

A Review on Opportunities and Challenges for Mobile Business Activities in India

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ABSTRACT

Technological progress has enormous significance for the development process of a nation as well as an individual business organization. Mobile business technology is the proliferation of mobile telephones, wireless enabled personal digital assistance and other services that enable the user to make purchases and transactions anywhere, any time. This supports mobile business activities. In India, mobile business service covers banking industry, share markets, customer shopping, office automation, packaging, hotel & tourism, pharmaceutical industry, construction industry etc. This paper aims to elicit the opportunities and challenges for mobile business activities in business to customer, business to business and customer to customers in various business industries and sectors with special reference to India in the form of a review. The impact of mobile business on business activities and the driving forces to adopt m-business are identified. It also provides discussion on advantages of m-business over e-business to strengthen the mobile business framework in the country.

Keywords : Mobile business Technology, Mobile business activities, Mobile Business Services.

I. Introduction

The convergence of wireless devices and the Internet is creating an important new channel to business and the next wave of change across industries. Mobile business (also called m-business) is doing any activity with profit motivation like promotion, buying, and selling of goods and services online through electronic data communication networks that interface with wireless (or mobile) devices. Mobile business is a subset of mobile computing, which is the accessing of information systems by wireless means. Many of the issues that affect mobile computing in general also affect mobile business. Mobile business will enable

organizations in every industry to expand their markets, improve their services and reduce their costs. M-business can best be described as the transaction of data between mobile devices. The most significant factor driving M-business is undoubtedly the proliferation of mobile telephones, wireless-enabled personal digital assistants (PDAs) and other devices that enable users to conduct transactions anywhere at any time.

Much of the discussion surrounding M-business has been narrowly focused on m-commerce, a subset of M-business that involves the use of mobile devices for marketing, selling and buying products and services over the Internet, "third generation" (3G) networks, or other supporting technologies. But it is believed that M-business is a far greater one that will build on organizations' e-business transformations and capabilities and provide the backdrop for a further qualitative shift in business operations. M-business will comprise a broad spectrum of applications, from communication and entertainment to consumer transactions and corporate services. These services will not be limited to one particular type of relationship, like business-to-consumer (B2C), but also will include business-to-business (B2B), business-to-employee (B2E), consumer-to-consumer and device-to-device relationships. For this reason, M-business has been dubbed A-A business : anytime, anywhere.

M-business is not just e-business without fixed connections, but it is an entirely new way of designing and deploying a wide range of systems and solutions that are :

- Personal.
- Convenient.
- Easy to use.
- Always available.
- Accessible in real time.
- Location sensitive.

Analysts predict that in the next five years the penetration of mobile devices will outpace that of televisions — and the more users have such devices, the more services they will demand.

But behind the scenes, there are other drivers moving this revolution forward, which include :

- Advancements in network technologies - Mobile-network operators around the world are investing large sums of money in licenses and in building a new generation of networks. Network technologies that can support always-on connectivity will allow users to immediately send and receive voice and data services. At the same time, business investment is continuing apace in innovation at other levels of the network. Device manufacturers are

creating prototypes of the products that might exist in the near future, and the race is on to create new standards for operating platforms.

- Falling costs for airtime and wireless devices - The cost of mobile devices and basic services such as voice and short messaging service (SMS) has plummeted. No longer is the mobile device a status symbol. It is becoming an intrinsic part of everyday life for millions of people.
- The ability to link elements in different value chains, in real time, to provide a dynamic, personalized service - Businesses those link services, many of which already exist independently, will streamline their customers' transactions. For example, linking aeroplane ticket purchases, car rental bookings and hotel reservations, then communicating all the information via messaging to mobile devices, would make travel planning easier. In order to offer these new services, businesses are beginning to enter into new alliances and partnerships, both within and outside their industries. This process in itself creates new possibilities and new business opportunities. M-business raises critical questions about strategic adaptation for every organization. It will herald the emergence of entirely new value chains and business models, not to mention new levels of personalized service. It will lead to new business alliances and a wave of convergence between industries. At a fundamental level, it will enable organizations to dynamically reconfigure their value chains and develop new relationships with employees, suppliers, customers and competitors.
- The ability to tailor services for end-users' various needs — Taking one-to-one marketing to a higher level — will become a new source of competitive advantage. By changing the nature of communication and interaction, customer relationship management will take on a new dimension. M-business will also facilitate efficiency gains through workforce management. Mobile technologies offer the potential for tasks to be scheduled for the right worker, with the right set of tools, at the right location and at the right time. They also increase the likelihood that customer enquiries can be resolved on the first port of call.

Organizations that succeed at M-business will have to do more than simply place supply chain management systems onto mobile devices, or mobile-enable enterprise resource planning (ERP) solutions. They will have to capture business "events" and translate them in real time into whatever format is required. Transaction volumes will be high, and the required service levels will far exceed those delivered by today's technology solutions. M-business is set to make a major difference in all aspects of operations and management, and it opens up a whole avenue of major top-line revenue growth opportunities and bottom-line productivity

gains for organizations in all industries. Organizations need to examine where their prospects for efficiency gains and improvements to customer service. This means anticipating changes in all areas of their value chains, which include : Administration, Human resources, Research and development, Production, Purchasing and sourcing, Sales and marketing, Distribution and logistics. Wireless technologies for mobile commerce can be roughly categorized into mobile client devices for interactivity (or m-commerce terminals) and communications infrastructure (Aithal and Varambally 2006)

(1) Mobile Client Device Technologies and Issues

The interactivity devices or mobile client devices currently most important to wireless e-commerce are mobile telephones, handheld computers, laptop computers, and vehicle-mounted interfaces. Hybrid devices are now appearing, such as the crosses between mobile phones and handheld devices (sometimes called smart phones), but the question remains as to what form the devices will ultimately take, which is an important issue for mobile system developers. Usability will become more critical with handheld and phone devices, which differ from desktop and laptop computers in terms of their smaller screen sizes, less available memory, and limited input devices. Many handheld devices are limited to a few lines of text, and do not have traditional keyboards. One usability issue is the need for organizations to determine how people can best use applications and access information through different devices.

Wireless devices have forced developers to carefully revisit both operating systems and applications software on a variety of platforms. Operating systems such as Microsoft's Pocket PC and Palm's PalmOS have been developed for handheld devices. Although this software meets some of the current needs, it has limited functionality. The creation of system software with increased functionality for devices with limited capabilities will be an ongoing challenge. Another important building block for this emerging infrastructure landscape may be the Wireless Application Protocol (WAP), which enables wireless devices such as mobile phones to access the Internet. Many WAP-enabled devices have already appeared, although there is doubt as to whether WAP will become a globally accepted standard, especially with the popularity of Japan's i-mode. Developers ultimately face the issue of deciding which set of protocols to accept, or risk the potential problems of working with multiple standards and/or choosing to ignore some.

(2) Communications Infrastructure Technologies and Issues

The communications infrastructure necessary for the wireless Internet environment is quite complex. Wireless devices are likely to remain at a disadvantage over their wired counterparts in terms of bandwidth. Limited bandwidth is a significant problem that requires organizations to rethink how users interact through a wireless device with an information system. An important issue is how to create efficient applications that can realistically work with current technology.

(3) Local Area Network Technologies

IEEE 802.11 and IEEE 802.11b are established wireless standards commonly used with laptops or personal computers for wireless local area networks. This technology provides speeds of 1 to 11 megabits per second (Mbps). Bluetooth is a relatively new, inexpensive short-range wireless standard that allows different devices (such as laptops and mobile phones) to communicate with each other. The maximum distance between devices is about 100 meters, and data exchange rates are 1 to 2 Mbps. HiperLAN is a set of wireless LAN standards, primarily used in Europe, which provides speeds up to 20 Mbps.

Issues that must be addressed concerning local area network technologies include a lack of compatibility between the different standards and the related difficulties involved with devices trying to interface with more than one communications environment. Frequencies used for wireless LANs are expected to become very crowded very fast. There has also been recent concern about possible interference problems between different signals of different standards.

(4) Telecommunications Technology

There are three basic “second-generation” (2G) digital wireless telephone technologies – time division multiple access, Global System for Mobile communication (GSM), and code-division multiple access. All these are circuit-switched services, where a user must dial-in and maintain a connection when data communications are desired. GSM is the most widely used of the three technologies, especially in Europe; its current speed is only 9.6 kilobits per second (Kbps). General Packet Radio Service (GPRS), based on GSM, is a continuous packet data service. Using this technology, network connections are “always-on”, and mobile users need not dial into the Internet each time they need to access an application. GPRS promises data rates from 56 to 114 Kbps. GPRS communication channels are used on a shared basis, only sending or receiving packets as needed, rather than maintaining a continuous dedicated line as with circuit-switched services.

UMTS (Universal Mobile Telecommunications System) is a so-called “third-generation” (3G) technology. It offers broadband, packet-based transmission at rates that will exceed 2 Mbps. Based on GSM, UMTS is the planned global standard for mobile users. Once UMTS is fully implemented, computer and phone users can be constantly attached to the Internet and have access to a consistent set of services worldwide.

Many of the issues with telecommunications technologies are similar to those found with LANs. There are distinct bandwidth limitations with the older generation technologies, which make it difficult to develop efficient applications for all technologies.

Standards vary from country to country, making it difficult for devices to interface to networks in different locations. An additional issue is the high initial cost of establishing a wireless network that uses these technologies.

(5) Other Wireless Technology Issues

Security of wireless information is another important technical issue in m-commerce. Users and organizations will want assurance that their wireless communications and transactions are not intercepted. Organizations that set up wireless LANs must realize that there are no physical boundaries limiting their networks, and that people and devices outside the organization may have (inadvertent) access to their systems. Frequency hopping can make it more difficult to intercept data communications. Encryption technologies can also help, but will need to be made more efficient and more foolproof. The increased use of wireless devices for e-commerce makes the issue of positive identity verification even more important yet more difficult to ensure. One consequence of this need is the increasing importance of biometrics. Location technologies, especially the Global Positioning System (GPS), will also play a large part in wireless communications. However, privacy issues must be addressed, such as how personally-identifiable data and location data should be used.

(6) Global M-Commerce

The global use of wireless technologies and applications adds another layer to the problems and issues in m-commerce. One important issue is the current lack of standardization throughout the world. Mobile phone standards vary from country to country and even within a country. A global initiative for universal standards would foster greater growth in m-commerce. A significant issue is the disparity in the adoption of wireless technologies and applications in different regions of the world. Japan will probably be the first to implement 3G technologies, followed by Europe and the United States. The primary reason for the U.S. lag is that the United States has not had the same demand for increased mobile capacity as

Europe and Japan. Fewer Americans use wireless devices than individuals living in Asia or Europe, and current American users exhibit lower usage rates than Asians and Europeans. Therefore, the overall demand for 3G will be slower to reach critical levels.

II. Features of Mobile Business

(1) Value Propositions for M-business

Value propositions define the relationship between supplier offerings and consumer purchases by identifying how the supplier fulfils the customer's needs across different consumer roles (Porter, 1998). Specifically, it defines the interdependence between the performance attributes of a product or service and the fulfillment of needs. The value proposition furthermore solidifies the relationship between the customer and various dimensions of product value. Thus, customer satisfaction is merely a response to the value proposition offered by a specific product/service bundle. For e-business, the establishment of a value proposition is rudimentary to any consumer-oriented strategy creation.

The mobility afforded wireless devices shapes M-business into a disparate entity from conventional e-business. Consequently, value propositions are likely to be new, different and novel for mobile e-business. The primary advantage of mobile devices is to provide a superior offering of value-for-time to users. That is, by accessing the Internet/SMS through mobile devices, users will be able to realize additional value allowances for any specified period of time, which fixed-line users will not be able to achieve. Information may now truly become available anytime, anyplace and on any wireless device. As such, value propositions of e-business will be forced to change to reflect the underlying dimensions of value-for-time for users. Specifically, M-business differs from e-business on the following value proposition attributes (Varambally and Aithal 2009) :

1. Ubiquity : Mobile devices offer users the ability to receive information and perform transactions from virtually any location on a real-time basis. M-business users will have a presence everywhere, or in many places simultaneously, with a similar level of access available through fixed-line technology. Communication can take place independent of the user's location. The advantages presented from the omnipresence of information and continual access to commerce will be exceptionally important to time-critical applications.

Mobile businesses, for example, can leverage this value proposition by providing alert notifications, such as for auctions, betting, and stock price changes, which are specified by the user as an important part of relevant personal content. As such, the real-time, everywhere presence of M-business will offer capabilities uniquely beneficial to users. Industries that are

time and location sensitive, such as financial services and travel, are likely to benefit from businesses exploiting this value-added feature of mobile business.

2. Convenience : The ability and accessibility provided from wireless devices will further allow M-business to differentiate its abilities from e-business. People will no longer be constrained by time or place in accessing e-business activities. Rather, M-business could be accessed in a manner which may eliminate some of the labor of life's activities. For example, consumers waiting in line or stuck in traffic will be able to pursue favorite Internet/SMS based activities or handle daily transactions through M-business applications. Consumers may recognize a special comfort which could translate into an improved quality of life. One opportunity to increase value lies in M-business capabilities that allow consumers to shop at where they are not located. This ability to obtain information and conduct transactions from any location is inherently valuable to consumers. As such, M-business offers tremendous opportunities to expand a client-base by providing value-added services to customers. By making services more convenient, the customer may actually become more loyal. Consequently, communication facilities within M-business are key applications for the delivery of convenience. Consumers will be looking for M-business applications which can deliver functions like : sending and receiving e-mail, voice mail forwarding, conference calling, faxing, document sharing, instant messaging; as well as transactional based activities.

3. Localization : Knowing the location of the Internet/mobile user creates a significant advantage for M-business over wired e-business. Location-based marketing, via global positioning technology, will soon be available in all mobile devices. Through GPS technology, service providers can accurately identify the location of the user. Utilizing this technology, M-business providers will be better able to receive and send information relative to a specific location. Since mobile devices like cell phones are almost always on, vendors will know the location of their customers and can deliver promotions based upon the likely consumer demands for that location. Location-specific information leverages the key value proposition of M-business over traditional e-business by supplying information relevant to the current geographic position of the user. M-business providers will be able to both push and access information relevant to the user's specific location. Mobile web-sites may serve as points of consolidation of consumer information and disseminate the relevant information for a particular location based on profile data built on the user's past behavior, situation, profile and location. As such, real time discounting may become the "killer application" for M-business.

4. Personalization : Mobile devices are typically used by a sole individual, making them ideal for individual-based target marketing. Mobile offers the opportunity to personalize messages to various segments, based upon time and location, by altering both sight and sound. New developments in information technology and data-mining make tailoring messages to individual consumers practical and cost-effective. For example, upon employing mobile Internet device, advertising messages tailored to ones individual preferences can be provided. Relevance of material and the "de-massing" of marketing becomes possible through the personal ownership of mobile devices.

5. Conditions of Usage : The mobile user may be engaged into another activity, like travelling, meeting people, etc., rather than sitting in front of his/her desk top terminal.

6. Adaptability : Mobile business applications should be adapted to the environment of their clients. Adaptability is possible along various dimensions including the type of the device in use, the currently available communication bandwidth as well as location and time.

7. Broadcasting : Some wireless infrastructures, such as cellular architectures and satellite networks, support broadcasting (i.e., simultaneous delivery) of data to all mobile users inside a specific geographical region. Broadcasting offers an efficient means to disseminate information to a large consumer population. This mode of operation can be used to deliver information of common interest to many users such as stock prices, weather information or for advertising.

A value proposition is developed as superior consumer value is created through an increasingly targeted Internet experience for mobile users. For M-business, the technological limitations magnify these value-for-time propositions. It has been estimated that every additional click-through, which a user needs to make in navigating through a commercial online environment with a mobile device, reduces the possibility of a transaction by 50 per cent (Durlacher Research, 2000). Providing the user with the desired, most relevant information without forcing a complex click-through sequence will significantly improve the effectiveness of any mobile e-business strategy. Value-for time propositions become maximized for those business strategies best able to implement M-business's distinguishing capabilities. M-businesses will become differentiated from traditional e-business based upon their abilities to integrate and actuate the advantages to the mobile devices. Various applications may provide differing value for mobile Internet users.

(2) Implications of the Mobile Devices

Mobile devices that are of interest to mobile communication can be divided into four categories based on their processor, memory and battery capacity, application capabilities (SMS, WAP, Web, I-mode), as well as physical size and weight. These categories are (from weakest to strongest) :

- (a) usual voice handsets with SMS capability,
- (b) WAP phones,
- (c) communicators/PDA with wireless communication capability, and
- (d) laptops with wireless communication facilities.

To be easily carried around, mobile devices must be physically light and small. The smaller and lighter the devices are, the *more portable* they are. In addition, a mobile device should be a multipurpose device (voice phone, data transmitter, PDA, etc.) so that the user does not need to carry too many gadgets. Portability considerations, in conjunction with a given cost and level of technology, will keep mobile elements having less resources than static elements. The devices have small screens and small multifunction keypads; the former fact necessitates the development of appropriate visual user interfaces, different from the PC or laptop. They have comparably less memory, disk capacity and computational power than traditional computing devices. Portable devices rely for their operation on the finite energy provided by batteries. Even with advances in battery technology, this energy concern will not cease to exist. This is because the conserved energy depends primarily on the weight, volume of the battery. There are higher risks to data stored and transactions performed in mobile devices, since it is easier for mobile devices to be accidentally damaged, stolen, or lost than fixed devices.

(3) Implications of the Wireless Networks

The necessary networking infrastructure for wireless mobile computing in general combines various wireless networks including cellular, wireless LAN, private and public radio, satellite services, and paging (Wesel, 1998). As compared with wire-line networks, wireless communications add new challenges:

C-autonomy : The handsets in the wireless radio networks are normally not always communicating with the network infrastructure, i.e., they are unreachable. There are numerous reasons for this behavior that can be described under C(ommunication)-autonomy (Veijalainen, 1990). First, disconnections may be voluntary, e.g., when the user deliberately avoids network access during nighttime, or while in a meeting, or in other places where the

user does not want to be disturbed. In cases that the handset does not have voice capabilities, and thus disturbing is not a big issue, it is still often reasonable to cut the wireless communications with the network to reduce cost, power consumption, or bandwidth use. The break in on-going communication or incapability to set up any communication can also happen against the will of the user, e.g., when a user enters a physical area where there is not any or not enough field strength for a successful communication battery becomes suddenly empty, or hand-over between base stations does not succeed and the connection is therefore lost.

Bandwidth restrictions and Network topology : In the case of many wireless networks, such as in cellular or satellite networks, communication channels have much less transfer capacity than wire-line networks. This is caused by the fact that the used modulation and channel allocation schemes designed for voice traffic have rather modest upper bounds. Further, wireless communications are much more error prone than wire-line communications and require much redundancy in the channel coding of the payload.

Asymmetric communications : Some wireless networks offer asymmetric transfer capacity for up- and downlink. The asymmetric transfer capacity on uplink and downlink can be applied in a reasonable way if the network offers broadcast facility. This is unfortunately not a strong side of the telecom networks, because they were designed for connection-oriented point-to-point communications. Wireless LANs are better in this respect, because they apply packet broadcast protocols. GSM networks have broadcast facility on the control channels, but the amount of application data that can be transferred on them is small. The currently very popular short messages (max 160 characters) are an example of such data that is transferred over control channels. If used, e.g., to broadcast multimedia contents over the network, the network would collapse, because controlling the traffic would not be possible any more. Still, the asymmetric transfer capacity is an important asset in cases where the wireless client usually sends a short request and gets a large data set as a response.

Variant bandwidth and bursty traffic : Currently, multi-network terminals are emerging that can use several networks to communicate. Typical forerunners are the dual-band devices that are able to use 900 MHz and 1.8 GHz GSM networks. New products are emerging to the market that are able to also use WLANs and possibly Bluetooth, together with GSM, GPRS, and soon also UMTS network infrastructure. Wireless technologies vary on the degree of bandwidth and reliability they provide. In this respect one can speak of variable bandwidth.

Another phenomenon also observable in the wireless world is bursty traffic which is the case with Internet-type networks and this holds in different time scales.

Variant tariffs : For some networks (e.g., in cellular telephones), network access is charged per connection-time, while for others (e.g., in packet radio), it is charged per message (packet). In the WAP environment there is a larger variety of tariffs, e.g., session-based, transaction-based, connection time-based, while in mobile e-commerce the range of tariffs is even wider.

Mobility : GSM infrastructure allows roaming all over the world, i.e., the user can get access to voice and data services basically in any other GSM network. Mobility causes diverse phenomena. The available bandwidth might vary, for instance, a mobile terminal may rely on low-bandwidth networks outdoor, while inside a building it may be offered reliable high-bandwidth connectivity or even operate connected via wire-line connections. Moreover, there may be areas with no adequate coverage resulting in disconnections while on the move. There may be also variability in the provision of specific services, such as in the type of available printers or local weather reports. Furthermore, the services offered by the telecom network used might differ from those at home. This might have drastic consequences for mobile business, if the e-commerce infrastructure used needs them. Finally, the resources available to a mobile element vary, for example, a docked computer or PDA has more memory or is equipped with a larger screen. Mobility also raises very important security and authentication issues.

Mobile business Value Chain :

As described by Barnett et al., (2000), transport, basic enabling service, transaction support, presentation service, personalization support, user application, and content aggregators are the seven links in the mobile business value chain (illustrated in Table 1).

Table 1 : Mobile Business Value Chain.

S.No.	Link Name	Function
1	Transport	To maintain and operate the infrastructure and equipment to guarantee data communication between mobile users and application providers.
2	Basic enabling service	To provide services such as server hosting, data backup, and system integration.
3	Transaction support	To provide the mechanism for assisting transactions, for security, and for billing users.
4	Presentation service	To convert the content of Internet-based applications to a wireless standard suitable for the screens of mobile devices.

5	Personalization support	To gather users' personal information, which enables personalized applications for individual users.
6	Content aggregators	To provide information in a category or search facilities to help users find their way around the Internet.
7	User applications	To carry out mobile commerce transactions for Mobile consumers.

From the perspective of a transaction, the following entities are the main participants in mobile business:

- 1. Customer.** He or she can initiate a transaction in one place, receive the service in another place, and complete the transaction in a third place. The places can be in different cities, states, and countries.
- 2. Content provider.** It provides customers specific content, which can be transmitted through a WAP Gateway or through a portal.
- 3. Mobile portal.** Different from an Internet portal, it offers customers services with a greater degree of personalization and localization.
- 4. Mobile network provider.** It plays different roles in mobile business varying from a simple mobile network provider to an intermediary, portal or trusted third party, depending on where it stands in the mobile business chain.

III. Opportunities & Challenges for Mobile Business Activities in India

India is at a stage where all trends suggest an imminent surge in M-business. The IT Act, convergence, e-governance initiatives, mobile technology and infrastructure, the globalization of the economy, the distinct drive within public and private sector firms for efficiency and the use of technology to achieve this are all good signs. M-business has already started changing the rules of the game on the Indian business front. An integration of mobile technology with e-business offers significant business advantages and opportunities beyond e-business. Global projections are astonishing with Strategy Analytic predicting the total revenue from M-business transactions to reach US\$ 500 billion by 2008 (Ozair et al., 2003 [6]). Statistical predictions in the Indian context too seem to be optimistic. Remarkable cellular phone penetration, and the increasing Internet subscriber base in India has definitely set a conducive ground for M-business revolution.

Today the Indian consumers have a host of options available and thus can choose a mobile device that suits her/his budget and lifestyle. Further more, cell phone manufacturers, service providers, and software/network providers have started coming together to let the Indian

consumer to get a feel of M-business phenomena. Indian cellular players are continuously striving to delight customers by increasing their coverage and introducing value added services. Cellular infrastructure rollout is faster than fixed line and in 2002, it is estimated that the cellular subscriber base will surpass that of the fixed line by 2008. But, due to unpredicted growth, cellular subscriber base surpassed that of the fixed line by 2006. In fact the growth of cellular infrastructure in India is fast becoming an index of development of states. States like Maharashtra, Gujarat, Andhra Pradesh and Karnataka are getting expensive coverage in every district and town. Although early winning M-business applications like mobile messaging, ticketing, stock trading, banking have become widespread in developed countries, it seems to be gaining grounds in Indian market as well. Banks are teaming up with cellular service providers to provide a full range of m-banking facilities to its customers. HDFC bank is the first Indian bank to offer mobile banking services followed by others like ICICI and Global Trust.

In India, the people are not worried about online payment. But they are worried about the security aspects. M-business sites have to be certified by an authority, like Verisign, which helps to build confidence about a site. Instead of online payment, cash on delivery is a very good model for India. Companies forcing their customers to make online payments are not good. Instead, they should look at educating their customers and then asking them to make use of the online payment mode. It was believed that the major hurdle would be posed by an absence of reliable bandwidth backbone and affordable Net access device. But presently the availability of optimum bandwidth as a result of adapting new mobile technology (3G) and the availability of handheld wireless Internet devices in the range of Rs. 1,000 to 3,000 certainly boost the M-business market in India.

The following sectors in India will get benefit under M-business transformation :

1. Banking industry : Possible facilities that could be offered include Account Balance Enquiries, Last 'n' transactions, Utility Bills Payment, Cheque clearing notifications, Inter account Transfers, Statement and Cheque book requests, Access to Portfolio management and other share dealing services.
2. Share market industry : Mobile phone-based stock trading allows users to receive instant updates on market information. The system allows users to identify which stock they are interested in and what levels of alert they want. The warnings are then sent to the user's handset, and then they can buy or sell immediately without going to a computer.

3. Shopping : Many mobile service providers have planned to launch services that promote shopping using mobile. Fabmart, Zee marketing are few examples. Customers can pay for their purchases through their mobile phone bills. Text message shopping is already in use to buy books, CD etc., at bargain rate.
4. Building and construction materials industry : The fragmented nature, geographical spread and multiplicity of levels in the distribution structure for most products in this industry offers unique challenges and opportunities for e-business and M-business initiatives. M-business adaptation in this sector would be driven by factors such as improving brand building and customer services, penetrating markets in the semi-urban and rural pockets, improved dealer management, and ensuring timely supplies and services.
5. Metal industry : M-business adaptation in the metal sector would be primarily driven by working with lower inventories and adapting IT techniques and catering the customers through remote devices. This will increase market coverage and widen distribution reach, improved dealer management and controlling cost at every stage of the value chain. Metals, as commodity, also provide considerable scope for on-line tendering and auction applications.
6. Office automation industry : The Indian office automation industry is another potential candidate to adopt M-business strategies to its sales and service. The major benefits would be improved customer service, wider market coverage, and marketing and procurement costs reductions.
7. Packaging industry : The Indian packing industry is another potential sector for adopting M-business. Handling order taking and order placement through mobile, the package industries can improve supply efficiency, customer service and market coverage.
8. Indian engineering industry : Indian engineering industry is another potential candidate for M-business implementation. Front-end activities like enhanced customer service and receiving new order, and back-end activities like enhanced vendor communication and booking purchases can emerge key priority areas in this industry.
9. Electrical and electronics industry : Implementing e-business and M-business in these industries is expected to result in improved sales and customer service through better information dissemination.
10. Chemical industry : Indian chemical and Petro-chemical industries have considered on-line business as a cost reduction tool. By adopting these strategies they would improve supply chain efficiency and reduce marketing / procurement costs.

11. Hotels and tourism industries : Booking hotel rooms and resorts at any time, at any place can be done through M-business options.

12. Pharmaceutical industry : Indian pharmaceutical industry views M-business as a tool that would aid community building, and to smaller extent, reduce costs through better supply chain management. They also expect to use this medium to provide people with more information on diseases and the products used to cure them.

13. Logistics industries : Both transportation and warehousing parts of logistics are potential candidates for M-business implementation due to the fact of increase in products sold on-line.

The need to move a large volume of small parcels and the increase in customer expectations.

14. Auto – components industry : The Indian auto-component industry is another prominent candidate for M-business implementation. Due to the increasing competition in the domestic market and threat of imports, necessitating widening of market reach, and exploring export markets.

15. Lottery and Betting : All on-line lotteries and betting can accept the bets through the message delivered by SMS. The M-business technology allows not only mobile betting but also, using a mobile video-phone, be able to watch the actual race while moving on the road or while travelling in an aeroplane.

16. Mobile positioning services : With mobile positioning services the mobile phone could become a personal tracking device, allowing your family friends and employer to know where you are at all times. Mobile positioning integrates with satellite positioning systems and let people tell others where they are.

Advantages of M-business over E-Business :

E-business has conquered the world. Despite the bursting of the dotcom bubble, it is hard to believe today how one managed to transact any business in the early 1990s without the Internet. Whether employed for information, support or advertising, nearly every business in the world of any size has a website. E-business has revolutionized how many companies do business, allowing for new business models and spawning completely new types of businesses. Like e-business that preceded it, M-business as a transformational force is here to stay. In the next few years, mobile business or M-business will emerge as a powerful new approach for conducting business. It will become as pervasive by 2008 as e-business had become by the late 1990s. While the transformation induced by M-business would be dramatic, it would not necessarily replace e-business. M-business would enhance existing e-business functions and applications and launch new ones, totally mobile instead of being tied

to desktop terminals. In many ways, M-business would establish new patterns of doing electronic transactions, over and beyond what fixed-line e-business is capable of. E-business happened because of the combined efforts of the personal computer, telecommunications, software, and office technology industries. M-business, similarly, is happening because of the combined efforts of the world's mobile handset manufacturing, telecommunications, computers, software, and office technology industries. In this massive global business, M-business is appearing as a new platform for creating product and service differentiation. Internet and e-business helped drive the supply and demand for multimedia computers. The underlying chip and display technology are upgrading at tremendous speed and as the mobile business matures, it would transform the handset – rendering it as different from its predecessors as today's desktop PC screen is from the green-tinted, non-graphic PC screen of the early 1980s.

The variables that are likely to set M-business apart from e-business are as follows :

(1) User Experience

The biggest differentiator between e-business and M-business is the sensory experience of the user. In e-business, the user is in a stationary position in front of a PC terminal, and interfaces the content using a keyboard and point-and-click devices. In M-business, this is replaced by total mobility and the terminal can be voice or touch activated.

(2) Different Terminals

A disposable terminal is probably the most radical way of describing how different terminals could be. Today's manufacturing technology aided by the unrelenting progress of Moore's law will allow an ever-increasing differentiation of terminal offerings. Terminals that are bendable, so that they can be rolled up, have been demonstrated at trade shows. Miniature sized terminals allow for packaging into ever-changing shapes and forms. Pre-paid phone service is just the introduction to other pre-paid services, complete with 'free' terminals. Multimedia is here to stay and will continue to evolve.

(3) Multi-Transaction Services

M-business services could be scheduled and delivered in multiple ways. Users can choose to have a variety of services delivered at the times and places that they specify. In some cases, the services can be pre-scheduled (for peak hours, late night, birthdays, etc.). In still other cases, the network and the device can make intelligent assessments of what services are needed and proffer such services.

(4) Integration with Enterprise Applications

With M-business, a business enterprise could move most of its capabilities out into the field. Services and applications that required office visits and meetings could now be delivered while moving with full access to all enterprise applications residing on business IT and information systems.

(5) Field Third Party Applications

Terminals that are M-business ready can receive services not just from the primary wireless service providers but also from a variety of third-party providers. Most of these third-party providers would work through the wireless service operators. In some cases, the terminal may be able to communicate directly to third-party wireless service providers, through ad-hoc information exchange set ups or direct connectivity. The source of applications and information therefore becomes transparent to the user.

(6) Geographic Positioning

From a continent to the corner of a street, M-business networks would be able to locate the user and tailor the service mix to the geographical location, keeping in view the constraints and opportunities of the geographical setting as well as the preferences of the user. A service would therefore work differently in India than in Honk Kong, London or New York based on profiles or regional preferences.

(7) Mobile Flexible Configurations

Today's user profiles – whether in e-business or M-business settings – show the way to flexible configurations. But rather than requiring manual setups and changes, the m-services of the future will be automatically configured. So the minute a user leaves the home area, the service will be automatically configured with ring-tones, forwarding information and even downloaded information as the user travels. If the user wants to configure it in a new way, a simple code will download a new configuration.

(8) Integration with Mobile Services

New M-business services would be easy to integrate with pre-existing mobile services. For example, M-business offerings could easily incorporate a variety of existing messaging services, SMS and e-mail. They could also use conference bridges, network based calling, voice mail as well as many emerging services like downloadable hand-set applications, Multi-Media Messaging and information services.

(9) Mobile Flexible Services

With easier integration of services, users would be able to avail of pre-packaged as well as programmable service-mixes. Some M-business systems would offer a service bundle from which the users would be able to choose and blend a variety of services.

(10) Flexible Location

With M-business, the user can work, do daily chores, and/or play at work, home, recreational, shopping, and vehicular locations. The coming blurring of roles in the era of M-business will spawn multiple opportunities as well as trigger major social changes.

(11) Network-enabled M-business Services

Extrapolating existing business approaches and paradigms into new areas is the most obvious way of looking into the future. For M-business, the problem with this approach – treating M-business as a simple extrapolation of e-business – is that it fails to take into account the dramatic differences (as well as different capabilities) between the two. Some of the most dramatic differences are screen size and the mobile user experience. But equally important are the fact that M-business services will be built (assembled) from different ‘piece-parts’ than e-Business. Wireless service operators will deliver some of these ‘new’ piece-parts and many of these are being discussed and implemented today. Examples include location information Application Programming Interfaces (APIs) and services. Certainly in future, there will be other, as-yet-unknown service piece-parts.

(12) Basic Data Transport Services

At the most basic level, adding data transport capabilities to simple mobile voice telephony opens up some opportunities for M-business. The evolution of Web-browsing from today’s slow WAP speeds to higher data rates will revitalize some of this market. Pure data transport to support custom terminal based network applications, like those used by today’s package delivery services, will continue to grow as enterprises start to capitalize on higher speed data transport to develop new business productivity and enhancement applications.

(13) Additional Network Services

Enhancing basic mobile data access and web-browsing capabilities with additional network services and specialized terminals add more value to the M-business concept. Examples of this include the handheld device, which provided mobile email and messaging capabilities. Present day technology provides GPS capabilities in the mobile phone, making it a useful device for navigating in cities as well as in wilderness. Multi-media messaging is certainly positioning itself as a major value added service, replacing today’s SMS as a key data

service. Some network data services will utilize location information, for example delivering messages only in certain areas.

(14) APIs for Network Services

APIs for network services allow for tighter service integration of Messaging, Location Based Services, Usage monitoring, and Billing. These API's are intended to be used by third parties or business enterprise applications to offer services that are more closely integrated with network services, utilize network billing or deliver services that are based on where the user is located.

(15) Additional Services

As an additional value-adding step, the wireless operator can offer additional M-business oriented services providing complete value added information, tracking, billing or messaging services. These complete service packages can be utilized by business customers in order to develop more complete applications for their users.

(16) Complete Integrated Service Packages

As an ultimate value-adding step, the M-business service provider can design and offer fully integrated service packages that solve complete problems.

IV. Impact of Mobile Business Activities in India

In India, like any other country, M-business will change the way the businesses are being carried on. It will lead to the emergence of new businesses as well as business practices and also a new role for intermediaries. Indeed, all the functional areas of business will undergo change as follows :

- The new technology will transform business processes, the way products and services are created and marketed, dynamics of competitions, the organization structure of the enterprise and the nature of the enterprise itself. This will include product design, manufacturing, marketing, supply chain management, customer and sales management, product development etc.
- Local proximity may no longer be a significant factor in retaining customer. Local markets will be replaced by global markets. Indeed it may bring to reality the goal of ideal making the whole world as one family.
- Transparency and openness continue and will continue, to be effective business strategy. Already many businesses have started recognizing key customers, employees and suppliers more like a partner in the business. M-business will lead to better customer service, more personalized products, reduced costs, supply chain efficiency and faster time to reach market.

The most significant aspect of m-business is new market development. The m-business links and the infrastructure, initially set up in communication sector, can be successfully used in other sectors.

- The change in the business functions will lead to new business models and create new set of facts and circumstances that can materially change the incidence of taxation.
- The Internet will emerge as a new platform for marketing of products and services that will displace and rebuild existing economy. It will affect organizational structure; require different skills for negotiation, new regulatory and legal framework, electronic money, taxation and many other things. The evolution of m-business will have profound impact on competition, mobility of enterprises, effect on consumer behavior, changes in the way the work is defined and managed. The net will enable businesses to save time on product design, design according to the individual customer specification, order and delivery of components, tracking sales and getting feedback from customers.
- The businesses can have virtual project team, virtual learning space so that the employees who are dispersed over various countries can work together as if they are together in one physical room. Business can be connected to the retail points in order to ascertain market trends, demand of the products and with the suppliers upstream to order the desired requirements. Better demand forecasting and stock replenishment can lead to significant reduction in the cost.

(1) Impact on direct marketing :

Product promotion M-business enhances promotion of products and services through direct, attractive and interactive contact with customers.

New sales channel M-business creates a new distribution channel for existing products. It facilitates direct reach of customers and the bi-directional nature of communication.

Direct savings The cost of delivering information to customers over the Internet results in substantial savings to senders when compared with non electronic delivery. Major savings are also realized in delivering digitized products versus physical delivery.

Reduced cycle time The delivery of digitized products and services can be reduced to seconds. Also, the administrative work related to physical delivery, especially across international borders, can be reduced significantly, cutting the cycle time by more than 90 percent.

Customer service Customer service can be greatly enhanced by enabling customers to find detailed information online. Also, intelligent agents can answer standard e-mail questions in seconds and human experts' services can be expedited using help-desk software.

Corporate image On the Web based business, newcomers can establish corporate images very quickly. Corporate image means trust, which is necessary for direct sales. Traditional companies such as Telco, HCL, Reliance, Mahindra, and Birla use their Web activities supporting mobile business to affirm their corporate identity and brand image.

(2) Impacts on organizations :

Technology and Organizational Learning: Rapid progress in M-business will force companies to adapt quickly to the new technology and offer them an opportunity to experiment with new products, services, and processes. New technologies require new organizational approaches. For instance, the structure of the organizational unit dealing with M-business might have to be different from the conventional sales and marketing departments. To be more flexible and responsive to the market, new processes must be put in place. This type of corporate change must be planned and managed.

Changing Nature of Work: The nature of work and employment will be transformed in the Digital Age; it is already happening before our eyes. Driven by increased competition in the global marketplace, firms are reducing the number of employees down to a core of essential staff and outsourcing whatever work they can to countries where wages are significantly less expensive. The upheaval brought on by these changes is creating new opportunities and new risks and forcing us into new ways of thinking about jobs, careers, and salaries. The Digital Age workers will have to become very flexible. Few of them will have truly secure jobs in the traditional sense, and all of them will have to be willing and able to constantly learn, adapt, make decisions, and stand by them.

New product capabilities: M-business allows for new products to be created and existing products to be customized in innovative ways. Such changes may redefine organizations' missions and the manner in which they operate. M-business also allows suppliers to gather personalized data on customers. Building customer profiles as well as collecting data on certain groups of customers, can be used as a source of information for improving products or designing new ones. Mass customization, as described earlier, enables manufacturers to create specific products for each customer, based on his or her exact needs. For example, Motorola gathers customer needs for a cellular phone, transmits them electronically to the

manufacturing plant where they are manufactured, along with the customer's specifications and then sends the product to the customer within a day.

(3) Impacts on Manufacturing :

M-business is changing manufacturing systems from mass production to demand-driven and possibly customized, just-in-time manufacturing. Furthermore, the production systems are integrated with finance, marketing, and other functional systems, as well as with business partners and customers. Using Web-based ERP systems, orders that are taken from customers can be directed to designers and to the production floor, within seconds. Production cycle time is cut by 50 percent or more in many cases, especially when production is done in a different country from where the designers and engineers are located. Companies like IBM, General Motors, are assembling products for which the components are manufactured in many locations. Sub-assemblers gather materials and parts from their vendors, and they may use one or more tiers of manufacturers. Communication, collaboration, and coordination become critical in such multitier systems. Using electronic bidding, assemblers get sub-assemblies 15 percent to 20 percent cheaper than before and 80 percent faster.

(4) Impacts on Finance :

M-business requires special finance and accounting systems. Traditional payment systems are ineffective or inefficient for electronic trade. The use of the new payment systems such as electronic cash is complicated because it involves legal issues and agreements on international standards. Nevertheless, electronic cash is certain to come soon and it will change the manner in which payments are being made. In many ways, electronic cash, which can be backed by currency or other assets, represents the biggest revolution in currency since gold replaced cowry shells. Its diversity and pluralism is perfectly suited to the Internet. It could change consumers' financial lives and shake the foundations of financial systems and even governments.

Driving Forces behind m-business :

The various driving forces behind M-business can be listed as below:

1. **Global Customers.** Customers are people who may travel anywhere or companies with global operations. Global IT can help provide fast, convenient service.
2. **Global Products.** Products are the same throughout the world or are assembled by subsidiaries throughout the world. Global IT can help manage worldwide marketing and quality control.

3. **Global Operations.** Parts of a production or assembly process are assigned to subsidiaries based on changing economic or other conditions. Only global IT can support such geographic flexibilities.

4. **Global Resources.** The use and cost of common equipment, facilities, and people are shared by subsidiaries of a global company. Global IT can keep track of such shared resources.

5. **Global Collaborations.** The knowledge and expertise of colleagues in a global company can be quickly accessed, shared, and organized to support individual or group efforts. Only global IT can support such enterprise collaboration.

6. **Ubiquity & Personalization.** Doing business anywhere, anytime, and any amount of time called ubiquity and providing the customized information or service to the customer by knowing his personality, geographical location and his interest.

7. **Ideal Business.** The ability to provide ideal business characteristics for intangible products, m-business model make it to resemble as ideal business model.

V. Conclusion

This paper aims to elicit the opportunities and challenges for mobile business activities in business to customer, business to business and customer to customers in various business industries and sectors with special reference to India in the form of a review. The impact of mobile business on business activities and the driving forces to adopt m-business are identified. It also provides discussion on advantages of m-business over e-business to strengthen the mobile business framework in the country.

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