

MOBILE COMMERCE BEYOND ELECTRONIC COMMERCE: ISSUE AND CHALLENGES

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ABSTRACT

The increase of the flexibility and power of wireless deals provides proper opportunities for rising up services to customers. In fact, this could mean the real services providing in all times (Despite the person's place). In the current Business organizations, mobile commerce or M-Commerce has been entered in finance, services, retails, telecommunication and information technology services. In these sectors, M-Commerce is not only being widely accepted but also it is being more used as a popular way of business/ commerce. In this paper we try to provide an overview of the fundamentals about m-commerce and e commerce. This paper attempts to help business managers, particularly those without IT background, to understand the key elements and basic issues of m-commerce and to assess the impact of m-commerce on current and future businesses as well as to identify new business prospects. In this paper we view M-Commerce as activity of conducting E-commerce transactions using mobile terminals over a wireless network. Finally, we'll look briefly into the situations of the mobile telephony market both in the world and India.

Key Words: Mobile Commerce, Business Organizations, Wireless Technologies, E- Commerce, Security

1. INTRODUCTION

Mobile is becoming the dominant means for accessing communications primarily because deploying mobile network is not only more cost-efficient but also mobile provides greater flexibility and convenience to its subscribers than landline telephone (Sanjay, 2007). Mobile Commerce is the subset of e-commerce, which includes all e-commerce transactions, carried out using a mobile (hand held) device (Sharma, 2009). In fact the main difference in M-commerce definition with E-commerce uses the wireless net for performing financial, services and purchases. In other words in M-commerce all kinds of trends such as business-to-consumer, business-to-business and consumer-to-consumer are there. The booming popularity has forced the corporate world to develop a new commerce platform

that can reach to masses. Mobile commerce has attracted massive traffic because of its unique characteristics. The user can change the service of any financial institute or banks if gets better product and service or user is unsatisfied with the service of the subscribing company. Mobile has played a giant role in communication technology through its versatility and superiority. The ubiquity and easy usage has further made it extremely popular across the globe. It has already surpassed the fixed phone in the world. Software platform is essential for operating any mobile and this tool has revolutionized the communication world because of its functioning as a small computer. (Kumar, 2009) Despite of huge popularity of mobile commerce, it is yet in the initial stage and can be further expand in to all the fields, which affect the human life.

2. PURPOSE OF STUDY

Mobile commerce has become the latest topic for today. Business organizations have been restlessly evaluating the revenue potential of the m-commerce market and developing business models to exploit the huge profit potential of this new market. So the main purpose of this paper is to:

- Provide an brief description about mobile wireless technologies
- Provide an overview of the fundamentals about m-commerce and e commerce.
- Understand the relationship between m-commerce and e-commerce.
- Help businesses to define what benefits they could derive from mobile commerce.
- Show what are the categories of mobile commerce applications
- Understand the situation of the Indian mobile telephony market and m- commerce

3. RESEARCH APPROACH

In an attempt to learn as much as possible about the Mobile Commerce, we conducted in depth research to obtain most of the necessary data. Through content analysis of firm disclosure data, historical data analysis, company case studies, and sector reports, we gained much valuable information pertaining to our research. We used secondary sources of data collection such as the Internet, websites, books and magazines etc.

4. REVIEW OF LITERATURE

4.1 Mobile wireless technologies

Mobile commerce, which is commonly referred to as m-commerce, has become an important concept in today's business environment (Rottenberg, et al. 2002).

Mobile commerce involves the use of mobile computing devices in carrying out different types of economic transactions or enabling them to take place over space and time. The m-commerce includes use of such technologies as SMS¹ services over a number of carriers (GSM², IS95³, CDMA⁴, W-CDMA⁵), Bluetooth applications, and the integration of low-level digital carriers to IP based services through WAP⁶ or Compact HTML⁷ like the Japanese I-Mode service. This integration is one of the fastest growing markets of E-business and it will involve the development and design of a host of new applications, services, business models and technological solutions (Lyytinen, 2001).

On the other hand, According to Malladi et al. (2002), mobile wireless technologies consist of two aspects—mobility and computing. They claimed that mobile computing represents

¹ : Short Message Service

² : Global System for Mobile Communications

³ : Interim Standard 95 (IS-95) is the first CDMA-based digital cellular standard by Qualcomm. The brand name for IS-95 is cdmaOne. IS-95 is also known as TIA-EIA-95.

⁴ : Code division multiple access (CDMA) is a channel access method used by various radio communication technologies.

⁵ : W-CDMA (Wideband Code Division Multiple Access), UMTS-FDD, UTRA-FDD, or IMT-2000 CDMA Direct Spread is an interface standard found in 3G mobile telecommunications networks

⁶ : Wireless Application Protocol

⁷ : HTML, which stands for Hyper Text Markup Language, is the predominant language for web pages.

users' continuous access to network resources without limitation of time and location. Wireless means that transmission of any form of data—text, voice, video or image—is conducted through radio waves, infrared waves or microwaves rather than using wires (Dubendorf, 2003). Therefore, mobile wireless technologies is defined as any wireless technology that uses radio frequency spectrum in any band to facilitate transmission of text data, voice, video, or multimedia services to mobile devices with freedom of time and location limitation.

The freedom of time and location is related to the concept of anytime and anywhere access that represents the two main characteristics of mobile wireless technologies: mobility and reachability (BenMoussa, 2005; Camponovo & Pigneur, 2003; Ng-Kruelle et al., 2002; Turban, et al. 2002).

4.2 Mobile Commerce: beyond electronic commerce

Electronic commerce has attracted significant attention in the last few years. This high profile attention has resulted in significant progress towards strategies, requirements, and development of e-commerce applications (Upkar, 2002 & Kalakota, 1999). The growth forecast for both business-to-consumers (B2C) and business-to business (B2B) aspects of e-commerce over the next few years is phenomenal by any standard. One point that should be made here is that nearly all e-commerce applications envisioned and developed so far assume fixed or stationary users with wired infrastructure, such as a browser on a PC connected to the Internet using phone lines or a Local Area Network (LAN). We envision many new e-commerce applications will be possible and significantly benefit from emerging wireless and mobile networks. We term these applications “wireless e-commerce” or “mobile commerce”.

Mobile commerce is a natural successor to electronic commerce (Mahil, 2008 & Au, 2007). With the rapid proliferation of mobile devices, including mobile phones, PDAs¹, and handheld computers, mobile commerce is widely considered to be a driving force for next-generation e-commerce (Ting, 2004).

M-commerce should not be viewed as e-commerce with limitations, but rather as a unique form of e-commerce with its own unique benefits (Scornavacca et al., 2006). Additionally, m-commerce is not a substitute for PCs. Rather; it is a new and a much more powerful way to communicate with customers.

Ubiquity, intimacy, time sensitivity and location awareness are key concepts that make mobile commerce so different from ‘traditional’ e-commerce (Paavilainen, 2002). The other difference between m-commerce and e-commerce is the opportunity to connect information with objects in a more direct way than has been possible until now (Mobile Commerce, 2008).

While electronic commerce continues to see phenomenal growth, mobile commerce is still in its infancy. However, as wireless network grows, it is expected that emerging wireless and mobile networks will provide new avenues for growth in mobile commerce, create new business models for mobile operators and offer new applications to business and consumers (Coursaris and Hassanein, 2002, Kumar and Zahn, 2003).

According to the Gartner Group, consumer to business e-commerce will soon come from smart phones using mobile commerce technology. Many researchers suggested that next phase of electronic business growth will be in wireless and M-commerce (Ngai and Gunasekaran, 2007, Smith, 2006, O'Connell, 2005, Matthew, et al, 2004, Urbaczewski, et al, 2003). To better understand the potential impacts of mobile commerce on businesses, a quick review of definition and background information about it would be helpful.

¹ : Personal Digital Assistant—handheld wireless computer

M-Commerce is also known as mobile electronic commerce or wireless electronic commerce. It is believed to be the next gold rush after e-commerce. Business organizations of different industries are rushing to stake a claim (Stafford et al., 2003). However, m-commerce is many things to many people. Some people conceive m-commerce as an extension of e-commerce to mobile phones. Some people think it is another new channel after the Internet. In general, m-commerce refers to any transaction with a monetary value that is conducted via a mobile telecommunications network. According to this definition, m-commerce represents a subset of all e-commerce, including both business-to-business and business to consumer. M-Commerce uses the internet for purchasing goods and services as well as sending and receiving messages using hand-held wireless devices. Wireless web applications will enable users with Internet enabled cell-phones.

M-Commerce is believed to be driving fundamental changes in the way business is conducted in many industries, particularly in telecommunications, information technology, media and financial services. M-commerce is so important because it represents the extension of the Internet beyond the static terminal of the PC, or even the television, into a more nimble, anytime, anyplace and anywhere context. It will enable millions of people to access web information services wherever they go (Yeo et al., 2003)

Today, the mobile Internet is emerging even faster, in part because providers, content partners, customers, and investors are leveraging lessons from e-commerce. Cellular carriers, both nationally and globally, have made significant advances to enable next generation data or "wireless Web" services and mobile, "m," -commerce. Broadly defined, m-commerce involves an emerging set of applications and services people can access from their Web enabled mobile devices (Sadeh, 2002).

Yet, m-commerce is facing many obstacles as an emerging market, particularly in the U.S. For example, in addition to lack of standards, cost and speed issues, a Yankee Group (Yankee Group, 2002) survey suggests that U.S. consumers are not convinced they want or need mobile services and many think it is simply too complicated. This is in contrast to other global markets in Asia and Europe where "going online" means reaching for a mobile handset, not turning on a PC. In Korea, for example, reports suggest that one-third of all mobile phone subscribers use their handsets for m-commerce activities (InStat, 2002).

4.3 Various Mobile Commerce Applications

Many more people have access to a mobile phone than to a computer and this means that m-commerce has the opportunity to connect not just big businesses but also small business and consumers on a massive scale. In this sense, mobile phones have the potential to bridge the digital divide and allow organizations and individuals to reach out to one another more easily than ever before (Mobile Commerce, 2008).

After the appearances of a new technology a remarkable growth occurs in it. This has been the same in mobile commerce.

Mobile Commerce has gained increasing acceptance amongst various sections of society in last few years. The reasons for its growth can be traced back to technological and demographical developments that have influenced many aspects of the socio-cultural behavior in today's world. Mobile services have registered impressive growth in preceding years and m-commerce is slowly but surely showing signs of a healthy growth.

Table 1 lists the major mobile commerce applications along with details of each (Gordon & Gebauer, 2001; Sadeh, 2002; Hu, 2005).

[Insert Table 1 about Here]

Travel and Ticketing: By utilizing the B CODE technology or NFC¹ technology we could use the mobile phone as a means receiving E-Tickets. B CODE tech consists of sending text SMS which is scan able from the mobile phone display screen through the related set. So by receiving the chosen SMS, the ticket is practically received and we could present the mobile phone to the scanning machine at the ticket receipt spot.

Commerce: Commerce is the exchange or buying and selling of commodities on a large scale involving transportation of goods from place to place. It is boosted by the convenience and ubiquity conveyed by mobile commerce technology. There are many examples showing how mobile commerce helps commerce. For example, consumers can buy products from a vending machine or pay a parking fee by using their cellular phones, and mobile users can check their bank accounts and perform account balance transfers without needing to go to a bank. (Hu, 2005)

Education: Similar to other wired technologies, mobile wireless technologies have first been used in industry sectors such as business. The movement of mobile wireless technologies in education is a recent trend, and it is now becoming the hottest technology in higher education (Levine, 2002; McGhee & Kozma, 2001; McKenzie, 2005).

Enterprise Resource Planning (ERP): In the coming mobile commerce era, users will want to be able to have access to the right resources and work as efficiently as possible– whether they are traveling, seeing a customer or working at other remote locations– with their ERP systems (Siau et al., 2001). Many ERP vendors are currently researching for means to provide mobility to ERP users. They attempt to connect employees to their work more effectively than ever before by enabling mobile phones and other wireless devices to become a new kind of tool to seamlessly exchange information, automate data entry and perform a range of transactions anytime, anywhere (Siau and Shen, 2003).

Entertainment: Entertainment has always played a crucial role in Internet applications and is probably the most popular application for the younger generation. Mobile commerce makes it possible to download game/image/music/video files at anytime and anywhere, and it also makes on-line games and gambling much easier to access and play. It is projected that by 2005, 80 percent of all mobile users in the United States and Western Europe will play mobile games at least occasionally (Leavitt, 2003).

Health Care: The cost of health care is high and mobile commerce can help to reduce it. By using the technology of mobile commerce, physicians and nurses can remotely access and update patient records immediately, a function which has often incurred a considerable delay in the past. This improves efficiency and productivity, reduces administrative overheads, and enhances overall service quality. Mobile technologies such as PDAs, Laptops or Tablet PCs can be of great value in hospitals and healthcare facilities by allowing better access to critical information – e.g. patient status, staff and patient location and facilities availability (Larkin 2001; Banitsas, 2002; Chau et al. 2004; Varshney 2004; Rowley 2005). Healthcare facilities that choose to adopt such technologies may be able to not only perform better but ultimately provide more efficient and better quality of care for patients (Bahlman et al. 2005).

Inventory Tracking and Dispatching: Just-in-time delivery is critical for the success of today's businesses. Mobile commerce allows a business to keep track of its mobile inventory and make time-definite deliveries, thus improving customer service, reducing inventory, and enhancing a company's competitive edge. Major delivery services such as UPS and FedEx have already applied these technologies to their business operations worldwide with great success.

Traffic: Traffic is the movement of vehicles or pedestrians through an area or along a route. The passengers in the vehicles and the pedestrians are all mobile objects, ideal clients of mobile commerce. Also, traffic control is usually a major headache for many metropolitan areas. Using the technology of mobile commerce can easily improve the flow of traffic in many

¹ : Near field communication

ways. For example, a mobile handheld device can have the capabilities of a GPS, such as determining the driver's exact position, giving directions, and advising on the current status of traffic in the area. A traffic control center could also monitor and control the traffic according to the signals sent from mobile devices in the vehicles.

4.4 The benefits of Mobile Commerce for people and organizations

By utilizing mobile commerce the user is simply and at every place and times, able to access his/her own data. The main advantage of M-commerce comparing to E-commerce also exists in. In fact while the use of E-commerce is provided only when the user is at his/her own home or workplace or in any other location he/she has to access media such as, Internet, TV.... M-commerce merely need the Mobile-phone. However this doesn't bear the meaning that M-commerce is limited to ordinary applications like reading E-mail or reporting. Within the pass of time the services and ample abilities of M-commerce are getting more popular and more complete than the E-commerce. Generally, M-commerce has several major advantages to consumers:

Context-specific services – M-Commerce makes it possible to offer location based services, which are specific to a given context (e.g. time of the day, location and the interests of the user).

Time-critical situations - The ubiquity and immediacy of Mobile Commerce allows user to perform urgent tasks in an efficient manner, irrespective of his current geographic location.

Spontaneous decisions and need- Spontaneous needs are not externally triggered and generally involve decisions that do not require a very careful consideration, e.g. purchase decisions involving small amounts of money.

Efficiency increase - Mobile Commerce helps increase the productivity of the workforce by increasing the efficiency of their daily routines. Time (employees) can use 'dead spots' in the day, e.g. during the daily travel to and from workplace, more effectively.

[Insert Graph 1 about Here]

4.5 Mobile Telephony Market in the world

Mobile phones are no longer just a means of calling another person. In several countries, mobile devices are used to pay for merchandise, receive time sensitive information and send e-mail messages (Paavilainen, 2002). There is no doubt that mobile technologies have the potential to bring changes to businesses and industries (Gordon, 2001). Despite the recent economic downturn, the use of ICT services, such as mobile phones and the Internet, continues to grow worldwide. By the end of 2009, there were an estimated 4.6 billion mobile cellular subscriptions, corresponding to 67 per 100 inhabitants globally (International Telecommunication Union, 2010).

[Insert Table 2 about Here]

According to above figure, China's largest mobile carrier's total mobile subscribers increased to 886.3 million in April 2011. China has the potential to move quickly towards m-commerce. In India, Wireless subscriber base increased from 635.51 Million in June-2010 to 652.42 Million at the end of July-2010 registering a growth of 2.66%. Wireless Tel density stands at 55.14 (Telecom regulatory authority of India, 2010).

The number of mobile phone users in Brazil grew to 187 million in July (2010), according to the telecommunications regulator Anatel. In July, 1.89 million new users were added, an increase of 1.02 percent over June. In the first seven months of 2010 Brazil recorded 13.06 million new users, the second best result for this period in history, behind only the same period in 2008 (14.35 million). With the result in 2011, Brazil now has 110.35 mobile phone users for every 100 inhabitants (Telecompaper, 2010).

4.6 Mobile Telephony Market and Mobile Commerce in India

India is going through a telecom revolution, especially in the wireless telephony segment. The adoption of mobile telephony remains unparalleled in scope, as users from diverse segments increasingly choose to exercise the option of personal mobility (IAMAI, 2006). Via, mobile phone users can be informed of different news such as stocks and financial markets, traffic, incidents, economical, cultural and sports. The growth of an infrastructure sector such as telecom has a multiplier-effect on the entire economy of the nation. Fortunately the telecom sector in India, since its liberalization in 1991, has registered an unprecedented growth and is therefore valued at \$100bn today, contributing significantly (13%) to the GDP. Globally in terms of mobile subscriptions, India is the world's second largest wireless market after China.

[Insert Graph 2 about Here]

With a subscriber base of more than 811 million, the mobile telecommunications system in India is the second largest in the world and it was thrown open to private players in the 1990s. Government and several private players run local and long distance telephone services. Competition has caused prices to drop and calls across India are one of the cheapest in the world. The rates are supposed to go down further with new measures to be taken by the Information Ministry. The mobile subscriber base has grown from 33.69 million subscribers in 2004 to over 811 million subscribers as of March 2011 (a period of less than 7 years) (Telecom regulatory authority of India, 2010). Nevertheless in India, mobile commerce is still in the development phase as the use of mobile phones for carrying out transactions is very limited. However, the development is taking place at a nice speed and in the coming years, mobile commerce is most likely to make its presence feel as companies and businesses have started understanding the benefits of mobile commerce. Some of the companies have even incorporated this technology. Airtel, ICICI, Reliance are some of the companies/businesses that are using this technology as their users are allowed to make limited purchases from their phones. For now, the users are mainly allowed to pay phone bills, utility bills, book movie tickets, book travel tickets with their cell phones. However, more services will be introduced in coming years. Security is one of the main concerns of Mobile Commerce as it's very important to offer secure transactions and this is the reason why M- Commerce is still in the development phase in India. For now, users are mainly allowed to do Mobile Banking i.e. to access the bank account with a cell phone in order to pay the utility bills. With the current rate of development, users will be soon allowed to purchase products, advertise, to take part in auctions and pay bills with the help of a cell phone, while they are on the move.

5. CONCLUSION

The ease of communication with goods and service presenters, in 24 hrs and without any locational limitations, has caused an everyday popularity increase in mobile trading. Both the telecommunications industry and the business world are starting to see m-commerce as a major focus for the future. As m-commerce applications and wireless devices are evolving rapidly, one will take forward the other one towards empowering innovation, versatility and power in them. There are a number of business opportunities and grand challenges of bringing forth viable and robust wireless technologies ahead for fully realizing the enormous strength of m-commerce in this Internet era and thereby meeting both the basic requirements and advanced expectations of mobile users and providers. The mobile Internet channel has opened up new possibilities. There is a big gap between technology's capabilities and the consumer's expectations. But, the good news is that problem areas like slow transmission speeds and high costs are being addressed by operators and equipment manufacturers. M- Commerce players need to improve the user interface soon and implement innovative pricing structures. Despite the initial frustrations of the users, consumers envision that once the glitches are worked out, mobile applications will become an integral part of their daily lives. On the other hand, Investing in m-commerce has its risks. While there is potential for a lot of money to be made, there is also potential to lose everything. Organizational and system changes in a business to allow for m-commerce can

be huge, and that means a lot of extra cost. Getting a return on this type of investment can take a long time, and businesses aren't always prepared to stay afloat until they recoup that money. Another big cost concern is the implementation of earmarks for consumer safety and confidence. A consumer who uses a device for mobile e-commerce needs to feel secure doing so. No security can mean any business for an e-commerce company. Because customers must provide personal and financial information, stability and reliability of the systems the businesses use must remain high. However, in India Mobile services have registered impressive growth in preceding years and m-commerce is slowly but surely showing signs of a healthy recovery.

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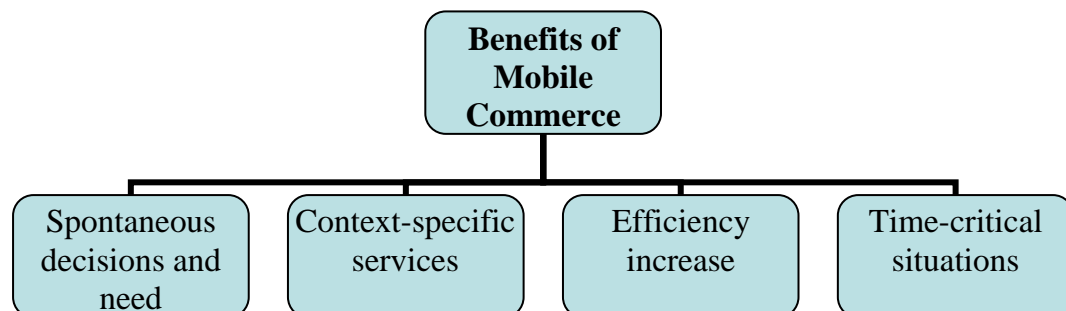
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Table 1: Major mobile commerce applications

Mobile Category	Major Applications	Clients
Travel and ticketing	Travel management	Travel industry and ticket sales
Commerce	Mobile transactions and payments	Business
Education	Mobile classrooms and labs	Schools and training centers
Enterprise resource planning	Resource management	All
Entertainment	Games/images/music/video downloads and online gaming	Entertainment industry
Health care	Accessing and updating patient records	Hospitals and nursing homes
Inventory tracking and dispatching	Product tracking and dispatching	Delivery services and transportation
Traffic	Global positioning, directions, and traffic advisories	Transportation and auto industries

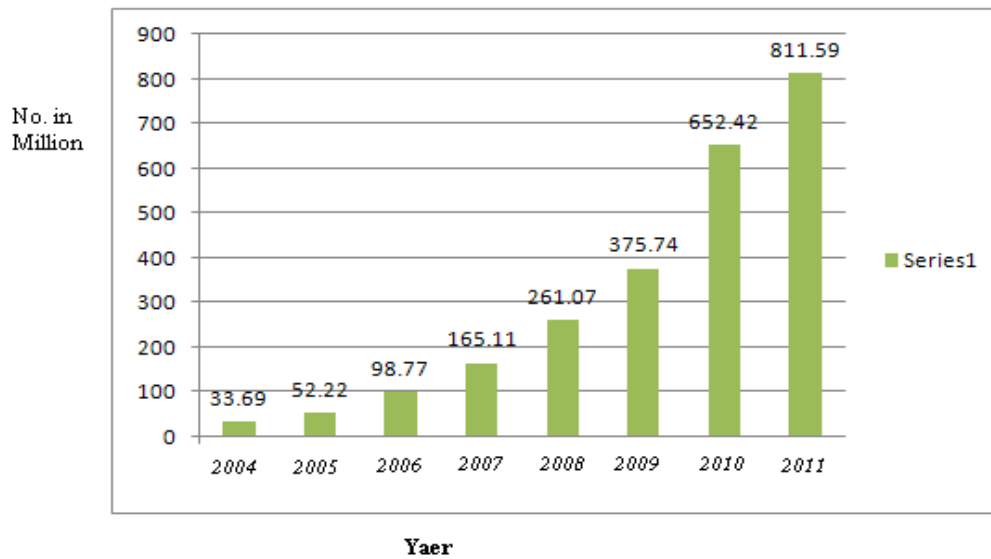


Graph 1: Specific advantages of mobile commerce to consumers

Table 2: List of countries by number of mobile phones in use (2010-11)

Rank	Country or region	Number of mobiles	Population	% of population
---	World	Over 5 billion	6,909,500,000	-
1	China	886,300,000	1,341,000,000	67.1
2	India	811,589,101	1,210,193,422	67.98
3	United States	302,947,098	310,866,000	96
4	Russia	220,550,000	142,905,200	151.9
5	Brazil	212,600,000	190,732,694	110.35
6	Indonesia	168,264,000	237,556,363	73.1
7	Japan	107,490,000	127,370,000	84.1
8	Germany	107,000,000	81,882,342	130.1
9	Pakistan	105,151,871	171,901,000	63.2
10	Nigeria	90,583,306	140,000,000	64.7

Graph 2 lists the number of India mobile telephony subscriber base from 2004 to 2011



Data sources: (IAMAI, 2008 & Telecom regulatory authority of India, 2010)