as well as put in place the strategies for the longer term.

kpmg.com/in

About KPMG

The Internet and Mobile Association of India [IAMAI] is a young and vibrant association with ambitions of representing the entire gamut of digital businesses in India. It was established in 2004 by the leading online publishers, but in the last 11 years has come to effectively address the challenges facing the digital and online industry including mobile content and services, online publishing, mobile advertising, online advertising, ecommerce and mobile & digital payments among others.

11 years after its establishment, the association is still the only professional industry body representing the online and mobile VAS industry in India. The association is registered under the Societies Act and is a recognized charity in Maharashtra. With a membership of 180 plus Indian and MNC companies, offices in Delhi, Mumbai and Bengaluru, the association is well placed to work towards charting a growth path for the digital industry in India.

iamai.in

About IAMAI

OMIDYAR NETWORK

Omidyar Network is a philanthropic investment firm dedicated to harnessing the power of markets to create opportunity for people to improve their lives. Established in 2004 by eBay founder Pierre Omidyar and his wife Pam, the organization invests in and helps scale innovative organizations to catalyze economic and social change. Omidyar Network has committed more than $772 million to for-profit companies and non-profit organizations that foster economic advancement and encourage individual participation across multiple initiatives, including Consumer Internet & Mobile, Education, Financial Inclusion, Governance & Citizen Engagement, and Property Rights.

To learn more, visit. www.omidyar.com

Follow on Twitter.

@omidyarnetwork **#PositiveReturns**.

About Omidyar

Acknowledgement

Contact us

KPMG

Nitin Atroley
Partner and Head Sales & Markets
T: +91 11 243074887
M: +91 9811138000
E: nitinatroey@kpmg.com

Akhilesh Tuteja
Partner and Head Technology
T: +91 124 307 4800
M: +91 98710 25500
E: atuteja@kpmg.com

Ashvin Vellody
Partner-Management Cosulting
T: +91 80 3065 4592
M: +91 99029 77005
E: ashvin@kpmg.com

Varun Gulati
Associate Director-Management Cosulting
T: +91 80 3980 6000
M: +91 9900488660
E: varung@kpmg.com

kpmg.com

IAMAI

Nilotpal Chakravarti
Associate Vice President
M: +91 981067 2906
E: nilotpal@iamai.in

Mehul Gupta
Associate Vice President
M: +91 9810375413
E: mehul@iamai.in

iamai.in