

**A Project Report on
MOBILE WALLET & PAYMENT SYSTEM**

*Submitted in partial fulfillment of the
requirement for the award of the degree
of*

B.Tech-CSE



**Under The Supervision of
Mr. Bibhas Kumar Rana**

Submitted by

Mayank

Awasthi(19SCSE1260010)

Jatin Sachdeva(19SCSE1250005)

**SCHOOL OF COMPUTING SCIENCE AND ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE AND
ENGINEERING
GALGOTIAS UNIVERSITY, GREATER NOIDA
INDIA September 2021**



**SCHOOL OF COMPUTING
SCIENCE AND ENGINEERING
GALGOTIAS UNIVERSITY, GREATER NOIDA**

CANDIDATE'S DECLARATION

We hereby certify that the work which is being presented in the thesis/project/dissertation, entitled "**MOBILE WALLET & PAYMENT SYSTEM**" in partial fulfilment of the requirements for the award of the B.Tech CSE submitted in the School of Computing Science and Engineering of Galgotias University, Greater Noida, is an original work carried out during the period of September, 2021 to December 2021, under the supervision of Mr. Bibhas Kumar Rana, Department of Computer Science and Engineering, of School of Computing Science and Engineering , Galgotias University, Greater Noida

The matter presented in the thesis/project/dissertation has not been submitted by me/us for the award of any other degree of this or any other places.

Mayank

Awasthi(19SCSE1260010)

Jatin

Sachdeva(19SCSE1250005)

This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Mr. Bibhas Kumar Rana

Professor

CERTIFICATE

The Final Thesis/Project/ Dissertation Viva-Voce examination of **Mayank Awasthi 19SCSE1260010 & Jatin Sachdeva 19SCSE1250005** has been held on _____ and his/her work is recommended for the award of B.Tech Computer Science & Engineering

**Signature of Examiner(s)
Supervisor(s)**

Signature of

Signature of Project Coordinator

Signature of Dean

Date: December, 2021

Place: Greater Noida

ABSTRACT

Information technology and payment systems have witnessed the introduction, acceptance and widescale deployment of electronic payment systems. The payment system ecosystem has now witnessed the introduction of mobile payment systems and their associated services. Major actors involved in mobile payment systems include telecom operators, banks, merchants and consumers. They need to aggregate their resources and develop a coherent ecosystem which would help the individual actors while also benefiting the overall mobile payment ecosystem. Financial institutions and mobile carriers are becoming increasingly interested and have started collaborating in order to provide mobile payment capabilities which would pave the way for the migration of payment systems from card-based to phone-based. In a developing country like India, mobile payment systems have experienced rapid growth, deployment and acceptance in a very short span of time. However, these systems are still far from mature and need to be customized and refined further in order to replace or equal the deployment and acceptance of electronic payment systems. Mobile payment services are primarily centred on the unbanked population but also consider the existing population with active bank accounts especially in developing countries.

The thesis describes the rapid growth and development of payment systems in India and how there has been a slow shift from e-payment systems to m-payment systems. The key mobile payment systems described in the thesis includes but not limited to, the Nokia money, and Airtel money. The key findings of the thesis have been supplemented with SWOT analysis, ARA model analysis and Ansoff matrix models of the mobile payment systems in the Indian market. The business models described in the thesis have been analysed by considering a few key factors and analysis results depicted that the biggest challenge of deploying mobile payment systems is initiated by uncertainties in the environment which result in lack of Acceptance Network, Interoperability and Accessibility for everyone in society (Including educated and un-educated).

Acknowledgement

It gives immense pleasure in bringing out this synopsis of the project entitled

“MOBILE WALLET & PAYMENT SYSTEM”

Firstly we would like to thank our guide **Mr. Bibhas Kumar Rana** who gave us his valuable suggestions and ideas when we were in need of them. she encouraged us to work on this project.

We are also grateful to our college for giving us the opportunity to work with them and providing us the necessary resources for the project

We would also thank to all of them who helped us to complete this project.

We are immensely grateful to all involved in this project as without their inspiration and valuable suggestion it would not have been possible to develop the project within the prescribed time.

With sincere thanks,

Mayank Awasthi 19SCSE1260010

Jatin Sachdeva 19SCSE1250005

Table of Contents

ABSTRACT	i
ACKNOWLEDGMENT	ii
LIST OF FIGURES	v
LIST OF TABLES	v
LIST OF ABBREVIATIONS	vi
CHAPTER 1: INTRODUCTION	1
1.1 BACKGROUND.....	
1	
1.2 Related Work	
5	
1.3 Problem Statement	
6	
1.4 Contribution of this research work.....	
7	
1.5 Scope	
7	
1.6 Limitations of the thesis	
7	
1.7 Structure of this thesis	
8	
CHAPTER 2: RESEARCH METHODOLOGY	9
2.1 Literature Study	
9	
2.2 Semi-Structure Interviews	
9	
2.3 Ansoff Matrix	
10	
2.4 ARA-Model	
11	
2.5 Comparative Study	
12	
2.6 Expected Result	
13	
CHAPTER 3: MAJOR DEFINITIONS	14
3.1 E-COMMERCE	
14	

3.2 U-COMMERCE	14
3.3 M-COMMERCE	15
3.4 Categories of Payment Service Providers and Processes	16
3.4.1 MNO and Gateways	17
3.4.2 Banks for financial institute	17
3.4.3 Handset manufacturers (OEMs)	18
3.4.4 Payment Processors and Technology Provider	18
3.4.5 Mobile payment as a payment	18
3.4.6 Mobile order	18
3.4.7 Mobile delivery	18
3.4.8 Mobile authentication	18
3.4.9 Mobile banking	18
3.7 Mobile Value Added Services (MVAS)	23
CHAPTER 4: ANALYZED CASES	25
4.1 CASE STUDY OF BILLDESK AS ELECTRONIC PAYMENT	25
4.2 CASE STUDY OF NOKIA MONEY AS MOBILE PAYMENT	30
4.3 CASE STUDY OF AIRTEL-MONEY AS MOBILE PAYMENT	34
CHAPTER 5: ARA MODELLED ANALYSIS OF MOBILE PAYMENT SERVICES	44
5.1 Analysis of Operator Led Model for mobile payment services	44
5.2 Analysis of Bank Led Model for mobile payment services	46
CHAPTER 6: MOBILE PAYMENT BUSINESS & DRIVER'S CHALLENGES.....	50

6.1 Factors influencing the adoption	50
6.2 Factors working in favour of adoption mobile payment services	52
CHAPTER 7: RESULT & DISCUSSION.....	42
CHAPTER 8: CONCLUSION & FUTURE RESEARCH	46

LIST OF FIGURES

Figure 1 Market Share of Mobile Subscriber in India	2
Figure 2 Generic Architecture for M-Payments Source	3
Figure 3 View of control information pattern	10
Figure 4 Ansoff matrix based on actors	10
Figure 5 Nature of the mobile payment opportunities and the relationship and inter-dependencies	12
Figure 6 Payment Service Providers and Process	17
Figure 7 Mobile payment categories	20
Figure 8 SMS Based Payment Ticketing	22
Figure 9 Mobile Phone Penetration in India	24
Figure 10 The overall workflow and key operational aspects of IVR Payment Gateway System	27
Figure 11 Business Groups of Nokia	31
Figure 12 Q1 2012 report for mobile phone volume in terms of sales	32
Figure 13 Airtel Vision and Action Pillar	35
Figure 14 Working Steps about re-charging using NEFT System	36
Figure 15 Payment Process for M-Wallet	37
Figure 16 Actors interacting with each other in system of semi-closed model	39
Figure 17 Enabling Mobile Money Account for Customer/User	40
Figure 18 ARA model for MNO driven by operator based	45
Figure 19 Ansoff matrix model for Operator led model.....	46
Figure 20 Analysis of Bank Led Model by ARA model	47
Figure 21 Ansoff matrix model for Bank led model	48

LIST OF TABLES

Table 1 Comparison of different modes of mobile payments	4
Table 2 Comparison of electronic payment systems	13
Table 3 List of common definitions	14
Table 4 Mobile payment categories	19
Table 5 Range of application services in India	23
Table 6 Comparison model of payment system	38
Table 7 Analysis both m-payments and e-payment in term of all factors related to actors	43
Table 8 Analysis both models in term of factor related to actors	49
Table 9 Different kind of factors given on Indian market	50
Table 10 Information about favour of adoption mobile payment services	52

LIST OF ABBREVIATIONS

MNO – Mobile Network operator

PSP – Payment Service Provider

MFS – Mobile Financial services

NFC – Near Field Communication

POS – Point of Sale

C2C – Consumer to Consumer

SMP – Significant Market Player

MPFI-Mobile Payments Forum India

NPCI-National Payments commissions of India

IMPS-Immediate Mobile payments services

KYC-Know Your Client

FDI-Foreign Direct Investment

NEFT-National Electronic Funds Transfer

ECS-Electronic crediting system

RTGS-Real Time Gross Settlements

MNO-Mobile Network Operators

PCI-Peripheral Component Interconnect

PIN- Personal Identification Number

IDRBT- Institute for Development and Research in Banking Technology

RBI-Reserve Bank of India

NPCI-National Payment Corporation of India

IVR -Interactive Voice Response

Mobile Payment – mPayment

Mobile Wallet – mWallet

MOM-Money-on-Mobile

MC- m-commerce

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Mobile operators play an indispensable role in the field of mobile technology. They are closely integrated with the core business with respect to the underlying technology and provide mobile services to the consumers. In every country there are financial rules and directives which have to be followed. There are three types of mobile payment markets (Carr, 2009) namely (1) High regulated markets which are heavily regulated and are not open to outside entities. For example, only financial institutions have the right to provide payment services. In this scenario a user can use his phone to carry out a transaction and the transaction is reflected on the user's bank account. (2) Moderately regulated markets whereby the regulations are not so strict. The system allows private players to join in the ecosystem and work with the financial institutions and offer the payment services, for e.g., in USA (3) Minimal regulated markets whereby the regulations are very relaxed. A telecommunication operator can enter the market and collaborate with financial institutions accept money directly from the user and then forward it to the financial institutions who will manage the backend. An example of such a system is deployed in Kenya.

The mobile payment ecosystem consists of member financial institutions namely users, service providers for mobile payments and the traders. Each entity uses their in-house technological equipment and software, and the overall ecosystem is heterogeneous. To a large extent the entire transaction flow and security is approved by financial institutions (Mobile Payment Forum of India, 2011). Mobile payment is the process of the parties exchanging financial value with the use of mobile equipment owned by the user and the merchant. Mobile payment service is a payment method which is supported by close interactions between the internet, mobile devices and banks. All these entities play a vital role in provisioning the payment service to the consumer. By providing these services consumers can receive financial account information and execute transactions with their respective financial institution ("mobile banking"). These functionalities allow the customers to make payments, transfer money or pay for goods ("mobile payments").

There are different stakeholders who each play an individual role in the process of implementing mobile payments and strategies (Karnouskos & Fokus, 2004). The interest and strategies of multiple stakeholders may cause conflicts between different players namely mobile network operators, merchants, mobile device manufacturers, consumers, bank, financial institutions and the government. For example the network provider companies have the primary objective to maximise their profits from carrying out the individual transactions while the other players namely, the consumers and the traders would like to spend minimum money and experience minimum risk while carrying out the transactions. The concept of mobile payment is subjected to the financial transactions executed through the mobile devices to provide services securely to the authorized users. (Kauffman & Au, 2008). Devices such as mobile phones, PDAs and wireless tablets use the telecom network to communicate with the payment systems to execute the financial transactions. (Karnouskos & Fokus, 2004). Juniper Research had successfully projected that the global mobile commerce revenues would have exceeded 88 billion USD by the year 2009 (Juniper Research Ltd, 2011). The popularity of mobile commerce applications provide new opportunities for Service providers, network providers, financial institutions and researcher to make the mobile commerce domain more profitable and promising. Moreover, the mobile users are benefited with more sophisticated ways to make financial transactions. (Basudeo & Jasmine, 2012). M-banking payment system is slowly emerging as a potential practice for financial transactions. In Africa during

the fiscal year 2012, around 700 million users were using mobile phones and among them, there were 13 million active users using the m-banking services (Greenacre, 2012).

The figure 1 below illustrates how the huge customer base for mobile subscribers in India is distributed between national and international mobile operators. In India, mobile phones have become an essential part of the daily lives of billions of Indians and have become the preferred medium for communication. The entry and consolidation efforts of mobile phone manufacturers and network operators forces them to always look for new avenues to capture the mobile subscriber share, and that has resulted in key operators like Airtel and Idea introducing mobile payment systems. The introduction of new application scenarios and the resulting intense competition between multiple national and international operators has ensured that the Indian mobile network and device market has become a hotbed for innovations and growth, which will in turn drive the overall mobile ecosystem.

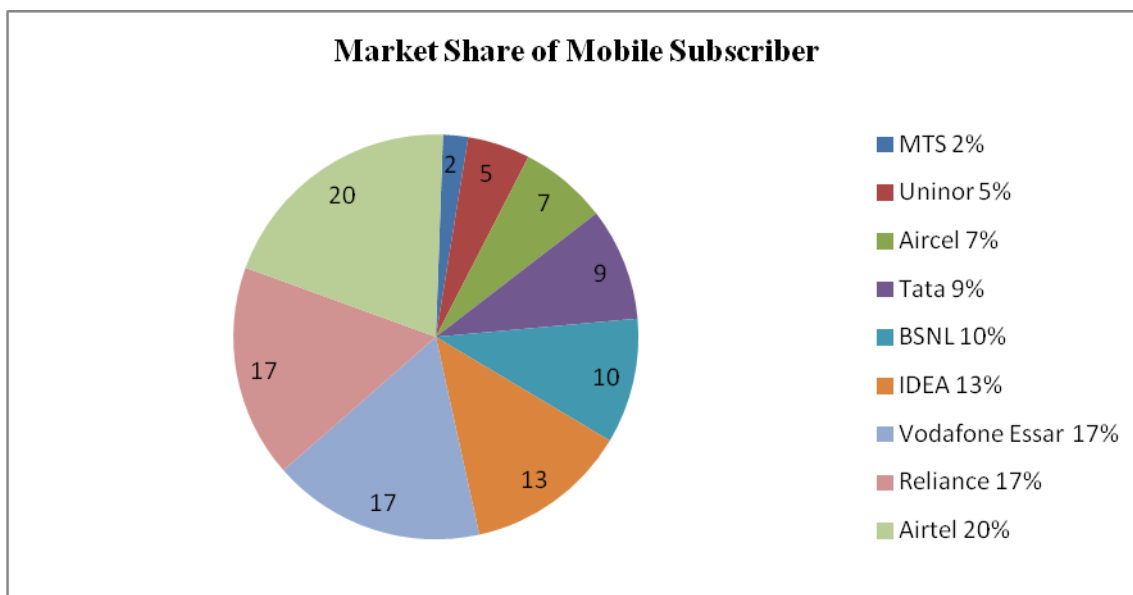


Figure 1 Market Share of Mobile Subscriber in India

(Bhattacharya, Gopinath, Oliver, & Tannirkulam, 2010)

An interesting and encouraging development towards sustained growth of mobile payment ecosystem in India was the set of guidelines, which were released and encompassed all the banks and mobile operators who wanted to operate in the Indian ecosystem. The crux of the guidelines was that the customers of any mobile network operator should be allowed to request for a mobile payment service in India. Mobile Payments Forum of India (MPFI) has developed message formats which the banks need to adopt, in order to ensure inter-operability between the different competing mobile payments service providers (Basudeo & Jasmine, 2012). With interoperable guidelines and infrastructures, the users can now avail the services of any preferred bank through their mobile network operator, without having to switch operators.

It is important to note that mobile banking in the true sense is not a revolutionary idea in the Indian ecosystem. For e.g., banks already provide mobile banking service to their customers, which allow the latter to verify their account information, initiate payments, and execute transfers. Thus, in the m-payment scenario, consumers would be able to transfer the money stored in their mobile phone accounts

to another mobile phone account by setting up SMS messages and valid pin numbers, and without the help of an additional application developed by the bank (Gulati, 2011).

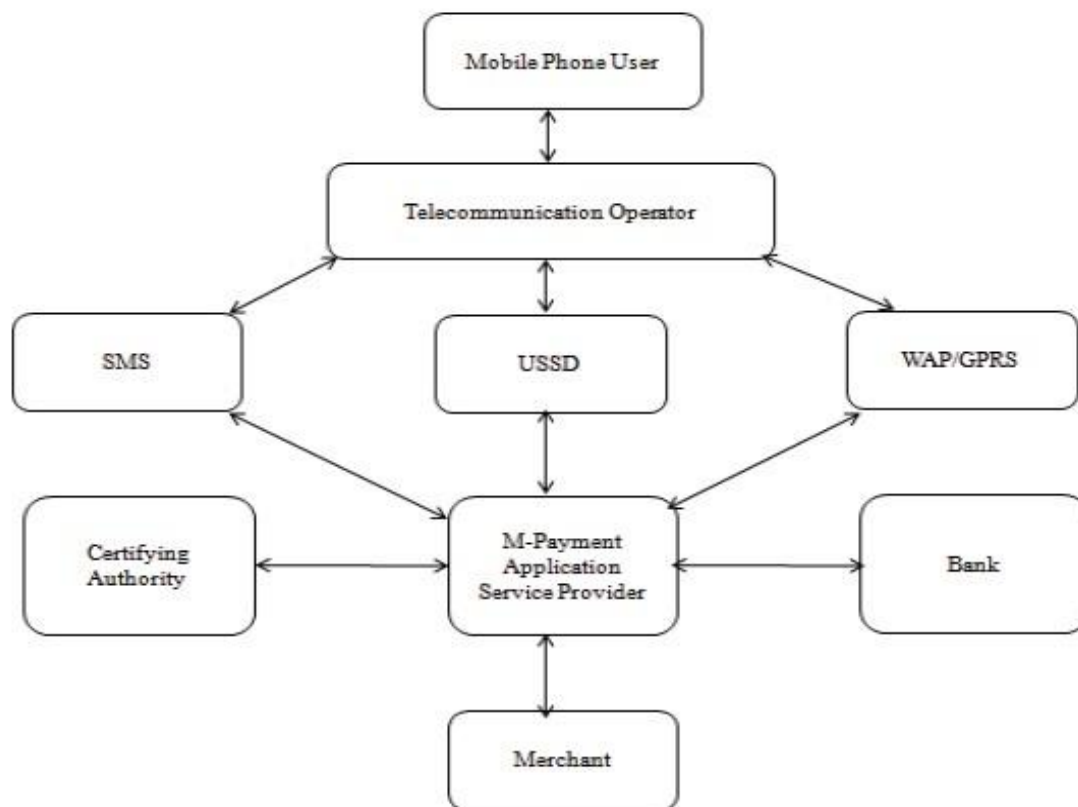


Figure 2 Generic Architecture for M-Payments Source
(Basudeo & Jasmine, 2012)

Figure 2 illustrates a generic architecture for M-payments source, and outlines the interaction between the key actors in a mobile payment ecosystem how key actors in a mobile payment system interact with each other. The primary actors include the merchant and the customer, who form the core of the mobile payment service. An important role is played by the m-payment application service provider (MASP), as it is responsible for connecting the MNOs, the banks and other financial organizations. Additionally, the MASP is further responsible for provisioning the infrastructure components which will be used to carry out the payments. A mobile wallet, which communicates directly with the backend server of the MASP can be downloaded and run on the mobile phone by both the customers and merchants, which acts as an application to access and carry out mobile payments. A customer initiates the process by selecting a product or service, for example, a clothing item and starts the transaction from his mobile phone. The merchant receives the request for the product and the mobile number of the customer and replies the total amount of the product or service to customer. The customer can accept the request and start the payment process. The MASP authenticates the user, checks his authorization privileges and transfers the money to the bank account of the merchant. After the payment has been completed successfully, both the parties, namely, the merchant and the customer are intimated of the successful transaction. The model is easily extensible to allow inclusions of payments made through internet banking as well.

Mobile applications are redefining the ways in which customers can interact with service providers. For example in India, in order to book a railway ticket, users had to stand in long queues, and the average

waiting time was between three to four hours. However, with the introduction of the Indian Railway's mobile app for train ticket bookings users can log on and book their tickets in a few minutes. Recently, 'Money-on-Mobile '(MOM) was launched which is an M-Wallet service that permits a mobile phone subscriber to purchase a wide range of goods and services. For example DTH recharge, prepaid mobile recharge, pay post-paid mobile bills and utility bills by utilizing the Consumer to consumer (C2C) payment mechanism which offers a viable alternative to conventional paper-based mechanisms for example cash and checks. In the near future, a joint mobile wallet service has been planned by the largest private sector bank in India (ICICI bank) and from a Mobile operator (Vodafone India) which would be launched and managed by the Mobile Commerce Solutions Ltd (MCSL). MCSL is a wholly-owned subsidiary of Vodafone (Vikas SN , 2012).

As per the table 1 given below there are 3 different types modes of mobile payment that can be adopted are prepaid instruments where the balance is credited before the purchase of a top-up transaction direct debit where the bank account is directly debited for the purchase and the post-paid wallet where it is either linked to a credit card or a mobile account and the customer has to pay for the purchase at the time of settlement with the credit provider.

	Prepaid	Debit card	Post paid
Description	Pre-loaded with desired amount	Linked to bank a/c in real time debit	Linked to credit card or mobile a/c
Benefits	Avoids exposure of bank a/c or credit card information. Credit checks it's not required	No recharge activity required	No recharge activity required
Drawbacks	The recharge activity required	Exposure of full bank a/c	Credit risk borne by the bank / operator

Table 1 Comparison of different modes of mobile payments (Deloitte Touche Tohmatsu India Private Limited, 2011b)

Factors such as high penetration of mobile phones and good connectivity of telecom networks in urban India would help overcome few of the drawbacks of e-payment system, which include limited access to internet and lack of existing infrastructure, both for the seller and the consumer, for carrying out e-payments. Another key factor which could drive the growth and usage of mobile banking in the Indian ecosystem is the fact that a large number of Indians already own mobile devices, which constitute the key infrastructure element for the consumers. The next step would entail that the sellers need to update their infrastructure elements to support m-banking and the m-payment service providers need to construct scalable and efficient backbone architecture, which would be able to support the m-payments. This development would act as a key driver for the m-payment system and result in exponential growth in the largely untapped Indian market. Additionally, it is important to note that the components and actors involved in a mobile based payment services are different from the electronic payment services, which would be further detailed later in this thesis.

1.2 Related Work

The existing paper based payment mechanism was slowly replaced by the electronically transacted system during the 90's. Since the time cash, namely notes and coins, were considered to be dying (Gleick, 1996) researchers looked at the important role electronic payment systems would play, moving

forward. It is no doubt that the arena of payment systems has shifted through and will continue to move through cycles of growth.

Recent development of high-speed mobile data networks together with the increase usage of mobile devices is creating a new channel for commerce. Mobile payment is kind of payment in which at least one exchange of payment information is performed via a mobile device. The processing of such virtual exchange of payment information via mobile devices has been proved to be much cheaper in few countries (Balan & Ramasubbu, 2009). Previous Studies by researchers suggest that m-commerce (MC) is an evolving, dynamic, and rapidly changing business opportunity to carry out a financial transaction digitally (Nikhilesh Dholakia, 2000). According to the theoretical analysis carried out by researchers (Prathima & Rao, 2003) there lies huge gap between the international mobile banking services and Indian mobile banking services. Researcher (Vyas, 2009) suggested the numbers of users using the mobile phone are increasing in comparison to the number of users having the desktop and laptop internet, thus creating possibilities for players like telecom providers, financial players, merchants and banks to introduce many new mobile based services such as Mobile banking.

M-commerce is similar to e-commerce in many aspects, but the term “M-commerce“is usually applied to the financial transaction activity performed using mobile networks. Nikhilesh, further proposed and analysed few factors related to diffusion of mobile technology and mobile commerce.

However the m-commerce is not a direct extension of e-commerce. The key differences between mcommerce and e-commerce are the technology they use, the nature of service they provide, and the business model they represent (Yufei & Zhang, 2003). Karnouskos et al. had provided a survey on different mobile payment procedures, in which they reviewed different technologies needed, utilized in this field. Furthermore, they also compared around 100 mobile payment providers; in terms of different services they offer (Karnouskos & Fokus, 2004). Zmijewska et.al provided a customer centric evaluation of various wireless technologies in mobile payments systems (Zmijewska, Dahlberg, Mallat, & Ondrus, 2008). Zmijewska further proposed six acceptance factors for mobile payments acceptance and based on these factors they studied fitness of different wireless technologies for mobile payments, The six factors he proposed were ease of use, usefulness, trust, cost, mobility, and expressiveness (Zmijewska, Evaluating Wireless Technologies in Mobile Payments –. The papers were mainly classified into five categories m-banking overview, security issues and conceptual issues, Mobile banking/payment practices in Indian Commercial Banks and Challenges in India strategic, legal and ethical issues, Current operating practices of commercial banks, Features & Benefits of Mobile Banking (Goyal, Pandey, & Batra, 2012). Bamoriya et al. in their research focused on the barriers in adaptation of mobile payment in India. Factors such as network problems, insufficient operating guidance and safety were few of the main barriers. They also found many consumers primarily use m-banking for information reading such as checking the account balance; this however is not the real aim of mobile payments services (Singh & Bamoriya, 2012). In the market a comparison of different mobile wallet has studied related to operator and bank driven and analysed the challenges faced by each driver (Narayan, 2013). According to (Karnouskos & Fokus, 2004) successful deployment of the mobile payment system is result of cooperation between different players. The main players include consumers, Mobile network operators, Bank. Other stake holders include merchants, mobile device manufacturers, financial institutions, software and technology providers’ and Government. However, the role of actors vary depending upon few factors such as political condition in a given geographical locations. This thesis focuses on the roles, responsibilities and attitude of the actors in Indian mobile payment services ecosystem.

1.3 Problem Statement

The key research questions that will be addressed during the course of the thesis work are:

- **How have the actors changed their roles and responsibilities from e-payment to m-payment? How these actors are involved in m-payment service ecosystem in India?**
- **What are the challenges faced by actors involved in mobile payment services, in both a bank led and operator led model?**

The Indian market consists of few mobile payment service providers for example Airtel money, Idea money, Money-on-Mobile, Movida and 'M-Paisa'. The research work will draw conclusions based on analysis of two major factors but not limited to Telephonic interviews with the experts and analysis of previous research work.

1.4 Contribution of this research work

As discussed in the related work in section 1.2, many different aspects of mobile payment services were discussed. However, no previous research work has particularly been focused on the different actors involved in the mobile payment ecosystem. Further, the roles these actors would play, the responsibilities each actor is obliged to, and the shift of these factors from e-payment to m-payment ecosystem systems are not discussed by previous researchers. One of the contributions of this research work is to analyse the transition of roles and responsibilities of various actors from e-payment ecosystem to m-payment ecosystem, with respect to Indian market.

Additionally, previous research discusses various challenges faced by the mobile payment ecosystem. Challenges including and not limited to strategic, legal, and ethical issues were discussed, however the challenges faced by individual actors of the m-payment ecosystem are not researched upon. This thesis work discusses about various challenges faced by the actors involved in both the bank led and operator led model of m-payment service ecosystem.

Furthermore, this research could also be used as a reference document by small and medium-scale organizations which are currently involved in or are planning to deploy and deliver technology platform related to m-payment services and support other actors in the ecosystem, for e.g., the mobile network operators and banks, in setting up and maintaining a backbone infrastructure for carrying out m-payments.

1.5 Scope

The scope of work in this thesis mainly focuses on key market players involved in the m-payment ecosystem in India. These key players are constituted by the banks and mobile operators, who would be involved in provisioning an m-payment service to their customers. Within the thesis work, multiple mobile based payment services in India will be described in detail. Their constituting mechanisms will

be researched with a special emphasis on their participating entities, including the different actors involved in the system. The reader of this thesis should also note that the research work focuses on the current m-payment systems in India and elaborates on the roles and responsibilities of the key actors with a strong focus on the amalgamation of business and technology.

1.6 Limitations of the thesis

The thesis has the following limitations:

The thesis will study the mobile payment services from the perspective of the service providers. Therefore, it will not study the challenges faced by the customers of the mobile payment service while adopting those services. Moreover, the customer responses while using those services would not be studied. The thesis describes the roles and responsibilities of actors in m-payment systems and does not consider how these roles are involved in in-depth technical, financial, or economic aspects, for

e.g., the involvement of actors in security enabled protocols, formulating investment plans, ensuring return of investment, computing and reducing the overall infrastructure cost, and deploying and maintaining the requisite hardware and software.

1.7 Structure of this thesis

This thesis is structured to have totally 7 chapters. Chapter 1 and Chapter 2 (*Introduction and methodology*) give the details and existences of mobile payments in India. This chapter also gives the purpose of the author to carry out this thesis project by questioning the research questions that have been raised. The research methodologies that have been used to answer the research question have also been included in this chapter so that the readers can get an idea about the approach used.

Chapter 3 (Major definitions) includes the brief description about various terminologies that are frequently being used in Mobile payment industries. The author has also included the details of various technologies that have been used in the present mobile payment ecosystem.

Chapter 4 (Different case studies such as IVR payment system, Nokia Money and Airtel Money) this chapter gives a wide view of Nokia company and information about the Nokia mobile money challenges in the Indian market. Airtel covers the various mobile payment models used in India. Explanation about the mobile payment eco-system, process, and SWOT analysis

Chapter 5 and Chapter 6 (Analysis of mobile payment and mobile payment driver challenges) gives the detailed information about the ARA model for Operator led model and Bank led model which is considered for the comparison in Ansoff matrix. Detailed challenges are made by considering all the factors in the current market of India

Chapter 7 (Conclusion and Future Research) tries to answer the research questions from the overall analysis made by e-payment to m-payment system and explains about the mobile payment system that will be introduced in India in the near future.

CHAPTER 2: RESEARCH METHODOLOGY

The working process of this thesis consists of number of phases this thesis includes the literature study, interview, survey, market analysis and customer review and analysis of the existing business model. In looking down to perspective collection of existing data is most essential and the selected methods are presented which are essentially based on the industry standard. Each and every task is related and connected to provide valuable information for the user to study about the mobile payment services which are related to electronic payment services to mobile payment services.

2.1 Literature Study

The literature study is done for a wide range of business models, how are they used, to which market are they more suitable and why. The analysis also includes study about the background of the operators and the banking sector also. A part of the study involves around Bharti Airtel, Vodafone and any nationalized Bank and third party vendor Bill desk. The Author decided to collect the more information which is available on internet research and white papers. Research paper provide different segment for author to drill down ideas and case studies reviewed by various authors on mobile payments on specific regions and countries are also taken into consideration for a better analysis of different market scenario.

2.2 Semi-Structure Interviews

As depicted in the figure no. 3, the author has decided to adopt a semi-structured pattern for conducting interviews. A one-on-one conversation is carried out between the interviewer and a representative from the operators and channel members of payment services. The representatives are typically senior members with considerable relevant experience, and are selected due to their deep knowledge and understanding about the m-payment ecosystem. Most of questions were pre-planned to get a good flow during interview and some questions were follow up questions which arise while doing the interview. The detailed list of questions and findings are mentioned in Appendix B. The raw data collected after the interview session is then categorized, and structured to extract the key findings. These key findings are written in Sections 4 and 5, and also used to carry out the SWOT analysis in Section 4 for each case study, the ARA modelled analysis described in Section 5, and for constructing the tables 4.4.1 and 5.3. The summary of the questions are related answers can be found in appendix B.

Secondary data sources are datasets those are already in existence, such as census data and research data and projected data. Subjective questionnaire are formed and used at the time of taking personal and one to one interview with senior executives over the phone and discussion were happened on the basic of question and given topic mobile payment in India. Most of the questions are straight forward and few more are discussed after reading the material, books and article from the internet. Secondary data is used to understand and evaluate the requirement and measure the worth of mobile payment in developing country that helped to get more accurate information to analysis the work. Data would help out to study about the e-payment payment module and m-payment module which itself is a huge source of

information about the each component and author will drill down the common factors which are involved in both payment system.



Figure 3 View of control information pattern

(Hancock, Ockleford, & Windridge, 2009)

2.3 Ansoff Matrix

As the research involved the involvement of organization product development strategy, so we would use the Ansoff matrix. The Ansoff matrix centres on the organization’s current and future customers and the respective products desired or used by them. Therefore, there are a total of four plausible market-product combinations which include current and future markets and current and future products (Kazi, 2012)

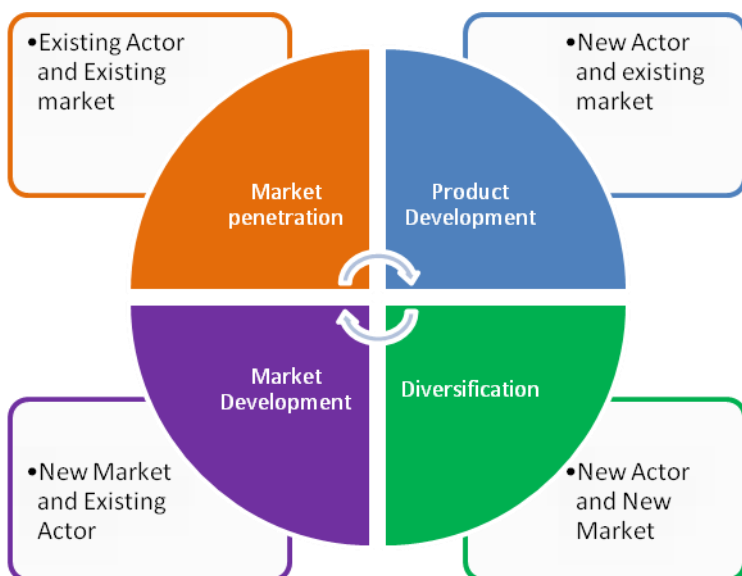


Figure 4 Ansoff matrix based on actors

(Kazi, 2012)

The Figure 4 depicts the Ansoff matrix based on actors. The area is segmented into a total of four quadrants, which enable the reader to understand the details of the Indian ecosystem. Ansoff matrix is utilized to depict the Bank led model in India. Additionally, in chapter 5, the Ansoff matrix is used to analyse the operator and bank led model and its relevance in the Indian markets. It will give the overall study of the market of the product lies in which quarter of the segment and what next to be focused to achieved the best result and market the product to get more revenue and increase the usability. The

market segment is divided into 4 major sections and in chapter 5 which is analysis of thesis work would provide a clear picture to the market.

Market Penetration

The organization tries to attain an increase in its existing market share for its existing set of products in its portfolio.

Market Development

The organization tries to achieve growth by introducing its products in new markets

Product Development

The organization generates a modified or new set of products for its existing markets.

Diversification

The organization achieves growth by generating new products and delving into parallel sectors in order to generate new opportunities.

2.4 ARA-Model

Chapter 2 proposes the methodology, which is supplemented by the main reason for selecting the methodology. The methodology is very important for researching a topic similar to the one discussed in this thesis, because a lot of data has been collected from different sources, which then needs to be filtered and processed and presented in an understandable and consistent manner. One of the models used to analyse data in this thesis include the Actors, Resource, and Activities (ARA) model which was developed by Håkansson and Snehota in 1997. The ARA model is primarily a model used to represent industrial relationships. The model represents the actors, their resources, and respective activities. The activity link is used to depict the matched relationship between two parties which might lie in different verticals, for example, technical, commercial, and administrative. The ARA model is particularly useful to provide an insight to the different roles played by the actors in their respective ecosystem. Chapter 5 describes the ARA model analysis based on operator and bank led model in detail and electronic payment system by company bill desk. The figure 5 given below is to clarify the nature of mobile payment elements, opportunities, relationship and inter-dependencies between each.

As depicted in Figure 5, the biller payment plays an important role by connecting the consumers and the billers. Billing is primarily distinguished in two ways namely as batch billing and real time billing.

On another hand batch billing is useful for billing in utilities and services. While on the other hand real time billing is prevalent in mobile airtime. A payment centric service is both deployed at an intracountry, as well as international level. The international payment transfers generally include foreign currency exchanges and the payment system should be able to switch between multiple currencies to support a wider set of customers. NFC technology enables payments to be carried out at the point of sale. Additionally, tags and contactless stickers enable the seamless migration of payments from card based to mobile-based by utilizing a tag or sticker which can be read by the mobile phone of the customer.

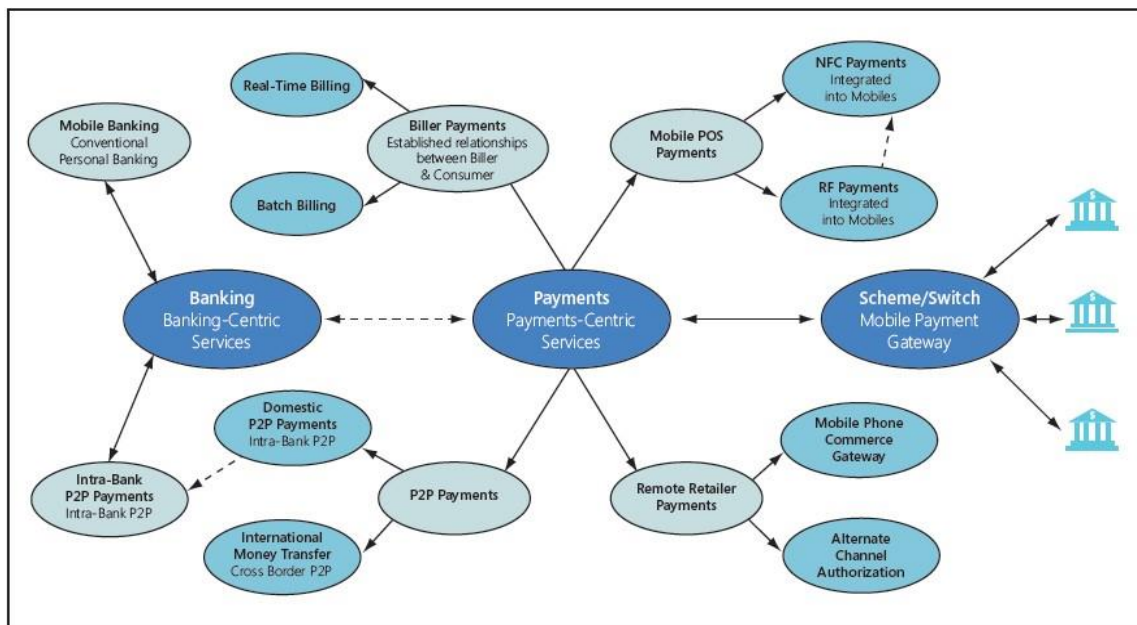


Figure 5 Nature of the mobile payment opportunities and the relationship and inter-dependencies (Microsoft, 2013)

2.5 Comparative Study

A comparative study between the different m-payment solutions will be carried out once data has been collected and organized for multiple m-payment solutions. Qualitative research shall be avoided until absolutely necessary. The comparative study will be done by utilizing results collected for individual m-payment solutions. Finally, the comparative study will be supplemented by plausible solutions to the obvious problems highlighted as a result of the comparative study. Comparison model is structured with the common factors involved in the e-payment and m-payment. These factors have been provided by the experts from m-payment systems. These common factors are utilized for carrying out the comparison between different m-payment solutions, and hence cover the overall analysis of the different m-payment solutions.

As an example, the table 2 below depicts some common features which can be used to compared Online Credit Card payment systems, Electronic Cash, and Smart card payment systems.

Features	Features Online Credit Card payment	Electronic Cash	Smart Cards
Actual Payment Time	Paid later	Prepaid	Prepaid
Transaction information Transfer	The store and bank checks the status of the credit card	Free transfer.	The smart card of both parties make the transfer
Online and offline Transactions	Online transactions	Online	Offline
Bank account involvement	Credit card account	No	The smart card account makes the payment

Limit on transfer	Depends on the limit of the credit card	Depends on how much is prepaid	Depends on how much money is saved.
Pre-registration	Yes required	Yes required	Not required

Table 2 Comparison of electronic payment systems

(Sumanjeet, 2009)

2.6 Expected Result

The expected result would be in the area of understanding the business model in the current market which involves the identification of different actors present in the field, collaboration among actors in the field of mobile operator and banks. Additionally, the extent to which the requirements of the customer are fulfilled and the services provided with respect to the money charged will also be discussed. The result will act as a guideline for the market players to strengthen their potential market value and perceived customer value of their offered services.

CHAPTER 3: MAJOR DEFINITIONS

E-Commerce	Most popular, doing transaction on Internet
M-Commerce	Business transactions through mobile
T-Commerce	Re-charge Commercials for Setup box mainly include Television
V-Commerce	Using voice commands to do transactions
P-Commerce	Proximity commerce using blue tooth or infrared technology
U-Commerce	Secure transaction using internet technologies

Table 3 List of common definitions

3.1 E-COMMERCE

E-commerce is primarily meant to execute transactions. It enables organizations and people to carry out digital commercial transactions among them. E-commerce has helped give birth to new opportunities for commercial trade and providing service to customers along with collaborating with business partners.

Organizations that have their core business processes and operations running on electronic media and/or the internet can be broadly classified as E-businesses. Core processes like marketing, sales, HR management, etc. will be a digital part of e-businesses. Processes which have an indirect impact, for example, change management and business process re-engineering can also be a part of this ecosystem. E-businesses have the advantage of being open and available for 24/7 duration via digital and online media.

3.2 U-COMMERCE

The fundamental purpose of U-commerce has been to shift the businesses in virtual space view and helped them spread over unlimited geographical space. In the future, users will have extremely fast network connectivity and would be able to connect with universal devices in order to provide the user the experience of ubiquitous communication (Miller & Watson, 2012).

U-Commerce is a combination of e-commerce, m-commerce, and t-commerce, along with the conventional brick and mortar enterprises. It can be defined as the seamless integration of all types of models encapsulated to deliver services centered on the user - U-Commerce.

Overall, the number of consumers embracing technological advances in payments and financial management is growing rapidly. For instance, the number of smart phone users who were interested in a mobile wallet service rose from 19 percent in March 2012 to 28 percent just six months later. Online banking is a service expected to be used by 96 per cent of users with a bank account, while 47 per cent of smart phone owners already use a mobile banking app. Consumers expect anytime-anywhere access to their financial information (First Data Corporation, 2013). Volvo implements a system which collects data in order to inspect the car location and improve the quality assurance which is an entirely enterprise-level wireless solution. Medical technology is has contemplated and is in the initial stages of monitoring the patients by use of high definition cameras installed in their rooms which is part of wireless technology. Remote monitoring of any product is also carried out by sensor technology.

3.3 M-COMMERCE

The power of e-commerce is leveraged for introducing increasingly innovative ways to market, crosssell, up-sell, targeted campaigns, promotions and pricing based on sliced and diced market segments.

M-Commerce is generally referred to as "Mobile E-Commerce" where all the electronic transactions are carried out using a mobile terminal or a wireless device (Jason J, Yufei, & Norm, 2002). Though M-Commerce has not fully matured in the current market, it is preferred more among the consumers, as it has the potential to make them spend money and purchase the product as and when they please. M-Commerce can also be termed to be a direct derivative of E-Commerce, since the products are bought and sold through the web. M-Commerce is considered to have more advantages than ECommerce solutions, primarily because of its direct and 24X7 connectivity. In M-Commerce, the transactions can be carried out on the go and do not have to depend on the limiting factors, for example, size and weight, especially if the device is as small as a laptop. Therefore, nowadays, especially in the case of day-to-day and routine transactions, use of m-commerce is more preferred. M-Commerce is defined as,

"M-Commerce is any transaction, involving the transfer of ownership or rights to use goods and services, which is initiated and/or completed by using mobile access to computer-mediated networks with the help of an electronic device" (Tiwari, Buse, & Herstatt, 2008).

Mobile Commerce: With the growth of the mobile devices market and the rapid and sustained advancement in mobile device technology, the demand for multimedia services along with multimedia content has drastically increased. Most forms of multimedia, for example, games, videos, music and other content are being ported to and/or designed for mobile devices. For all m-commerce transactions carried out by using mobile devices, multiple issues related to copyrights, distribution, etc. can arise and have to be addressed.

Mobile Apps: The app platform, an offering by major cell phone operating platform developers today, is experiencing an exponential growth. The app platform has created a billion dollar business for Apple Inc. through its App Store. The app platform is now closely tied to the cell phone and operating platform manufacturers and can be connected to the desktop through the use of installable desktop applications. In the case of Android alone, the mobile app store, Google Play, is owned by Google, who supplies the operating system and not the physical device itself, only exception being the Google nexus range of phones. The market for applications is exploding and in the foreseeable future, mobile apps could be offered by third party merchants instead of being tightly connected to device manufacturers and operating platform developers, as is the case today.

Location-Based Services: These include GPS Services and location-based notification services. These services are mostly subscription based.

Mobile Ads: Mobile Ads is a fast growing business trend and includes targeting based on profile preferences and geographic location of the user. Mobile campaign is becoming increasingly popular for certain market segments, especially the segments related to entertainment.

Mobile Networking: Similar to web based social networking, mobile social networking is prevalent in virtual communities. Many popular Internet social networking websites, for example, MySpace and Facebook have turned mobile. Interactions within mobile social networks are not limited to exchanging simple one-on-one text messages (SMS) but are evolving towards sophisticated interactions of Internet virtual communities.

Mobile Payment: Future technologies are based on NFC which involves a contactless method of payment. This method saves a lot of time and does not require users to stand in long queues to carry out their payments. The major factors involved in the mobile payment industry include MNO, Financial institutions, TSMs, Merchants, Consumers, third party providers etc. The mobile payment business model is considered to be complex, as it is new and the existing players in the market are on the verge of finding out their responsibilities.

Micropayment: Mobile commerce requires one-time payments, or continued subscriptions. The onetime payments could be carried out through a credit card, ACH, stored value card; pre-paid card etc., by using a payment gateway or the amount could be consolidated with the monthly usage bill, which requires integration between the transaction and the user profile. Each such transaction will lead to one or more back-end transactions requiring complex fulfilment logistics, settlement issues, and disclosure compliance; thereby involving all ends of the business spectrum. Another factor is the development of technology such as high bandwidth in the internet usage, which has led to the increase in the usage of M-commerce. This driving factor has enabled the users to opt for M-commerce in order to make their business more competitive and unique.

There are some unique features of m-commerce

(1) **Simplicity:** The authentication of user is simple, as the system includes an in-built Subscriber Identity Module (SIM), whereby the user details are known to the respective MNO, and further transactions are carried out by entering the Personal Identification Number (PIN).

(2) **Ubiquity:** In M-Commerce, the transaction can be carried out at any place independent of the location, provided the user possesses a mobile phone.

(3)**Accessibility:** It gives an easy access to the transaction data and other details, because the data is in hand.

(4)**Personalization:** The user can personalize his data according to his needs.

3.4 Categories of Payment Service Providers and Processes

Accordingly, merchants should consider what each of these systems has to offer. Given below are some key considerations for the most common types of service providers in the global e-Commerce space:

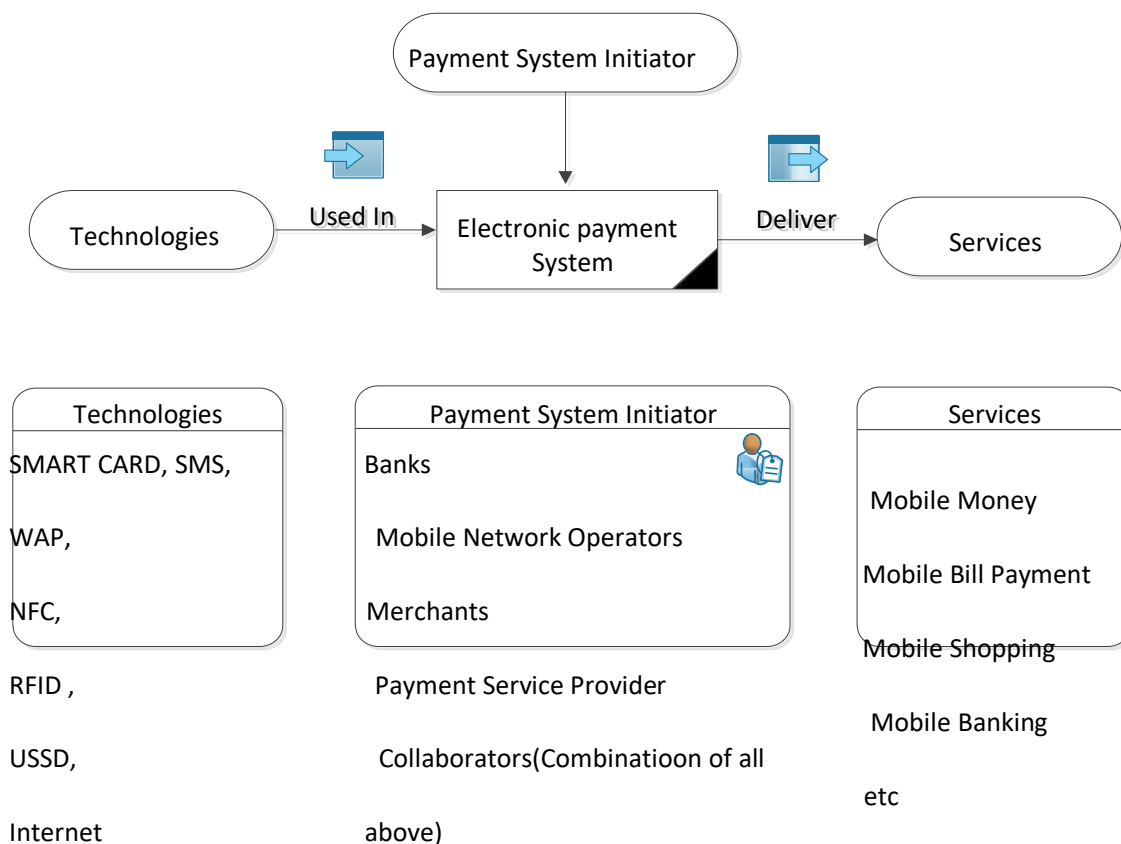


Figure 6 Payment Service Providers and Process

(Goudar, 2012) (Mathew, Balakrishnan, & Pratheeba, 2010)

The above figure 6 describes the relationship between technologies, payment systems, and services (or applications). The figure shows that the payment system solutions receive various technologies as an input. The output is a series of services (or applications) that the technologies are capable of providing. One of the perceived challenges in electronic payment systems is the competition amongst actors involved in the electronic payment systems.

3.4.1 MNO and Gateways

MNOs have been providing an attractive proposition for mobile payment services in the market and have been investing to attain a fruitful start and avail returns on their investments (ROI). Their efforts will help improve the overall infrastructure and will try to provide an edge with respect to their efforts to increase the available air time and data usage. MNOs are trying to move ahead in every possible way, in order to benefit in these areas and provide a richer experience to the user. For different types of payments transactions are occurring through the mobile device's gateway which can be positioned

between a merchant and a consumer and sometimes levy a fee on the participating entities. In a network, the linked transaction between the shopping cart and the payment service provider is passed through the payment gateways. These services are frequently offered between the bank and merchant or consumer with the merchant as referred to figure no 6.

3.4.2 Banks for financial institute Mobile payments are associated with the bank and financial institutions, because these payments are responsible for protecting and projecting accounts and surrounding loan products. Retails payments are also an important constituent of the banking sector. Banks have a strong hold on the market for providing the services to the customers, and try their best to maintain and retain the consumers. The banking sector in India is growing rapidly and the overall scope for providing similar services is increasing exponentially. However, the participating entities have to follow important guidelines from the Reserve Bank of India (RBI) and National Payment Corporation of India (NPCI). The core objective of these institutions is to standardize the business processes for all retail payment systems. Another important entity involved in the ecosystem is the Institute for Development and Research in Banking Technology (IDRBT), whose core objective entails "*To be the premier and preferred Research and Development Institution on Financial Sector Technology and its Management, working at the intersection of Banking and Technology for the Indian Banking.*" (Mobile Payment Forum of India, 2011). The IDRBT is a major banking research institute in India for providing and improving the banking technology.

3.4.3 Handset manufacturers (OEMs)

Handset manufacturers, or more specifically, Original Equipment Manufacturers (OEM), are responsible for producing mobile devices and making sure that their capabilities and usability matches the requirements of their target group. The successful use of the mobile devices for voice, data, and payments provides the potential and corresponding growth in the market in terms of sales made to new customers.

3.4.4 Payment Processors and Technology Provider The technology is constantly developing in all the sectors which are collaborating with other handset vendors, for example, system integrator, chip manufactures, and the smart card chip provider. A mobile technology utilizes the security enabled SIM card as the core of its secure element. The service provider can provision the payment security by managing the authentication between the entities, while the Trusted Services Manager (TSM) enables the secure element to be used by service provider. Banks and mobile network operators are focused on the security issues and concerns encountered while establishing a secure payment controller and overall payment model deployed between the gateway and the merchant, and the merchant and the consumer payment model as referred to figure no. 6.

3.4.5 Mobile payment as a payment The term defines a transaction made by a mobile phone, which involves the initiation and confirmation of successful transfer of funds to the payer or any merchant in return of service or goods. These payments may be made at a mobile device or at a Point of Sale (POS), and can be carried out by utilizing credit or a pre-paid wallet. Example: Deduction of funds from a prepaid account or transfer of funds, or billing carried out by an MNO (Smart Card Alliance, 2011).

3.4.6 Mobile order transitions are mainly utilized to initiate the order but cannot be used for making payments, for example, not in cases which involve ordering of a lunch or dinner via the mobile phone and payment at the time of delivery by using a supplier like Pizza hut.

3.4.7 Mobile delivery transactions are mostly used for receiving delivery of goods or services which do not involve making a payment. For example: buying tickets for event or show.

3.4.8 Mobile authentication mobile device is used to authenticate the user as a part of payment transactions, whenever a specific code is sent to a mobile phone, or whenever the user inputs his request for carrying out an online payment.

3.4.9 Mobile banking To access the services provided by bank and used with mobile phone. The facility is usually provisioned and deployed directly by the bank. The functionalities provided can include telephone banking, online banking, and checking the existing and registered transactions via a mobile browser or app (ThinkRupee, 2012)

M-payment type	Technology used	Purchase relationships	Method	Charged to	Examples World wide
"Message or Browser payments"	SMS USSD Accessing the web from a mobile device	C2B B2B	Remote	Network bill Debit card Credit card "Virtual pre-paid account (PayPal"	M-Pesa Obopay Roshan
"Applications based payments"	Send money Mobile money transfers (MMT) Virtual currencies	C2C C2B	Remote	Bank account Prepaid virtual account Credit card	PayPal Zong Mwallets Face book credits Starbucks
"Contactless payments"	NFC RFID Technology SIM Card, Sticker containing payment information Numeric code payments	C2B B2B (typically Small and Medium Enterprises)	Proximity	Debit card Credit card Prepaid account	Mobile Felica Pay pass "Touch and Go" (Zantel)
"Hybrid payment devices"	"Hardware-based mobile payment devices that can be "clipped on to a device" or "built in" to the device" "Mobile device becomes the card reader"	C2B B2B C2C	Proximity	Credit card Debit card	Square VeriFone Pay Ware Intuit Go Payment

Table 4 Mobile payment categories

(Deloitte Touche Tohmatsu India Private Limited, 2011a)

The above table 4 represents about the mobile payment categories

CHAPTER 4: ANALYZED CASES

4.1 CASE STUDY OF BILLDESK AS ELECTRONIC PAYMENT

IndiaIdeas.com Limited ('IndiaIdeas' or 'BillDesk') is one of the largest electronic payment and collection service providers in India. BillDesk is a full-service payments processing company (Chaudhary, 2012) – it works as an Internet Payments Service Provider and aggregator providing both online real-time payment gateway services as well as the capability to process bulk electronic transactions and transactions generated through multiple channels – both for banking accounts as well as credit card transactions.

IndiaIdeas is a ten-year old company, they are providing the services under the brand label of “BillDesk” and is at the forefront of electronic payments technology and service delivery and is today the leading player in the country in its chosen domain (Thomson Reuters, 2012). IndiaIdeas are connected with multiple banks and institutions as a single point of interaction across the country. The IndiaIdeas technology and service enables institutions to deliver efficient third-party payment and collection services to their customers, while outsourcing the service management complexity to IndiaIdeas. All payment gateway implementations for large utilities in India managed through aggregators [viz. LIC, BSNL, MTNL, MSEB, Reliance Energy, Vodafone, Airtel, Tata Indicom, etc.] are managed by BillDesk – clearly indicating the highest levels of acceptance of BillDesk as a trusted payment solutions partner for large organizations.

BillDesk is an independent, professionally managed organization with no bank/group holding a controlling stake in BillDesk. . According to (Saicharan, 2013) IndiaIdeas is one of the few companies that can offer the entire range of payment options (given below) and provides single consolidated payment MIS and funds post reconciliation daily for transactions across all modes:

- Internet Based Online Real-time Payment Gateway.
- Standing Instructions (ECS, Credit Card, and Bank Account).
- IVRS.
- POS Machines.

Competitive Strengths

The principal competitive strengths which have enabled 'BillDesk' to have a leadership position in its industry segment as described by the expert (Saicharan, 2013).

Neutral Entity, Non conflicting structure and business model Bill Desk is a neutral entity with no conflicting ownership or management structure. Its ownership structure is structured as a broad-based entity with no single dominant shareholder nor is it an affiliate of any other entity that has potentially conflicting objectives. The management of the Company is independent and comprises of professionals.

Proven system with Banking Industry and Service Organizations There is significant learning and experience resident within BillDesk built over time by demonstrated delivery of services to large banks and service organizations – on integration aspects, on process design and management and managing service operational issues. This knowledge platform and process provides BillDesk with an unmatched competitive advantage in the Indian markets.

Confidentiality and Security of Customer information

As a key service provider to banking entities BillDesk is organized in its ownership management and operations, in a manner that provides the highest levels of assurance to banks on the use, maintenance, and protection of the Bank's data. This has been one of the guiding principles of BillDesk and forms the core of its Service philosophy. This also works as a critical advantage in the marketplace, allowing the Company to partner with a wide range of partners and without any constraints and conflicts.

Range of product offerings

Over the last few years BillDesk has developed and rolled out a broad range of solutions for the banking and services industries. These solutions have been designed to address the varied and expanding requirements of clients and to help them achieve their business objectives. In tandem with other service offerings, these solutions enable BillDesk to obtain additional payments and collections management businesses from existing clients as well as address a larger base of potential new clients. According to the interview (Saicharan, 2013), BillDesk today is the only organization in the country with the ability to provide comprehensive electronic payment collection and remittance services.

Strong management team

According to the interview (Saicharan, 2013), a key strength of BillDesk is its top management team – that brings with them extensive experience in the banking, insurance and financial services industries. Many of the senior management team members are strong industry professionals with qualifications from the premier technical institutes in India. The management team has a deep understanding of the payments and remittances industry in India and has conceptualized, designed and developed the software products and solutions that form the core of BillDesk' product offerings.

The emergence of new technologies is rapidly changing the way consumers can interact with organizations that they do business with — specifically, how, when and where they choose to pay their bills. From an organization's perspective, delivering on customer convenience makes it essential for organizations to provide consumers with numerous payment options and touch points that are most convenient for them. On successful validation, the customer's account is checked for balance availability and the transaction is either successfully processed or rejected. The customer is intimated of the same instantly and an electronic acknowledgement is displayed which will display his payment confirmation number. Simultaneously data is transmitted electronically to merchant portal intimating the success/failure of the transaction. The monies collected from the successful transactions will be pooled into the designated collection account of merchant portal maintained with the identified bank. These monies will typically be made available to merchant portal by two working days of the payment. The payment transaction through the IVRS is highly secure and the card details remain confidential between the customer and the system.

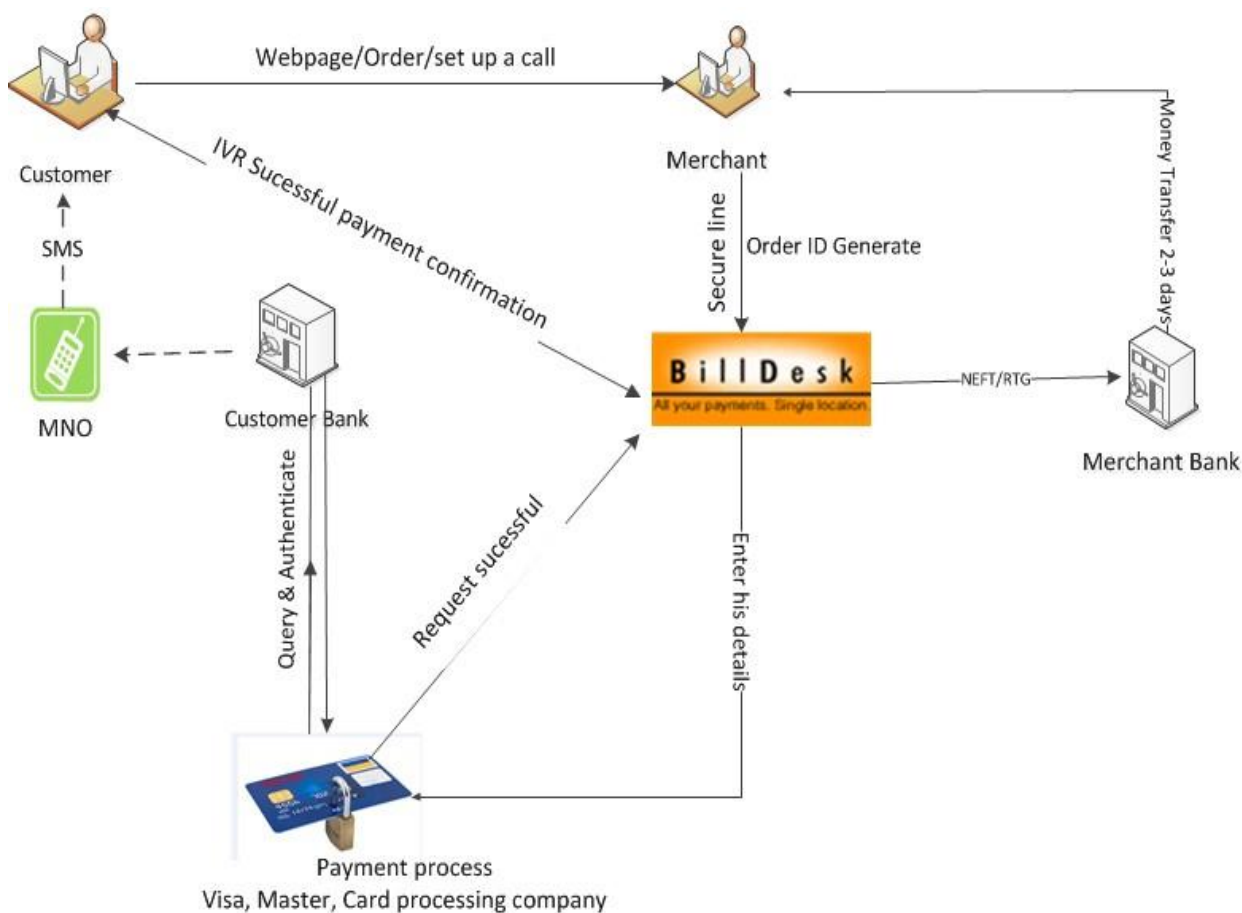


Figure 10 The overall workflow and key operational aspects of IVR Payment Gateway System

The proposed service is a telephone based payment solution giving a customer the convenience of paying RFC anytime, from anywhere by using their telephone/mobile. BillDesk IVR Payment Gateway is an automated telephone payments system, through which RFC call centres can achieve a higher rate of automation, 24/7 availability, and enhanced customer convenience. BillDesk Payment gateways can be accessed by the RFC IVRS. Capturing telephone payments is made easy through touch-tone prompts and account data validation.

The following section outlines the process after the call has been initiated and the customer wished to use the IVR payment option as shown in the figure no 10

1. RFC IVRS communicates to the customer the option of paying using a Visa/MasterCard Credit/Debit Card and provides the same to the Customer.
2. Upon Customer's consent to make the payment, RFC IVRS generates a unique number (order no.) on the RFC system and then initiates a call onto the Payment Gateway [by conference dialling into BillDesk dedicated telephone number provided by BillDesk for RFC]; the Customer line is also kept 'live' on hold. The RFC IVR enters the Agent ID as provided by BillDesk, which is validated by BillDesk.

3. Over the IVRS, the Customer is prompted to enter the amount payable. The Customer carried this out by punching the data on the phone keypad. The amount is validated and is read back to the customer.
4. Customer is prompted to input Credit Card Number, Credit Card Expiry Date, CVV number, and OTP.
5. The IVRS reads back the credit card number (last 4 digits only) provided and expiry date of the card for confirmation by the customer. The Customer is also informed of the amount being charged to the card and the Transaction ID. This data is then sent through to the Payment Gateway, which processes the same Visa/MC networks and provides confirmation to the IVRS system on the success/failure of the card transaction.
6. The transaction status is read out (success/failure transaction) to the customer and the agent along with a transaction reference number.
7. The Payment Gateway logs out of the conference call, while the RFC IVR continues the conversation with the customer.
8. For transactions done during the day, BillDesk will provide RFC with a consolidated report, T+2 day (where "T" is transaction day) listing all the transactions.
9. The money for the transactions (matched with the above report) will be remitted to RFC bank account on Day T+2.

Primarily, the 2 payment options include:

VISA Credit Cards / Debit Cards

MasterCard Credit Card / Debit Cards

The swot analysis of BillDesk is illustrated below and is depicted with respect to the inputs received from (Saicharan, 2013) and other research documents, SWOT analysis is created and this helps to solve the problem definition as defined in the section 1.3

SWOT of BillDesk

Strength: India's largest payments' processor and executes the bulk of payments. Robust customer support and accuracy of Internet based transactions.

Weakness: Focus on e-commerce and retail transactions in order to grow further. A bulk of the retail market has little or no awareness of BillDesk retail capabilities and continues to rely on CC Avenues.

Opportunity: The high level of reliability that customers have for making payments over the BillDesk Payment gateway may be used for its retail foray. Newer and more innovative payment options may be explored to retain the market leader's position.

Threat: Dominant position of CC avenues in e-commerce market and atom in m-payments. Growth of online and internet based payments is attracting a lot of newer modes of payments, for example, NFC.

Interaction scenarios of actors:

Customer initiate a call with merchant and merchant is connected to Bill desk IVR payment system for purchasing goods by customer and On secure line IVR payment system interact with customer for payment processing to access bank details and checking the credential of customers like bank details and amount. Later on successful payment process would inform to IVR system and bank transaction is successfully completed message would receive by customer from the MNO.

In the case of e-payment the aggregator is connected with the banks and merchants as per the given figure no. 10 which deals with the business relationship with each of these actors and the end-user is strongly connected with the banks and merchants. End user and bill desk acts as aggregator have an indirect relationship as end user is not aware of the back-end process of bill-desk. End-user is connected with carrier provider actors as they are providing the technical support to users and providing internet connectivity. In the given figure no.10 actor banks have an activity with the end user do transaction processing. In the case of actor merchant have an activity of providing invoice details and do shipping of product.

4.2 CASE STUDY OF NOKIA MONEY AS MOBILE PAYMENT

Nokia's vision is *"a world where everyone can be connected. Our vision is to ensure that 5 billion people are always connected at any given point and to achieve 100 fold more network traffic."* (Oduyemi, 2013)

Nokia is renowned as the world's largest company in manufactures mostly telecommunication equipment. It is considered as a leading brand in local markets and businesses and is focused on supporting customer needs and growth of telecommunication industry. Nokia have a core market for producing mobile handsets and they also produce telecommunication equipment's for voice over IP, wireless LAN, mobile phone infrastructure, mobile radio, and line of satellite receivers. Nokia has worked with 2 technologies, namely, Global System for Mobile Communications (GSM) and Code division multiple accesses (CDMA) (Daga, 2006).

Nokia comprises three business groups as represent in figure 11

- Mobile Phone is a two way communication device used mainly for connecting people by providing its services like mobile voice and data.
- Multimedia is a service which enables standards users to interact with multiple forms of media by creating, editing, transferring and consuming different types of files. Current mobile devices and personal computers can be inter-connected and communicate with the use of different

standards in order to share and consume the multimedia content. Multimedia is a standard form of video and graphic related information used by users in their daily activities.

- Enterprise Solutions provides organizations of different sizes with a set of services and products, in order to satisfy their business requirements. It represents a main vertical for a company as a business prospective. It can differ for every company in their underlying security infrastructure, software, services and enterprise grade mobile devices.

The primary business group namely Customer and Market Operations is assigned the responsibility for sourcing and procuring, designing, manufacturing and developing, logistics, and marketing the mobile handsets from Multimedia and Enterprise solutions (Gupta A. , Nokia-Restructuring a Giant, 2009). Moreover, Nokia’s technology platforms act as the backbone on which additional services can be deployed, which in turn benefit the business partners and customers of Nokia. **What are the key parameters for Nokia to lead in the competitive Indian market as compared with its competitors, namely, Ericsson, Motorola, LG and Samsung?**

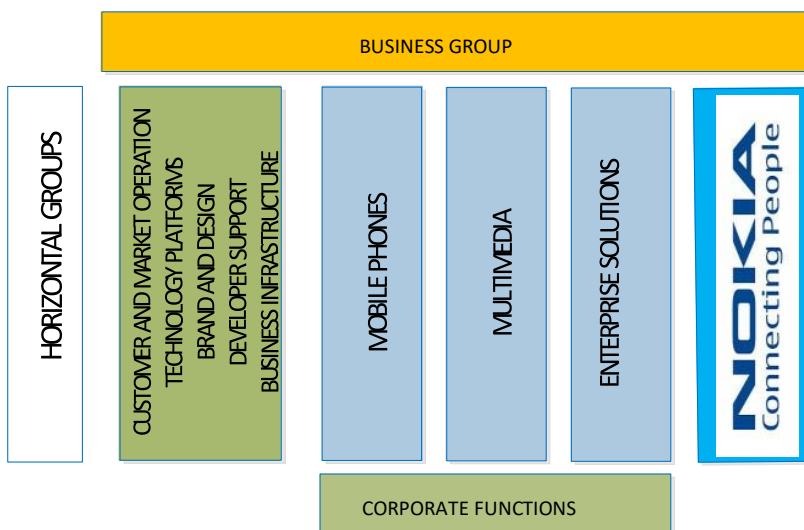


Figure 11 Business Groups of Nokia

(Gupta A. , Nokia - Restructuring a Giant, 2012)

Nokia's strategy is to focus on the mobile phone market. In the market they are establishing distribution partnerships and it is too early for investment product manufacturing and image brandbuilding, and developing innovative product features. Nokia has launched the first FM phone device and Nokia handsets are providing all basic services, namely, SMS, calls, and GPRS facility. The design of Nokia handsets is simple and handy. It is easy to easy to operate from a user’s point of view and provides a soft touch of the keypad. Nokia has offered a similar set of pattern stencil in all its handsets. In India, especially in the rural sector, a major challenge which is faced by the user is the ‘range of signals’. Nokia phone supports all the networks in India, while other handset manufactures fail to provide the power of connectivity. Nokia’s handsets are better for the support on all networks and design pattern and their models are more convenient for all age users.

In India, Nokia is pioneer players for using and manufacturing mobile phones devices and Nokia are very old players in the mobile telecommunication market as compared with Samsung and Apple. Nokia believes that there are 4 billion mobile phones but only 1.6 billion bank accounts (Nokia Corporation, 2009). Nokia recently launched its mobile payment service as Nokia Money. Nokia money works features in phones and allows financial and mobile top-up transactions for example for to ticket booking. Nokia money is using this service without requiring the user to have a bank account. Nokia Money wallet service is specified for the rural India where forget a bank account, an average user does not even have a smart phone, personal computer and credit/debit card. Company Nokia had conducted a successful field test for about a year in area location such as Pune, Nasik, and Chandigarh. Nokia Company has partnered with two banks in India to provide the services namely “YES bank” and “Union Bank of India”. Nokia India Private. Ltd. has launched Mobile Money service in partnership with two Public banks such as Union Bank of India and Yes Bank (Narang, 2011). But this service works only on handsets manufactured by Nokia.

Nokia Money: Challenges ahead

Infrastructure support and rural area awareness: The Quality of mobile network in rural India and mostly in remote areas is not sufficient to provide proper SMS-based system. Call drops, poor network and unsent SMS are major issues which are experienced by users and hence their SMSes are not received immediately.

Handset manufacture

As presented in Figure 12 the handset volume is huge i.e., 70.8m units; and it dipped by 16% which is not a good sign in mobile phone volumes. Worse, the average selling price (ASP) went down 18% to \$44 (Guardian News and Media Limited, 2012). There is a huge competition in developing markets by other smart phone manufacturers for example, from companies such as Huawei and ZTE. Their products are not so expensive in their make and build but the durability of product is great to sustain for a longer period of time.

Devices & Services⁵			
Net sales	4 246	7 087	-40%
Smart Devices net sales	1 704	3 528	-52%
Mobile Phones net sales	2 311	3 407	-32%
Mobile device volume (mn units)	82.7	108.5	-24%
Smart Devices volume (mn units)	11.9	24.2	-51%
Mobile Phones volume (mn units)	70.8	84.3	-16%
Mobile device ASP ⁶	51	65	-22%
Smart Devices ASP ⁶	143	146	-2%
Mobile Phones ASP ⁶	33	40	-18%
Operating profit	-219	729	
Operating profit (non-IFRS)	-127	733	
Operating margin %	-5.2%	10.3%	
Operating margin % (non-IFRS)	-3.0%	10.3%	

Figure 12 Q1 2012 report for mobile phone volume in terms of sales

(Guardian News and Media Limited, 2012)

There are two types of accounts: Easy Pay and Easy Send.

Easy Pay is one of the basic versions for the users as they can avail this facility of paying their utility bills and top ups and use the SMS facility for booking their tickets and insurance premiums (Bhushan, 2011).

Easy Send in easy send the user has to provide few important documents namely ID proofs, signature and address proof. This account is more sophisticated and provides additional services once the user has successfully signed up to avail these services in the future. Users can transfer money to another user who is an existing user of Nokia money. Users can pay money to retailers who are registered as members of the service (Bhushan, 2011).

Interaction scenarios of actors:

The user has to visit a local retailer which is an authorized service centre in order to enable an agent to embed the service on the phone. Users can make the payment via cash and get digital cash transferred to their phone via an instant SMS message. *“Nokia Money is independent of network carriers and individual banking network”* (Khedekar, 2011). Nokia money works with all kinds of mobile devices and Nokia money is re-installed in the same version of mobile handsets. Users have the option to select any bank for their service subscriptions.

With respect to the inputs received from (Sharma A. , 2013) (Srimal, 2013) and other research documents, SWOT analysis is created and this helps to solve the problem definition as defined in the section 1.3

SWOT of Nokia Strengths:

Nokia is a key player in the market for distribution and selling large number of handsets in India and globally. Nokia have a highly professional and high-quality team which is their key strength and provides substantial financial advantages. A wide range of classy products are manufactured by Nokia and are sold in the market which has helped them obtain the as No.1 position in global and Indian markets. Nokia handsets are user friendly and provide all accessories and options of plug and play. The most important feature in the Indian markets is the authorized resale outlets of products which are provided by Nokia as compared with other handset brands.

Weakness:

Price advantage of their products is comparatively much lower when stacked up against other handsets. From the user's point of view few products are not user friendly. Nokia has not targeted the poorer class of the society which has not allowed them to target a larger set of users. Moreover, some of their products are at a higher price point than their competitors.

Opportunities:

Nokia has to target all segments of users from lower to middle class and they should launch new products with respect to the purchasing power of the people. Nokia has the opportunity to increase its business

which can be achieved by support and service. Nokia should look for a different range in price and availability of handsets to overcome their competitors. In India, the Telecom industry is at its peak and Nokia has the opportunity to increase its sales as well as market share. India has potentially an increasing purchasing power and Nokia can exploit that.

Threats:

For a big company like Nokia, maintaining their position as a market leader has many issues and threats. The major threats for example, Motorola, Sony Ericsson and Cingular (US) etc. are arising in the market and threatening their market share. This is leading to widespread and consistent competition to the mobile phone market of Nokia. Major threat for company Nokia is that neighbouring countries like China manufactures handsets at a much cheaper price point and are decreasing the sale of Nokia handsets. Nokia has CDMA phones which are less in demand as the Indian market consumers prefer using the GSM technology enabled phones. A major threat for Nokia is the new features enabled handset or those which provide new style and more functionality.

4.3 CASE STUDY OF AIRTEL-MONEY AS MOBILE PAYMENT

In India, Airtel constitutes amongst the 4 main telecom and mobile operators, besides other operators, namely, Vodafone, Idea, and Aircel. Airtel is the third largest mobile operator with 180 million subscribers, registered till the end of March 2012. They have covered 400 languages and local dialects in rural India, and are planning to expand their network in rural area (Cisco Systems, Inc., 2012)

Airtel Company has launched the Airtel Money which is known as 'mobile money'. Airtel can safely be categorized as one of the initial successful mobile payment solution provider, besides Nokia money. Airtel has partnered with one of the biggest Indian consulting company named Infosys and they are one of the key players in the business of mobile money. They are providing the support for services deployed on the software and application platform. Airtel has also partnered with two major Indian banks, namely, State Bank of India (SBI) and Axis bank. These banks have the largest banked population in India. These two banks are acting like a financial institution for mobile money transfer and transaction in-cash and cash-out flow (Bennett, Coleman & Co, 2012). This joint venture offered and provided initial growth for accumulating a consumer and retailer base which is more than 1.5 million. Banks and companies have invested Rs.100 Crores (Rs. 1 billion) for this business in order to market it to the consumers (MixedBag Media Pvt. Ltd, 2012).

Airtel money has launched their first project in Gurgaon city as it is known as a 'Technology Hub' and later down the line they are planning to move towards south India (The Hindu Business Line, 2011). They have focused more on the major big cities in order to obtain and evaluate the initial consumer reaction and behaviour after using this new mobile payment technology. It is used on basic handsets, because the user does not need to have a GPRS connection to carry out the payments. This new platform has allowed a user to use his mobile phone for paying all kinds of utilities bills. Additionally, the user can re-charge it very easily and does not have to use his credit/debit card so often. Mobile money has made it easier to pay his electricity bills, phone bills, and the user can book an online ticket and pay for it using his phone. User can use the service for shopping in city malls and to make payments for train tickets. Mobile banking system provides a clear edge to promote and provide their financial services for

the population base which does not use internet banking/credit or debit cards often and provides them a safe solution which involves minimum transactions of physical money.

“A quasi bank account will provide a better alternative mechanism to the formal banking system, which will make the transaction cheap and dealing in cash” (Infosys Limited, 2012).

M-commerce of Airtel

Payment system in India has rapidly changed from the initial transaction method to a new way of carrying out transactions. In the past, a user used his mobile phone for checking his balance and carry out minimum transactions, which is known as information based service (Deloitte Touche Tohmatsu India Private Limited, 2011c).. Airtel is the first Indian telecom operator company to have license from the RBI Government regulatory to build and deploy the mobile payment services (Bharti Airtel Ltd, 2011-2012). Airtel Money, as a product of Airtel m Commerce Service Ltd (AMSL) is able to transform the old payment mechanism to a new and more dynamic payment mechanism platform. In India, 65 per cent of the retail business is carried out for cash Inflow (Deloitte Touche Tohmatsu India Private Limited, 2011b). Airtel is capable of capturing the market by providing and enabling micro transactions. Airtel is enabling the retailers to work with them and spend money at a low transaction cost. Airtel is laying the necessary foundation for banks and service providers to offer financial transactions and provides the financial support and micro-insurance to the under-banked and unbanked segment, Airtel as an organization is extremely successful in the Indian market as it has been successful in executing a win-win engagement for all the entities in the mcommerce ecosystem (Bharti Airtel Ltd, 2011-2012).

As per the given figure 13 below Airtel represents their 3 strong vision and action pillars in present market.

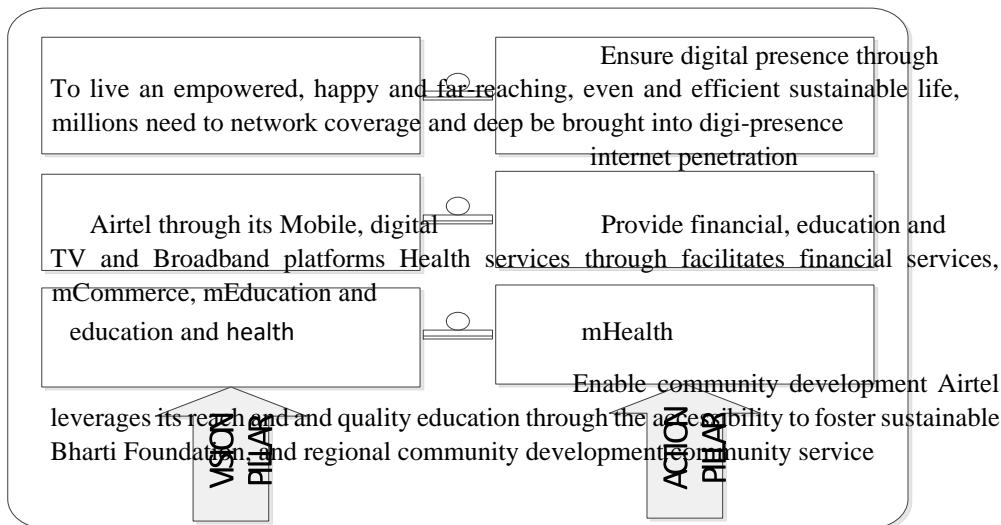


Figure 13 Airtel Vision and Action Pillar

(Bharti Airtel Ltd, 2011-2012)

There are two major distinct models which are currently available in the market under the Airtel money service express and power account service (The Mobile Indian, 2012). Recently, in January 2011, State Bank of India and Bharti Airtel announced a joint venture (JV), in order to pave the way for stimulating and driving the monetary formation for unbanked India, and make available a banking service to India's unbanked millions (NextBigWhat, 2010b). Later in February 2012, Bharti Airtel had launched its first mobile wallet service under the name of "Airtel Money", which acts as a semi-closed mobile wallet. Semi-closed model is a successful model and is based on the model used by Nokia Money. It provides multiple facilities, for example, utility payments and their semi-closed model is partnered with other utility providers in India (Infosys Limited, 2012). Airtel money can be used in 3 different ways (NextBigWhat, 2010b)

- **Load cash:** User can load cash on their Airtel mobile account by visiting their nearest Airtel retail outlet in any part of the city. The range for loading the money in their mobile account varies from INR 10, till INR 5,000 and standard monthly limit is INR 50, 000] (Gupta A. , 2012).
- **Pay bills & recharge:** User should be able to use this cash in his mobile account for making all types of payments, for example, (electricity, home bills, financial services, etc.) and recharge – Limits are applicable as above.
- **Shop & make payments:** There is no direct cash involved, and payments can be made to pay over-the-counter merchants, for example, the nearest grocery store, chemist, etc. using a mobile phone. The user can sit at home and pay for services like booking movie tickets online.

“Since there are more than 60 Crore mobile users in the country, it offers a good conduit to reach out to the unbanked population” (The Hindu Business Line, 2010).

Recharge Using National Electronic Fund Transfer (NEFT) System: The virtual account which is an Airtel account needs to be recharged before it can be used for carrying out any utility payments. The M-Wallet system supports two types of recharges. The outlet can recharge the accounts of user through their registered mobile devices by sending an SMS to the M-Wallet system containing the details of the recharge. The other mode of adding money to an account is via NEFT enabled bank account. This mode of adding money into accounts involves the Registration, Transaction and Payment Process steps. The procedure is depicted in above Fig 14.

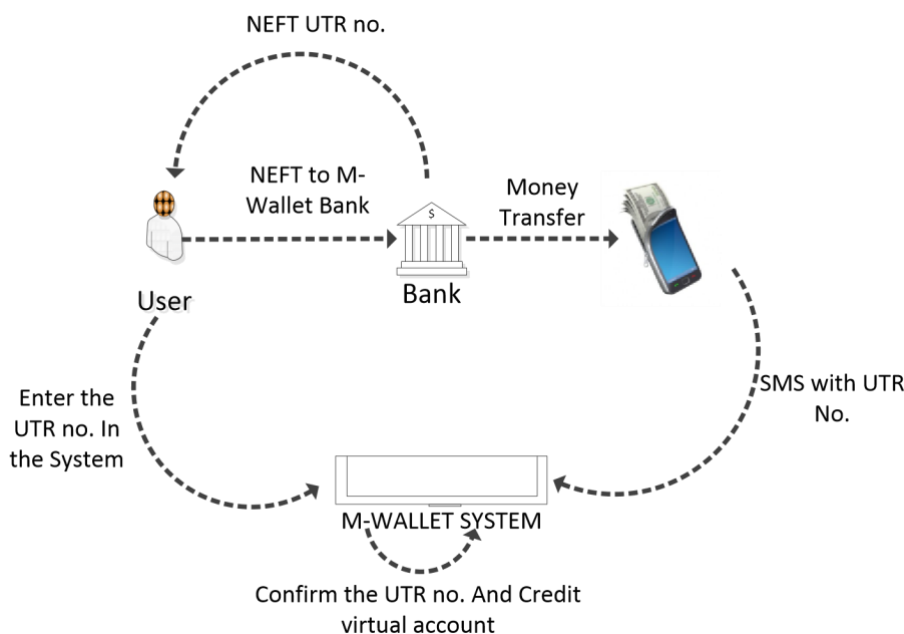


Figure 14 Working Steps about re-charging using NEFT System

(Arolker, Rai, Anurag, & Chakraborty, 2012)

Registration: A user should register for this service by sending an SMS to an M-wallet system from his mobile phone which should be verified. The user mobile number acts as his Unique ID. Later, a unique PIN is generated and is sent to the user, which can be changed by the user for its own additional security. The M-wallet then creates a virtual account for the user. The user will have a zero balance when his account is initially created. For the registration process, the user must fill the Know Your Client (KYC) form for opening his account as per the RBI guidelines. Later on the account can be fully activated once the documents are submitted to an m-Wallet outlet.

Transaction: The transactions are subjected as recharge, withdrawals, payments, and recurring payments. The user can visit any m-wallet outlet or bank to use NEFT for re-charging his account. The user can withdraw his money from his account, provided this user is linked to his bank account for carrying out NEFT transactions. After a period of 1-2 working days, the user is allowed to withdraw his money from the bank.

Redemption: The funds in the virtual account can be redeemed for money by carrying out a direct bank transfer with the NEFT system. The user can request a bank withdrawal by sending an SMS to the system. The request will be processed, and payment will be made to the bank account specified.

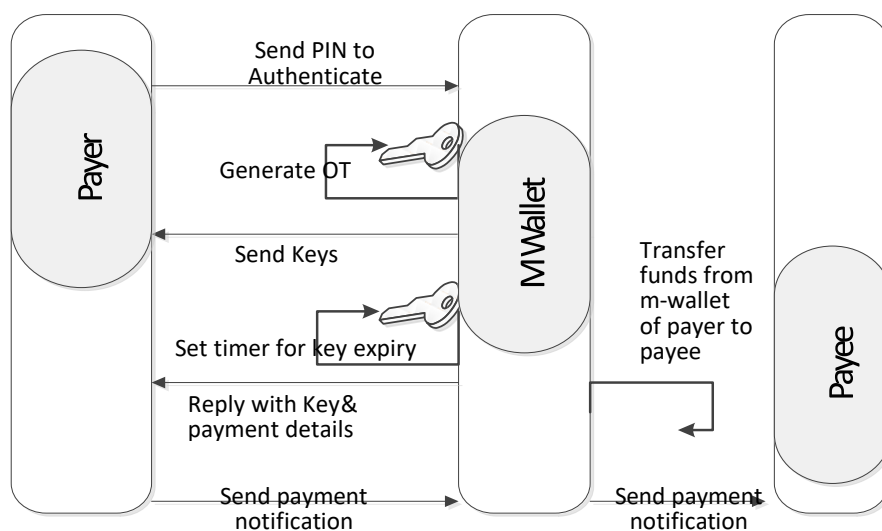


Figure 15 Payment Process for M-Wallet

(Arolker, Rai, Anurag, & Chakraborty, 2012)

Payment Process: Once the money is accounted in a user virtual account, the user can use the funds in the account to make payments for various transactions. The payment process depicted in Figure 15 is initialized by sending an SMS to the M-Wallet system with the PIN for the authentication. The MWallet system generates a one-time random key for the next transaction with a timeout and sends it to the user. The user has to reply within the timeout with the key, payment details like the mobile number of the merchant, the amount to be paid to the merchant, and an optional reference text that can be used by the

merchant to identify the transaction. If successful, the user's M-Wallet account gets debited and merchant's M-Wallet account is credited with the specified amount and confirmations along with reference text are sent to both the user and the merchant. The merchant is charged a percentage of the transaction amount as service fee which the merchant may pass on to the customer or bear it himself.

The merchant in payment transaction need not be an M-Wallet user. A temporary M-Wallet account is created for the merchant if he is not an M-Wallet user and this account is maintained till the user registers for M-Wallet, or decides to withdraw the funds parked in the temporary account. The account needs to be verified by using the mobile number as a unique identity to withdraw the funds.

Miscellaneous features: The M-Wallet system provides the user the facility of checking his account balance by sending an SMS. Additionally, the user can receive details of all the payments made and recurring payments scheduled over SMS. Flexibility in registration is provided to M-Wallet consumers where-in the consumer can update the existing M-Wallet account to the new SIM number by registering the new number using the SIM of the old number and the PIN. If at any point an MWallet consumer believes that his account has been compromised, he can freeze his respective account via the customer service or the M-Wallet web portal, or by sending an SMS.

The pre-paid payment instruments are generally classified as four types as referred in table 6 and brief description given in figure no. 16

Sr No.	Models	Example	RemarksAllowed	License
1	Closed	Within Entity. Cash-in by customer and in return can redeem Voucher from the business entity	No Cash-out	Operators
2	Semi Closed	Bill Payments, Utility payments Ticket etc.	No Cash-out	Operators
3	Semi-Open	Any POS terminal. Customer Cash-in can be used to pay at any POS terminal	No Cash-out	Operators
4	Open	Cash-Out Allowed	Cash-out	Bank Only

Table 6 Comparison model of payment system

(Ravindran, 2013)

Pre-paid payment instruments are generalized for purchasing of goods and services against the stored value in the instruments. They are of different types, for example, internet account, smart cards, internet wallets, mobile accounts, mobile wallet, and magnetic stripe card. The stored value is paid by the credit card, debit card, cash, cheque, and vouchers. (1) Closed-system payment instruments. (2) Open system payment instruments. (3) Semi-Open system payment instruments. (4) Semi-Closed system payment instruments.

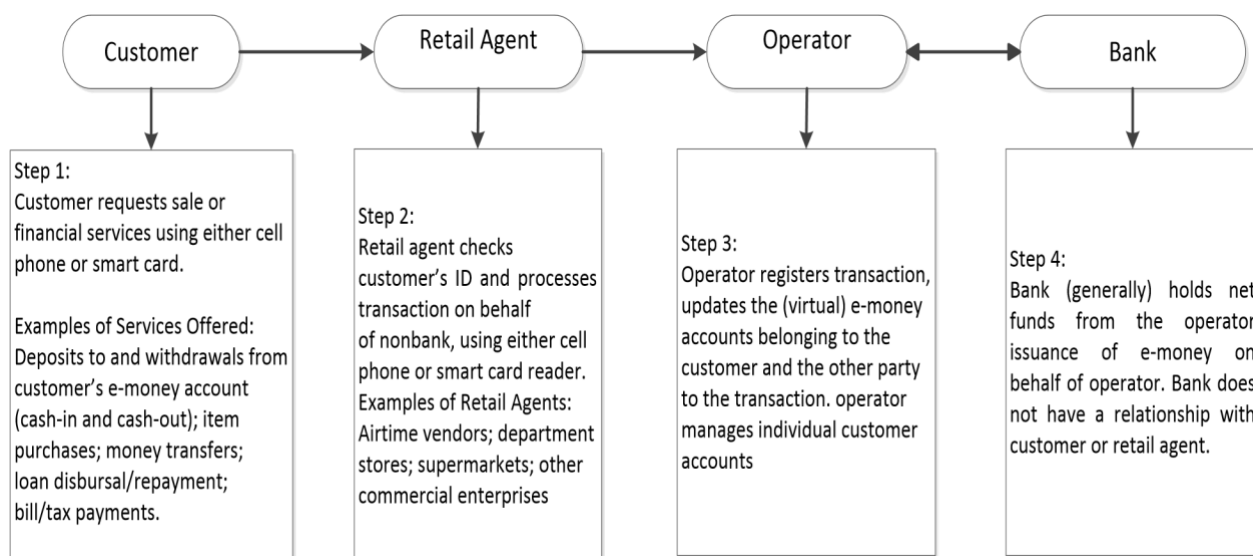


Figure 16 Actors interacting with each other in system of semi-closed model

(Mathur & Shrimali, 2010)

Closed System Payment Instruments: These payment instruments are generalized by business and merchants for establishing a service as issuing telephone cards and gift vouchers. Another well situated example of a closed system is the mobile pre-paid value, which is used for providing value added services by the operators (Kumar, 2013).

Semi-open System Payment Instruments: These payment instruments are generalized for accepting the card payments at a merchant location, mainly at Point of sale terminals for purchase of goods and services. These instruments would not permit withdrawn cash. Examples of such cards include gift cards which are mainly issued by banks which are operated and settled with recognized companies.

Open System Payment Instruments: These payment instruments are generalized for accepting the card payments at a merchant location, mainly at Point of sale terminals for purchase of goods and services. These instruments would permit cash withdrawn from ATM, and example of these cards includes payroll cards and travel cards (Kumar, 2013).

Semi-Closed System Payment Instruments: These payment instruments are generalized for payment of all kinds of utility payments, for example, booking tickets, or paying at a tourist resort, or shopping mall, or paying electricity bills. In this system, the user can load money into his account and make payments but cannot withdraw money at a retailer. Semi-closed payment is the most convenient system for the unbanked users who wish to carry out transactions through their cell phones. As per the RBI estimation, there are 700 million mobile phone connections and 50,000 of its six lakh villages have bank branches. Semi closed mobile wallets would be a potent channel for One-time payment and would help in extending parts of cash based and non-cash based payments (Ullekh, 2011).

The "Semi closed wallet" A user can visit retail chains and use his m-currency for purchase of any goods, instead of paying with paper cash or using his credit/debit card. In order to enable virtual payments for users of retails chains, the company Airtel receives an additional benefit by launching its mobile payment service in the country.. Airtel Company has successfully passed the regulations set by RBI and has received the clearance and license to use semi closed wallet (NextBigWhat, 2010a). The

Government is also looking to spread banking and financial services to remote areas as part of its inclusive growth programs.

Semi -closed model working steps of Actors

The description about figure no. 17 is given as mobile information base consists of more parts like an Account mapper, which enables their mobile m-money accounts. The central working functionality of the account mapper is to link the different identities of each individual. In the simplest form, a row would be created against each individual, when he/she enables his mobile e-money account, and the row would have the UID number, the mobile number, and the mobile e-money account number. Account mapper is managed as a shared repository by all the MNOs who want to enter into the business of providing financial services through mobile phones.

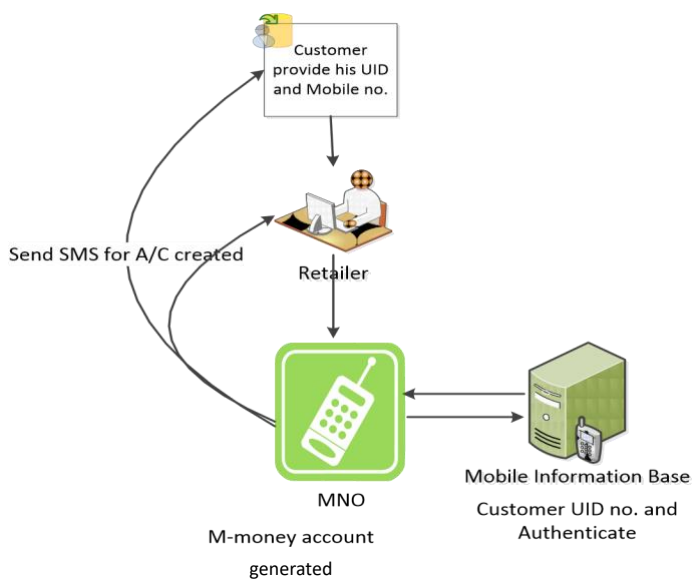


Figure 17 Enabling Mobile Money Account for Customer/User

Steps of Enabling Mobile Money Account for Customer/User

1. Customer has to visit to his nearby retailer shop or the correspondent of the MNO to enable the mobile e-money account. The customer should provide his UID number for scanning. Additionally, the authorization biometrics of the customer is required, along with the customer 10 digit mobile number and other KYC details, which are provided to the retailer/correspondent of the MNO.
2. Retailer/Correspondent sends the information electronically to the MNO.
3. Verification of the details of customer should be done by the MNO, by sending the verification request to the UIDAI server through SWITCH.
4. MNO verifies the UID number and biometrics of the customer with the UIDAI Server.
5. Mobile e-money account is created by MNO.
6. MNO stores the mobile e-money account details, customer's mobile number, and UID number in the Account mapper.

7. Both the customer as well as the retailer/correspondent is intimated via message on their mobiles.
8. MNO sends a pin number to the customer on his mobile for making future transactions with his/her mobile e-money account.

With the inputs received from (Kohli, 2013), (Pandey, 2013) and other researched related work the SWOT analysis is created and this helps to solve the problem definition as defined in the section 1.3

SWOT of Airtel

Strength: Airtel have a highly professional, dedicated and highly qualified team, which is their key strength and provides them with substantial connectivity advantages. A wide range of premium offers are provided by the company and they have been successful in maintaining their considerable consumer base, which has enabled them to obtain the top position in the Indian telecom sector. For the benefits of the consumers, easy usage and easy recharge schemes have been introduced. The operational CRM of Airtel is responsible for managing their day to-day call activities and supports both their business and private customers. Airtel's main attribute is to maximize the customer product and service experiences, and generate widespread and long lasting customer goodwill.

Weakness: Waiver of airtime charges on calls carried out between Airtel cellular customers should be introduced. Airtel should emphasize on developing and maintaining a long lasting one-on-one relationship with the customers, in order to solve their basic problems. The organization should revamp their pricing strategy in the market.

Opportunities: Airtel should target the rural consumers, along with its dedicated customer base, which includes the urban customers. The organization should reduce their data traffic charges, in order to attract new customers. The public sector and private sector banking customers should have a business line of contract, in order to attract them to new schemes. Additionally, Airtel should focus on its network coverage. Airtel now has the opportunity to attract existing subscribers of other telecom service providers, through the mobile number portability (MNP) program introduced in India, which can be done if it manages to improve on its weak areas described above.

Threats: All big telecom operators which are currently in the Indian market are launching new schemes, in order to attract more customers. Major operators, for example, Aircel, Vodafone, Idea cellular, and spice are Airtel's major competition in the present scenario. These operators have slashed their tariff rates considerably in the local region, and offer value added services at attractive prices.

Additionally, uncertain economic and political conditions in India can harm the business of telecom sector.

Internal Issue and treat

In India, the market can be divided into two segments namely the organized retailing market and unorganized retailing market. The organized retailing market is situated at a proper well planned and clean and wide location inside the city. Additional facilities for example car parking and other retail shops as co-located. Example situations are the shopping malls, where a large number of organized shops are co-located. On the other hand, un-organized retailing market can be defined to include the local shops, which are commonly termed as the "Kirana store" in India. A "kirana" store is a local shop which is generally situated in the vicinity of a housing society in a city. Moreover, they are the sole

property of their respective owners and are managed completely by them, usually by the members of the same family. In India, most of the shopping takes place in through unorganized retail markets and millions of independent grocery items are purchased from these markets by millions of people every day. Organized retail markets, for example, supermarkets and shopping malls accounted for only 6% of the market in 2009. In the local “kirana” stores, the user pays by cash and payment with a credit or debit card is not possible. However, according to (Pandey, 2013) another deterrent for the cash payment is that the shopkeepers have to pay 2% of the total amount as card transaction fee to the concerned bank for every purchase carried out by the user. The Indian market should focus on these growth avenues in order to gain some profit from the local markets (Saikia, 2013).

These set of case studies, and the elaboration of the respective roles and interaction scenarios helps solve the problem definition as defined in the Section 1.3, which is "research on the roles and responsibilities of the actors involved in a mobile payment service".

CHAPTER 5: ARA MODELLED ANALYSIS OF MOBILE PAYMENT SERVICES

This chapter provides an analysis of the given payment models which are used in the Indian market. It starts with the analysis of the exiting and current payment systems, whereby the analysis is carried out by using the Actors Resources Activity (ARA) model. The basic idea of using the ARA model is to find out the connectivity between each and every actor, whereby the actors are directly or indirectly related and are Inter-connected. In the e-payment and m-payment ecosystem, there are some correlation and discrepancy as seen in the model. In the payment ecosystem, the behaviour and roles of the actors differ with respect to their interaction and activities with a few resources. The actors have taken their respective paths in order to connect with the different actors, and thereby some of their activities are changed, which is reflected in the analysis. Furthermore, the user can have a detailed look into some of the correlation and dissimilarity in their roles, which would enable the author to answer a part of the initial research question (RQ1 and RQ2). The study of ARA model and specification used by Jan Markendahl in his published reports, for example, “*Mobile Network Operators and Co-operation*”, “*Analysis of roles and position of mobile network operators in mobile payment infrastructure*” and “*Can mobile eco-systems for technical innovations be standardized*”?

(Andersson, 2011) (Markendahl, 2011).

5.1 Analysis of Operator Led Model for mobile payment services

The key summary of the analysis using the ARA model of the operator led model can be seen in figure no. 18. The basic components of the operator led models are Operators, Banks, end user, and merchants. Each individual component plays a vital role in the overall system. The MNOs maintain a control on all the transactions made or derived by the users. For initiating a re-charge facility in the operator led model, the re-charge can be carried out at any operator outlet and any open shop, which is available to the user and is authorized to load the required amount to the user’s account. The financial transaction flows from the re-charge of the account, to spending the money at any outlet or retail shop, and finally paying the

utility bills. The user can pay the money at any outlet, for example when buying a coffee or any food item, by initiating a huddle-free transaction to the merchant's account. Once the money is transferred to the merchant, the merchant can send that money to his bank account as per his convenience and time. In the last stage of the transaction money flow, the merchant POS interacts with the merchant bank through the payment network processor. Once this stage is complete, the merchant's bank account is credited with his money and he can use the money from his bank account. The connection between the MNO and the Merchant is not directly connected and for security purposes the control of the connection resides with another actor, for example, Visa and Com-viva.

There are few major roadblocks faced by the operators to fully operate this service in the Indian market are described below:

- More POS terminals need to be set up and be accepted by the merchants and consumers □ Consumers should be well trained to adopt and use these services in their daily routine.

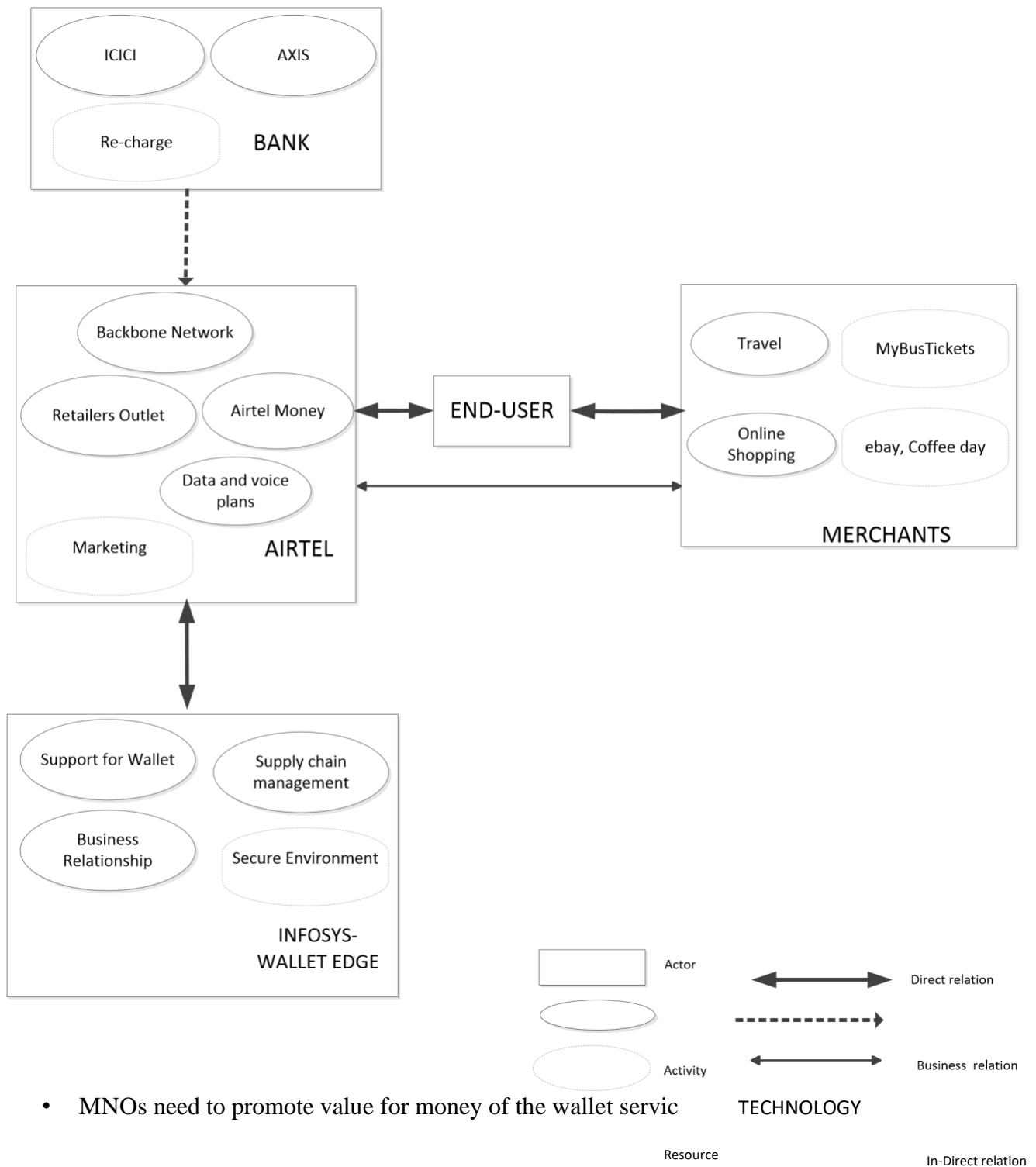


Figure 18 ARA model for MNO driven by operator based

Analysis of Operator Led Model by Ansoff matrix model

This section describes the analysis of the market position of the operator led model by applying the Ansoff matrix. In this model, the most significant entity is allocated in the best possible quadrant, namely, 1, which is Market development in this scenario. Here in this quadrant, the operator led model

concentrates on its growth strategy, which defines where the business seeks to sell its existing products. Additionally, it involves the strategy which defines how the telecomm operators are pushing their products into new markets with aggressive advertisements and campaigns. This quadrant is subjective to targeting of new markets. The mobile payment product has been newly launched in the Indian market and the operators are currently focussed on the growth strategy of their respective models as mentioned in figure no. 19.

At a later stage the operators will move to another quadrant, namely, 2, which is termed as Product development. They are going to determine the respective state option, which would define the state for which the product has been developed. The state name is extremely relevant in the Indian scenario, because users in almost each state speak a different language or dialect. India has 4 major geographical zones, namely, North, South, East, and West. The operator should provide more facilities and solve the basic needs of all or at least majority of the users in all these zones. In the last phase, the operator should focus on Market penetration and Diversification

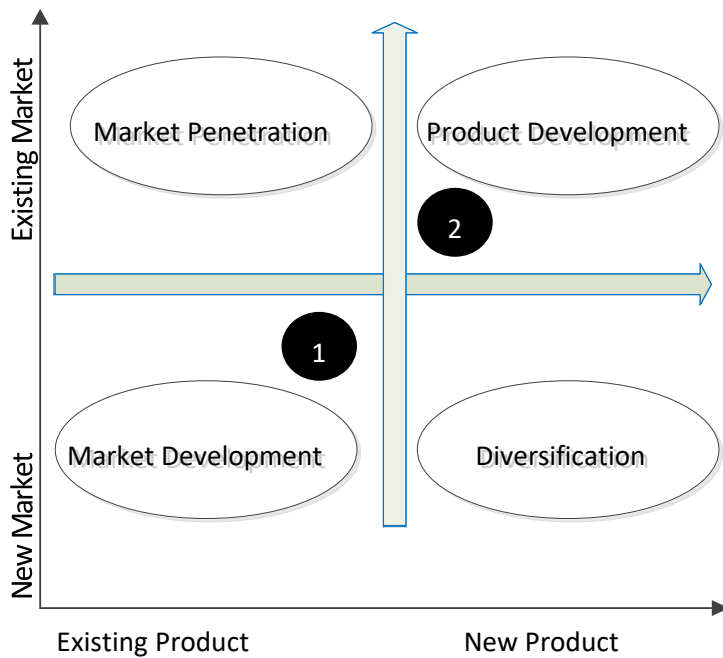


Figure 19 Ansoff matrix model for Operator led model

5.2 Analysis of Bank Led Model for mobile payment services

The key summary of the analysis using the ARA model of the Bank led model can be seen in figure 20. The basic components of the operator led model are Operators, Banks, end user, and merchants. Each individual component plays a vital role in the overall system. The Bank led model is more focused on retaining the existing customers and dealing with the clients. This model is based on managing the financial transactions which are executed by the customers, in order to facilitate the facility of transferring the money in their own area. The ownership of the model is taken care of by the driving forces in the banks and is regulated by the Government defined norms, rules, and regulations, which are in turn enforced in the payment ecosystem by the RBI. This facility is provided to the private and public sector banks in India. The banks have their respective application provider technology teams which provide support with respect to the network and application issues, and provide the 24 by 7 facility to

keep the up-link. They have a strong relationship with the back-end teams of the banks and do not interact with the front-desk executives. They are responsible for maintaining an available and secure platform to all the banking applications. The customers can apply for the KYC form from any bank and their account would be created in two to three working days after they have deposited the required initial amount in their bank accounts. The customers should re-load their virtual account by using their own account which is linked with each and every individual customer bank account. Subsequently, once the customer accounts have been activated, they can make a payment for travel, shopping, and other utilities. The merchant and the bank relationship is business oriented, as the merchants maintain their respective bank accounts in the banks and the deposited money circulates between the involved parties in the ecosystem. The customers have a facility to send their money to their bank accounts and withdraw it as per their need.

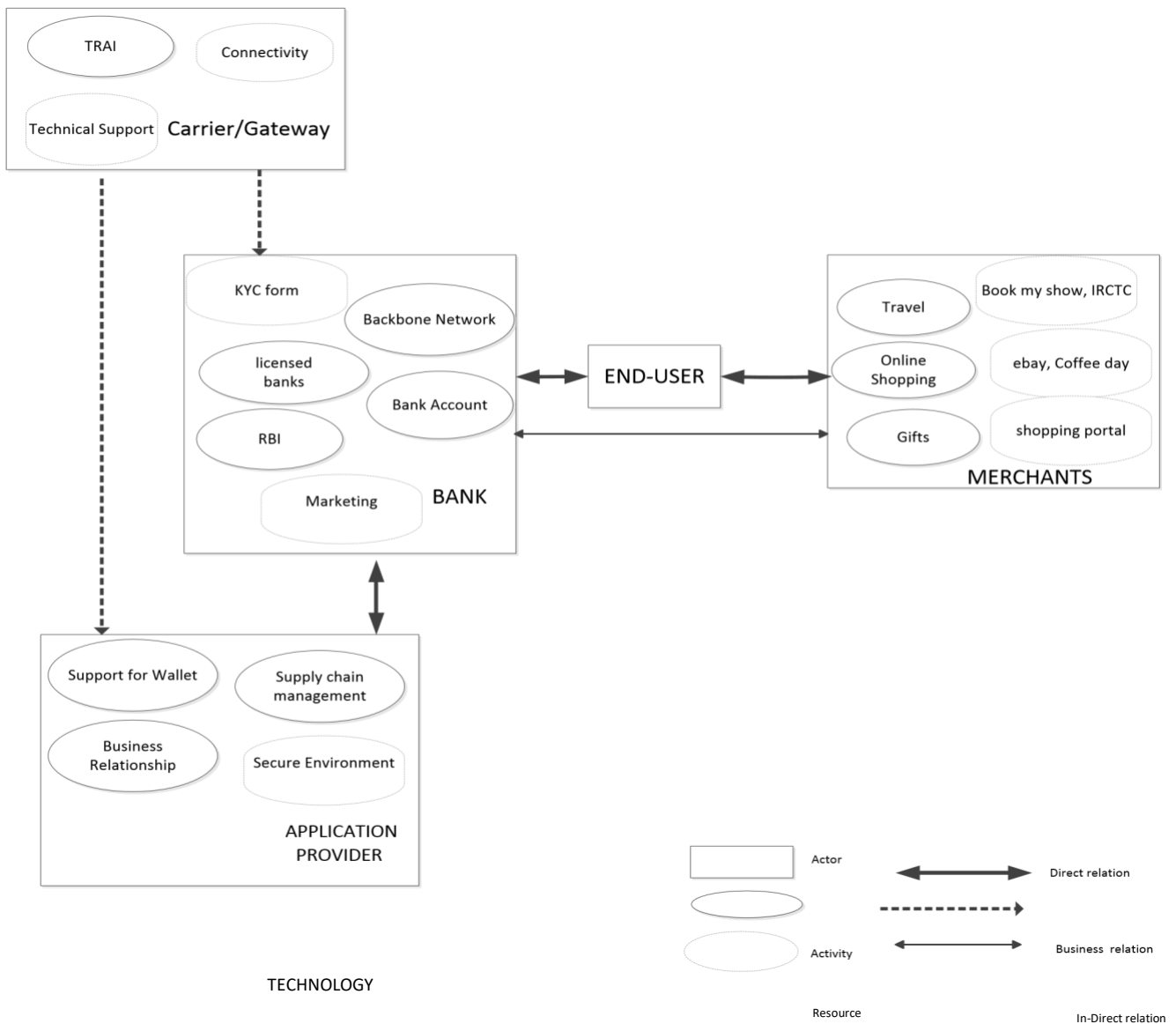


Figure 20 Analysis of Bank Led Model by ARA model

By investigating the Bank led model with the ARA model, we can summarize by stating that the major roadblocks that the banks need to address are:

- Banks are fully dependent on the RBI rules and regulations which they should follow as per the stated guidelines.
- Banks should be more flexible with their customers and develop a good relationship with them.
- They need to create a revenue sharing model to satisfy all the collaborators in the ecosystem.
- Banks should implement the facility to withdraw money from ATM via mWallet.

Ansoff matrix is applied to analyse the market position of this Bank led model in the market. In this model, the most significant aspect is positioned in the best possible quadrant, namely, 1, which is Product development in this scenario. Here in this quadrant, the ‘Degree of Trust’ is extremely relevant in the Bank led model. The mobile payment system product has been newly launched in the Indian market, and thus it is extremely important to attain a degree of trust amongst the customers as well as with other entities in the ecosystem. On one hand, the businesses are trying to sell their new products in existing markets, while the banks are pushing their model by utilizing word of mouth publicity. This quadrant is subjective to targeting of new products as mentioned in figure 21.

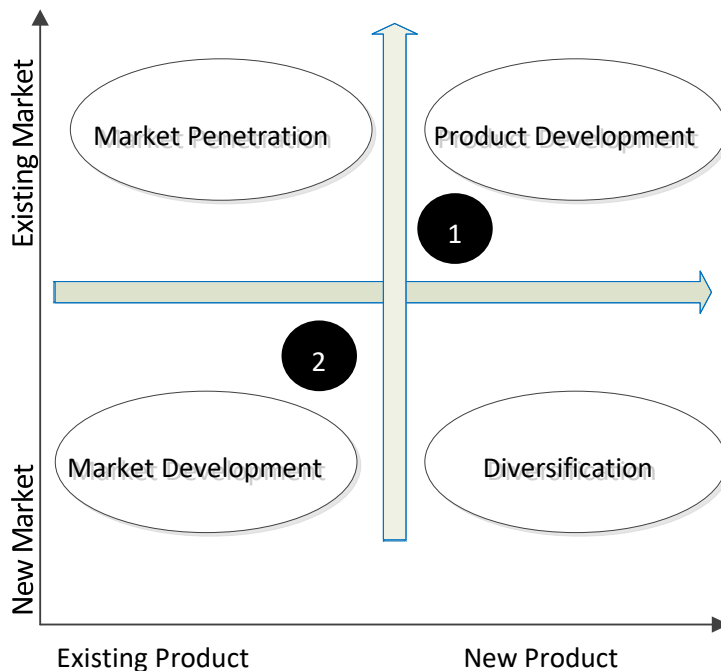


Figure 21 Ansoff matrix model for Bank led model

At a later stage, the businesses are moving to another quadrant, namely, 2, which involves “Market Development”. Market Development is important because it will try to reduce the complexity of the existing systems. The Banks should provide more facilities and solve the basic needs of the users, for example, the ability to withdraw money from their mobiles during non-office hours of the banks. In the last phase, the operators should focus on Market penetration and Diversification

CHAPTER 6: MOBILE PAYMENT BUSINESS & DRIVER'S CHALLENGES

In this chapter the mobile payment challenges experienced by actors involved in MNO-led model and Bank-led model are classified as **Regulatory factors, Socio-cultural factors, Technology factors, and Business factors and user convenience**. These factors support adoption directly or influence the adoption indirectly.

As mobile payment services constitute a growing market a number of drivers are engaged in deploying and providing mobile payment solutions through their services. Predominantly most of the m-payment services in India are still relatively in the piloting phase or have just been commercially launched in some parts of India by a handful of companies. By investigating the challenges faced by actors while launching the payment services and by analysing the obstacles faced by the drivers. However, according to (Baswa, 2013) the list of challenges can be classified into 3 major issues namely:

- Acceptance Network
- Interoperability
- Accessibility for all the society (Including educated and Un-educated)

6.1 Factors influencing the adoption

Regulatory factors	No Cash Withdrawn	RBI guidelines on prepaid instruments	
Sociocultural factors	Cash based Economy	Trust issue among customers	Non Monopoly
Technology factors	Complication of work flows	NFC constraints	Security issues
Business factors and user convenience	Interoperability is still a question	Freezing of money unto the device	Unorganized retail

Table 9 Different kind of factors given on Indian market

The payment eco-system in India should develop with a proper business plan and a technical system which will enable the integration of the existing market's components into the new market. An important fact obtained after the analysis of the Indian market is that the rate of penetration for SMS in India is 40% while in the rural parts of India the villagers are still not aware of how to use the mobile phone in order to transfer money from their phone to another mobile phone.. Another key factor which frustrates the Indian users is the slow and low internet and mobile network connectivity and no convergence range in the hilly areas. Good network penetration and stable network coverage is an essential requirement for handling an ever increasing number of transactions which are initiated by the service users. In majority of the shopping areas and markets in India the number of installed POS devices is very less. Additionally retail shops do not have sufficient time to look at the purchase details of individual users. The information related to the given table no. 9 as follows

Regulatory factors: Nonbanking entities are active in a semi-closed loop as they block cash withdrawals and C2C options for instruments issued by these entities. Reserve Bank of India has drafted some important guidelines for issuance all prepaid payments and operation of Prepaid Payment Instruments in India for all mobile operators. These payments are to be strictly used only for purchase of goods and cash withdrawn from the banks. These guidelines which are issued by the RBI are mainly subjected to evaluate the customer’s payment ability and check money laundering in India.

It’s important for the user to declare and provide documents for opening an account in m-wallet. These guidelines provide simple and important terms and conditions in order to verify the user and open his account (Reserve Bank of India, 2009). RBI’s main agenda is that operators should not take the role of banks in case of operations, which is congruent to the guidelines of the RBI, otherwise it could lead to money laundering and mobile operators could also dis-intermediate the banks. Most of the operators are currently able to charge the user by providing facilities like voice, video, VAS like premium SMS, ringtones, downloads, and a disintermediation of banks could be possible if banks are made redundant in the value stream (NextBigWhat, 2010c).

Business factors and user convenience: In case of mobile wallet if the customer wants to pay through an Airtel mobile wallet the merchant should also have the same and support it. Although the NPCI is trying to improve interoperability between service providers through IMPS it’s limited to the bank account model. Majority of the time in rural India a mobile device is shared by the family members and accessibility to this device for transactions is heavily curtailed. The money locked in prepaid instruments is idle cash for the end customer as compared with a savings account balance. Organized retail accounts for only 4% of the total business done. The rest of the business is accounted by unorganized sector and micro-entrepreneurs ranging from hawkers to shopkeepers who set up their shops once every week who hardly have a basic bank account where can they afford to accept mobile payments.

6.2 Factors working in favour of adoption mobile payment services

	Disadvantages of cash economies	Advantages against card based payment solutions
Business and convenience factors	<ul style="list-style-type: none"> • Inconvenience and security issues in cash handling. • Cash logistics for printing and distributing notes. • “Tendering exact change”. 	<ul style="list-style-type: none"> • Low value and high volume of transactions. • Poor penetration of card based payments

Table 10 Information about favour of adoption mobile payment services

As per the table no.10, In the market a lot of inconvenience and security issues arise in cash handling which can be prevented when using mobile payments. Moreover cash logistics involved in printing and distributing notes can be avoided by the use of mobile payments. It costs the RBI considerable capital in order to print and circulate currency notes which can be vastly reduced by adopting emoney. A major problem while carrying out transactions using physical money is the lack of the exact amount payable by the user which is also known as the “Tendering exact change” problem. Therefore the exact payable amount can be deducted in the digital format from the user’s account and hence solve the inconvenience of carrying exact change to make payments.

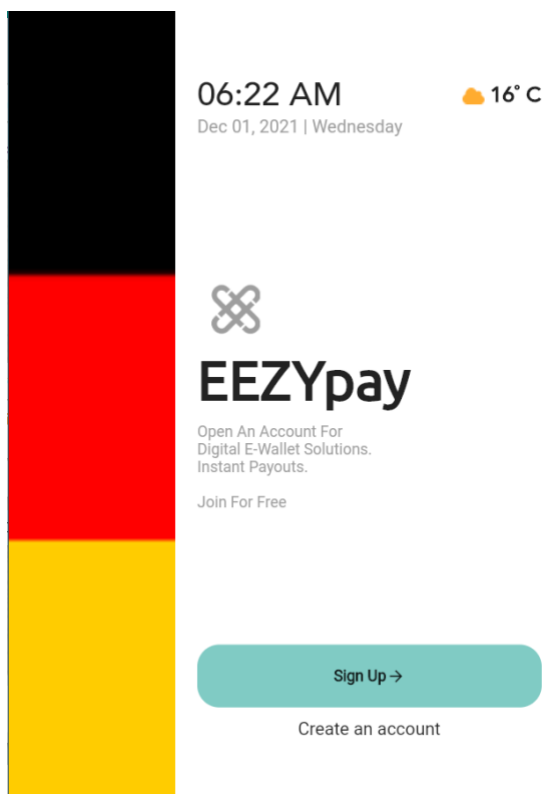
Technology factors: The work dataflow amongst payment networks outlets and MNO and card issuers is long cumbersome and results in compounding of reconciliation problems. Additionally mobile devices with NFC are a relatively unexplored entity in Indian markets. Data at the bank end is safe when taking into consideration the security and IT standards the banks maintain. However the same cannot be said about the data residing at the customer's end which is vulnerable to multiple forms of attacks.

Advantages against card based payment solutions: Card based payments offer low value and involve high volumes of transactions. The above nature makes the cards business quite expensive and not sustainable in rural environment. Additionally there is a poor penetration of card based payments in rural parts of India. There has been a natural elimination of C2C solutions for example NEFT and RTGS. Solutions like NEFT, ECS and RTGS cannot be used to make retail payments thereby making the retail sector as one of the most favourable audience for mobile payments. Moreover there has been an increase in the growth of organized retails with the advent of FDI in India which provides an increased incentive for deploying mobile payments in the retail sector.

CHAPTER-7

RESULTS AND DISCUSSION

Screenshot of Application





Account Overview

69,000
Current Balance



Send Money



Mayank



Shubham



Anita

Services



Send



Receive



Mobile



Electricity



Jatin Sachdeva
New Delhi, India



Home

Profile

Accounts

Transactions

Stats

Settings

Help

 Logout

Ver 2.0.1



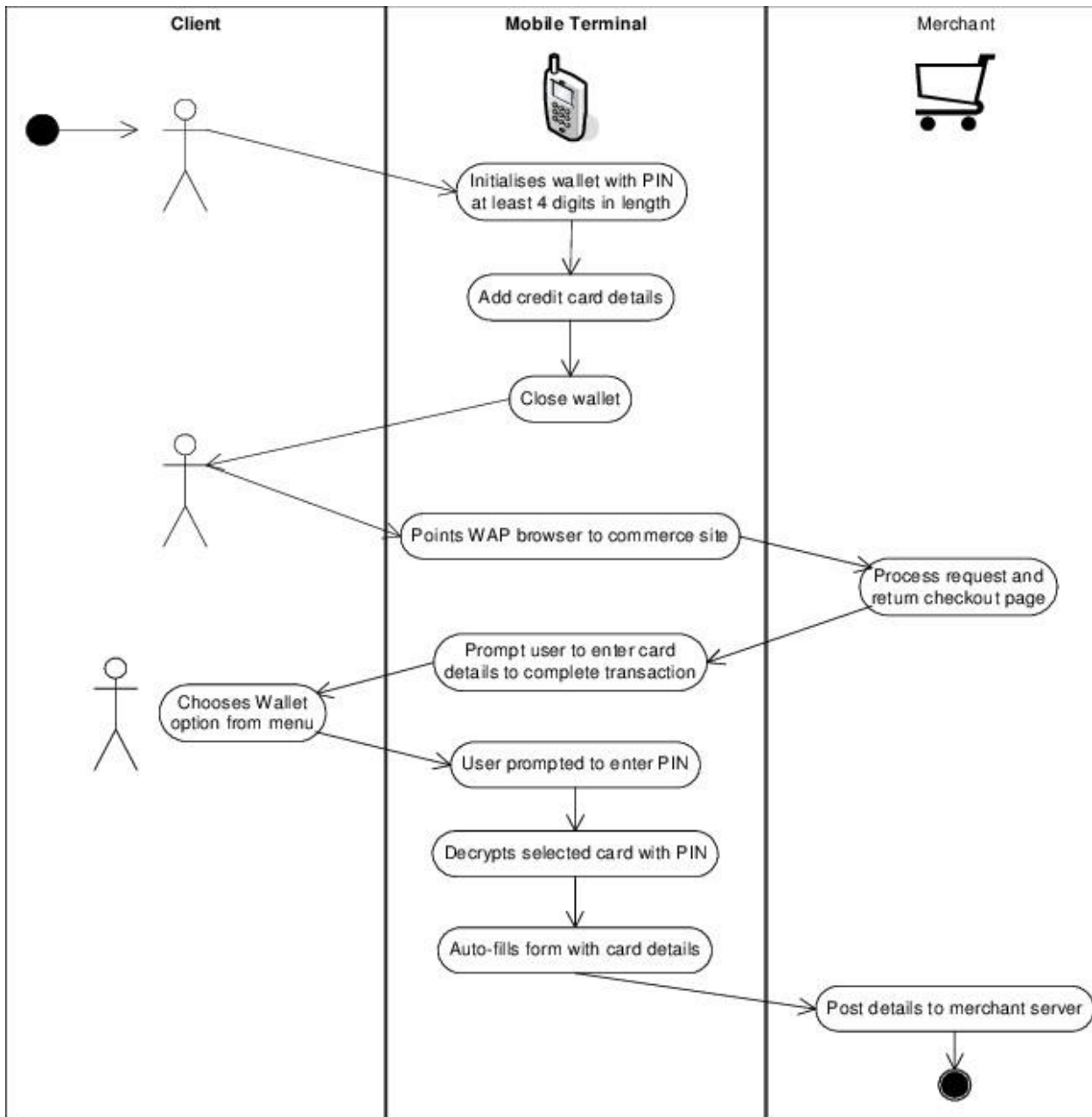
Account Overview

69,000
Current Balance

Send Money



UML Diagram



CHAPTER 8: CONCLUSION & FUTURE RESEARCH

In this we would like to say our application will help the end user and the society to easily transfer their money on the internet and various banks. It will help the society to move forward in a positive way and will also help in Speed and Efficiency, Security. To implement & develop this we used Flutter as the main framework and Dart as the main programming language. Google's Machine Learning Kit which is freely available helped us in implementing its true functions that transfers money. We used GIMP as the main logo designing tool and for other artwork designing. We used VS Code as the main IDE for programming and writing our code. We used Genymotion Emulator as our main android emulator as it is lite weight and easy to use. We also used some native code from Java and Kotlin. XML was also used for designing the Splash screen. As we used basically all open-source software and APIs, it would be easier for others to implement these on their own system and hence make more modification for more refining in the future.