Mobile Broadband-
Outlook 2015

PricewaterhouseCoopers

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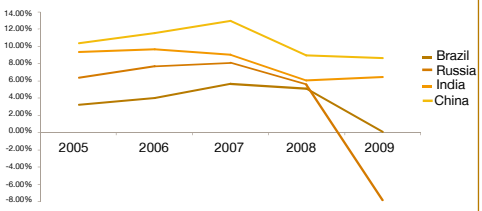
01

Executive Summary

India a resilient economy
Despite the effects of the global economic slowdown, the Indian economy remained resilient and outperformed its peers.

GDP Growth rate: BRIC Nations



Attractive foreign investment destination
India has emerged as one of the most preferred destinations for foreign investments. In the last decade India attracted FDI totalling U$ 114 Billion USD representing 14% of the average nominal GDP for the period.

India a growing economic power

In the past two decades, the country has seen sustained high economic growth. Presently, India is world's fourth largest economy behind US, China and Japan in terms of purchasing power parity. Despite the effects of the global economic turmoil, the Indian economy has managed GDP growth rate of 6.7 percent in 2009-10, amongst the highest growth rates in the world.

Services, Inbound Investment and Consumption Driving India's Growth

- Services sector accounted for over 59 percent of the overall average growth in GDP for the period of 2000-2008.
- Post liberalization India has experienced huge inflow of foreign funds across sectors especially in services sector including telecom.
- India's demographic composition augurs favourably; it is estimated that by 2015 the population in the 20-29 age group would have crossed 210 Mn. In addition, the middle class presently is estimated to be over 300 Mn. The youth and the growing middle class drive the consumption story.

Infrastructure challenges, gaps partly bridged by telecom

The growth of basic infrastructure like roadways, airports, power etc is still lagging way behind what is required to sustain a healthy growth rate. Telecom infrastructure has played a key role in bridging the connectivity gap. Government had estimated investment of Rs. 22.5 trillion for infrastructure sector during 11th five year plan (2007-12). It is estimated that actual investment would be in line with the plan primarily due to investments in telecom exceeding the target.

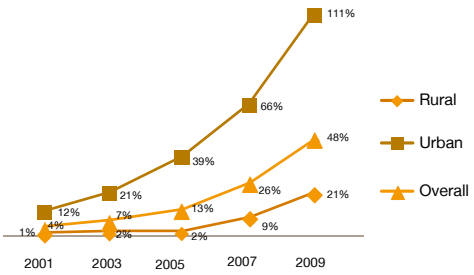
Telecom sector: Unprecedented growth story

Indian telecom market has been growing at a CAGR of approximately 30 percent since 1995 and still growing strong. The high growth of the Indian telecom market can mainly be attributed to mobile services which have grown at a CAGR of more than 117 percent during the period 1995-2009. With additions of more than 14 million subscribers per month in the year 2009, the telecom subscriber base has grown to 601 million in April 2010, second only to China.

High growth in overall teledensity: urban-rural divide continues.

Only 21 percent of Indians in rural areas have phone connection. There are still more than 500 million un-served population located mainly in rural areas

Teledensity

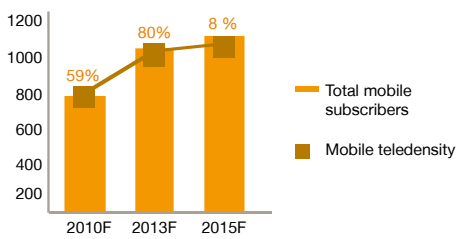


Source: TRAI

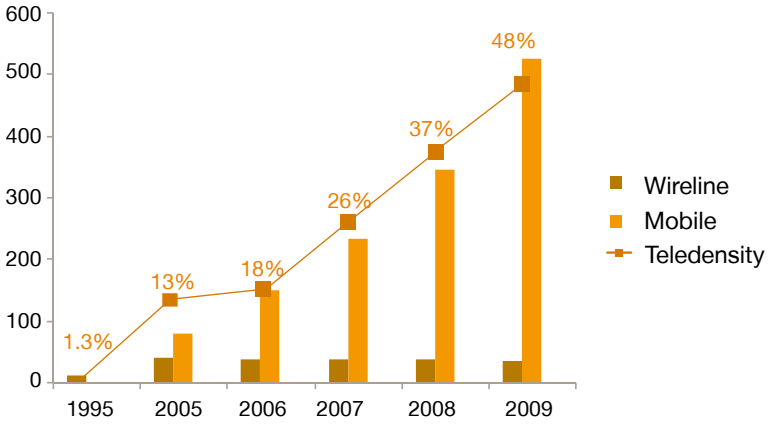
Mobile Services: Positive Outlook

The growth story of the mobile services is expected to continue for next 3-5 years driven by high subscriber additions in mostly non-urban areas. The mobile subscriber base is projected to cross 1 billion in 2014, growing at CAGR of more than 9 percent from 2010.

Mobile Subscriber Forecast



Telecom Subscriber Growth (in million)



Challenges and impending growth opportunities

Low rural penetration: The growth in telecom services has been mainly limited to urban areas with majority of rural population still un-served.

Stagnant data usage over the years: Data revenue has remained stagnant at 11-12 percent of mobile services revenue in last 2-3 years.

Limited broadband services: Uptake of broadband has been abysmal so far. Wireline broadband subscriber number stood at only 8 Mn in Dec 09. While, wireless broadband has been limited in terms of availability. CDMA operators have only recently launched EVDO based services which allows high speed access, however the uptake has been limited due expensive end user device.

Over hundred million 3G broadband subscribers by 2015 and growing

Given the context of non-scalable wireline infrastructure, we expect broadband in India to be delivered on wireless platform. Wireless broadband offered using TDD LTE / WiMax is expected to address enterprise consumers and high net worth individuals; while broadband volumes are likely to be driven on the mobile platform leveraging 3G.

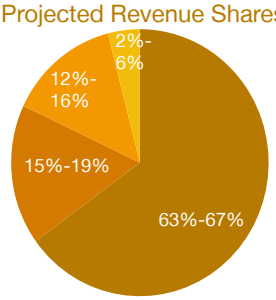
3G based mobile broadband Services in India will be driven by both supply and demand side factors. We believe introduction of new innovative applications, enhanced user experience, decreasing prices of 3G enabled handsets would be key driver for mobile broadband in India.

3G subscriber numbers are projected to cross 107 Mn by 2015 growing at a CAGR of 190% between 2011 and 2015. Further, the 3G penetration is expected to reach 13 percent by 2015. Initially, the uptake of mobile broadband services will almost exclusively be in urban India; however

VAS Revenue Shares Realign

As content becomes the primary means to attract 3G subscriber and generate additional data revenue, VAS revenue shares will realign.

Projected Revenue Shares in 2015

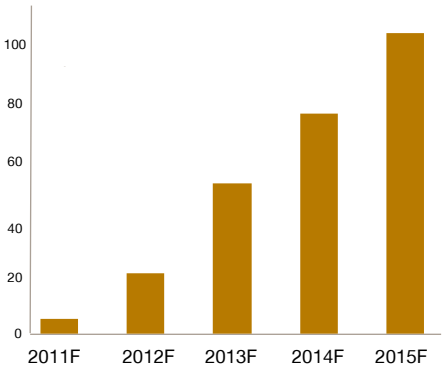


- Mobile operator
- Content aggregator
- Content developer
- Technology enabler

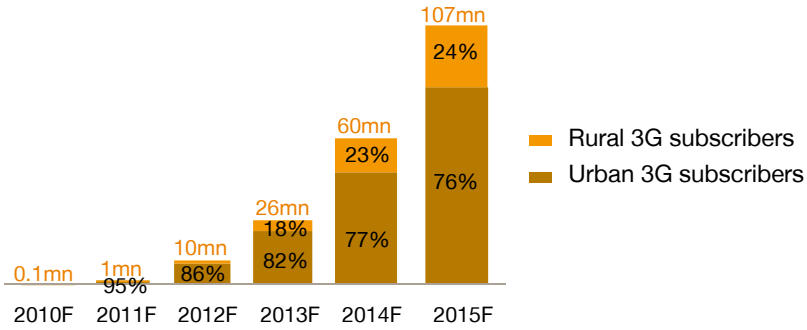
3G Data Revenue

The increased data usage on 3G network will lead to incremental 3G data service revenue of over Rs. 100 billion in 2015

Incremental 3G Data Revenue (Rs. Billion)



3G Subscriber Forecast *



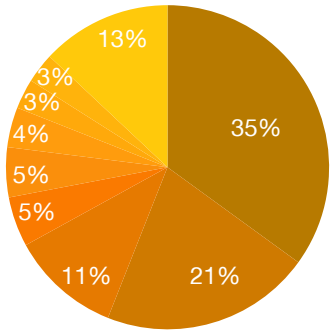
**Unique subscriber numbers. Figures are as of year end*

by 2015 rural subscribers are likely to comprise 24 percent of overall 3G subscriber base in 2015. Total revenue from 3G subscribers is expected to reach Rs. 264 Bn by 2015 growing at a CAGR of 150% of which Rs. 102 Bn would be from data services.

Internet browsing and music related applications would be the service drivers

In line with international precedents web browsing is expected be the most used service among the mobile broadband subscribers in India. Music services are likely to see the second highest uptake, confirming Indian consumers' inclination towards music related services through mobile. Mobile music will dominate the digital music scene in India, cornering over 80% of the segment.

MBS data services composition - 2015



- Internet browsing
- Music services
- Application stores
- Video calling
- Enterprise svcs.
- Tele-Med/Tele-Edu
- M-Comm
- Govt svcs.
- Others

Mobile banking, a cost effective alternative
Mobile banking transactions are expected to be over 340 million in the year 2015 resulting in cost savings of approximately Rs. 11 billion.

Banking for the Un-banked
Using Unique ID, a customer who has a mobile phone will be able to open a mobile linked no-frills account.

Media and Entertainment
Digital music sales are expected to grow at a CAGR of 24 percent between 2009 and 2013 to reach Rs. 3 billion in 2013.

Online advertising in India is expected to grow with CAGR of 32 percent between 2009 and 2013 to touch Rs 20 billion in 2013.

Mobile gaming is projected to grow from a size of Rs. 2.5 billion in 2008 to an estimated Rs. 12 billion by 2013; translating into a CAGR of 36 percent between 2009 and 2013.

Mobile broadband catalyst for changing business dynamics

- High speed access will enable content developers and aggregators to generate additional revenue by offering diverse interactive content such as videos, interactive gaming etc.
- Open internet access allowing direct access to subscribers and increasing value proposition of content to customers, will reflect in the bargaining power of content developers and aggregators increasing.
- Content will be the key differentiator which will see new alliances being forged between handsets vendors/ operators and application developers to attract new customers.
- Mobile operators will leverage proprietary content to create customer stickiness.
- Boundaries may blur, as handset vendors and operators may also enter the content space.

Cascading impact of mobile broadband services

Mobile broadband services will generate incremental revenue of Rs.940 Bn in 2015 for telecom industry as a whole, constituting roughly 1.5% of India's real projected GDP in 2015.

- Incremental 3G data revenue for mobile operators is expected to cross Rs. 67 Bn in 2015 growing at a CAGR of 109 percent over the next 5 years.
- Revenue from 3G related data services for other VAS value chain players is likely to reach Rs.36 Bn in 2015.
- 3G handset sales are expected to stand at approximately 135 Mn in 2015. Revenues from 3G handset sales are expected to reach Rs.670 Bn in 2015 growing at a CAGR of 33% between 2011 and 2015.
- Equipment manufacturer revenue from 3G roll out is expected to be Rs. 165 Bn in 2015 growing at a CAGR of 72% over the next 5 year period.
- Cumulative investment related to 3G is expected to be in the region of Rs 500 Bn for the period of 2010-15.
- 60,000 to 70,000 new employment opportunities are expected to be created by the telecom industry (service providers, handset vendors, equipment vendors and VAS value chain players) by 2015.

Agriculture
Through effective utilization of various mobile broadband based services, farmers are likely to save approximately Rs. 6 billion in 2015.

Government Services
Approximately 50 to 60 percent of government services in India can be delivered through mobile channels.

IT and BPO Services
Rollout of 3G will lead to additional revenue of approximately Rs. 90 billion over the period of 2010-2015 for the IT and BPO industry.

Financial Services, Media & Entertainment, Agriculture and other allied sectors to benefit from mobile broadband

- Mobile based banking transactions are at a nascent stage in India and will grow rapidly. The Financial services sector could effectively leverage the platform to reach out to a large base of unbanked customers across India.
- Digital distribution platforms for television such as Mobile TV are likely to get off the starting blocks with the introduction of mobile broadband services.
- With the advent of mobile broadband services distribution platforms such as downloads, streaming and music subscriptions will proliferate.
- Going forward, digital media advertising (internet and mobile) is expected to emerge as the alternate medium for advertisers
- Mobile broadband would also play a role in integrating rural India with other parts of the country and help widen markets, create better information flows, lower transaction costs.
- Better rollout economics of mobile broadband can enable the Government to reach out to many more villages with individual common service centres (CSC).
- Indian operators are expected to extend IT outsourcing to address 3G subscribers and services as well.

Key Enablers to driving uptake of mobile broadband services

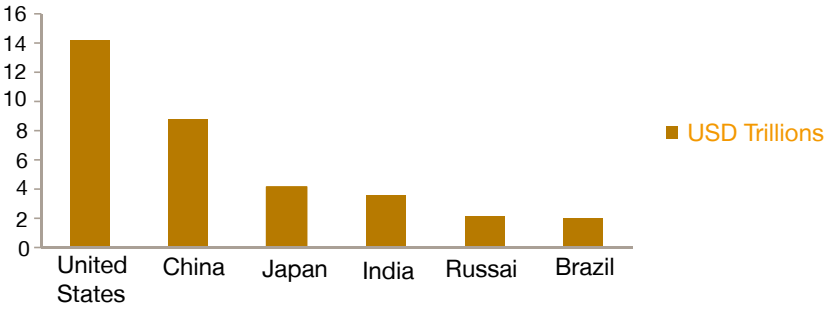
- The rate of decline in prices of 3G enabled handsets would be a key driver for uptake of mobile broadband
- Availability of diverse vernacular content at affordable prices would enable proliferation of 3G services across the country especially rural India.
- Spectrum availability for 2G as well as 3G will be critical for uptake of mobile broadband services:
- Existing congestion on 2G network could lead to potential cannibalization of data services on 3G network by mobile operators to safeguard voice revenue.
- Adequate spectrum would encourage creation and use of rich media content
- Quality of service would be just as important as content for faster uptake of mobile broadband services, which again would be linked to network congestion and hence spectrum

02

India Growth Story

India is the largest democracy in the world, with a population of just over 1 billion. In the past two decades, the country has seen sustained high economic growth. Presently, India is world's fourth largest economy behind US, China and Japan in purchasing power parity terms. Between 2007 and 2020, India's GDP per capita in USD terms will quadruple, and that the Indian economy will surpass the United States (in USD) by 2050.[1]

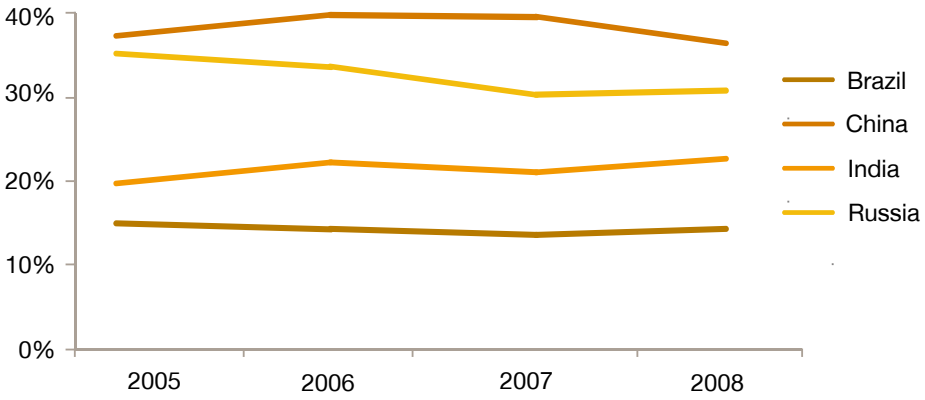
Figure 1: GDP (Purchasing Power Parity)



Source: IMF, 2009

Despite the effects of the global economic turmoil, the Indian economy remained resilient and managed to perform relatively better than its peers recording a real GDP growth rate of 6.7 percent in 2009-10, amongst the highest growth rates in the world. This is because India's growth is not heavily reliant on export-oriented sectors and the economy is also driven on the back of strong domestic consumption. This is substantiated by the fact that most of the major emerging economies (barring Brazil) have a relatively higher dependence on export oriented sectors in comparison to India.

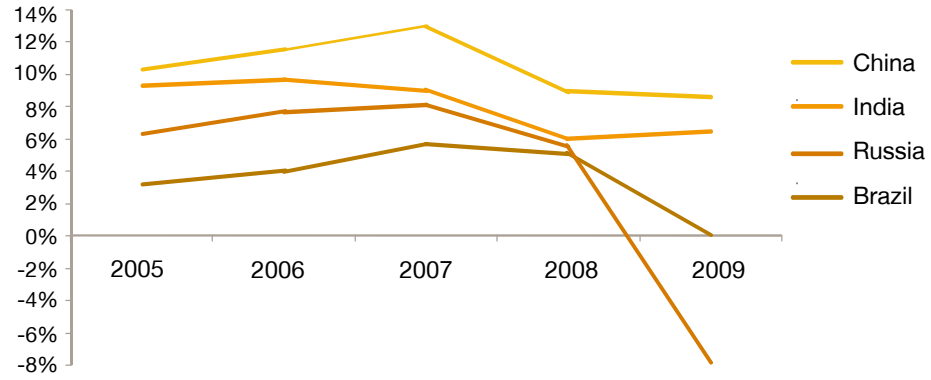
Figure 2: Exports of Goods & Services (% of GDP)



Source: World Bank

[1] Goldman Sachs

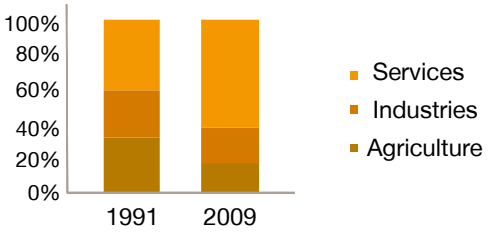
Figure 3: Annual GDP Growth Rates for Major Economies



Source: World Bank CIA World Fact book

India started the process of economic reforms in early 1990s. Post liberalization of the industry, leading to increased foreign trade and foreign Direct Investments (FDI), the composition of GDP has changed substantially. Between 1991 and 2009, percentage share of the agriculture in the total GDP has declined by around 14%, whereas the percentage share of services in the GDP has risen by over 20%.

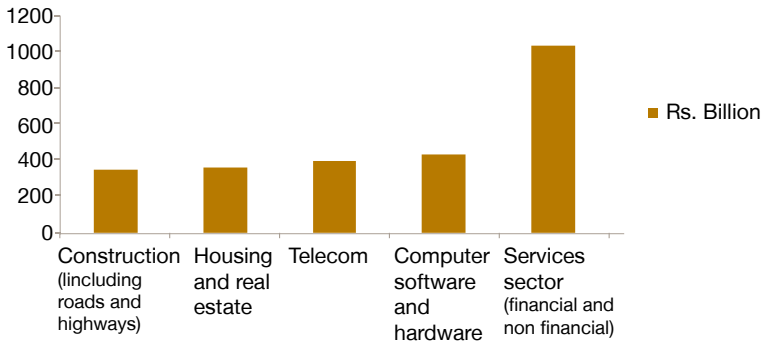
Figure 4: Composition of India's GDP



Services, Inbound Investment and Consumption Driving India's Growth

- Services - India's services sector stands out for the size of its contribution to GDP and its dynamism. Communication and banking are among the fastest growing segments. As per Confederation of Indian Industry, services sector accounted for 59.6 per cent of the overall average growth in GDP in the eight years between 2000-01 and 2007-08.
- Foreign Direct Investment - Indian policy on FDI has been liberalised progressively over the last two decades. Initiatives have included opening up of new sectors to FDI, raising the FDI caps in sectors already open to investment and procedural changes to enhance FDI flows. Some of the sectors that have attracted the biggest share of FDI include services, telecommunication, computer software & hardware and housing & real estate and power.

Figure 5: Top 5 Sectors for FDI between 2000-2010



Source: Dept. of Industrial Policy and Promotion, India

- Consumption - India has a burgeoning middle class, which is estimated to be around 300 million. As the middle class grows it will increase domestic demand for goods and services and spur economic growth. For instance, combined annual sales of two-wheelers and passengers vehicles in India have grown from 6.2 million units in FY 2003 to 11.4 million units in FY 2009. In addition, India's demographic composition augurs favourably; in the 20-29 age group there will be over 210 million people by 2015. As a result , India is witnessing the rise of a new generation eager to consume on-demand services and products, driven by higher incomes, a more global outlook and a higher propensity to spend vis-à-vis the earlier generations. Among the major economies in the Asia-Pacific region, India's private domestic consumption as share of GDP, at 57 per cent in 2008, was the highest.[2]

Infrastructure is the biggest challenge as well as opportunity

Despite all the positives, for India to realise its full potential, it needs to invest in infrastructure, which at present is not sufficient to meet the growing demands of the economy. Mobile telephony is the only notable exception in the infrastructure space. Post liberalisation, telecom has been one of the high growth sectors in India. Failing to improve the country's infrastructure will slow down India's growth path. For India to sustain its growth rate at over 9 percent, the following concerns need to be addressed urgently; power deficit, under capacity in the port sector, investment backlog in railways and low penetration of broadband services in India. The government has estimated that India would require a total investment of Rs.22.5 trillion[3] in infrastructure during the 11th five year plan (2007-2012). As per estimates actual investments during the 11th plan would be in line with plan figures, primarily due to investments in telecom exceeding its target of Rs.2.9 trillion. For the 12th five year plan India would need to more than double its infrastructure spend to Rs.46 trillion, as per estimates made by the planning commission.

[2] Mckinsey Global Institute

[3] Total investment of USD 492.5 Billion. 1USD = INR 45

03

Telecom leading infrastructure growth in India

The Indian telecom sector has charted an impressive growth trajectory. The telecom market has been growing at a CAGR of approximately 30 percent since 1995. The high growth of the telecom sector can mainly be attributed to mobile services which have grown at a CAGR of more than 117 percent during the period 1995-2009. Multiple factors such as extremely low tariffs, availability of ultra low cost handsets, encouraging regulatory environment, increasing income levels and change in consumer behaviour, have combined to produce remarkable growth in the last decade. Indian telecom service sector contributed approximately 2 percent of the GDP in FY 2008-2009 and its contribution is expected to rise further. Telecom infrastructure also played a key role in bridging the connectivity gap in a vast and diverse nation such as India.

With substantial additions of more than 14 million subscribers every month in the calendar year 2009, the telecom subscriber base stood at 519 million as on 2009 year end and has grown to 601 million as of April 2010[4]. India has grown to become the second largest telecom market after China. The teledensity has grown from a mere 1.3 percent in 1995 to over 50 percent as of April 2010[5]. Despite the significant volumes and growth story, India still has over 500 million addressable population. This provides a huge opportunity as well as challenge for the operators and telecom sector as a whole. Due to hyper competition (approximately 8-9 operators in each circle) and the dynamics of the market, India has one of the lowest tariffs globally.

Indian telecom sector has also experienced a large amount of FDI investment since the liberalization of the telecom sector in 1994. In last few years there has been increase in both value and volume of foreign investments in telecom sector, showcasing the untapped potential that the sector still has. In 2008, four global majors Etisalat, Batelco, Telenor and NTT DoCoMo picked up stakes in Indian telecom Industry.

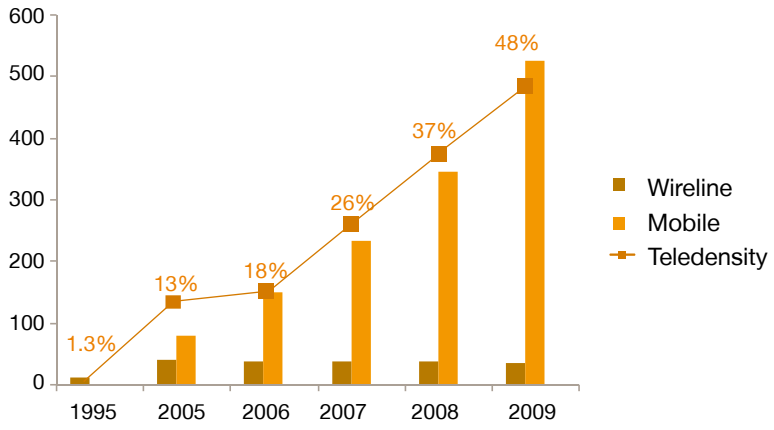
As a result of the spectacular growth in the telecom sector, original equipment manufacturers and electronics manufacturing service providers also have set up shop in India to serve the booming domestic market as well as overseas markets. Presently, global majors such as Flextronics, Ericsson, Nokia, LG and Motorola, have manufacturing operations in India.

Mobile services driving telecom growth

The exponential growth of the Indian telecom sector has mainly been driven by mobile services. The mobile services have been growing at CAGR of 65 percent over the last 5 years. The total number of mobile subscribers surpassed the total wireline subscriber in 2004; reflecting the consumer's preference for mobile based service. Since 2004 wireline service has been experiencing negative growth due to fixed to mobile substitution.

[4] TRAI

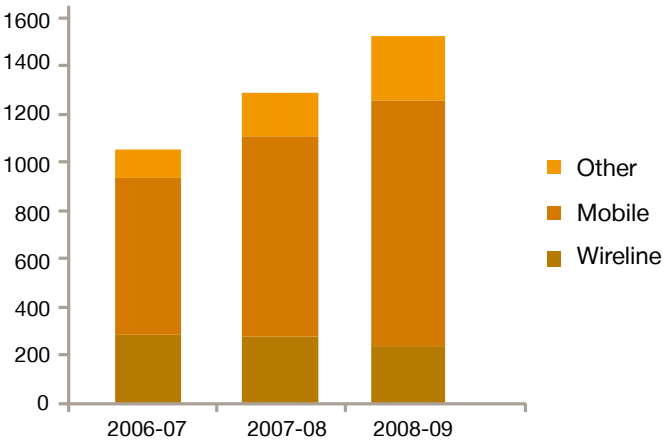
Figure 6: Telecom Subscriber Growth (Millions)



Source: TRAI [5]

India's telecom services industry revenues (excluding inter-segment revenues) were in excess of Rs. 1,130 billion in FY 2009 growing at CAGR of 20 percent since FY 2007. Mobile services revenue contribution to the total telecom services revenue has increased over the years, contributing 90 percent in FY 2009.[6] On the other hand, wireline service revenues have not only declined in terms of overall contribution to the total telecom services revenue but also in absolute terms. Other services revenue such as long distance (NLD and ILD), VSAT, etc have also grown at a fast pace over the last two years.

Figure 7: Telecom Services Revenue (Including inter-segment revenues) (Rs. Billion)



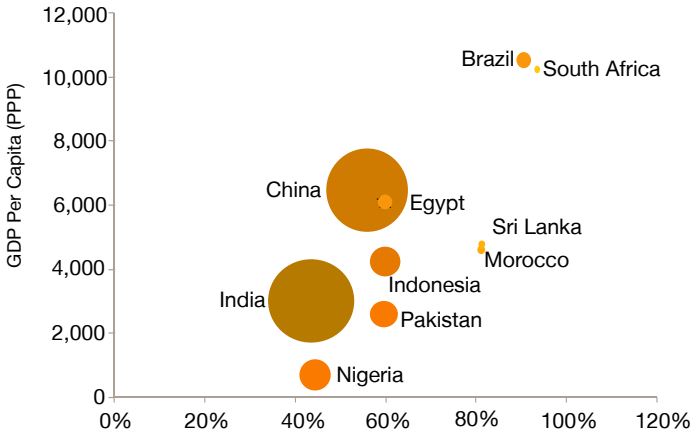
Source: TRAI

[5] All numbers are for the calendar year (CY) ending if not specified otherwise

[6] TRAI

Comparison of India's mobile teledensity with select developing countries is provided below. The size of the circle depicts the size of the unaddressed population in the respective country. It is clear that despite the spectacular growth in mobile subscriber base in India mobile teledensity is lower in India in comparison to countries such as Indonesia, Philippines and Nigeria which have a similar level of GDP per capita (purchasing power parity).

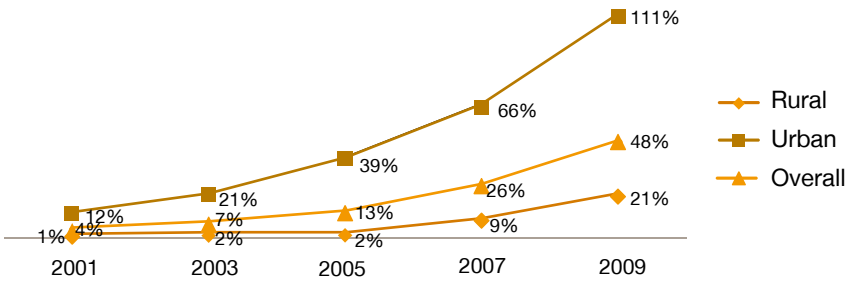
Figure 8: International Precedent- Mobile Teledensity and GDP per Capita (2009)



Source: PwC Analysis

Growth in overall teledensity is mainly attributable to the exponential growth of mobile services in both urban and rural areas. However, there continues to be a rural-urban divide in terms of number of mobile subscriber vis-à-vis population. Only 21 percent of Indians living in rural areas have access to mobile phone connections. There are still more than 500 million un-served population located mainly in rural areas with moderate to low capacity to pay for the telecom services.

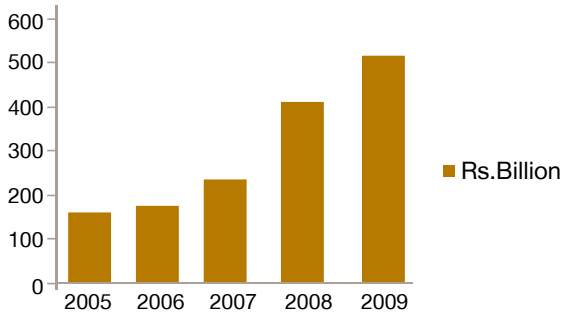
Figure 9: Teledensity



Source: TRAI

Further, increasing mobile penetration has had a cascading effect on the Indian telecom manufacturing sector. Demand for mobile handsets and telecom equipments has increased over the years. India ranks fourth in telecom equipment manufacturing in the Asia-Pacific region. India had a 6 percent share of the region's total telecom equipment production in 2009[7].

Figure 10: Telecom Equipment Manufacturing Revenue

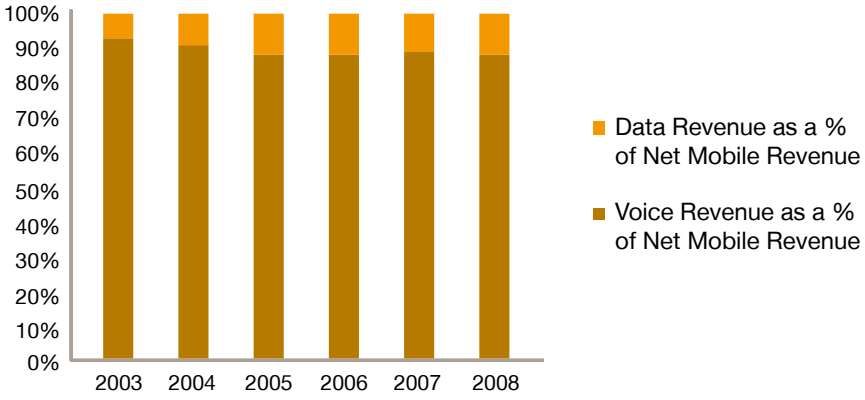


Source: TRAI

Stagnant data usage over the years, next growth lever for telecom

Rapid growth in subscriptions of mobile services has been accompanied by a rapid decline in ARPU due to the continuously falling tariffs and addition of marginal subscribers. Operators would look at value added services (VAS)/ data services for bridging the ARPU gap and differentiating their offerings from competitors in the market. However, in the last 4 years the proportion of the data revenue has remained stagnant at 11-12 percent[8] of overall service revenue.

Figure 11: Data Revenue Share – Indian GSM Industry

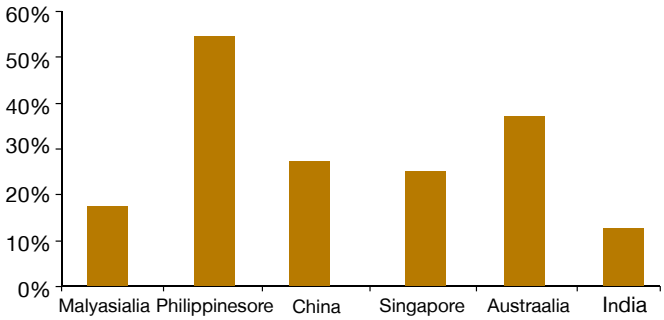


Source: PwC Analysis

[7] Gartner

India has one of the lowest data revenue proportions to gross service revenue among the APAC countries. With increasing choice of services offering and changing subscriber preferences data revenue share is expected to grow.

Figure 12: International Benchmarking - Data Revenue Share

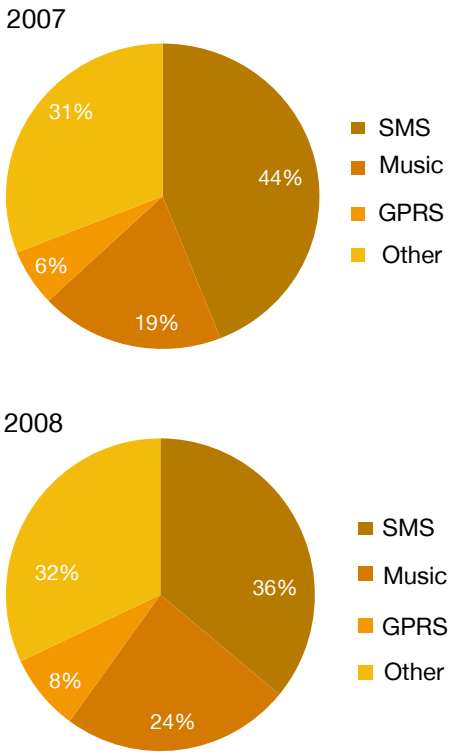


Source: PwC Analysis

Although the percentage of the data revenue has been stagnant the silver lining has been the changing data usage pattern of mobile subscribers. Share of SMS services has gone down from 44 percent of the data revenue in 2007 to 36 percent 2008, signifying increased usage of non-SMS data services. Currently, non-SMS data usage in India is mainly limited to music related services like ring tones, caller ring back tones and music downloads. Other data revenues include revenue from voice mail service, itemised billing, MMS, operator's own voice portal, blackberry/data application and m-Commerce applications and content downloads. In the last few years with the availability of low cost GPRS enabled handsets, GPRS usage has increased to 8 percent of data revenue in 2008 from 6 percent in 2007.

[8] PwC Analysis

Figure 13: Composition of Data Revenue – Indian GSM Industry

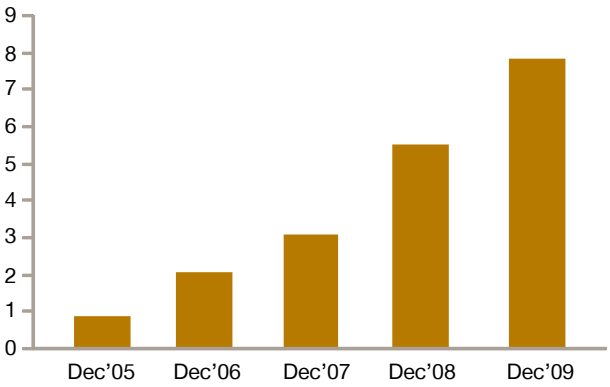


Source: PwC Analysis

Non-availability of broadband is an impediment to growth of data services

Broadband subscriber base in India is currently at a very low level. High cost involved for both the operators and subscribers act as an impediment for growth of wireline based broadband services. During 2005 to 2009 wireline broadband connections have grown by approximately 7 million, which is abysmally low when compared with 14 million mobile subscribers monthly additions in the year 2009.

Figure 14: Broadband Subscriber Growth (Million)



Source: TRAI

Total broadband subscriber number stood at 8 million as of December 2009, which is far less than the target set by the Government of India (20 million) for broadband by 2010[9]. India continues to be one of the least broadband penetrated markets with current penetration of less than 1 percent.

Low PC penetration coupled with limited wireline infrastructure including right of way challenges and high tariffs have constrained the growth of broadband. Most of the existing infrastructure for the wireline based broadband services is concentrated mainly in urban and semi-urban areas with limited presence in rural. Further, the legacy wireline infrastructure is not scalable for providing high speed broadband services. Moreover, local loop unbundling is not allowed to enable new players to utilize the existing infrastructure to provide wire line broadband services. All of the above has lead to slow and limited growth of wireline broadband.

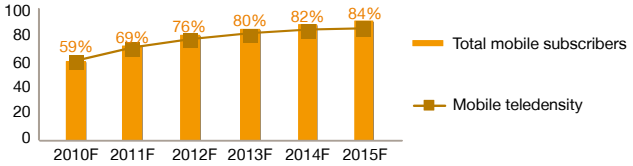
On the other hand wireless based broadband availability is also limited. Currently there are more than 149[10] million mobile subscribers who are capable of accessing internet through their handsets, along with more than 2 million data card subscribers. However, despite the large subscriber numbers capable of accessing internet, the growth of the data services through wireless is largely inhibited due to lack of high speed access to data through current GPRS, EDGE and CDMA 1X technologies deployed in India. In recent times CDMA operators in India have launched EVDO based internet access services which allows high speed access.

[9] DoT
[10] TRAI

Mobile services: Positive outlook

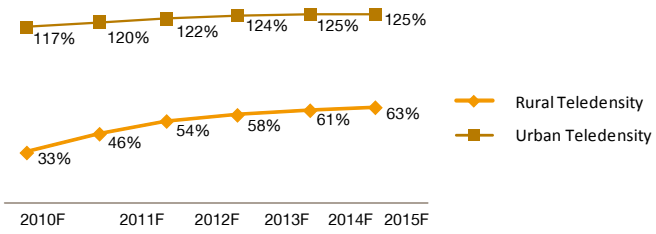
There is still a large section of Indian population not served by mobile services .The growth story of the mobile services is expected to continue for 3-5 years driven by high subscriber additions in mostly non-urban areas and multiple SIMs purchased by the existing subscribers in urban India. The majority of the next 500 million subscribers are expected to be added in the semi-urban and rural areas. The mobile subscriber base will cross 1 billion in 2014, growing at a CAGR of more than 9 percent (2010 to 2015). The mobile penetration in India is projected to cross 80 percent in next 4 years. The urban mobile teledensity, which has already crossed 100 percent mark in 2009 as per TRAI will reach 125 percent by 2015, while the rural mobile density will increase more than three times the current level of 20 percent to reach approximately 63 percent by 2015. The market will begin to saturate in terms of subscriber numbers starting 2013.

Figure 15: Mobile Subscriber Projections



Source: PwC analysis

Figure 16: Urban- Rural Mobile Teledensity



Source: PwC analysis

India striding towards mobile broadband services

The recently concluded 3G spectrum and BWA auction saw intense competition among the bidders resulting in a revenue inflow of Rs.1.06 trillion for the government, surpassing most estimates.

Following the completion of the auction operators are expected to launch 3G and BWA services soon after receiving the spectrum from the government. The public sector operators BSNL and MTNL who have already received the 3G spectrum have launched 3G services in select cities. This will help address the supply side constraint.

3G will drive mobile broadband in India for next 3-5 years services

Given the context of non-scalable wireline infrastructure, we expect broadband in India to be delivered on a wireless platform leveraging 3G. In the next 2-3 years wireless broadband offered using technologies like TDD LTE/ WiMax are not expected to takeoff on a large scale due to limitations related to voice over LTE, cost of access devices and low business case for wider rollout. Therefore, initially

wireless broadband using technologies like TDD LTE / WiMax are more likely be an economic alternative for the expensive wireline based broadband services targeted towards enterprise consumers and upwardly mobile urban consumers seeking high bandwidth.

On the other hand, introduction of new innovative applications, enhanced user experience, and decreasing prices of 3G enabled handsets will drive 3G uptake. Mobile broadband using 3G is inherently less expensive than wireline and other alternate wireless broadband platforms. Accordingly, broadband volumes are likely to be driven on the mobile platform leveraging 3G.

Over hundred million 3G subscribers by 2015 and growing

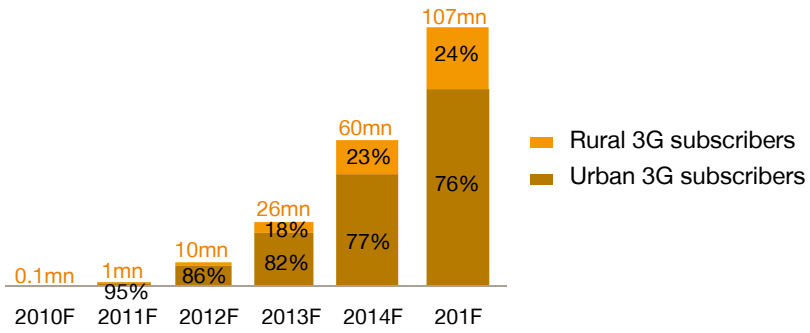
Following the conclusion of 3G spectrum auctions and subsequent rollout of the services by the private operators, 3G subscriber numbers are likely cross 107 mn by 2015 growing at a CAGR of 190 percent between 2011 and 2015.

Currently the 3G services are provided by the incumbent operators with limited coverage leading to very slow uptake in 2009-10. However with expected rollout of 3G services by the private operators the uptake will kick off from 2011.

The 3G subscriber projections are based on multiple factors that will impact its uptake in Indian market. For our projections we have considered the population coverage of the 3G network in rural and urban areas characterised by young populations and rising income levels, number of subscribers owning the 3G handsets driven by decreasing cost of 3G enabled handsets and likely migration of existing post-paid and prepaid subscribers to the 3G services.

Initially the rollout is expected to be more focused in urban areas therefore the uptake of 3G services will be concentrated among urban subscribers, but with increasing coverage in rural areas the uptake among rural subscriber will pick up. By 2015 rural subscribers are likely to comprise up to 24 percent of overall 3G subscriber base. Overall, 3G subscriber penetration in India is expected to rise from 0.1 percent in 2011 to 8 percent in 2015.

Figure 17: 3G Subscriber Projections (Million)



Source: PwC Analysis

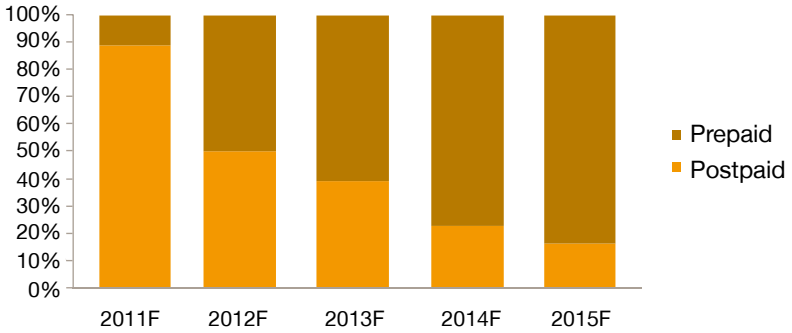
Year	2010F	2011F	2012F	2013F	2014F	2015F
3G Penetration (%)	0.01	0.1	0.8	2.1	4.7	8.3

Source: PwC Analysis

3G adoption will be more among the post-paid subscribers in the initial phase as these subscribers have higher propensity to pay for the services, also going forward most of the post-paid subscribers are expected to migrate to 3G services especially in urban areas where 100% of the post-paid subscriber will migrate to 3G by 2015.

With increasing affordability of 3G services, availability of low cost 3G handsets along with higher aspiration value for 3G services the uptake of the 3G will also kick off among the prepaid subscribers. With India being a predominantly prepaid market the overall 3G subscriber base will largely comprise of prepaid subscribers by 2015.

Figure 18: 3G Subscriber Composition - Post-paid and Prepaid



Source: PwC Analysis

Globally, most operators report higher ARPUs from their 3G customers than their 2G subscribers because of the higher uptake of value added services. For instance, Telstra in Australia enjoys approximately 150 percent higher 3G ARPU than 2G ARPU. Also in Japan, which is one of the mature 3G markets, APRUs from NTT DoCoMo's 3G subscribers have been 58 percent higher on an average than APRUs from its 2G customers for the last three years[11] . The high APRU for 3G in is mainly attributed to the increased data usage as compared to 2G[12].

We expect that 3G subscribers will pay a premium of up to 15-35 percent following the services rollout by private operators in the year 2011. Going forward the pricing for the 3G services is expected to come down due to increased competition among operators to capture larger share of the potential 3G subscribers leading to fall in ARPU. The average 3G revenue per user for mobile operators is expected to be Rs.712 in 2011 and Rs. 265 in 2015.

The fall in ARPU would be on account of decrease in service tariffs over the period and addition of lower ARPU customers to the overall 3G subscriber mix. Data revenue's share of 3G mobile ARPU is expected to be around 24% in 2015.

[11] Crisil Report
[12] Company financial and PwC Analysis

04

Mobile broadband service is the way forward

Mobile broadband is about more than enhanced application and network performance; it is also a catalyst for business-model innovation, driving change in the way services are delivered as well as revenues generated. Long-term potential of mobile broadband is enormous, it's not hard to imagine video players, personal navigation, and gaming devices all benefiting from enhanced connectivity. In the industrial sector, the opportunity is possibly greater, with phenomenal potential in healthcare, financial services, retail, Government services and so on. Mobile Broadband Services (MBS) in India will be driven by both supply and demand side factors:

Demand Side Factors

- 600+ million subscribers – India has a rapidly increasing mobile subscriber base with the highest number of net mobile subscriber additions in the world. This factor is expected to be the biggest driver for MBS in India.
- Availability of low cost handsets – OEMs are planning to launch 3G enabled handsets priced at USD 100 by next year, which will push the adoption of 3G services even amongst lower income groups in India.
- Lack of availability of broadband services – High cost associated with provisioning of fixed broadband services has led to lack of fixed broadband infrastructure. High cost of ownership (higher monthly commitment) for subscriber has also not helped in creating the necessary demand for fixed broadband. Mobile handsets are available at low prices compared to the high cost PCs (sub 200 USD PCs are yet to see commercial deployments on a large scale) leading to lower entry costs for customers.
- Existing 3G enabled handset - 3G compatible handsets already form 5-8 percent of the existing handset base in India. These existing 3G compatible handset owners would be more likely to subscribe to 3G services in the early phase. Further, increase in smart phone penetration including android devices will push the adoption of 3G services.
- Young Demographic Profile – It is estimated India's population in the 20-29 age group will be over 210 million by 2015 . Lowering of age profile of handset owners is likely to result in higher uptake of MBS as the youth and upwardly mobile professionals are more inclined to try new services. India is also witnessing the rise of a new generation eager to consume on-demand services and products, driven by higher incomes, a more global outlook and a higher propensity to spend vis-à-vis the earlier generations.
- Enterprises – enterprises will drive demand for mobile broadband with their ability to pay, need for remote access and productivity enhancing applications.
- High use of VAS by other sectors - Other sectors like media channels have been using SMSes to promote programs, run contests, provide feedback/voting etc driving up VAS usage. Example: Recently concluded Indian Premier League was promoted and viewed over Youtube using mobiles.

Supply Side Factors

- Better business case for wireless than fixed line – Capital expenditure required per subscriber for fixed line broadband is in the range of Rs. 45,000 -90,000, whereas for mobile broadband the capital expenditure per subscriber is expected to be Rs 3000-4500 only. Especially, in rural areas with low population densities mobile broadband access can be a substitute for fixed broadband access in order to make the economics more attractive.
- Hyper Competitive Environment – Indian mobile market is one of the most competitive in the world, with as many as 8-9 players in each circle and a HHI index of .15. Given the highly competitive market and proposed mobile number portability, it is getting increasingly important to differentiate offerings. The intense competition has also put downward pressure on ARPU and EBITDA margins. Therefore, it is imperative that operators look at differentiators beyond price. Mobile broadband Services (MBS) will facilitate operators to increase share of data revenue and more importantly create differentiators.

Urban and enterprise subscribers early adopters of MBS followed by rural

Based on the need for and likely use for mobile broadband services in India, there are essentially two broad customer segments i.e. enterprise and non-enterprise. The non-enterprise segment includes individuals and communities in rural India. The enterprise segment includes businesses and the government.

Figure 19: Customer Segments in India

Non-Enterprise Users

In rural as well as in urban India a young population, growing literacy rate and rising disposable income will drive usage of information and entertainment related media services through mobile broadband.

Urban

India is likely to see rapid urbanisation, with around 45 per cent of Indians living in urban areas by 2050, up from 30 per cent in 2007-08, according to a study by National Council of Applied Economic Research (NCAER).

The urban consumer consists of young people and upwardly mobile professionals with high propensity to pay for premium services. They understand the advantages of adopting mobile broadband due to factors such as high speed, mobility characteristic and the contemporary usage of the phone and the Internet. The remaining urban user comprising housewives, elderly people, children and low income individuals are aware of mobile based VAS and internet services. However, costs and complexity involved in adopting mobile broadband services would likely act as impediments for these users, at least in the initial years. The key applications for the urban segment would be:

- Internet Browsing and Mobile Social Networking
- Location Information; area maps etc
- Video Calling, mobile gaming, music and video downloads / streaming
- Mobile Banking and Commerce
- Tele counselling services; tele-education and tele-medicine
- Easy access to services such government services, utilities etc

Rural

As India's growth spreads to rural areas telecom companies are looking closely at the rural consumer. Two-thirds of India's consumers live in rural India, where spending power of consumers are increasing steadily. There are numerous pilots internationally which have established the positive externalities of mobile utility applications such as Governance, health, learning etc. especially in rural and remote areas in emerging markets. India could lead the way in this area with large scale deployments by extending the reach of the planned eGoverment deployments by enabling them on mobile appropriately.

Since a vast majority of rural Indians are involved in farming related activities such as animal husbandry, agriculture, fishing and poultry farming, therefore access to information on prices, weather, and productivity enhancement measures would be important drivers for use of mobile broadband. For instance, presently the lack of information on effective agriculture practices lead to huge losses for those who are dependent on agriculture. Therefore,

individuals involved in farming related occupations would be willing to pay a nominal cost to access information on mobile broadband. For youth in rural areas limited availability to entertainment sources would spur the use of mobile broadband as an alternate channel for accessing entertainment related content. In addition, for village communities mobile broadband can facilitate remote access to education and healthcare. The key applications for the rural segment would be:

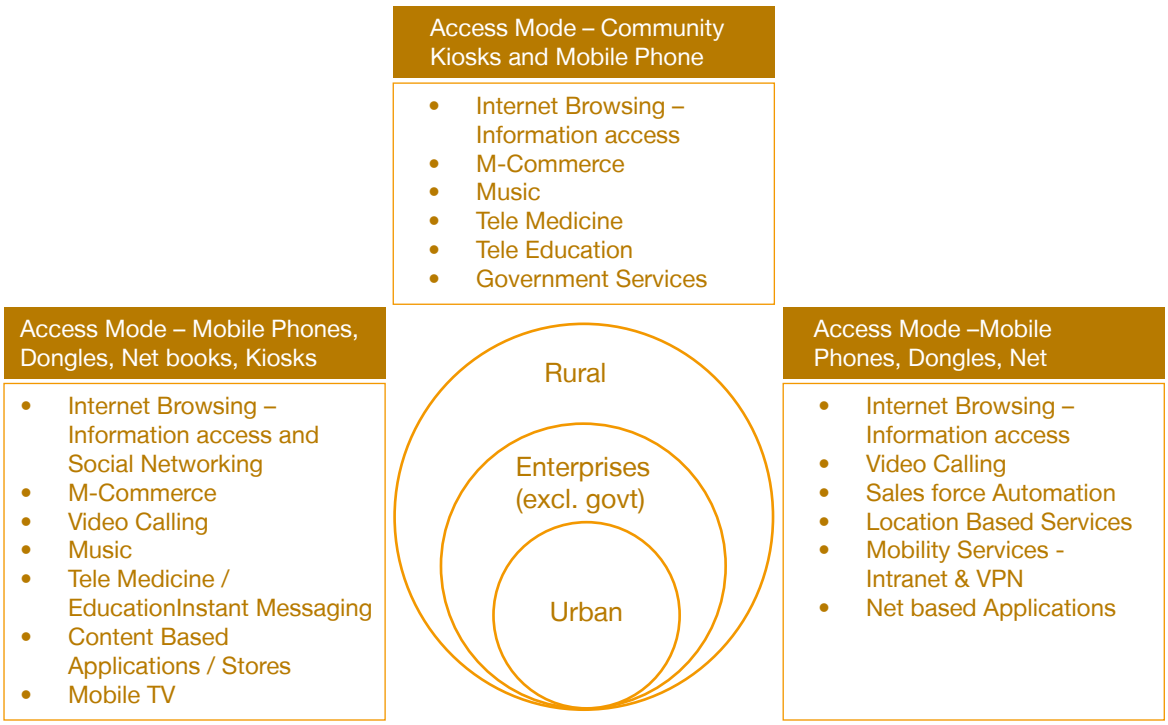
- Selling and Procurement Information and Support for farm commodities
- Educating farming community on best practices
- Delivery of Healthcare and Education to remote village via the mobile broad band network
- Regional language content; news and entertainment (music / ring tones)
- Access to Government Services on MBS platform individually or on CSC (Common Service Centre) model

Enterprises

In business enterprises mobile broadband will lead to the integration of e-Commerce with their existing operations resulting in the development of new delivery channels and new consumer markets. In addition businesses would adopt mobile broadband applications like sales force automation and location based services (tracking and monitoring of goods, inventory, human resources etc), which will result in productivity enhancements and cost savings. Mobile broadband will also facilitate teleworking, which allows the workforce to carry out their tasks outside their conventional workspaces.

Mobile broadband offers Government an opportunity to better deliver public services leading to improved governance and more inclusive development. It will allow government to make public services easily accessible to all citizens in a cost effective manner.

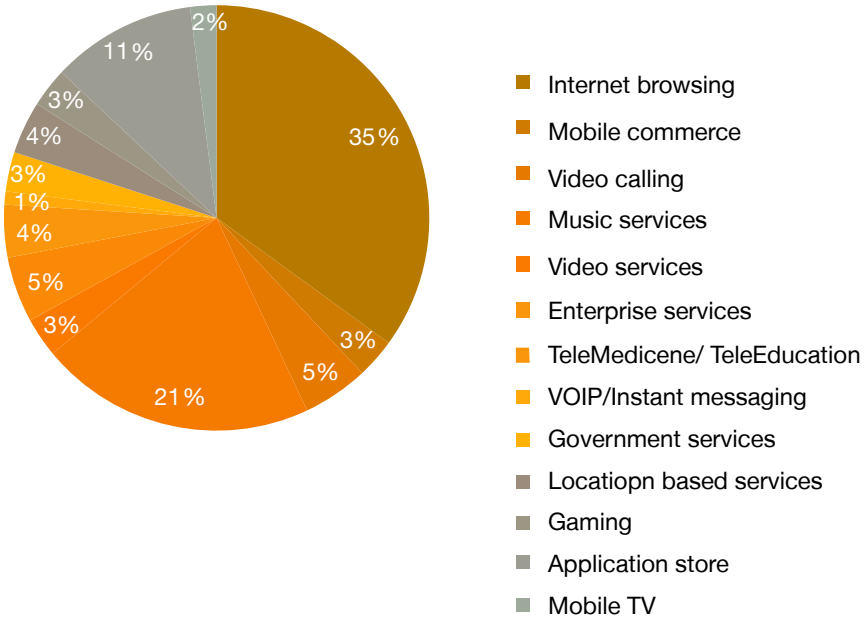
Figure 20: Mobile Broadband Services by Customer Segment



Internet browsing and music related applications would be the service drivers till 2015

The potential for new services and the existence of comparable services in the 2G environment would be important factors in operators' choice of launch of specific 3G services.

Figure 21: MBS data services composition - 2015



Source: PwC Analysis

- Internet Browsing – In line with international precedents web browsing is expected be the most used service among the MBS subscribers initially. However, the share of revenue from internet browsing will fall due to advent and uptake of other new mobile broadband services.
- Music Services – Mobile music continues to dominate digital music in India and commands a share of 88 percent in the segment. Historically Indian consumers have inclination towards using music related services through mobile. The trend of high adoption of music services among Indian masses is expected to continue even in MBS.

- Video Calling – Video calling has been one of the top contributors of revenues across the globe among 3G services; however its uptake largely depends on wider reach of the 3G services among masses.
- Application Stores – In recent times various mobile value chain stakeholders including handset vendors and mobile operators have launched mobile based application stores where consumer can download application both free of cost as well as for a fee. Examples include Ovi by Nokia, App store by Apple, Google's application store. In India, Airtel has launched its own application store recently and it recorded 2.5 million downloads in the first month of launch.
- Enterprises Services – Businesses in India will benefit tremendously from the launch of Mobile broadband. Mobile broadband will allow Indian employees real time access to remote desktop enterprise solutions such as sales force automation. This will optimize a company's response time to customers, leading to increased productivity, while high data rates and optimised quality of service would increase the country's competitiveness.
- Tele-Education – Less than 10 percent of the approximately 1 mn schools in India have either PC or internet connectivity[13]. Mobile broadband services can play a key role in filling this connectivity gap and providing remote access to experts and educational material. Despite the fact that India's tertiary education system is one of the largest in the world with over ten million students, only 1 out of 10 young people has access to higher / vocational education. Mobile broadband can help expand tertiary education especially among low and middle-income students. With increased 3G network coverage and decreasing cost of MBS access tele-education will see greater adoption both in rural and semi-urban areas.
- Tele – Medicine - In a country such as India where medical facilities are scarce, telemedicine will provide huge advantages. Telemedicine can possibly transform the health care sector in India as India faces a scarcity of both hospitals and medical specialists. India is short of 600,000 doctors, 1 million nurses and 200,000 dental surgeons for every 10,000 Indians, there is barely one doctor available. A large majority of India's population still lives in villages, where healthcare facilities are poor. 80 percent of doctors, 75 percent of dispensaries and 60percent of

[13] IDFC - SSKI INDIA

hospitals in India are situated in urban areas. There are more than 50,000 Primary Health Centers and 6,000 Community Health Centers that can be empowered through MBS to provide better healthcare facilities.[14]

- mCommerce – mCommerce services will enable both banking and payment services through mobile platform. With a large proportion of the Indian population still unbanked, mobile based banking services can lead to financial inclusion of the unbanked population as well as being a cost efficient channel for banks to provide financial services. The Indian retail market, which is the fifth largest retail destination globally, has been ranked as the most attractive emerging market for investment in the retail sector[15]. According to ICRIER, the retail sector is expected to contribute to 22 per cent of India's GDP by 2010. Online retail will offer all India reach for both buyers and sellers, which is absent in the case of a fixed physical store. It also provides round-the-clock reach and hence there are no restrictions on market timing. The biggest advantage of online sales is its cost effectiveness. The online version is not only available at zero real estate cost but also negligible inventory cost. In addition to merchandise purchases, revenues from m-commerce will likely see an increase on account of adoption of mobile payment mechanism for services such as travel booking and utility payments.
- Government Services – Ongoing Initiatives of the National Informatics Centre such as "India Image Project", have made available government services on the worldwide web. The programme entails provision of an entire spectrum of web services of Government sector as well as running specialized portals for the benefit of citizens and other stakeholders. This would provide single window access to all Indian Government websites. MBS can facilitate national e-Governance initiatives by connecting remotest corners of India to government services in a cost effective manner.

[14] Zdnetasia.com
[15] AT Kearny

Mobile Broadband Services (Usage)	Existing Services in 2G Environment	Likely Service Uptake in 3G Environment (2015)
Internet Browsing (Information Access, Social Networking)	Operators are trying to tap the large number of GPRS enabled handsets in India through various packaging. e.g. Aircel has launched recharge coupons for internet access. Most of the mobile operators in India are promoting easy access of various social networking sites. E.g. Aircel & Reliance are offering single touch access to social network	
m-Commerce (Retail & Banking)	mChek is a new way to make payments using mobile phones. One can securely pay prepaid mobile phone connections, postpaid mobile bills, flight tickets, insurance premiums, movie tickets, utility bill payments & transact on e-commerce websites. ngpay is touted as India's Mall on Mobile. It allows one to shop, buy movie tickets, book travel, pay bills, bank etc with a mobile handset.	
Video Calling (Communication)	Not available	
Music (Downloads, Streaming)	Music in the form of Ringtones & Caller RingBack Tones is second largest VAS revenue generator contributing about 25 percent of VAS revenue and is a key driver for the VAS Market	
Video (News Updates, Sports, Soap Operas)	Not available	
Enterprise Services (Sales Force Automation, Mobility Services, Location Based Services)	Email access through Blackberry services in India has picked up very fast in last couple of years. Mobile operators are bundling VPN services as part of the enterprise service portfolio Operators are selectively offering innovative services related to SCM, SFA, and Tracking etc.	

Cloud Computing & Software as a Service (Saas)		
Tele Education (Accessing education content online)	As a pilot project in the run up to disseminating study material and conducting of limited objective tests on mobile phones, IGNOU has started SMS service to send SMS alerts to students about various developments.	
Tele-medicine (Accessing medical advice online) (Communication)	In late 2007, as a part of Gramjyoti project, Ericsson in partnership with Apollo hospitals provided ECG, blood pressure and heart beat measurements, teleconsultation and basic medical check-ups, including live interactive check-ups and reporting.	
VOIP / Instant Messaging (Social Networking, Personal / Professional Communication)	Googletalk, Twitter , Facebook on various handsets	
Location Based Services (Tracking, Monitoring)	Just Dial directory / location services available over mobile phone	
Content Based Applications / Stores (Gaming, Books, Other Applications)	Airtel's Application Store, Aircel's INQ	
Mobile TV	Reliance is providing 19 TV channels on mobile. MTNL had also launched Mobile TV on a pilot basis.	
Government Services (Traffic Monitoring, Security, Delivery of Services)	eSeva: Funded by the Government of Andhra Pradesh. It provides services such as birth and death certificates, registration of vehicles and learners' driving licenses. Presently, the e-Seva centres provide about 50 government services within 60 seconds to 120 seconds, including utility payments.	

05

Mobile broadband catalyst for changing business dynamics

Mobile broadband services are set to change the existing telecom market landscape in India following the launch of new services and emergence of new business models.

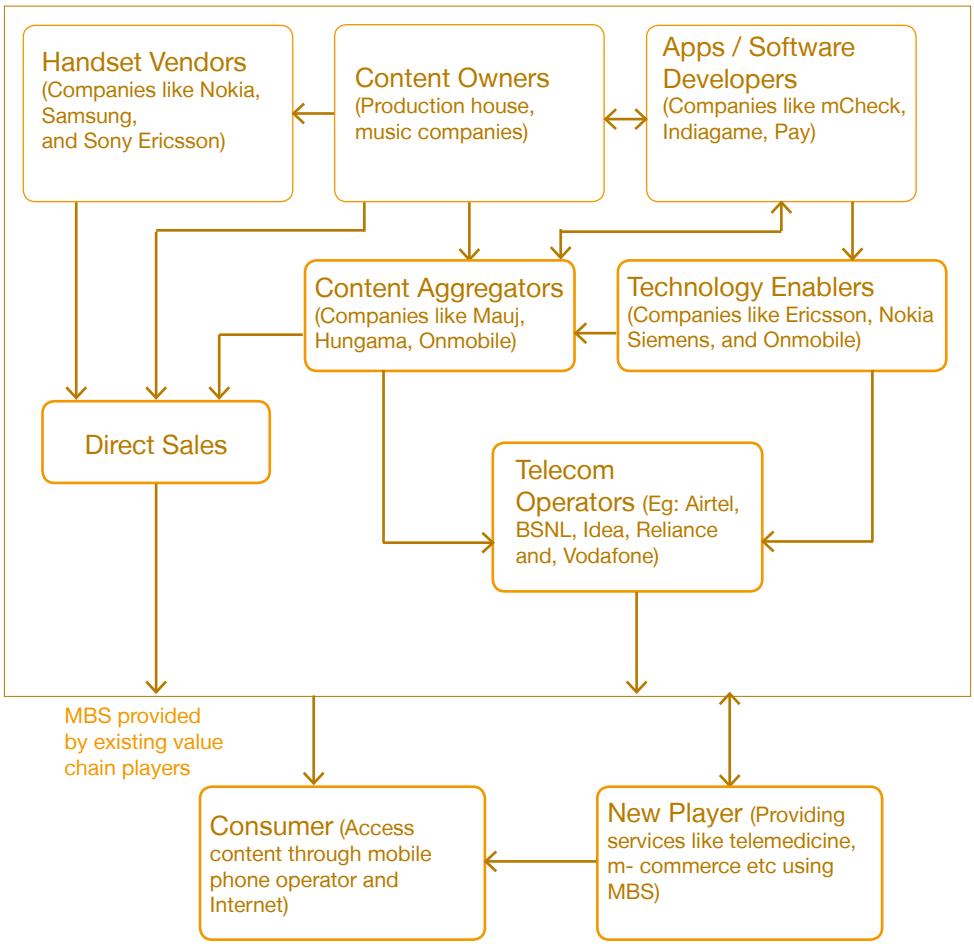
Broadly from the standpoint of telecom industry, over the short term impact of mobile broadband services would be in form of additional business for engineering firms, network infrastructure firms and equipment vendors for rolling out the network. In addition, venture backed content and technology startups are likely to emerge.

VAS value chain players (content developer, aggregator and technology enabler) are likely to call for investment to the tune of Rs. 12 billion over the period of 5 years ending 2015. Over medium to long term, service innovations and new business models will emerge to deliver advanced services for the media, health, education and other sectors.

Changing roles within the VAS value chain

The biggest impact from the roll out of mobile broadband would be on data services in terms of emergence of new players, change in roles of existing players, transformation of existing revenue sharing models and proliferation of new services.

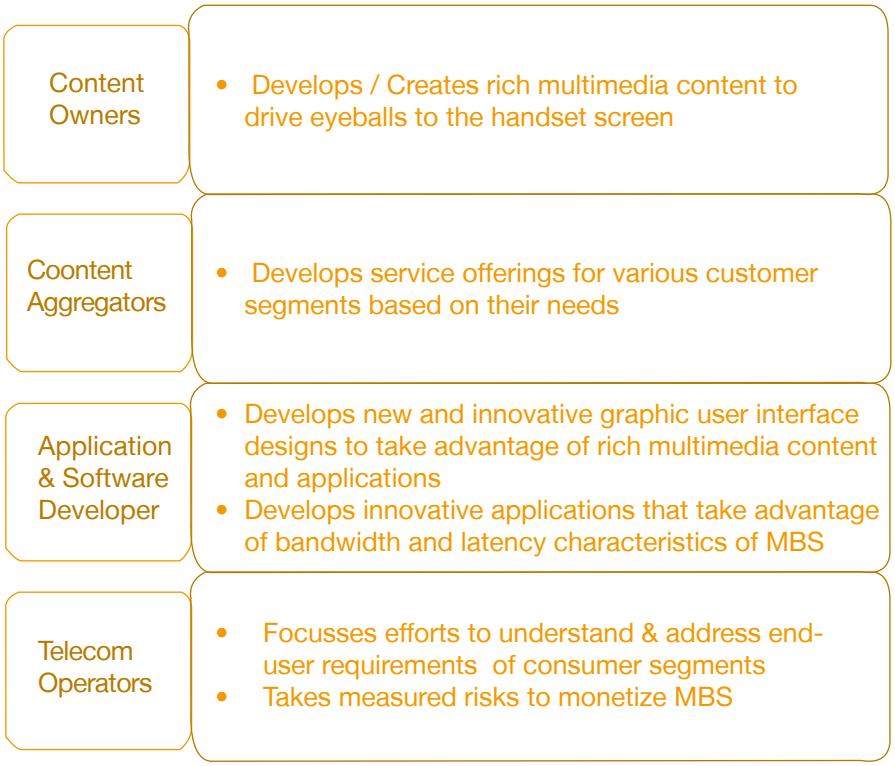
Figure 22: Mobile Broadband Value Chain



Source: PwC Analysis

Current business model for mobile VAS is heavily reliant on mobile operators due to lack of reliable payment mechanisms, which will change with mobile broadband. In addition new and innovative business models for VAS such as off deck portals by content providers, exclusive content offered by operators, co-branding to offer new services by operators will emerge. The role played by various value chain players are as follows:

Figure 23: Roles - MBS Value chain Players



High speed access- New revenue potential for content developer and aggregator

In terms of service offerings, currently content is largely restricted to film based entertainment and cricket. Content owners will diversify content categories and new categories will emerge as the data usage increases, more importantly interactive content will gain in significance. Music and video services will be a key growth drivers, with a whole range of new music services like full track downloads. Additionally, Content owners will be focusing on providing relevant content in local languages as well.

Content aggregator will offer rich media service for various customer segments based on their needs. Further, their focus will shift from current services like CRBT/Ring tones etc to rich multimedia, interactive and niche offerings. There is also large potential for providing wide range of utility and government services especially to the rural masses where the majority of new subscribers are expected to come from.

Open internet access – Leveraged by non operators for direct access of subscribers

Based on open access of mobile broadband services primarily through internet the business models for the value chain players will change significantly.

Content owners will move beyond operator portals and onto direct services via internet. This will also see advertising driven models, offering interesting monetary benefits to the users, with advertiser partially footing the bill.

Also with increased access to internet and direct payment medium for mobile broadband subscribers, content aggregators' & content owners' reliance on mobile operators in reaching out to customers will go down, thereby leading to increased revenue. Also with varied and innovative content available, content owners' & aggregators' will be in a better position to demand a greater share of the content revenue from the operators.

Fostering of New partnership

Handset vendors will be partnering with content owner and content aggregators to embed various applications in their devices to create product differentiation. In addition handset vendors may also have bundling arrangements with mobile operators for the 3G enabled handsets to leverage mobile operator's distribution reach.

Mobile operators are increasingly using content /application brands to introduce new services for instance Aircel is promoting its internet access services by promoting easy access to Facebook through mobile. In an increasingly competitive market, content /application brands are going to become more powerful and the mobile operators will have to recognize this.

Increased pull factor of data services

The VAS ecosystem players will recognize the power of compelling content. Accordingly it would be almost imperative for telecom operator to own/ create content for their customers recognizing the stickiness that 'non-commoditized' data services could create.

Some of the handset manufacturer could also take this route to add on to the unique selling proposition for selling the handsets.

Increased demand for both highend and ultra low cost 3G enabled handsets and devices

Handset vendors will be targeting entire segment of mobile broadband services subscribers through a range of access devices including netbooks and handhelds for high income users and ultra low cost 3G enabled handsets for low income users.

Revenue, Investment and Employment effects of Mobile Broadband

The growth of mobile broadband services will manifest itself in terms of additional revenue and employment generation for the industry. In addition to these impacts auction of the 3G and BWA spectrum in India has generated Rs. 1.06 trillion for the Government Exchequer.

The phenomenal take-up of mobile communication in India has driven revenues for mobile operators in India from Rs. 650 billion in 2006-07 to over Rs. 1000 billion in 2008-09 growing with CAGR of 25 percent. The rollout of the 3G and BWA services in India is expected to have significant impact on entire telecom value chain including telecom operators, handset manufacturers, equipment vendors, VAS players.

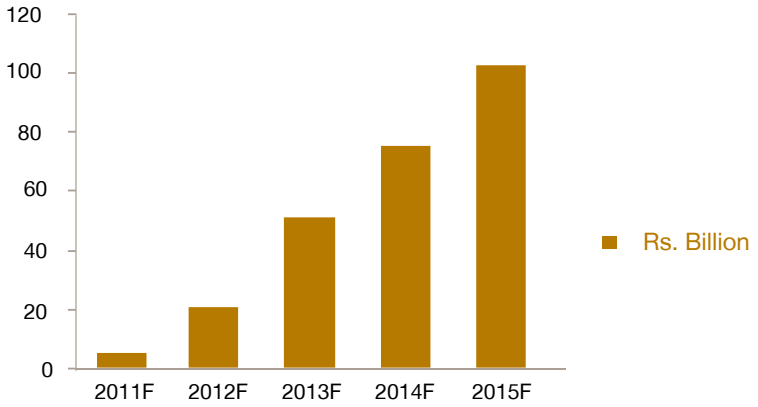
Following the rollout of the 3G services by the private operators in 2011, the 3G related revenue for the mobile service (excluding manufacturing) industry will witness significant growth. With high speed capability and better content based service offerings the rollout of mobile broadband services will give data usage the much needed impetus. The increased data usage on 3G network will lead to incremental 3G data service revenue of over Rs. 100 billion in 2015 growing at CARG of 112 percent between 2011 and 2015.

Further, 3G mobile subscribers are expected to grow at a CAGR of 190 percent between 2011 and 2015, attributable to fall in the prices of 3G enabled handsets, availability of wider range of multi media services through 3G and reduced tariffs.

It is expected that with the availability of 3G handsets priced below Rs.5000 the new subscribers as well as the replacement buyers will increasingly prefer to buy 3G handsets. The incremental revenue from 3G handset sales is expected to reach Rs. 670 billion in 2015 from Rs. 135 billion in 2010.

Telecom equipment vendors are expected to receive fresh contracts for 3G network roll out from the telecom operators. The incremental revenue for the telecom equipment vendors is expected to cross Rs. 150 billion in 2015.0.

Figure 24: Incremental 3G Data Revenue

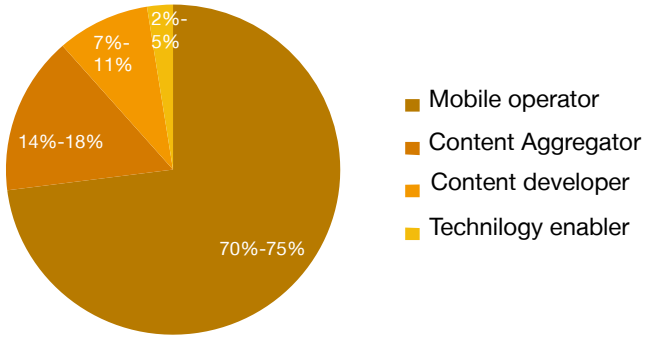


Source: PwC Analysis

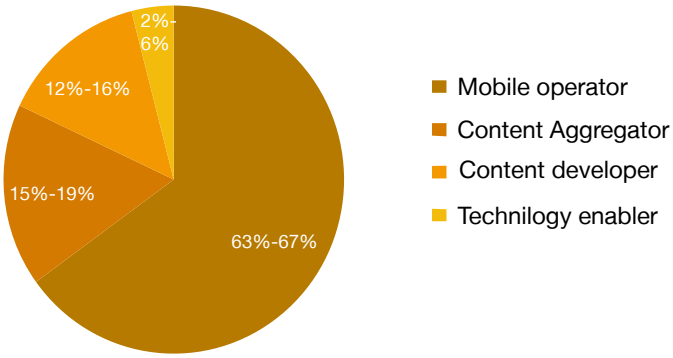
Currently, the VAS revenue share is heavily skewed towards mobile operators, but with increasing customer awareness, greater customisation, services would have the ability to create customer stickiness. As content becomes the primary means to attract 3G subscriber and generate additional data revenue, VAS revenue shares will realign, with operators expected to forego up to 10 percent of their share by 2015.

Figure 25: Revenue Share

2010F



2015F



Source: PwC Analysis

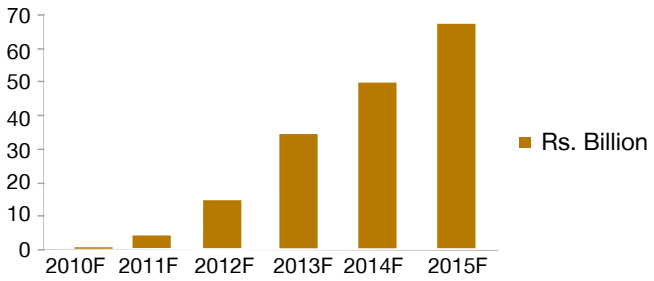
With growing demand for the mobile broadband services mobile operators will be required to invest in building additional capacity to meet the demand. In addition, with huge potential opportunity for providing new and innovative value added services on mobile other VAS value chain players like content developer, aggregator and technology enablers are also expected to make investments. Further, handset manufacturers and the telecom equipment vendors will also be investing in manufacturing and research & development to cater to domestic demand. The total cumulative investment related to mobile broadband services is expected to be in the region of Rs 500 billion for the period of 2010-15.

With the rollout of services by mobile operators and corresponding early growth in demand for mobile broadband services 60,000 to 70,000 new employment opportunities are expected to be created by the telecom industry (service providers, handset vendors, equipment vendors and VAS value chain players) by 2015.

Impact on Value Chain Players

- Mobile Operators – Total incremental data revenue from mobile broadband services for mobile operators is expected to rise to Rs. 67 billion by 2015. The growth of data revenue will be driven by both growth of the 3G subscribers and increasing demand for wide range of data services among subscribers. Mobile operators are expected to make a cumulative investment of Rs. 380 billion excluding spectrum costs between 2010 and 2015 to build the capacity to support the demand and increase coverage of 3G network. Further, mobile broadband services are expected to create 7,000- 8,000 new jobs between 2010 and 2015.

Figure 26: Revenue



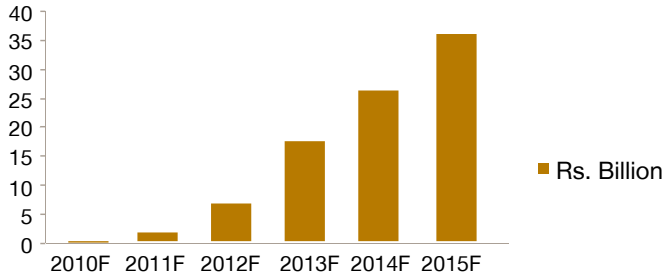
Cumulative Investment 2010-2015	Total Employment Generated 2010-2015
Cumulative investments for mobile broadband services are expected to cross Rs. 380 billion	7,000- 8,000 new jobs related to mobile broadband are expected to be created

Source: PwC Analysis

- Other VAS Value Chain Players – Additional revenue from roll out of mobile broadband services for other VAS value chain players is expected to reach Rs. 35 billion in 2015 from around Rs.1 billion in 2011. New and innovative services provided through the 3G network provide an opportunity to the aggregators to increase their revenue share as well as add new revenue stream other than the existing data services. Content developers will also benefit from a shift in the revenue sharing model in their favour after the launch of mobile broadband services. Further, with the rollout of mobile broadband services new opportunities will open up for the developer to sell new and innovative content related to interactive gaming, video streaming etc.

  To take advantage of opportunities presented by the mobile broadband, other VAS value chain players are expected to invest over Rs. 11 billion between 2010 and 2015. Trickle down effect of investment in mobile broadband services would be in the form of generation of additional employment, other VAS value chain players are together expected to create 10,000-12,000 new jobs to cater to service demand.

Figure 27 Revenue



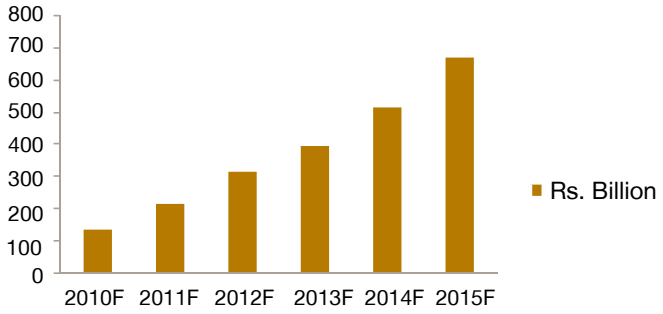
Cumulative Investment 2010-2015	Total Employment Generated 2010-2015
Cumulative investments are expected to cross Rs. 11 billion.	10,000- 12,000 new jobs related to mobile broadband are expected to be created

Source: PwC Analysis

- Handset Manufacturer – Average handset prices have reduced drastically in recent times with setting up of local manufacturing plants by the handset manufacturers like Nokia, Sony Ericsson etc and the emergence of many local handset manufacturers in India like MicroMax, Karbon, etc. It is expected that 3G Handset prices would reach Rs.5000 levels. etc.

  The Indian mobile handset industry would be a direct beneficiary of the growth in the 3G subscriber base. Launch of 3G services in India would allow handset manufacturers to generate incremental revenues of Rs. 135 billion in 2010 and further raise it to approximately Rs. 670 billion by 2015. 3G handset revenues would comprise of the sale of handsets to new subscribers and sale of replacement of handsets to existing subscribers. Handset manufacturers are expected to make a cumulative investment of approximately Rs. 50 billion between 2010 and 2015 to meet demand for feature rich and cost effective 3G handsets.

Figure 28 Revenue

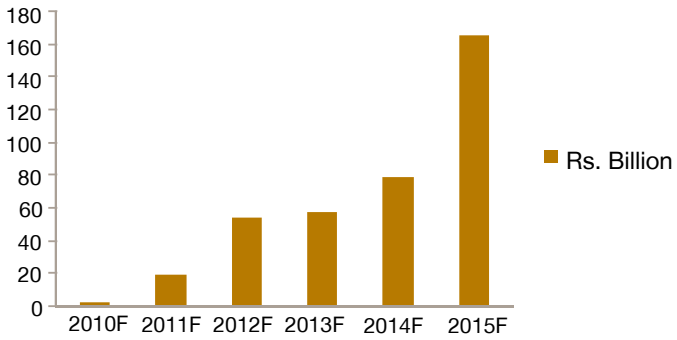


Cumulative Investment 2010-2015	Total Employment Generated 2010-2015
Cumulative investments for the period are expected to reach Rs. 50 billion.	Total employment generated related to manufacturing and R&D is expected to be around 40,000.

Source: PwC Analysis

Equipment Manufacturer – Equipment manufactures will benefit from 3G network rollout by mobile operators i.e. new capital expenditure made by mobile operators for 3G services. Equipment manufacturers are expected to generate initial incremental revenues of Rs. 2 billion in 2010, which will further rise to Rs. 165 billion by year 2015. Equipment manufacturer will make cumulative investments of Rs.56 billion between 2010 and 2015 for establishing manufacturing facilities and for carrying out R&D related to 3G. Growth led by 3G is expected to generate 10,000 – 12,000 new jobs between 2010 and 2015.

Figure 29 Revenue



Cumulative Investment 2010-2015	Total Employment Generated 2010-2015
Total investment for the period is Rs.56 billion.	10,000- 12,000 new jobs related to mobile broadband are expected to be created

Source: PwC Analysis

Financial Services, Media & Entertainment, Agriculture and other allied sectors to benefit from mobile broadband

Financial Services

The financial service is one of the rapidly growing service sectors in India. Financial services sector will be benefited significantly from mobile broadband in the areas of mobile commerce.

Mobile commerce has already reached a new level of convenience, visibility and safety around the world and is just getting off the ground in India. Using mobile broadband, financial services would be able to cater to the consumers' need of real-time, round-the-clock access to financial services on the move.

Mobile based banking services enabling financial inclusion

Presently a large proportion of India's population do not have access to basic banking services. While 70 percent of India's population lives in rural areas, currently only 31 percent or little over 20,000 of the total bank branches in India are in rural areas. Access to basic financial services remains an elusive dream for millions of Indians in rural areas as substantiated by the following facts[16] :

- 51.4 percent of nearly 89.3 million farmer households do not have access to any credit either from institutional or non institutional sources
- Only 27 percent of farm households are indebted to formal sources
- Only 13 per cent are availing loans from the banks in the income bracket of less than Rs. 50,000

In India there are more people subscribed to mobile services than having a bank account especially in rural areas where banking presence is still very low. The banks can use mobile platform to provide a variety of services such as long distance remittances, micro payments and informal airtime bartering schemes to provide financial services to "the unbanked". These services are no longer merely pilots and have become increasingly popular in countries such as Philippines, South Africa, Kenya, and elsewhere.

[16] Framework for Delivery of Basic Financial Services Using Mobile Phones, Report of IMG, 2010

The Future – Banking for the Un-banked using Unique Identification (UID) number and Mobile

"The new system will help unbanked citizens of the country gain access to basic financial services through institutional channels. It will facilitate citizens in depositing, transferring and withdrawing money from and to the remote locations of the country at an optimal cost which is much lower than what is being currently spent by them for similar financial services.

Pending operationalization of UID numbers in the country, a customer who has a mobile phone will be able to open a mobile linked no-frills account. For opening the mobile linked no-frills account, a customer can either visit the BC (or sub-agent of BC) or directly visit the bank branch. Once the mobile linked no-frills account is opened by the Bank, a mobile based pin (called m-pin) will be provided to the customer using which he/she can directly make financial transactions using his/her mobile.

Post the operationalization of UIDAI infrastructure and generation of UID numbers, a customer must present his UID number and biometrics for opening the mobile linked no-frills account. ..... Therefore a customer will have to obtain his UID number through a registrar of UIDAI before approaching the nearest Business Correspondent (or sub-agents of BCs)/Bank branch for opening of his/her mobile linked no-frills account."

(Source: Report of the Inter-Ministerial Group - Delivery of basic Financial Services Using Mobile Phones, April 2010)

Mobile based banking, a cost effective alternative

Adoption of Mobile banking can lead to significant cost advantage in distribution of banking services. As per RBI estimates, it costs close to Rs.50 per transaction if conducted in a branch, an ATM transaction costs about Rs. 15 and a net based transaction costs the bank only around Rs. 4 primarily due to savings in real estate and personnel costs. Mobile banking transaction cost is expected to be of the same order as internet banking transaction cost.

Post the roll out of mobile broadband services mobile based banking transactions are expected to grow rapidly. Urban users will be early adopters for these services, however with increased awareness of the services, cost benefits and reliability; service adoption will increase significantly among rural subscribers. The volume of mobile banking transactions are expected to be over 340 million for the year 2015 resulting in a cost saving of approximately Rs. 11 billion.

Media and Entertainment

The Indian media and entertainment industry is one of the fastest growing industries in the country. Its various segments like film; television, advertising, print and digital among others have witnessed tremendous growth in the last few years. According to Federation of Indian Chambers of Commerce and Industry (FICCI) the media and entertainment industry in India is likely to grow at a CAGR of 12.5 percent over the period of 2009-13 and will touch Rs. 945 billion by 2013.

With a majority of the population between the age group of 20-30, and increasing disposable income in Indian households, the average spend on media and entertainment is likely to grow.

Impact on Media and Entertainment Segments

- Television – The television industry will expand by a CAGR of 11.4% per cent between 2009 and 2013 to reach Rs.420 billion[17] in 2013
  Digital distribution platforms for television such as Mobile TV are likely to get off the starting blocks with the introduction of mobile broadband services. However due to limited bandwidth growth of Mobile TV services may not be exponential.
- Music – Mobile handsets have increasingly become a preferred medium for accessing the music related services and advent of mobile broadband will further accentuate this trend. The current size of the Indian music industry is over Rs.6 billion[18] , however growth has been stymied by a rapid decline of sales of the physical music formats.
  With the advent of mobile broadband services other digital distribution platforms such as downloads, streaming and music subscriptions will proliferate and growth will be driven by the digital music segment. Digital music sales are expected to grow at a CAGR of 24 percent between 2009 and 2013 to reach Rs. 3 billion in 2013.[19]
- Advertising – Going forward, digital media advertising (internet and mobile) is expected to emerge as the medium of choice for advertisers. Mobile broadband will give advertisers an outstanding platform which allows them to deliver not just text-based content but also full motion video transfer or live streaming on the move. Mobile broadband will also be seen as an opportunity for screen-specific advertising, helping brands to better target their audience. Brand advertisers will be able to target

[17] [18] [19] PwC Analysis

consumers in a specific geographical area as well. Online advertising India is expected to grow with CAGR of 32 percent between 2009 and 2013 to touch Rs 20 billion in 2013.[20]

- Mobile Gaming – Gaming industry in India is still in its early stages but is showing huge potential due to sheer market size.

  In a survey of mobile phone users across the BRIC (Brazil, Russia, India and China) countries and the U.K., India ranked as the top mobile game market. Of the 355 respondents in India that identified themselves as mobile data users, 32 percent said that they play mobile games monthly, exceeding the UK mark of 15 percent.[21] Every month India sees about 6-7 million game downloads on the mobile phone.

  Today variety of games are available and many games are offered for free downloads, making games very popular among the mobile users.Highly priced downloadable games, slow download speeds and expensive GPRS enabled handsets are a few reasons contributing to slow growth of mobile gaming. Growth of third generation (3G) networks will enable wireless games to approach the quality of console games, thereby increasing in the number of mobile gamers.

  Mobile gaming is projected to grow from a size of Rs. 2.5 billion in 2008 to an estimated Rs. 12 billion by 2013; translating into a cumulative growth of 36 percent between 2009 and 2013[22] . Driven by the growth in the high-end segment of the mobile users, new content by mobile operators and the availability of 3G spectrum that enables ease of play mobile gaming is likely to comprise up to 74 percent of gaming industry revenues in 2013.

Agriculture

Mobile telephony maybe one of the most convenient means of communications for majority of rural Indians as wire line communication in rural India remains extremely poor. Mobile has become a reliable source of information related to their occupation. Typical information needs of farmers is given the table below

[20] [21] PwC Analysis
[22] Pyramid Research

Figure 30: Information needs of Farmers[23]

Stage		Typical Information Needs
Know- How	• Crop Choice • Seed Variety	• What are the new crop options or seed varieties? • Are there higher value crops or better seed varieties I could be planting?
Context	• Weather • Plant protection • Cultivation best practice	• When should I sow? When should I harvest given my climate/soil? • What are best cultivation practices for my crops and soil? • What inputs should I use? How best can they be applied? Where can I find them?
Market Information	• Market Prices • Marke Demand • Logistics	• What are the prices and demand in relevant markets? • Has there been a transport breakdown?

Source: PwC Analysis

Mobile communications in its current form provides farmers with benefits of improved convenience, time and travel savings. Mobile broadband will further help to widen markets, create better information flows, lower transaction costs and substitute for costly physical transport. Mobile broadband will integrate rural India with other parts of the country in numerous ways. For instance, fishermen can use mobile broadband to negotiate prices for their catch before heading for shore by sending in pictures of the type of fish they have on board. Similarly, farmers and horticulturalists who have perishable produce can take advantage of mobile broadband services to bargain for the best prices before harvesting, bypassing middlemen.

[23] ICRIER, Socio-Economic Impact of Mobile Phones on Indian Agriculture, Feb 2010

Benefits of Enhanced Information Access in Fishing and Agriculture

Small Farmers

- Increase in convenience and cost savings from using their mobile phones as basic communication devices to seek information such as input availability or to check on market prices
- Farmers benefit from improved access to information on seed variety selection, best cultivation practices, protection from weather-related damage, handling plant disease and price realisation.

Large Farmers

- Derive greater value from access to information on market prices and in dealing with input and disease problems.
- Extract greater benefit from being able to access resources to deal with input availability and disease control
- Able to access professional help immediately from the fields in case of plant disease.

Fishermen

- Larger catches (the fishing sector equivalent of 'yield') and Prevention of losses
- Decreased vulnerability and isolation while at sea
- Weather and optimal fishing zone information impact overall revenue by inducing fishermen to venture out to sea on days when they would otherwise have remained on shore.
- Mobile as an information platform could be used as a means to communicate newly accessed information to others and allowed even those who did not have access to service to share in the benefits.

(Source: ICRIER, Socio-Economic Impact of Mobile Phones on Indian Agriculture, Feb 2010, working paper no.246)

Impact on Agriculture

Mobile broadband will increase the penetration of rural internet kiosks based services such as ITC's e-choupal, which are currently available over limited geography mainly due to lack of wireline infrastructure. As per research done by ICRIER, ITC's e-choupal led to productivity gains between 10–40 percent primarily due to adoption of hybrid seed varieties and new farming practices by farmers. In addition, by providing the farmers access to information about prices not only in their local mandi but across the region, the e-choupal saves the farmer approximately Rs. 250-270 per ton through reduction in transportation, baggage and commission costs.

With advent of mobile broadband rural occupation based services currently available to smaller section of rural people is expected to expand rapidly to reach out people in remote areas also. As per PwC analysis, by 2015, due to the roll out of mobile broadband services 35 percent of rural villages (as per proposed 3G and BWA rollout obligation 50 percent of district headquarters is required to be covered by 2015) are likely to have access to mobile broadband. Through effective utilization of various mobile broadband based services, farmers are likely to save approximately Rs. 6 billion in 2015.

[24] Notice inviting application for 3G and BWA by DoT

The Future - Transformation of Government Service Delivery

"The Government of India runs a number of schemes involving payments to the citizen such as the National Rural Employment Guarantee Scheme (NREGS), Janani Suraksha Yojana etc. In order to cut down the intermediaries, Government has decided to directly credit the benefits into the beneficiary accounts. However, the fact that a large section of the population does not have bank accounts makes this a difficult task for the government. Even where citizens have managed to open a bank account, he/she incurs significant indirect costs such as transportation, loss of wages etc. to avail the benefit of the Government scheme. The inability of the citizen to withdraw money from his bank account at his convenience and at low costs remains the biggest challenge of adoption of this mechanism of Government payments through bank accounts. The ability to access the mobile linked No-Frills Account through mobile devices and the ability to deposit and withdraw money anywhere, anytime by the citizen will enable the Government in solving the "last mile" problem in reaching the benefits to the poor. In order to get Government Payments directly to the mobile linked No-Frills Account, the citizen would need to register the mobile linked No-Frills Account with the Government Agency.

Therefore, Key benefits of payments under Government Schemes through mobile phones are:

- Be passed on up to the last mile
- Be accessed easily and used by beneficiaries through mobile phones
- Cut down delay in the process
- Significantly reduce the indirect costs incurred by the beneficiaries
- Lower the dependence on beneficiaries
- Enable authentication of identities involved in transactions
- Enable end to end traceability of transaction "

(Source: Report of the Inter-Ministerial Group - Delivery of basic Financial Services Using Mobile Phones, Department of Information Technology (Ministry of Communication and Information Technology)

Government Services

Governments across the globe have realized the benefits of computerization and high speed connectivity in helping scale various e-governance initiatives. By leveraging connectivity the Government can process Government to Citizen (G2C) transactions such as the filing of tax returns, death and birth registration, land records, etc. as well as receive feedback helping enhance the level of Governance.

Mobile phone technology has drastically lowered the entry barriers for citizens in developing countries in connecting to government services. Launch of mobile broadband will allow citizens to get access to government services virtually in any place covered by high speed mobile network.

According to an estimate provided by Department of Information Technology, Government of India, approximately 50 to 60 percent of government services in India can be delivered through mobile channels. Indian Government launched an ambitious project to provide connectivity to the remotest part of the country through National eGovernance Plan (NeGP) starting May 2006. The plan consists of providing broadband connectivity (2mbps) for all state departments up to the block level and Common Service Centres (CSCs) on a public private partnership model. CSCs are typically kiosks managed by village entrepreneurs who charge a nominal fee for services rendered.

[25] Department of Information Technology, India

Currently more than 60,000[25] CSCs have already been established and Government is targeting to achieve the target of 100,00 CSCs in 2010-11. However these CSCs provide limited access of the various government and other services to the rural masses as each CSCs is catering to 6 villages on average, which is not sufficient. The reach of CSCs is limited due to the lack of wireline infrastructure in the remote areas. 3G and BWA with better rollout economics can enable the Government to reach out to all 600,000 villages with individual CSC.

IT and BPO services

Information Technology (IT) is an important part of any telecom business and is critical for smooth functioning across the organization. With the proliferation of technology, telecom operators are looking for partners who can reduce costs and risk, move assets off their books, reduce their headcount, and enhance customer satisfaction. Indian mobile operators started the practice of outsourcing IT operations, which lead to predictable IT spending, improved cash flow, and optimized use of technology resources.

As in the case of 2G services Indian operators are expected to extend IT outsourcing to address #G susbribers and services as well. This will result revenues of more than Rs. 40 billion for IT service providers over the period of 2010-2015.

In addition, almost all mobile operators in India have entered into call centre outsourcing deals, in which specialized third party vendors manage and operate the entire call centre operations. As per PwC estimates rollout of 3G will lead to additional revenue of approximately Rs. 50 billion over the period of 2010-2015 for the BPO industry.

Figure 31: Impact on IT and BPO sector

Revenue (2010-2015)	Rs. Billion
IT Service Providers	40
BPO Service Providers	50

Source: PwC Analysis

06

Key Enablers for driving uptake of mobile broadband

3G is expected to enhance broadband penetration; however constraints related to spectrum, access device and content must be addressed for sustainable growth.

Adequate bandwidth for rich media mobile broadband services

Globally, mobile operators have a 2 x 10 MHz to 2 x 15 MHz spectrum to enable service providers to promote data services aggressively. In India, though the government has taken a positive step towards 3G, the 5 MHz of spectrum may not be able to support data intensive services like video, especially given the spectrum crunch in the 2G bands. As per the analyst reports, based on 3GPP simulation, optimum data capacity of each 3G cell site for 5MHz bandwidth is only 7.2 Mbps capable of serving 250 data users per site with speed of 256 Kbps (assuming contention ratio of 1:10).

Availability of utility and diverse vernacular content

Content and applications for broadband are still not widely available in India. For mobile broadband adoption to grow, content and applications that make broadband Internet an everyday utility in the life of a user must be made available at affordable prices.

Business users seem to be the immediate beneficiaries of mobile broadband; stakes for rural India are even higher given the unparalleled benefits that broadband enabled applications such as telemedicine, m-commerce, m-education and m-governance can unleash. For this to happen, the availability of content that caters to the needs of the rural population is critical. The local language content would be a key enabler for the uptake of mobile broadband amongst the rural masses.

Affordable 3G enabled handset a key driver

Availability of affordable 3G enabled handsets would be a key driver for adoption of mobile broadband services in India. Although few handset manufacturers have already announced the launch of sub Rs 5,000 devices, however price levels for 3G handsets are not expected to reach the level of 2G handset prices in the absence of substantial volumes.

Notes

Notes

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