

# Case studies in m-commerce applications using mobile phones: potential for micro & macro level user groups in India

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## Abstract

The extension of the use of a mobile phone into electronically transacted commerce seems to be a natural phenomenon that was quite expected. Banking transactions, seat bookings and short message services (SMS) done through mobile phones are a few examples of the rapidly growing m-commerce phenomena the world over. This is also happening in India. However there are clear differences in the very usages of a mobile phone between different User groups. Local culture seems to influence not only local usage patterns but also has potential for innovation. This paper attempts to understand some issues behind the rapid adaptation of the mobile phone through two case studies. The case studies report two new applications designed and simulated on mobile phones – one each at the micro and the macro level. The first case study shows the heuristics of designing a macro commerce application for travelers' information needs for people traveling across the nation. The second study reports a design solution for a micro level transaction at a local store. These case studies yield some of the heuristics of designing m-commerce applications on mobile phones. They indicate that the potential for m-commerce at micro level is higher than that of macro level despite the later having a larger user base.

## Keywords

M-commerce, Usage, Cultural Issues, Micro & Macro level Users, Mobile Internet.

## Introduction

Mobile phone based commerce (m-commerce) offers a new paradigm of utilizing mobile phones for enhanced transactional services that benefit the user and at the same time generate huge business volumes for the service providers with additional benefits of low costs. There has been a number of past researches and implementation that have established the effectiveness of using M-Commerce for business institutions. In 2005 the total global m-commerce revenues were 22.2 USD millions and in 2009 the total global revenues is estimated to be 88 billions.[1] Although m-commerce was a concept which was beneficial to customer as well as to the wireless carriers and the service providers, the service lacked its predicted acceptance levels in its early phase. This was mainly due to the lack of compelling features in phone devices and networks for doing transactional processes. The interface on most phones was inadequate for any real data entry and the wireless networks only recently have the capacity and connectivity for the content that is associated with making a purchase. Evolution trends in handsets and wireless networks that has taken place in the last four years is shown in Table 1.

Category (in Millions)	2004	2005	2006	2007	2008(expected)
Smartphone	18	57	88	120	156
3G handset	20	50	110	223	363
Mobile TV handset	NA	NA	19	39	55
Total	38	107	217	382	574
Market Size (all handsets)	646	796	956	1070	1167
<b>Penetration Rate %</b>					
Smartphone	3.0	7.0	9.0	11.0	13.0
3G handset	3.0	6.0	12.0	21.0	31.0
Mobile TV handset	NA	NA	20	4.0	5.0
Total	6.0	13.0	23.0	36.0	49.0
<b>Annual Growth %</b>					
Smartphone	0	217	54	36	30
3G handset	0	143	121	102	63
Mobile TV handset	NA	NA	NA	105	41
Total	38	107	217	382	574
Market Size (all handsets)	NA	178	103	76	50

Table 1. Trends in Hand set technologies and growth. Source: Deutsch Bank Research, ROA Group. [1]

The table clearly shows that Smart phones with user friendly features are predicted to lead the replacement demand in high-end handsets. This trend is further justified by the fact that most global vendors are trying their best to add smart phones to their product portfolios. As smart phone markets are expected to grow during 2007 with the expansion of 3G, it will have a positive impact on data and transaction intensive services such as in m-commerce applications.

In addition to this the wireless operators continue to offer new products and services that are suitable for mobile users. All these factors have made it essential for a market to be evaluated beforehand. However unlike e-commerce research studies, empirical explorations of m-commerce are beginning to attract attention in a country like India. Several questions and uncertainties exist in a mobile user research strategy. One major problem in m-commerce research is the lack of standards in terms, concepts, and theories. Since this is only the onset it is essential for an m-commerce product to fulfill user expectations in terms of perceived needs, perceptions, cultural acceptance and technology.

Various sub-segments of users making up the potential market segments exist. Some of them already traceable for possible development into large scale m-commerce applications are as follows [2]:

- *Mobile Ticketing*
- *Mobile Vouchers/Coupons/Loyalty Cards*
- *Content Purchase & Delivery*
- *Location Based Services*
- *Information Services*
- *Mobile Banking*
- *Mobile Brokerage*
- *Auctions*
- *Mobile Purchase*

However it is pointed out here that the listing shown above indicates implementations at macro level segments. Macro level segments are defined here as consisting of users from widely distributed geographical regions in India. The users are from the upper income groups and belong to either metros or big cities. The services listed above are aimed at a pan Indian user. The features of such services are optimized for volumes and are generalized in terms of design. The features though tuned to the users' needs are entirely under the control of the service provider. In contrast there is a set of users which is defined here as micro level. This segment is middle class and lives in towns and villages. This segment has limited use for the pan India macro level services available on a mobile phone. This segment is rapidly increasing in number and has high potential. For a macro service provider the pan India user statistics may look bigger and therefore attractive but when seen in terms of potential for number of transactions it is posited in this paper that the micro level segment has much more potential.

### **Cultural Impute in M-Commerce**

Although the demand for m-commerce is increasing, the scope for global products are limited as different cultures and consumers have diverse needs and expectations of the capabilities of their mobile devices. For example in US users prefer large screen while in Japan users opt for confinement and small screens. Also according to a recent research [3] done to study adoption and usage difference in Hong Kong and UK it was found that the distributions are markedly different between Hong Kong and UK. UK mobile phone users have a wider experience of m-commerce services. Only 23% of Hong Kong users have had experience of the two core services (voice and SMS). In contrast, half the UK users have experience of six m-commerce services (two core services plus four additional).

According to Patricia Harris, Ruth Rettie & Cheung Chak Kwan [3], these differences arise mainly from two factors. The major factor is the m-commerce infrastructure availability. It apart from focusing on the m-commerce infrastructure availability for product implementation it is also essential to know the adoption and usage patterns of the culture. This knowledge is essential for knowing the market potential of a product prior to its implementation. Although India can be considered as a country marked by eastern traits, individual traits existing within different regions in India and different social groups are very prominent. Hence it becomes very important to examine the applicability of an m-commerce product at micro level than at macro level.

### **India and M-Commerce**

Very few industries have witnessed the kind of growth telecom has seen in India. In the last five years the mobile has literally been a part of the upward mobility of the average Indian. The tea vendor, the taxi driver, the farmer, the housewife, just about everyone has a monthly budget to keep their mobile phone alive. Early 2006 approximately 98 million (TRAI March 2006)[4] people in India owned mobile phones. Late last year in a single month 2.9 million new Indian mobile phone subscribers added: the GSM subscriber base grew by 2.11 million users (for a total of 65 million) and the CDMA platform added 0.8 million (for a total 20 million).

According to Internet and Mobile Association of India, the m-commerce market size is reported to be moving from Rs 5000 cr. to Rs 9500 cr. by 2007. Telecom Regulatory Authority of India (TRAI) states that 30% of the land area in India is covered by m-networks. The subscribed include 300 million (13%) of the Indian population.

Many big names like Tata, Reliance and Bharti are in the telecommunications arena. Also India is the second largest mobile handset market in the world. Nokia, Qualcomm, Sony, Motorola have their establishments in India. Other big companies are on their way to setting up base in India.

Paymate is another mobile payment gateway that is offering similar service to what Bharti plans to offer. Very recently, Magicbricks, one of the leading real estate portals came up with their

mobile real estate portal. There are also host of other M-Commerce application providers in India. With the entry of Bharti in this arena, M-Commerce in India will take much bigger proportions as they already have more than 50 million strong subscriber base who are readymade customers for M-Commerce applications.

### Finding issues that matter in developing M-Commerce Products in India

To understand the issues related to user behavior that are likely to influence design decisions in m-commerce products in India a user survey was conducted covering 52 users. The focus group for this survey was selected based on their huge market potential i.e. students, businessmen, office employees and others requiring services. Keeping in mind the cultural diversity that exists in India the users with different cultural backgrounds were selected for the survey. Out of 52 users, 10 users were also interviewed after they filled the questionnaires. Questions that were asked in interview were related to the future plans regarding handsets and services they wish to use. Questionnaire with the results that we got from the user survey is presented in the following table:

Q 1 Which age group do you belong to?				
Below 15 - 0	15-24 - 51	24-30 - 1	30-40 - 0	40 and above - 0
Q 2 What is your occupation?				
Student - 40	Businessman- 0	Engineer - 2	Doctor - 1	Finance - 0
Q 3 Which mobile brand do you use?				
Nokia - 37	Motorola - 7	Sony Ericsson-3	LG - 2	Others - 1
Q 4 Each day, how long do you keep your mobile with you?				
Can't say - 9	Less than 6 hours- 8	6-12 Hours - 19	More than 12- 16	
Q5 What are the peak hours of your mobile usage in a day?				
Before 8 AM - 0	8AM-10 AM - 1	10AM - 2PM - 0	2PM-5PM - 1	5 PM - 8 PM - 8
8PM - Midnight- 42				
Q6 Which kind of display your handset has?				
Colored - 39	Black and White - 13			
Q7 Which mobile connections do you have?				
Airtel - 40	Reliance - 7	BSNL - 1	Hutch - 3	Idea - 0
Q8 Rank the following services in order of your preferred usage(Our of 8):				
Making receiving calls : 1.63	SMS./MMS - 2.63	Games - 3.5	Camera - 3.85	GPRS- 4.52
Other VAS - 4.37				
Q9 What are the various services that you use on your mobile phone?				
SMS/MMS - 47	Sports news - 11	Entertainment- 19	Games - 37	GPRS - 6
Caller tunes - 18	Dedicating songs- 5	Polling and Voting - 12	Competitions - 7	Other - 2
Q 10 Are you comfortable using mobile features other that SMS/Calls features?				
Yes - 45	No - 7			
Q 11 Have you ever transferred applications on to a mobile from other mobile/computer?				
Yes - 23	No - 31			
Q 12 Have you downloaded wallpapers/ringtones from your service provider?				
Yes - 15	No - 37			
Q 13 What is the things you carry with you while traveling?				
Laptop - 8	Mobile - 44			

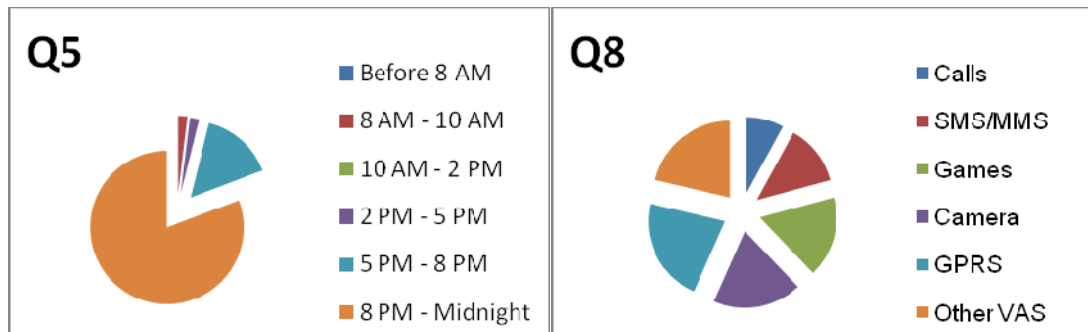


Table 2. Results of survey conducted.

### Case Studies

As discussed earlier, owing to the vast diversity that exists within India it is essential for a product to be designed for micro level implementation. Different regions in India have different characteristics that affect the implementation of m-commerce products. Even within a region there exist different social groups with differing lifestyles, needs and purchasing power. To strengthen our argument about the adaptation to these two different levels namely micro and macro, we conceptualized two design products at the Department of Design, IIT Guwahati. The first product addressed a macro level segment namely Indian tourism. The second product was a home delivery ordering application for mother dairy – a Delhi based grocery provider. This addressed the micro level segment. Both have been presented as case studies.

#### Case Study 1: Mobile application for Travelers in India

##### Target User Segments:

After discussions we identified three different user segments from across India who in our view had the highest potential for becoming prime users of the application. These were:

1. Students from one region who travel frequently to other region across India for academic and leisure
2. Professionals on a business trip
3. Leisure travelers

The aim was to encompass those tasks that will go into determining the needs or conditions to be met for the product, taking account of the possibly conflicting requirements of the various users. The objective of this study was to develop a mobile application which caters to the need of the travelers in India belonging to macro user segment.

This mobile application provides a medium for travel information while on the move. The application demonstrates a visual prototype which shows the possible features.

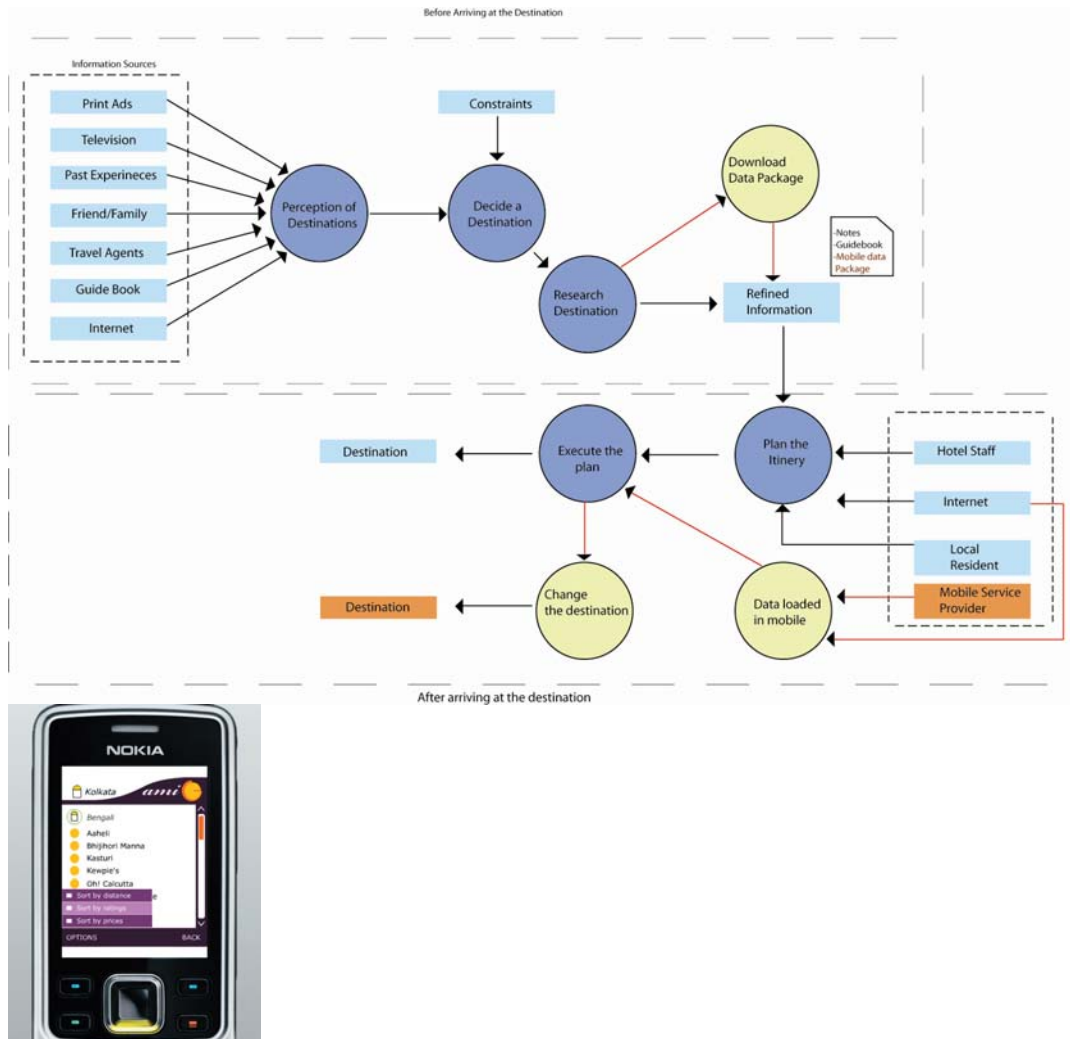


Figure 1. Travel information system with a mobile based product

Figure 2. Interface of the application designed for most popularly used handsets

#### Strategies adopted:

The product was decided as an addition to the current travel information system available through web. The aim of this application was to provide suitable travel information “on the go”. It means this is an additional resource which provides travel information that is “urgently” required.

The application was designed for Symbian based Nokia phones capable of running Flash Lite 2.0 application. The reason for doing this was to give macro-level acceptability as many people in India are using similar handsets. The design of the application was decided on the basis of level of urgency different type of information demanded. Information that is required in an urgent situation was put in an easily accessible position in the user interface than the information not required in urgent situation.

The way the system work was decided taking into account both the internet requirement and the technical limitation of the mobile handsets that are generally used in India. Considering the cost of GPRS in roaming, the system was proposed to be packet based where each packet

would contain major information about a city. Since it is difficult and expensive to get a mobile internet connection for travelers and also as internet was essential for downloading packet data, the application was designed such that user can download the packet of the city he is visiting when he is in hometown and later use it offline when he is traveling.

## Case Study 2: Mobile application for Home delivery of Mother Dairy products

Target Users:

1. All families living in metropolitans especially those where both the parents are earning and are often busy on their phones with their clients. Users are the parents by providing them with an opportunity to make a quick order
2. Singles living in Metropolitan cities who are employed and earning a descent income
3. Students in Universities located in big cities as it is seen in IIT that it is very difficult for them to move out
4. Employees of a company



Following were the objectives for the product:

1. *Solving the problem of home delivery associated with most of the food enterprises:* This problem arises due to the large size of metropolitans. With increase in number of locations these firms are often confused that how to sort different orders according to different locations as this sorting is done by people who are not fully known to all the locations in the entire city.
2. *Reducing the cost of calls that one made for ordering the food:* One order of less orders is this factor. People hesitate to make a call that costs them for a not non negotiable amount of money for ordering a product.
3. *Reducing the time of communication:* Customers are often fed up when it takes much time to explain the order over the phone. This particularly happens when the customer and the seller are over line and they both are from a different cultural populace.

4. *Reducing errors in communication hence customer satisfaction:* The effect brought up by implementing the product will be a drastic reduction in errors that will add to customer satisfaction and increase in the sales of that enterprise.

*Strategies adopted:*

The application was designed for taking home delivery orders as and when essential. Since home delivery is a current real problem, demand for these types of products exists. Hence the application was designed to be implemented on Nokia S60 devices running Flash Lite 2.0.

Considering the life in metropolitan cities in India that is often characterized by round the clock work routine, the ability to be used at any time in the day was a major issue in the application. However the requirement generally arises in the morning when there is a need for getting milk and other regular products. In morning the usage of mobile is low hence fast working of the application was given major attention in the User Interface.

Since the plan was to implement in metropolitan cities where almost all wireless carrier providers are equally used the plan was to make is application available by mother dairy as a download on their website. The product was made SMS based not only to meet the current technical requirements but also to accommodate multiple usages of the service cheaper and faster.

## **Inferences**

From the user survey and the two case studies specifically designed for this research we infer the following heuristics that could be useful for identifying, designing & developing new m-commerce products:

- Although the travel application was targeted at larger user group(macro) than the home delivery order application(micro) the number of transactions that a user would make during a day with the later is much more than that of travel application. Hence total transactions (number of users \* number of transactions during a day) in the second case was found out to be greater than total transactions using travel application. Hence it could be easily inferred that even though macro level products are targeted at larger user segments, owing to the greater frequency of usage of a micro level applications, the total amount of revenue that would be generated through transactions of a micro level application will be greater than that of a macro level application.
- Users perceived macro level m-commerce products (like IRCTC railways booking) to be meant exclusively for higher income groups with professional or higher educational qualifications. In actuality too the travel application only supported those clients who have a GPRS connection in their phones or a good phone with computer connectivity. Most users lack these features in mobile phone which results in missing of large users in India. GPRS connectivity is only available in major states of India but remote states like Assam have no services at all. Indian railways carry more middle and lower income passengers than higher income group. Micro level segment is not being addressed here though it has higher potential.
- A good option of implement value added services is through wireless carriers but the trend of choice of wireless carriers varies widely. In Delhi Airtel is the leader with 2.6 million connections followed by Hutch with 2.1 million mobile users whereas in Mumbai BPL mobile is the major player with 3.4 million subscribers followed by MTNL with 1.2 million users. Southern regions are dominated by Aircel. So implementing a product at macro level in India may face problems related to choosing an appropriate wireless carrier. On the other hand micro level products can be easily implemented by wireless carriers.
- Implementing as a value added service through wireless carriers also has an added advantage that users do not need to know very much about installing the application which can

- be of great benefit to the user as many of them do not know much beyond downloading ringtones from their service providers.
- To allow a macro level service provider to also cater the needs at micro level could also be one of the feasible options but due to geographical vastness of India it would create a very huge database for the system to manage. For example in the travel application (case study 1) we added a functionality of finding the hangouts in a city. But later we found out that number of hangouts in an Indian city is so huge that it was unpractical to think of including for offline views. Ultimately we had to reduce this functionality to a suggestion based system which would suggest best hangouts based on reviews.
  - From the user survey we did we found out that even though some user uses laptops they preferred not to carry it. For using internet on the go user would generally preferred mobile phone with GPRS connection.
  - Although in the user survey we found out that Java running mobile phones are dominating the current market in India, only a few users had purchased Flash Lite compatible handsets and others were planning for the same.
  - The result of the questionnaire showed to us that 50 of the 52 users reported the peak time of the mobile usage to be after 5 PM. Hence for second case study which can be proposed to be used at any time of the day it was essential to keep fast navigation of the system a top priority. Hence in the product a separate option for ordering regular products was created in the main menu itself
  - Micro level products receive greater mental credibility from the users than macro level products as they are specifically designed to cater their needs. This is important particularly in India as people still consider mobile and other internet based transactions to be less secured.
  - Most users do not use computers or other mobiles for transferring data because of technical limitations (mainly slow data cable speed) or their limited knowledge about transferring applications. Hence an m-commerce product has more scope in India when it is provided by a wireless carrier.

## **Discussions**

This paper attempted to understand differences in micro and macro level applications. Due to large cultural difference between India and western countries, implementing a macro level m-commerce product in India would mean excluding a major segment of Indian population. However most major products launched in India have been implemented at Macro level only. The case studies presented in this paper provide inferences which prove that although macro level framework is focused on larger user segments the frequency of transactions that would be received by a micro level product makes it a better option of generating revenues. The fact that India itself is a diverse country with many sub cultures should be taken into account by any one intending to develop new m commerce products. Case studies presented in this paper may be a good starting point for companies to realize that micro level products can serve a broader market in India.

Although the importance of cultural factors in India is shown in the paper some companies may still prefer to launch their products in India at Macro level. Such products must be accompanied by good advertising to make user believe about the credibility of the product at the micro level living conditions and also make them believe that the product is made for them and not for the elite, upper income class of Indian society. It also must take into account the technical limitations and lack of knowledge of the user. It clearly indicates that developing a new product for a micro level is better and safer choice than trying to adapt an existing macro level product to micro level Indian segments by making a few tweaks in its design.

## References

- [1] Jeong Ho Yoon, "Global Handset Trends 2006-2007"
- [2] [www.wikipedia.org](http://www.wikipedia.org), "Mobile Commerce"
- [3] Patricia Harris, Ruth Rettie & Cheung Chak Kwan, "Adoption and usage of m-commerce: a cross-cultural comparison of Hong Kong and the United Kingdom"
- [4] Telecom Regulatory Authority of India
- [5] Dianne Cyr, Milena Head & Alex Ivanov, "Design aesthetics leading to m-loyalty in m-commerce"
- [6] Per E. Pedersen, Leif B. Methlie & Helge Thorbjørnsen, "Understanding mobile commerce end-user adoption: a triangulation perspective and suggestions for and exploratory service evaluation"