

# ***A COMPARATIVE STUDY OF MOBILE BANKING OF PUBLIC AND PRIVATE SECTOR BANKS IN INDORE***

**A Thesis Submitted to  
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For the award of the Degree of  
Doctor of Philosophy  
in  
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I

**DECLARATION BY THE CANDIDATE**

*I, the undersign, declare that the thesis entitled 'A Comparative Study of Mobile Banking of Public and Private Sector Banks in Indore' is my own work conducted under the supervision of Dr. Geeta Sharma, Reader, International Institute of Professional Studies, Devi Ahilya Vishwavidyalaya, Indore (M.P.) India approved by the Research Degree Committee.*

*I further declare that to the best of my knowledge, the thesis does not contain any part of any work, which has been submitted for the award of any degree either in this University or in any other university without proper citation.*



Surendra Malviya

Indore

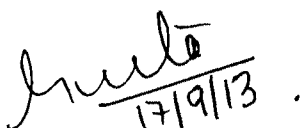
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## II

### CERTIFICATE OF SUPERVISOR

This is to certify that the research work entitled *‘A Comparative Study of Mobile Banking of Public and Private Sector Banks in Indore’* is the record of the work done by Mr. Surendra Malviya under my guidance and supervision for the degree of Doctor of Philosophy in Management of Devi Ahilya Vishwavidyalaya, Indore, M.P., India.

To best of my knowledge and belief, the thesis is his original work carried out under my guidance and the contents or any part of the thesis has not been submitted for any other research degree. He has duly acknowledged all the references and assistance from various sources. The thesis fulfills the requirement of ordinance relating to the Ph.D. degree of the university.

  
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### III

## EXPRESSION OF GRATITUDE

First and foremost, I would like to express my gratitude to God for his abundant grace that I am able to be what I am today.

It would not have been possible to write this doctoral thesis without the help and support of the kind people around me, to only some of whom it is possible to give particular mention here.

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**Surendra Malviya**

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# *CHAPTER - I*

## *INTRODUCTION*

### *1.1 Introduction and Need of the Study*

### ***1.1 Introduction and Need of the Study***

Indian banking industry is at a very important phase. The last two decades marked the era of globalization and liberalization. Indian banks have shown remarkable commitments in absorbing these reforms. Along with the popularity of the internet and easy access to the wireless network, Indian banking industry has come a long way for banking system to transform itself from traditional branch banking to total IT-enabled banking. Today most banks are offering their services in the form of IT-enabled banking. Banks in India are increasingly using alternate channels like phone banking, internet banking, and ATMs.

With rapid growth of cellular services in India, banks identified mobile phones as an effective tool to reach maximum unbanked customers. To become more efficient, flexible and competitive in today's changing business environment, banks are increasingly acknowledging the benefits of internet using mobile phones in satisfying the needs of the modern consumer. Mobile banking is another vehicle; banks can utilize to make banking more accessible to customers. Mobile banking is a very effective way of improving customer services and could be used to inform customers better.

Mobile banking users are expected to grow, Kiran (2013)<sup>82</sup> K.S.R, Finacle Infosys technologies Ltd. predicted that by the end of the year 2014 half of the mobile phone users are going to used mobile banking.

During January 2012, only 660 million people in India had deposit accounts, while there were 936 million wireless subscribers i.e.

mobile users, out of which 313 million subscribers were from rural areas from the overall population of 1.2 billion. This translates into 78 percent having a mobile phone and only 55 percent having a bank account. Out of the 1.2 billion population of India only 12.23 million bank customers have so far registered for mobile banking services, which are just 1.0 percent of the overall population. A report published by Boston consultancy group, FICCI and Indian Bank's association (Shah, et al., 2010)<sup>143</sup> predicted that 250 million to 300 million mobile subscriber will use internet over their mobile phone which is 25–30 percent of mobile users have GPRS / 3G activated.

On the brighter side, this shows the scope and enormous potential for mobile banking services in future. Thus, mobile banking is the key to reach to the un-banked and driving financial inclusion for the larger population.

Mobile banking is useful for bank as well as its customers. The customers feel convenient while banking through mobile phones. By using mobile banking services customers need not to stand in queue or face bank employees with whom they have had a bad experience in the past. Mobile banking is also cost effective for the customers as it saves money and time involved in visiting a remote branch.

For banks, mobile banking provides a unique opportunity to reach their customers at very low cost and provide them access to banking services, anytime and anywhere. The advantage that mobile banking offers to banks is that it drastically cuts down the cost of providing service to the customers.

Looking ahead, as mobile banking usage continues to expand, there will be more pressure on banks to differentiate themselves by identifying and deploying key mobile banking applications that will attract new customers and retain existing customer's base by offering value-added and innovative services. Further, Mobile Banking also presents a chance to generate additional revenues to the banks. Mobile Banking also has the potential to become one of the widely spread and accepted application in the field of Mobile Commerce. When a service provider knows how the service will be evaluated by the consumer, he will be able to suggest how to influence these evaluations in a desired direction.

According to a study by Alix Partners (Alix, 2012)<sup>5</sup> found that thirty-two percent of consumers who switched banks in the past year and who also used mobile banking services, choose mobile banking as a preferred bank attribute whereas only six percent non-users of mobile banking also decided to switched banks. Thus mobile banking services are major criteria for the customers of banks. As the mobile banking users are increasing day-by-day the financial service providers have to develop innovative and easy-to-use mobile banking applications in order to differentiate themselves from other banks and satisfy customers.

To retain existing customers and to attract more customers through mobile banking, the customer has to be satisfied with the quality of mobile banking services provided by their bank. When customers evaluate the quality of the service they receive from a banking

institution, they use different criteria which are likely to differ in importance, usually some being more important than others. Thus the customer of banks, quality of service is seen more as a key differentiator in the marketplace.

Service quality is one of the critical success factors that influence the competitiveness of an organization. A bank can differentiate itself from competitors by providing high quality service. Service quality has been one of the most attractive areas for researchers over the last decade in the retail banking sector Parsuraman, Zeithmal and Berry (1985)<sup>115</sup>(1988)<sup>120</sup>(1991)<sup>121</sup>; Avkiran(1994)<sup>8</sup>; Johnston (1995)<sup>73</sup> ; Satya and Prabhakaran (2003)<sup>136</sup>.

For developing services, perceived service quality can be viewed as a concept for understanding. Whereas customer satisfaction is a concept for the evaluation of how successfully these services are fulfilling the needs and desires of customers. To retain customers, banks should try to make customers satisfied with their banking services, and this can be achieved through delivering high electronic service quality. Thus delivering high quality services requires understanding of service quality dimensions considered crucial, and trying to improve the quality of the services, so that customers' satisfaction is assured. Thus, perceived service quality comes first, then satisfaction with quality.

Nevertheless, the mobile banking service market is still in its infancy, leaving a great deal of room for development. It is necessary to identify service quality factors that affect their satisfaction with

mobile banking. This information can really help mobile banking companies attract customers, and also can help them discover why current customers are using the existing mobile banking system.

Therefore, it may be concluded that service quality, the key to satisfy customers is an important dimension for comparing mobile banking services provided by the banks. This study is comparing mobile banking service quality provided by the public and private sector banks operated in Indore district of Madhya Pradesh in India. While comparison, this study has develops a model which measures the relationship between mobile banking service quality and customer satisfaction.

# *CHAPTER - 2*

## *MOBILE BANKING AND MOBILE BANKING SERVICE QUALITY*

*2.1 Mobile Banking and Mobile Banking Service Quality*

*2.2 Technology Behind Mobile Banking*

## **2.1 Mobile Banking and Mobile Banking Service Quality**

**Mobile Banking:** Mobile banking is availing banking and financial services with the help of mobile telecommunication device. According to Barnes and Corbitt ( 2003)<sup>13</sup>; Scornavacca and Barnes ( 2004 )<sup>141</sup> Mobile banking is a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistant (PDA).

The phenomenon where mobile is used to carry out banking services is termed as mobile banking. Mobile banking caters for financial transactions using a mobile device like mobile phones, PDAs, Smartphone's such as viewing account balances, making transfers between accounts, or paying bills. There are three types of operations done in Mobile banking i.e. mobile accounting, mobile brokerage and mobile financial information services. Accounting and brokerage services are transaction-based, like fund transfers from account to account in the same bank or account from one bank to other account in different bank; bill payment processing; mobile phone recharge, micro-payment handling.

Mobile financial information services are non-transaction-based services like monitoring of recent transactions, alerts on account activity, access to loan and card statements and the status of checks. However, mobile financial information services may be essential for conducting transactions: for instance, a balance check might be in order before ordering a money transfer.



Previously mobile banking is defined by so many researchers. According to Barnes and Corbitt (2003)<sup>13</sup>; Scornavacca and Barnes (2004)<sup>142</sup> Mobile Banking is a channel whereby the customer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistant (PDA). Pousttchi and Schurig (2004)<sup>125</sup> defined Mobile Banking as the type of execution of financial services which the customer uses mobile communication techniques in conjunction with mobile devices. Suoranta and Mattila (2004)<sup>148</sup> defined mobile banking as conducting account balance and transaction history inquiries, funds transfers, bill payments, stock trades, portfolio management, as well as insurance ordering via a mobile device .

Ongkasuwan M. and Tantichattanon W. (2002)<sup>112</sup> compared internet-based banking services available in thirteen banks in Thailand. They ranked these thirteen banks based on internet banking services to determine the best internet banking service in Thailand. According to Porteous (2006)<sup>124</sup> mobile banking services can be categories as: additive and transformational. The Additive mobile banking model provides existing customers of the banks with alternate banking service channel in order to access their accounts.

According to Otair and Tarawneh (2011)<sup>113</sup> mobile banking benefits for customers and banks (table 2.1) follows:

**Table 2.1: Mobile Banking Benefits for Customers and Banks.**

<b>Benefits for Customers</b>	<b>Benefits for Banks</b>
Provides customers with access to information at their fingertips.	Ability to retain most profitable clients.
Brings the information to the customer vs. bringing the customer to the information.	Enhanced channel in attracting new clients.
Enables customers to access important personalized financial information - Any Time, Any Where.	New source of retail banking revenue from current customers through subscription and per transaction fees.
Personalized, tailored, and user-friendly customer interface.	Lower customer service costs.
Menu driven, familiar and user friendly customer interface.	Differentiated product and service offerings.
Ability for Value Added Services to be added or changed centrally.	Improved information channel for customers.
Opportunity for extended services such as ability to conduct financial transactions.	Improved competitive position as a technological leader.
Customer need not type the key word which saves his time as well as he avoids making any typographical error.	Extended client reach and improved customer loyalty.

According to (Singh, 2012)<sup>144</sup>, mobile banking is needed in India because of following reasons:

1. For Financial inclusion. Almost 60% of the population does not have a bank account.
2. Take banking to the masses - there are only 90,000 bank branches in India and covering the whole population with physical bank branches will take more than 20 years.
3. Mobile banking costs make for a compelling business case - according to Citibank the bank branch is 10 times more expensive than doing a transaction on a mobile phone.

4. Large part of the population has a mobile phone, but no bank account - making the case of using mobile phones for financial services (like payments) compelling.

Limitations and problems of Mobile Banking in India context:

1. Despite a high base of mobile phone users, the smart phone penetration is limited, less than 20%. This restricts use of full scale mobile banking; users can't download banking app on basic phones. They have to depend on SMS, which is cumbersome.
2. A user can have up to nine mobile phone numbers (allowed by TRAI) but only one mobile bank account (says RBI). And the limit of transactions for mobile payments is Rs 50,000 per month.
3. The mobile payments model via telcos makes money on scale. According to Airtel it will take two years to be relevant and five years to make money. Mobile payments today are at the same stage as credit cards 20 years back and ATMs 15 years back.
4. Despite being convenient, the cost of Know Your Customer (KYC) for mobile banking or mobile payments is huge - Rs 400 to Rs 500 per person. This is more than the average revenue per subscriber (ARPU) for telcos.
5. Less than 10,000 outlets today accept Airtel Money or any other mobile payment. There's no incentive for merchants to accept mobile payments as they don't get any commission.

According to Singh (2012)<sup>144</sup> the future in India is Mobile Banking for the following reasons:

1. Mobile banking is the future because of its cost effectiveness and ability to reach out to customers in remote areas. It will take 5-6 years for the model to mature.
2. In US, Europe, phones with NFC (near field communication) have entered the market. NFC is a chip embedded in a phone enabling the phone to interact with a point of sales terminal (with this, phone can act as a virtual credit card).
3. Cheque truncation can be done via mobile phones. In US it is called 'Cheque 21' or 21<sup>st</sup> century cheque payment. Not yet available in India.
4. Banks will be able to approve and give loans via mobile banking within the next five years. This will further reduce the need to go to a branch.

***Mobile Banking Service Quality:*** The characteristics of mobile banking service quality, which include intangibility, inseparability, variability and perishability are different from those of tangible goods. In particular, since mobile banking service quality is intangible, customer will have a perceived risk hence mobile banking service quality concept varies with customers. Mobile banking Service quality is the level of customers need and expectation. Successful mobile banking service quality is the best tool to sustain in competitive environment.

Mobile banking service quality has been receiving increased attention from bank managers and customers. In particular, how to effectively measure service quality has become an important issue. Hence,

Mobile banking service quality is an important issue to compare public and private sector bank.

## ***2.2 Technologies behind Mobile Banking***

Technology companies that provide backend functions for mobile banking are taking the lead in rolling out new services that involve banks and mobile network operators. Banks hold the accounts and mobile network operators have the channels and networks. Presently, the banks are using the network of telecom industry and use technology like interactive voice response (IVR); short messaging service (SMS); wireless access protocol (WAP); standalone mobile application clients in order to provide mobile banking.

### ***2.2.1 Interactive Voice Response (IVR)***

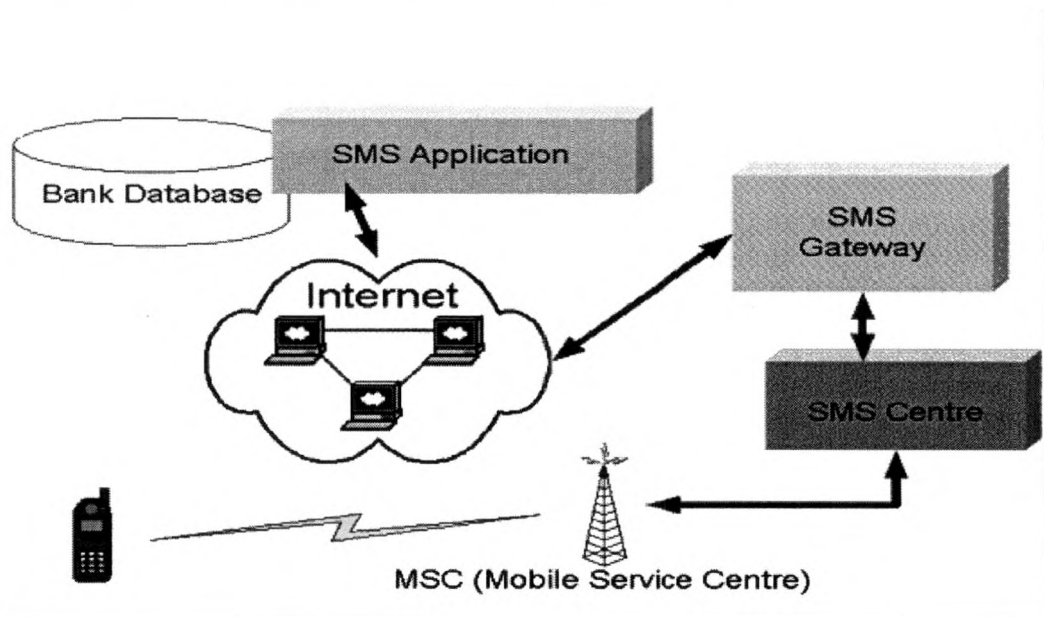
The customers use interactive voice response service by calling on a pre-specified number provided by bank. The customer follow different instructions provided by bank on IVR and can choose different options by the bank. Mobile banking based on IVR is mostly used for Enquiry based services. Major disadvantage of using IVR is that the mobile phone is busy i.e. we cannot receive calls and expensive also, as it involves making a voice call.

### ***2.2.2 Short Messaging Service (SMS)***

Mobile banking application use SMS text-messaging standard to perform banking. The users send SMS containing pre-defined format for specific banking operation to number a pre-specified number provided by the bank. The bank responds with SMS having specific

information about the transaction. Balance enquiry and mini statement are the popular services used by the mobile banking customers. The SMS based mobile banking services provided by different banks are : the customers of the State Bank in India can get their account balance details by sending the keyword 'SBAL USERID MPIN' and receive their balance information again by SMS. Similarly using ICICI Bank SMS Banking can be used to check your account balance, request a mini statement, recharge a prepaid mobile number, DTH connection or a broadband connection and much more. For balance enquiry 'IBAL Last 6 digits of Account No', last three transaction enquiry 'ITRAN Last 6 digits of Account No', cheque status enquiry 'ICSI chequeno Last 6 digits of Account No' ,etc. customers of the HDFC Bank can get their account balance details by sending the keyword 'HDFCBAL' and receive their balance information again by SMS. However there have been few instances where even transaction-based services have been made available to customer using SMS. Axis bank customer can transfer funds using Inter-bank mobile payment services (IMPS) by sending SMS 'mobile number, MMID of receiver, amount to send'. Customers of the Centurian Bank of Punjab can make fund transfer by sending the SMS 'TRN A/cNo PINNo Amount'. The main advantage of deploying mobile applications over SMS is that almost all mobile phones are SMS enabled. One of the major reasons that SMS banking is not used because of concerns about security. The figure 2.1 for SMS architecture in which SMS based service is hosted on a SMS gateway that further connects to the Mobile service center provides SMS service through SMS Centre.

**Figure 2.1: SMS Network Architecture for Mobile Banking**



source: [www.Infogile.com](http://www.Infogile.com)

### **2.2.3 Wireless Access Protocol (WAP)**

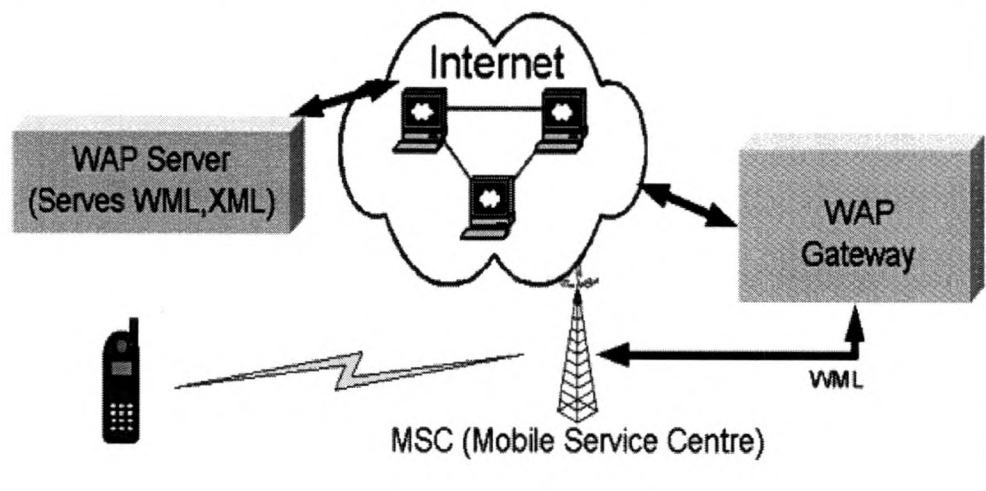
WAP is a global specification used by wireless devices like mobile phones to easily access and interact with internet information and services instantly. Wireless Access Protocol is also using internet standards. WAP enabled mobile application devices use WML markup language. The Banks maintains WAP enabled sites contain form based interface used by customer's through WAP compatible browser on their mobile phones. WAP enabled mobile banking is provides by banks like ICICI bank, State bank of India, Indian Bank, Union bank of India etc offers a WAP based service channel to its customers in India. The banks customers can access all enquiries and transaction based services and also performs complex transaction like trade in securities using mobile phone.

A WAP based service requires hosting a WAP gateway. Mobile Application users access the bank's site through the WAP gateway to carry out transactions, much like internet users access a web portal for accessing the banks services. The following figure 2.2 demonstrates the WAP network architecture for banking.

The forms that go into a mobile application are stored on a WAP server, and served as requested by the mobile banking application.

The WAP Gateway is an access point to the internet from the mobile network.

**Figure 2.2: WAP Network Architecture for Mobile Banking.**



*source: www.Infogile.com*

#### **2.2.4 Standalone Mobile Application Clients**

Standalone mobile applications are used to perform complex banking transactions like trading in securities. These applications are easily customized according to the user interface complexity supported by the mobile. In addition, mobile applications enable the implementation of a very secure and reliable channel of



communication. The client's needs to download the mobile instrument specific banking application provided by the bank on their hand held device. These applications are developed in J2ME or Qualcomm BREW environment. J2ME is fast becoming an industry standard to deploy mobile applications and requires the mobile phone to support Java. One of the other big advantages of using a mobile application client is that it can implement a very secure channel with end-to-end encryption. However countries like India face a serious obstacle in the proliferation of such clients as few users have mobiles, which support J2ME or BREW.

# ***CHAPTER - 3***

## ***MOBILE BANKING STATUS***

- 3.1 World's Mobile Banking Status*
- 3.2 Mobile Banking Status in India*
- 3.3 Mobile Banking in Indore*
- 3.4 Mobile Banking Regulatory Framework*

Over the last few years, the mobile and wireless market has been one of the fastest growing markets in the world and it is still growing at a rapid pace. Mobile phones have become an essential communication tool for almost every individual. Mobile commerce is the new type of business conducted through mobile devices using wireless telecommunication networks. The advancement of M-Commerce has managed to take mobile to next level. Mobile banking removes space and time limitations from banking activities. Mobile commerce is about delivering right information to the right place at right time. Mobile banking which is an integral part of m-Commerce is defined as availing banking and financial services with the help of mobile telecommunication device.

The mobile phone has dramatically changed life of people and still there seems to be much work left for it. The reason is that the SIM card acts as a debit or credit card parallel to its original purpose of communication. This enables users to not only use mobile for making and receiving calls, but also to handle their bank accounts using their mobile phone.

Today, most of the banks are using mobile banking as an additional channel apart from retail banking, ATM, online banking etc. The transformational model attempts to attract the unbanked segments by using the existing infrastructure like telecommunication and agent/bank representatives. RBI in India is promoting transformational model through technology providers like Oxigen, mChek, Obopay, FINO, and A Little World have developed m-

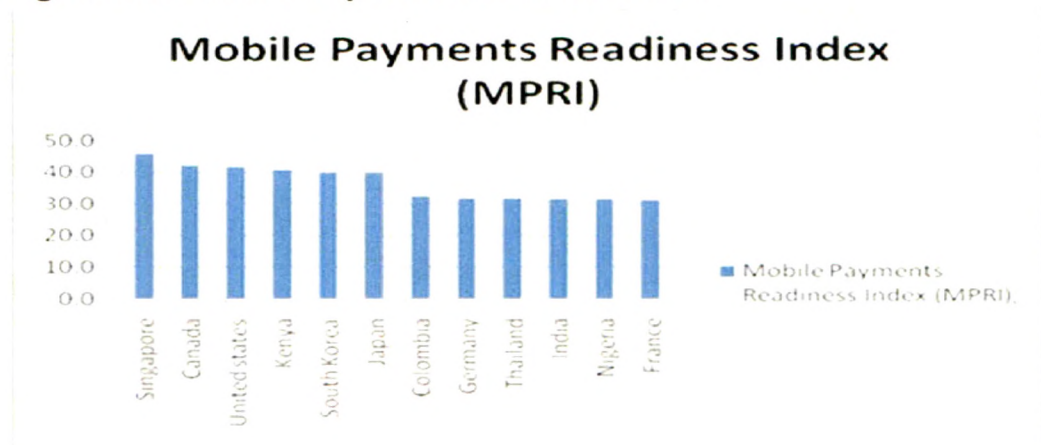
payment platforms and business models that are ready to be rolled out to un-banked customers via agent networks.

Mobile banking is among the alternate banking channel with ATMs and Internet Banking which brings revolutionary improvement in the quality of service delivery of banks. The main reason that Mobile Banking scores over other form of banking is that it enables 'Anywhere Anytime Banking'. Customers don't need access to a computer terminal to access their bank accounts, now they can do so on-the-go while waiting for the bus to work, traveling or when they are waiting for their orders to come through in a restaurant.

### ***3.1 World's Mobile Banking Status***

Global Industry Analysts, Inc. (Analyst, 2010)<sup>7</sup> report that the global customer base for mobile banking is projected to reach 1.1 billion by the year 2015. Convenience of mobile banking operations and need to lower transactional costs are major driving factors for the technology's adoption. According to figure 3.1, a survey among 34 countries based on mobile payments readiness index (MPRI) which is based on readiness to use mobile banking on three types of mobile payments: person to person, mobile e-commerce and mobile payments at the point of sale (POS). Based on (Kiran, 2013)<sup>82</sup> MasterCard Mobile Payments Readiness Index (MPRI) India is ranked 21st among 34 countries with the score of 31.4 on a scale of 100. Singapore topped with a score of 45.6 followed by Canada and then United States of America with scores of 42 and 41.5, respectively (Shah, et al., 2010)<sup>143</sup>.

**Figure 3.1: Mobile Payment Readiness Index**



source: Kiran,2013

According to Federal Reserve Board (Board, 2013)<sup>23</sup> published report in 2013 a total of 87% of United States adult population has mobile phone and 28% of all mobile phone owners have used mobile banking . 87% users are using check account balance service, 53% of them use transferring balance service and 21% of users have deposited cheque using mobile banking.

The United States, Europe and Asia-Pacific dominate the global mobile banking market, as stated by the new market research report on mobile banking. North America and Europe are characterized by high usage of mobile devices for Internet access, as a result of which mobile banking is an extension of online banking services. In Europe, mobile banking services are still in early stages, and regarded primarily as 'convenience providers' and 'value additions' rather than revenue generators. On the other hand, the Middle East and African markets are expected to benefit from the mobile banking technology's ability to provide financial services to remote areas.

Rapid growth of mobile banking services is driving banks to devise strategies to sustain presence in an intensely competitive market. Success of a bank's mobile banking service is dependent on its ability to retain customer base and achieve cost reductions. According to (Analyst, 2010)<sup>7</sup> the top banks providing mobile banking services includes : Bank of America, JPMorgan Chase & Co., Wells Fargo & Co., Citigroup Inc., ClairMail Inc, Firethorn Holdings LLC, Fronde Anywhere Ltd, Industrial & Commercial Bank of China Limited, Macalla Software Ltd, mFoundry, Monitise plc, MShift Inc., and Sybase Inc., among others.

In the increasingly competitive markets of financial services Mobile Banking can be seen as an attempt to provide the needed added value for customers by offering more opportunities for conducting different banking actions.

### **3.2 *Mobile Banking Status in India***

Mobile banking was launched in 2004 by ICICI bank, India's second largest bank in conjunction with Reliance Communication (R-Com), India's third-largest mobile provider during 2004. The service is availed by ICICI Bank customer who also subscribed to R-Com to send to and receive money to/from another ICICI customer. (Up to a maximum of Rs 5,000 per day).

In 2008 , Barclays India introduced mobile banking 'called 'Hello Money' that lets customers perform tasks such as checking balances, paying bills, transferring money and adding top-ups in mobile balance.

More recently in 2012, Bharti Airtel, launch Airtel Money its mobile wallet service launched a range of mobile commerce services in partnership with India's HDFC Bank, ICICI, SBI, Corporation Bank, and VISA. The services, launched include mobile money transfer, bill payment, and prepaid recharge is available across 300 key cities in India. 'Airtel money' is a fast, simple and secure service that allows its users to load cash on their mobile devices and spend it to pay utility bills and recharges, shop at 7,000-plus merchant outlets and transact online.

Public sector banks also bring their own mobile banking solutions. Union Bank of India recently rolled out UMobile, a mobile service for account inquiries and fund transfers. State Bank of India, the country's largest commercial bank, now offers SBI Freedom, which provides fund transfers, account inquires, bill payment, and mobile top-ups etc.

India has the world's second largest number of mobile connections, after China and ahead of the Unites States. As published in (Express, 2012)<sup>47</sup> Finance Minister of India, P Chidambaram said in Lok Sabha that till October 2012, nearly 1.72 crore customers are utilizing the Mobile Banking Services. According to a 2012 report by Boston Consulting Group, the total mobile banking transaction in India is expected to reach \$350 billion by 2015.

According to (Kumar, 2013)<sup>85</sup> the top five banks in India based on the mobile banking transactions during October-December 2012 provided by RBI are State bank of India, ICICI bank, Axis bank, City bank and

Hdfc bank. The popular mobile banking services in India are balance checks, account transactions, cheque status, setting alerts, payment reminders, accessing mini statement, placing orders for cheque books, etc.

Shyamal Saxena, general manager-retail banking products, Standard Chartered Bank said that mobile banking is used for enquiries such as balance status, new cheque book issuance, mobile top-ups, movie ticket or air ticket booking, utility bills such as cell phone, telephone, credit card and electricity bills.

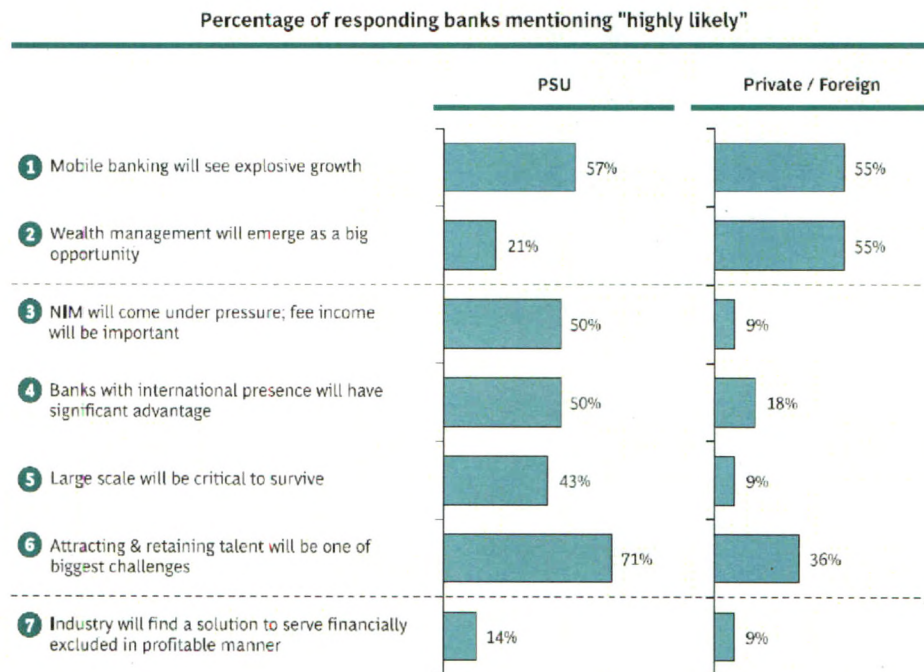
According to Birendra Sahu, senior executive vice-president, HDFC Bank Ltd, mobile is usually used for urgent transactions such as fund transfers, bill payment and credit card payments. As per ICICI Bank Ltd's spokesperson, prepaid mobile recharge, direct-to-home recharge, ticket bookings (movie/air/bus) are some of the rapidly growing transactions in mobile banking.

From the report published by Bosten consultancy group figure 3.2 it is clear that mobile banking is growing in public sector banks as well as in private sector banks. From figure 3.2, 57% users are using mobile banking services of public sector banks in India, whereas 55% users are using mobile banking services of private sector banks.

According to Reserve Bank of India, 65 banks (table 3.1) have been approved by Reserve Bank of India for providing mobile banking services, out of which 47 banks have commenced offering mobile banking services.



**Figure 3.2: Mobile Banking Statistics for Public and Private Sector Banks in India.**



Sources: IBA – BCG Survey of Banks; BCG analysis.  
 Note: Sample size: 13 PSU banks, 7 Private banks, 4 Foreign banks.

source: Shah, et al., 2010

According to (Menon, 2013)<sup>104</sup> data from the country's central bank, the Reserve Bank of India (RBI), the volume of mobile banking transactions nearly doubled in the past year, from 2.67 million in December 2011 to 5.22 million in December 2012. The value of transactions in this period grew nearly three-fold from Rs.1.98bn (\$36.8m) to Rs 5.98bn. Out of India's 75 banks, 53 already offer mobile banking services. At the end of December 2012, there were 20 million registered mobile banking customers in the country, and this number is expected to grow several-fold.

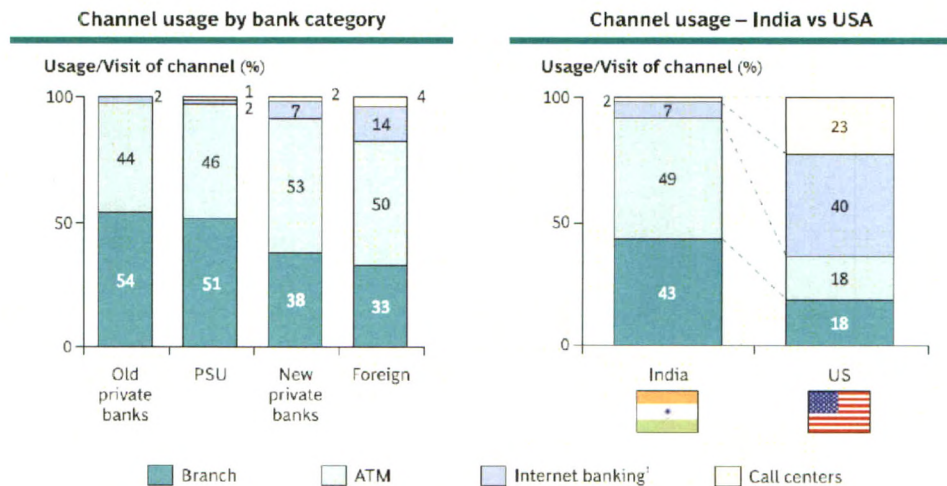
**Table 3.1: Banks Permitted to Provide Mobile Banking Service in India by RBI till March 31, 2012.**

S. No.	Bank Name		Bank Name
1	Allahabad Bank	34	Kotak Mahindra Bank Limited
2	Andhra Bank	35	Nainital-Almora Kshetriya Gramin Bank
3	APMahesh Co-op. Urban Bank Ltd.	36	Oriental Bank of Commerce
4	Axis Bank Limited	37	Pragathi Gramin Bank, Bellary
5	Bank of Baroda	38	Punjab National Bank
6	Bank of India	39	Punjab&Maharashtra Co-op. Bank Ltd.
7	Bank of Maharashtra	40	South Indian Bank Ltd.
8	Barclays Bank PLC	41	Standard Chartered Bank
9	Baroda Gujarat Gramin Bank	42	State Bank of Bikaner & Jaipur
10	Baroda Rajasthan Gramin Bank	43	State Bank of Hyderabad
11	Baroda Uttar Pradesh Gramin Bank	44	State Bank of India
12	Canara Bank	45	State Bank of Mysore
13	Catholic Syrian Bank Ltd.	46	State Bank of Patiala
14	Central Bank of India	47	State Bank of Travancore
15	Citi Bank N.A.	48	Syndicate Bank
16	City Union Bank Limited	49	Tamilnad Mercantile Bank Ltd.
17	Corporation Bank	50	The Cosmos Co-operative Bank Ltd.
18	Dena Bank	51	The Development Bank of Singapore Ltd.
19	Development Credit Bank Ltd	52	The Dhanlaxmi Bank Limited
20	FirstRand Bank Ltd.	53	The Dombivli Nagari Sahakari Bank
21	HDFC Bank Limited	54	The Federal Bank Limited
22	ICICI Bank Limited	55	The Greater Bombay Co-operative Bank Ltd.
23	IDBI Bank Ltd.	56	The Hong Kong and Shanghai Banking Corporation Ltd.
24	Indian Bank	57	The Lakshmi Vilas Bank Ltd.
25	Indian Overseas Bank	58	The Ratnakar Bank Ltd.
26	IndusInd Bank Limited	59	The Royal Bank of Scotland
27	ING Vysya Bank Limited	60	The Thane Janata Sahakari Bank ltd.
28	Jammu & Kashmir Bank Ltd	61	UCO Bank
29	Janata Sahakari Bank Ltd.	62	Union Bank of India
30	Jhabua-Dhar Kshetriya Gramin Bank	63	United Bank of India
31	JP Morgan Chase Bank	64	Vijaya Bank
32	Karnataka Bank Limited	65	Yes Bank Limited
33	Karur Vysya Bank Ltd		

Source: Data collected by researcher from banks website.

By (RBI, 2013)<sup>129</sup> during the financial 2012-13, total of 1,329,221.92 billion rupees were transacted through RTGS, paper clearing,

**Figure 3.3: Banking Statistics for India and USA**



Sources: NCR; BCG Consumer Survey (N=3,000); BCG analysis  
 †Includes Mobile Banking

source: Shah, et al., 2010

government securities clearing, forex clearing, cheque clearings, retail electronic clearing, credit and debit cards and mobile banking. Out of which a total 59.90 billion funds were transferred by the mobile banking users in India. Out of which 8.07 billion is from January 2013, 9.92 billion rupees is in Feb '13 and 9.89 billion rupees is transected in mar'13 using mobile banking in India.

From the banking statistics for India and USA using different banking channels (Shah, et al., 2010)<sup>143</sup> if we observe figure 4.3 the users accessing different services like branch, ATM, internet/ mobile banking, call center services provided by the banks. The researcher observes that 43% users are dependent on the branch of the banks in India, whereas only 18 % users from USA depend on branches. 49% users are using ATM services in India, whereas only 18% users are using ATM services in USA. For internet/mobile banking services,

the statistics explain that 40% of USA users are using internet /mobile banking services whereas only 7% of users from India are using internet/mobile banking services. As far as call center services is concern, only 2% users from India is using as compare to 23% users of USA. Thus it is clear from the above statistics that in India 92% users from India are using traditional services like Branch banking and ATM and only 9% of the users are using internet/mobile banking and call center banking services. As far as USA users are concern, 63% users are using internet/mobile banking services and call center services, only 37% users are using ATM and branch banking services.

Thus it is clear that internet/ mobile banking in India perspective, from all the users of banking services, only 2% users are from public sector banks, where as 7% users are from private banks and 14 % users are from foreign banks. And if we compare the Indian mobile banking status with USA we found that only 7% users are dependent on internet/mobile banking service where as in contrast, 40% users of USA are using internet /mobile banking services.

According to Singh (2012)<sup>144</sup> report, current status of Mobile banking In India is as follows:

-In HDFC bank, two years back 40-45% of the banking transactions were happening in the bank branch. This has dropped to 18% now. So, 82% of the banking needs of a HDFC bank customer who has registered for mobile banking are done outside the bank branch. HDFC has 1.2 million mobile banking users. State Bank of India has 5.2 million registered mobile banking users and this is increasing by 2

lakh new mobile banking users per month. Almost 63% of Citibank account holders use the digital medium for banking.

-Banks have gradually moved from offering non-financial services to financial services on mobile phones - the evolution curve has been: alerts (on ATM withdrawals, credit card purchases etc), cheque book request, payments (of utility bills), debit and credit statements, fund transfer, opening fixed deposits, cash management at low end (up to Rs 50,000 per day) etc. In future more services will be added.

- The Reserve Bank of India has allowed use of 'semi closed wallet' by mobile companies. Via semi closed wallet accounts, people can send and spend money through the mobile network, but can't withdraw cash. Airtel, Vodafone and Idea are offering such services.

- To expand mobile banking reach, HDFC Bank has started Hindi mobile banking service and a 'net safe light' virtual card - both were started last month. The latter helps a user to store a limited value on his mobile. Say a credit card limit is Rs 2 lakh but a user want to buy books online worth Rs 2,000. He can create a new limit on his card using net safe light and use the code generated for online shopping. This creates a security layer for the user - he uses the card for online payments without worrying about it being misused as the limit is only Rs 2,000.

### **3.3 *Mobile Banking in Indore***

Indore is located on the southern edge of Malwa Plateau; the city is located 190 km west of the state capital of Bhopal. With a Census-estimated 2011 population of 2.2 million distributed over a land area

of just (526 km<sup>2</sup>), Indore is the most densely populated major city in the central province. The Indore Metropolitan Area's population is the state's largest, with 2.2 million people living there. Indore is the 14<sup>th</sup> largest city in India and 147<sup>th</sup> largest city in the world. As per 2011 census, the city of Indore has an average literacy rate of 87.38%, higher than the national average of 74%. Male literacy was 91.84%, and Female literacy was 82.55%.

**Table 3.2: List of Public, Private and Foreign Banks Providing Mobile Banking Service in Indore.**

S. No.	Public Sector Banks		
1	State Bank of India	14	Central Bank of India
2	Bank of Baroda	15	UCO Bank
3	Canara Bank	16	State bank of Patiala
4	Bank of India	17	State Bank of Bikaner & Jaipur
5	Punjab National Bank	18	Syndicate Bank
6	Indian Bank	19	United Bank of India
7	Oriental Bank of Commerce	20	Andhra Bank
8	Indian Overseas Bank	21	Bank of Maharashtra
9	Dena Bank	22	State Bank of Saurashtra
10	Union Bank of India	23	Punjab & Sind Bank
11	Corporation Bank	24	State Bank of Mysore
12	State Bank of Travancore	25	Vijaya Bank
13	Allahabad Bank	26	State Bank of Hyderabad
S.No.	Private Sector Banks		
1	ICICI Bank	5	Karnataka Bank
2	HDFC Bank	6	IDBI bank
3	Axis Bank	7	City Union Bank
4	Ing Vysya Bank	8	IndusInd Bank Limited
S.No	Foreign Banks		
1	Standard Chartered bank	3	HSBC bank
2	City Bank		

Source: Data collected by researcher from banks website.

Indore functions as the state commercial capital. Industries in Indore range from automobile to pharmaceutical and from software to retail and from textile trading to real estate. As Indore is the economic



center of central India and therefore banks in Indore also enjoy a certain degree of importance. The banks in Indore play an important role in providing banking services to the citizens and industries.

Proportionate to the economic importance of Indore there are 37 banks which operates in Indore district which includes (table 3.2) 26 public sector banks and 8 private sector banks and 3 foreign banks.

### ***3.4 Mobile Banking Regulatory Framework***

In order to ensure a level playing field and considering that the technology is relatively new, The Reserve Bank in India (RBI, 2008)<sup>130</sup> brought out a set of operating guidelines to be followed by the banks. The guidelines, finalized following a wide consultative process with the stakeholders, were first issued in October 2008 and since then have been updated keeping in view the developments taking place. Gists of RBI mobile banking guidelines for Indian Banks are as follows:

1. Only such banks which are licensed and supervised in India and have a physical presence in India will be permitted to offer Mobile banking products to residents of India. Thus, both banks and virtual banks incorporated outside the country and having no physical presence in India will not, for the present, be permitted to offer mobile banking services to Indian residents.
2. The products should be restricted to account holders only and should not be offered in other jurisdictions.
3. The services should only include local currency products.

4. The 'in-out' scenario where customers in cross border jurisdictions are offered banking services by Indian banks (or branches of foreign banks in India) and the 'out-in' scenario where Indian residents are offered banking services by banks operating in cross-border jurisdictions are generally not permitted.
5. Overseas branches of Indian banks will be permitted to offer Internet banking services to their overseas customers subject to their satisfying, in addition to the host supervisor, the home supervisor.

Given the regulatory approach as above, banks are advised to follow the following instructions:

- a. All banks, who propose to offer transactional services on the mobile services, should obtain prior approval from RBI.
- b. The guidelines issued by RBI on 'Risks and Controls in Computers and Telecommunications' are equally apply to Mobile banking.
- c. Banks should develop outsourcing guidelines to manage risks arising out of third party service providers, such as, disruption in service, defective services and personnel of service providers gaining intimate knowledge of banks' systems.
- d. 'Inter-bank Payment Gateways' for settlement of such transactions between the customer, the bank and the portal and the framework for setting up of payment gateways should be adopted for Mobile Banking.



- e. Only institutions who are members of the cheque clearing system in the country will be permitted to participate in Inter-bank payment gateways for Internet payment.
- f. Inter-bank payment gateways must have capabilities for both net and gross settlement. All settlement should be intra-day and as far as possible, in real time.
- g. Bilateral contracts between the payee and payee's bank, the participating banks and service provider and the banks themselves will form the legal basis for such transactions.
- h. Banks must make mandatory disclosures of risks, responsibilities and liabilities of the customers in doing business through Mobile, through a disclosure template.

Payment Account to be used for Mobile Payments e.g. Credit card account, Savings Bank Account, virtual account, Pre-paid account should be similar existing Credit card, Debit Card / bank account issuance framework.

Following (MPF, 2011)<sup>107</sup> should be taken into considerations:

1. RBI's Guidelines and policies on know your customer(KYC) and Anti-Money laundering(AML)
2. Financial settlement between the various entities should be undertaken as per the existing Guidelines and processes.
3. The messaging system between Application and Bank needs to be regulated and standardized to ensure standard transaction processes and settlement systems.

4. Guidelines need to be evolved to ensure complete interoperability of between all the stakeholders of mobile payments.
5. Guidelines need to be evolved for allowing domestic money remittances by Cash-In and Cash-Out at Telco Outlets including usage of Telco's KYC and adherence of AML guidelines.

Telco's role should include providing platform to initiate transactions and carry the messages to the bank's systems. The Telecom Regulatory Authority of India (TRAI) on 17<sup>th</sup> April 2012 has issued new regulations on mobile banking to ensure faster and reliable communication for enabling banking through mobile phones. It has prescribed norms for telcom service providers for facilitating communication related to banking and parameters for quality of service (TRAI, 2012)<sup>152</sup>.

According to TRAI Access Providers includes the Basic Telephone Service Provider, Cellular Mobile Telephone Service Provider and Unified Access Service Provider in India. Every Access Provider needs to facilitate banks to use SMS, USSD and IVR to provide banking services to its customers. Access providers can also optionally allow banks to use WAP or STK (SIM Application Toolkit) to provide banking services to their customers. According to the regulations, the response time for delivery of message for mobile banking services generated by the customer or the bank will be within the time frame of less than or equal to 10 seconds for SMS and IVR

and less than or equal to 2 seconds USSD. The access provider needs to ensure confirmation of the delivery of the message is sent to the customer or the bank or send an USSD communication to the customer confirming the completion of the transaction. The access provider should ensure that the customer is able to complete basic services like cash deposit, cash withdrawal, money transfer and balance enquiry, in not more than two stages of message transmission.

For mobile banking, the service providers should ensure to meet the quality of service standards as specified by TRAI for cellular mobile telephone service. The regulation mandates access providers to maintain a 99.5% success rate in delivering financial transactional messages and time taken to deliver either error or success confirmation message should be less than two minutes for 99.5% of the messages. However, there should be 100% transaction update in the system.

Every access provider must protect the privacy and security of mobile banking communications and ensure the confidentiality of end-to-end encryption, integrity, authentication and non-repudiation of such communication i.e. message sender cannot later deny having sent the message and the recipient cannot deny having received the message. Also they should maintain a complete and accurate record of mobile banking transaction messages for six months for audit purposes.

# *CHAPTER - 4*

## *LITERATURE REVIEW*

- 4.1 Service Quality*
- 4.2 Service Quality in Banks*
- 4.3 Technology-Enabled Service Quality*
- 4.4 Internet Banking Service Quality*
- 4.5 Service Quality and Structure Equation Modeling*
- 4.6 Mobile Banking Service Quality and its Comparison*
- 4.7 Research Gap*
- 4.8 Research Questions and Objectives*

#### ***4.1 Service Quality***

Quality is the measure of excellence and a state of being free from defects, deficiencies or variations. Crosby (1979)<sup>41</sup> the Japanese philosopher defined quality as "zero defects-doing it right the first time", Garvin and David (1983)<sup>53</sup> tried to measure quality as number of internal and external failures (internal during manufacturing a product or external when the unit is installed or functioning).

It is insufficient to understand service quality by studying the goods quality. Most services are Intangible which cannot be counted, measured, tested and verified in advance of sale to quality.

Groorooos (1982)<sup>57</sup> gave the concept that the service will be evaluated by the customers. When a service provider knows how the service will be evaluated by the consumer, he will be able to suggest how to influence these evaluations in a desired direction. He developed a model in which he contends that consumers compare the service they expect with perceptions of the service they receive in evaluating service quality.

Service quality is more difficult for the consumer to evaluate than goods quality. According to Lehtinen and Lehtinen (1982)<sup>95</sup> the interaction between a customer and elements in the service organization produces service quality. On the basis of interaction there use three quality dimensions: physical quality, which includes the physical aspects of the service (e.g., equipment or building); corporate quality, which involves the company's image or profile; and

interactive quality, which derives from the interaction between contact personnel and customers as well as between some customers and other customers.

Parsuraman, Zeithmal and Berry (1988)<sup>120</sup> developed SERVQUAL, an instrument for measuring service quality for service sector and retail sector. The developed instrument has five-dimension SERVQUAL scale to measure the perceived service quality of variety of services by changing the works in the instrument. For developing the scale ten service quality dimensions consisting of 97 items for the initial SERVQUAL instrument. Each item in SERVQUAL scale is measured on seven point likert scale ranging from 'strongly agree' to 'strongly disagree'. The expectation statements were grouped together forming the first half of the SERVQUAL instrument and perception statements were grouped together for forming second half of the SERVQUAL instrument. The data collected in two stages, first stage sample size of 200 was collected from the shopping malls located in Southwest, USA. The respondents were the users of five different service category like appliance maintenance and repair, retail banking, telephone, security brokerage and credit card services. The criteria used in deciding whether to delete an item is correlation, based on this criteria 54 items were retained whose alpha scored is in range of 0.72 to 0.83 for the ten dimensions. Principal axis factoring procedure using oblimine rotation was applied on the 54 items.

SERVQUAL has 22 items in the instruments for measuring the customer perception of service quality. SERVQUAL can help in

assessing consumer expectation about and perceptions of service quality which can help in identifying the areas require managerial attention and action to improve service quality. Before the scale development there is no quantitative scale available to measure the service quality. In this paper they have stated the eleven steps for developing the service quality instrument and describe two important aspects first is how to develop a multiple item scale to measure service quality and second is to discuss the service properties and its applications.

Cronin and Taylor (1992)<sup>40</sup> proposed an alternative to the SERVQUAL model the SERVPERF instrument, which is a more concise performance-based scale. The perceived quality model postulates that an individual's perception of the quality is only a function of its performance. In SERVPERF Cronin and Taylor (1992)<sup>40</sup> argues that there are serious conceptual and operational drawbacks associated with the SERVQUAL model.

Parsuraman, Zeithmal and Berry (1994)<sup>116</sup> again developed three alternative formats for comparing alternative service quality measurement scale on psychometric and diagnostic criteria to address the unresolved methodological issues in service quality. The study was conducted on four different types of service computer manufacturer, retail chain, auto insurance and life insurance. The finding suggests that the company which has system only to measure perception of users of the services should identify the shortfall in service more accurately.

As described by Hayes (1997)<sup>65</sup> Functional quality of a service is often assessed by measures of customers' attitudes, as in customer satisfaction questionnaires and the process of identifying customers' attitudes begins with determining customers' requirements or quality dimensions. However, some quality dimensions are generalized across many services, but some will apply only to specific types of services, and it is necessary to understand quality dimensions to be able to develop and measures to assess them. Hayes explains two approaches for identifying important quality dimensions of services: quality dimension development approach which uses different sources of information, such as opinions of providers and literature and critical incident approach which obtain information about quality from customers.

#### ***4.2 Service Quality in Banks***

Parsuraman, Zeithmal and Berry (1985)<sup>115</sup> have proposed a conceptual model SERVQUAL to measure service quality perception of the consumers. For this purpose, four service categories were chosen retail banking, credit card, securities brokerage, and product repair and maintenance out of which twelve focus groups were studies in metropolitan areas in southwest. In-depth interviews of the executives of the services and the focus groups consumers were conducted. From the executive responses some gaps or discrepancies exist regarding the executive response towards service quality perception. The gap exist between consumer expectation, market expectation, marketer perception, Management perception, service quality specification,



actual service delivery, external communications, expected service, perceived services. Thus these gaps results due to relationship between service quality as perceived by consumers and the different gaps occurring on the marketer's side. From the exploratory research of the focus groups ten service quality determinants were identified and they are reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing the customer and tangibility.

Using Parsuraman, Zeithmal and Berry's SERVQUAL scale, a number of researchers conducted studies on bank service quality including (Avkiran,(1994)<sup>8</sup>;Johnston,(1995)<sup>73</sup>; Gerrard and Cunningham, (2000)<sup>55</sup>; Malhotra and Mukherjee,(2003)<sup>101</sup>; Satya and Prabhakaran, (2003)<sup>136</sup>;safakli, (2007)<sup>134</sup>;Ladhari, (2009)<sup>89</sup> ).

Avkiran, N.K (1994)<sup>8</sup> studied the service quality perceived by the customers of the trading bank branch in Australian. He has developed an instrument in order to measure the customer service quality in branch banking. The 34-item instrument was customized for the bank and further refinement attempted; pretesting of the instrument is done in three stages, first it was present in front of the 40 university students and bank practitioners who were using services of bank. For testing for acquiescence bias, the second stage of pretesting was composed of two different versions of the same questionnaire i.e. first version with four negative items and second version with eight negative items. In the absence of empirical evidence for acquiescence bias, it is reasoned that there would be no need to include negative

items. The instrument is piloted in nine branches through exit interviews; these branches were chosen with care to include variations in geographic location and size. The main survey was administered through the customers of 20 randomly chosen branches; data collection methods were triangulated by employing exit interviews, telephone interviews and mailed questionnaires. Seven-hundred-and-ninety-one completed questionnaires were returned. Construct Validity of the research instrument were tested. The 27 variables were factor analyzed using Principal Axis Factoring (PAF) on SPSS; six factors were extracted which coincided with the number of conceptualized dimensions. The six factors are: staff conduct, communication, credibility, responsiveness, access to bank management and access to trailer services. Again the 22 variables were factor analyzed with principal axis factoring. Finally the six dimensions were reduced to four dimensions staff conduct, credibility, communication, and access to teller services.

Johnston (1995)<sup>73</sup> explores the determinants of bank's service quality which tends to be a source of satisfaction and dissatisfaction. The UK's high-street banks four branches customers asked for the study. It was agreed that these would cover two large and two small branches; one in each category was chosen to be a rural branch and the other an urban branch. The sample of customers was identified by selecting every tenth customer from the alphabetical computer records in each area. The banks customers were studied with the help of questionnaire. The questionnaire comprised two questions. The first question asked customers to think of a time when they felt very

pleased and satisfied with the service received and to describe the service situation and why they felt so happy. The second question required customers to think of a time when they were unhappy and dissatisfied with the service they received and to ask them to describe, in a few sentences, why they felt this way. The critical incident technique is used as it allows customers to express their perceptions in their own words and classify them into satisfying and dissatisfying factors. The findings suggest that for the personal customers of the bank the main sources of satisfaction are attentiveness, responsiveness, care and friendliness. Whereas the main sources of dissatisfaction are integrity, reliability, responsiveness, availability and functionality. With the determinants of satisfaction and dissatisfaction the service managers should be able to improve the delivery of customer perceived quality during the service process and have greater control over the overall outcome.

Gerrard and Cunningham (2000)<sup>55</sup> compared the service quality expectation of the customers of public quoted banks and government banks in Singapore. The study aims to focus on three aspects of bank service quality, first is to compare the service quality expectations of customers of public quoted banks and government bank in Singapore. With comparison it establishes if the customers of different types of banks do or do not have the same service quality expectations. Second is the service quality perception of the bank customers is same or different of public quoted banks and government banks. Finally the service quality dimensions predict overall customer satisfaction for both types of banks. Five service quality dimensions were identified

on the basis of past literature they are convenience, reliability, service portfolio, staff who deliver the service and tangibles. The targeted population is the resident of a district known as Yishun situated in central north of the island in Singapore. The survey forms were used for collecting the responses. The t-test was conducted in order to measure the expectation and perception of the customers of public quoted banks and government banks. In order to establish relationship between independent variables of service quality with dependent variable of customer satisfaction correlation was used, where as regression analysis was used to find the contribution of five independent variables of service quality towards satisfaction of users of public quoted banks and government banks. The correlation result's suggests that there is significant association between the five dimensions of service quality and customer satisfaction. The regression results suggest that for government banks four dimensions: staff who deliver the service, service portfolio, tangible and convenience is helpful in predicting customer satisfaction.

Malhotra and Mukherjee (2003)<sup>101</sup> attempts to understand organizational commitment and service quality relationship in the service context of the telephone call center and branch of a major bank in UK. Stratified sampling was used in order to ensure non-biased selection. Factor analysis using principal component analysis was used separately for organizational commitment and service quality. Reliability was also measured separately for organizational commitment and service quality. The relationship between the variables and service quality dimension were established using

correlation and regression. Separate studies were done for branch banking and call centers. In case of branch banking, for organizational commitment there exist effective and normative commitment whereas no relationship is found between continuance commitment with two variables i.e. Affective and normative commitment. All the three components of organizational commitment (affective commitment, continuance commitment and normative commitment) have positive correlation with the service quality. The findings indicate that in branches, both affective commitment and continuance commitment have significant positive impact on service quality while in call centers, only affective commitment is found to affect service quality significantly. In case of call centers, effective and normative commitment has positive correlation with service quality but continuance commitment have very small negative correlation with service quality. Regression results suggest that effective commitment have positive relationship with service quality where as continuance and normative commitment have no relationship with service quality. Two-way ANOVA is also used in order to study the group of employees in bank branch and call center were different with respect to service quality and the three components of organizational commitment. The results of ANOVA suggest that the employees of call center and bank branch are different with respect to service quality and organizational commitment.

Satya and Prabhakaran (2003)<sup>136</sup> tried to study the various service quality attributes in the banking sector affecting the customer satisfaction. The respondents were the customers of the banks availing

housing loans in Bangalore city in India. Exploratory research is conducted in order to identify dimensions related to service quality. The respondents were the clients who are already paying EMI for housing loans from the banks. Primary data has been collected through questionnaire from the customers to understand their perspective of service dimension, its attributes and its reflection on the satisfaction level. Statistical tools were applied on the collected data. The study identifies the attributes which forms the evaluation criteria for customers to perceive service related to banking sector by the clients. Statistical techniques were used to analyze the data collected. Association of attributes was used to study the relationship between the attributes. The finding suggests that there is a fair degree of association between reliability and responsiveness, reliability and empathy, empathy and responsiveness, empathy and tangibility, and assurance and reliability.

Safakli, O.V. (2007)<sup>134</sup> has study the sustainability of SERVQUAL dimensions developed by Parsuraman towards the service quality of commercial banks in Northern Cyprus. The data is collected through structured questionnaire

The analysis and tests utilized in the study include frequency and percentage analysis, one-sample *t*-test, independent-samples *t*-tests, paired-samples *t*-tests, one-way ANOVA test, factor analysis and reliability analysis. The factor analysis was conducted using varimax rotation on the collected data. Result of the factor analysis and other statistical tests shows that cultural differences across countries may

have the potential of generating different quality dimensions pertinent to the country and culture where the service is offered. A new dimension that of 'customer orientation' has been added to the SERVQUAL model while two of the original dimensions, 'assurance' and "responsiveness", have been extracted. Therefore the new SERVQUAL model has been reduced to four dimensions rather than five. These dimensions are tangibles, reliability, empathy and customer orientation. This shows that all types of commercial banks, regarding which client quality perceptions did not differ significantly, should improve their service quality in order to overlap with client's expectations.

Ladhari, R. (2009)<sup>89</sup> investigates the psychometric properties of SERVQUAL model. The study utilizes the performance component of SERVQUAL on Canadian bank customers. A self-administrated questionnaire was used to collect data regarding bank customers' perceptions of service quality. The confirmatory factor analysis is applied on the data. The reliability, convergent validity, discriminant validity and predictive validity for the questionnaire were tested. The regression technique is used in order to identify the relationship between the SERVQUAL dimensions and customer satisfaction. The results show that responsiveness and empathy are the most important dimensions of overall service quality in the Canadian banking context. The findings highlight that the service provided by employees makes the largest contribution towards the customer satisfaction of Canadian bank. Canadian bank managers must recognize that frontline

employees are crucially important in establishing and maintaining a competitive position for their institution.

### ***4.3 Technology-Enabled Service Quality***

One of the major forces behind the changes happening to business today is technology, which is creating new products, services market opportunities and developing more information and system oriented business and management processes.

Banking is one of the most information intensive sectors and is an ideal domain using technology. For banks, technology has emerged as a strategic resource for achieving higher efficiency, control of operations, productivity and profitability. For customers, it provides them: anywhere, anytime, anyway banking dream. This has prompted the banks to effectively use technology to meet the increasing customer expectation and face the tough competition.

Parsuraman et. al. (2000)<sup>119</sup> tried to study the impact of technology on dimensions of service quality, perceived value and loyalty. He developed the pyramid model of service marketing which is an extension of triangle model proposed by Kotler. He introduces the concept of technology in Kotler's triangle model. The triangle model suggests that between the company, employee and customer, external marketing between the company and customer, internal marketing between the company and employee, and interactive marketing between the employee and the customer. The external marketing emphasizes on marketing of goods to the customers by the company by using product, prize, place and promotion. The internal marketing



emphasizes on the service employees of the company as internal customers by giving them proper training, support and motivation in order to serve the customers of the company. The interactive marketing deals with marketing of good impression on the customers during the interaction. The pyramid model emphasizes the role of technology for managing the link between company, employee and the customers.

Netoffer Model developed by Gronroos et al (2000)<sup>58</sup> for studying various offerings on internet. A typical offering on the Internet, sales of cinema tickets by a large conglomerate of movie theatres in Finland, the Kinopalatsi (the Palace), was used for case data illustrating how offerings function on the Internet. The objective is to develop an understanding of the nature of such offerings on virtual market space. In the proposed model accessibility and interaction elements of service offerings merge into one communication variable and a user interface element is included as an Integral part of an internet offering. In order to make the service package function as an Internet offering, customer participation and communication were found to be necessary augmentation elements in a virtual market-space environment.

Zeithaml V (2002)<sup>160</sup> has tried to study service delivery through electronic channels. He tried to discuss meaning of service and tried to understand how the customers evaluate and describe electronic service quality. He derived the service quality as an extent to which a website facilitates efficient and effective shopping, purchase and delivery. The

scale consists of two scales: e-SQ and recovery scale. He developed e-SQ scale for measuring customer's perception towards electronic service quality and the dimensions related to e-SQ are efficiency, fulfillment, reliability and privacy. Through these dimensions the website has an opportunity to establish or reinforce quality perception amongst customers as no direct human contact in accessing remote services. The recovery scale consists of three dimensions responsiveness, compensation and contact.

Following Zeithaml a number of researchers Santos, (2003)<sup>135</sup>; Parsuraman, Zeithaml and Malhotra, (2005)<sup>118</sup> have worked on electronic service quality and developed variety of e-scales.

Santos (2003)<sup>135</sup> proposed a conceptual model of the determinants of e-service quality in e-commerce environment. For this exploratory research is done in order to determine the determinants of electronic service quality. For this 30 focus groups were formed from the UK population. Each focus group needs to identify the favorable or unfavorable dimensions and rank those dimensions according to its importance. A total of 11 dimensions were identified on the basis of their importance. The dimensions were clustered into two dimensions: the incubative and active dimension. The incubative dimensions were defined on the basis of design, technology used in order to provide consumers easy access, understanding and attraction of the website. The incubative dimensions are ease of use, appearance, linkage, structure and layout, and content. The active dimensions are defined as good customer support, fast speed and attentive maintenance of the

website provided to the customers. The active dimension includes reliability, efficiency, support, communication, security and incentives. These dimensions are the determinants of e-service quality in e-commerce environment.

Parsuraman, Zeithaml and Malhotra (2005)<sup>118</sup> developed multiple-item scale (E-S-QUAL) for measuring the service quality delivered by Web sites on which customers shop online. The preliminary scale consists of 121 items representing all factors of electronic service quality. A quota-sampling plan is used, one third was asked to evaluate their second favorite sites, and one third was asked to evaluate their third favorite sites. To collect data respondents were diverted to a website containing the revised questionnaire. The questionnaire was divided into two sections , first section consist of electronic service quality scale i.e. E-S-Qual which consistes of items related to electronic service quality and the second section consist of quality of recovery i.e. E-RecS-Qual scale. Reliability and validity of the scale was measured using exploratory factor analysis. Four dimensions were identified for website service quality and they are Efficiency, fulfillment, system availability and privacy. Whereas three dimensions were identified for quality of recovery from the website and they are responsiveness, compensation and contact. A model was also developed for website service quality using confirmatory factor analysis. After the subsequent stages of scale development and refinement of the scale, it consist of a subscale of E-S-QUAL called E-RecS-QUAL containing items focusing on handling service problems and inquiries encounters with the sites. The basic E-S-

QUAL Scale for a Website has a four-dimensional, 22-item scale, whereas E-RecS-QUAL for the customer base with recovery service experience is a three-dimensional scale containing 11-item.

Boshoff (2007)<sup>24</sup> studied the E-S-QUAL instrument consisted of two parts, the one measuring service quality and the other so-called 'service recovery', Beshoff consider only first part to measure service quality in order to study psychometric properties of the scale. Chi-square difference test applied on the date for comparing between the first quartile and the last quartile of respondents, using all available demographic-type information. The results revealed that there were no significant differences between quartile 1 and quartile 4 in terms of gender and level of education. However, in terms of age, there were some differences. The data analysis is done in two phase, exploratory factor analysis conducted in the first phase in order to assess whether the data contain the four factors or dimensions of electronic service quality. The result of exploratory factor analysis suggests six, five and four factor. The six factors consist of efficiency, website speed, fulfillment, delivery, reliability, privacy and system availability configuration were privacy and system availability. The five factor model extract fulfillment, efficiency, privacy, speed and system availability, except system availability. The four factor mode extracted have dimensions Fulfillment, Efficiency, Privacy and System availability The next phase is to study the three measurement models on six, five and four factor using confirmatory factor analysis. The fit statistics suggests clearly show that the six-factor model fits the data better than five and four factor model. Further Chi-square

Date .....

difference test for nested models was used in order to differentiate between four-factor configuration of electronic service quality and the proposed six-factor model. The results of chi-square difference test reveal that the six-factor configuration of electronic service quality is superior to the four-factor. Then the convergent, predictive and nomological validity of the six dimension model were investigated. Thus the results suggest that the E-S-QUAL instrument is a valid and reliable instrument to measure service quality in an electronic shopping environment, provided their dimension is properly analyzed.

Ombati et. al (2010)<sup>111</sup> establish the relationship between e-banking services (internet banking, mobile banking and ATM) and service quality in the banking industry in Kenya. The study used primary data, which was captured through semi-structured questionnaires. Correlation analysis was also used to establish the relationship between the technology and service quality in the banking industry. To determine the factors that lead to customer preference of different service delivery channels, the score of customer preference was cross tabulated to establish the degree of influence. The result suggests that there is a direct relationship between technology and service quality in the banking industry. This was made possible through the use correlation analysis, percentages and means. The key factors for satisfaction/ dissatisfaction in the Kenya banking industry in relation to technology were established. The e-banking customers seem to be quite satisfied in the following areas: Security, efficiency, accurate records, convenience and accurate transactions.

Numerous studies have focused on the service delivery using electronic channels Gronroos, (2000)<sup>58</sup>; Zeithaml, V., (2002)<sup>159</sup>; Parasuraman et al., (2000)<sup>119</sup>, (2005)<sup>118</sup>; Ombati et. al. (2010)<sup>111</sup> is the best known researchers in electronic service quality.

#### ***4.4 Internet Banking Service Quality***

Internet Banking is one of the most emerging sectors using technology in order to cater the changing need of the customers. Electronic based banking system such as telephone banking, Automated Teller Machine (ATM), Electronic Funds Transfer (EFT), Internet banking and Mobile banking are the alternate banking channels. Research has shown that electronic service quality is a significant factor in the success of internet banking.

Jun and Cai (2001)<sup>74</sup> identified the service quality dimensions with respect to internet banking services in USA. These dimensions ultimately result in satisfaction or dissatisfaction of the customer using the services of the banks. The critical incident technique is used in order to indentify the dimensions of internet banking service quality. From the 532 critical incidents, 168 single lined-space pages 45 nodes were identified and then refined into 17 dimensions. These 17 dimensions, 10 dimensions were assessing customer's service quality, six dimensions for assessing online systems quality and one dimension form online banking product quality. The one dimension for banking service product quality is "product variety/diverse features" ten dimensions for customer service quality are reliability, responsiveness, competence, courtesy, credibility, access,

communication, understanding the customer, collaboration and continuous improvement. Whereas the six online systems quality dimensions are: content, accuracy, ease of use, timelines, aesthetics and security. Thus the internet banks should pay attention on 17 dimensions which will have a positive impact on customer's satisfaction.

Karjaluoto et. al. (2002)<sup>77</sup> studied the factors underlying attitude formation towards online banking in Finland. The data were collected through questionnaire from the online internet banking users of Nordia bank in Finland. Factor analysis was conducted in order to identify factors that help in explaining the experience and reference groups in online banking. Four Factors: prior computer experience, prior technology experience, personal banking experience and reference group influence was identified using factor analysis. Correlation between four factors were identified, the results suggest that prior computer experience, prior technology experience, personal banking experience and reference group and computer attitude strongly affect attitude and behavior towards online banking. Based on these factors and attitude towards internet banking a model is constructed and using confirmatory factor analysis. The result of the model implies that all the variables were significantly significant. The result suggests that the demographic factors like age, occupation and income impact heavily on the attitude towards online banking. The result suggests that young, well educated and having high income with good job are users of online banking in Finland.

Wang (2003)<sup>153</sup> identified the determinants of user's acceptance of internet banking by the users. According to the technology acceptance model (TAM), perceived ease of use and perceived usefulness constructs are believed to be fundamental in determining the acceptance and use of Information Technology. Using the technology acceptance model Wang introduces "perceived credibility" as a new factor that reflects the user's security and privacy concerns in the acceptance of Internet banking. It also examines the effect of computer self-efficacy on the intention to use Internet banking. The results strongly support the extended TAM in predicting the intention of users to adopt Internet banking. It also demonstrates the significant effect of computer self-efficacy on behavioral intention through perceived ease of use, perceived usefulness, and perceived credibility.

Jayawardhena and Foley (2000)<sup>70</sup> develop an instrument to measure customer service quality of internet banking. The data was collected from fifteen different banks providing internet banking service in USA. Exploratory factor analysis using orthogonal rotation was conducted on the 26 variables. Six dimensions were identified are interaction, web interface dimension, assurance, empathy, responsiveness and reliability. Factor analysis on the 23 variables were applied, two items on the variable whose factor score is less than 0.5 were removed from the questionnaire. The reliability and validity of the questionnaire were evaluated. In the second stage six dimensions were reduced to five dimensions and they are access, web interface, trust, attention and credibility. Using these five dimensions and overall service quality of banks, a model is constituted using



confirmatory factor analysis. Regression analysis was carried out between five dimensions as independent variables and overall service quality as dependent variable. The results suggests that five dimensions positively affect overall service quality of online banks.

Bauer et. al. (2005)<sup>15</sup> tried to measure the quality of e-banking portals in Germany. The questionnaire was created by conducting by consulting with the expert through interviews at banks and e-business consultancies who used banks portal. Pre-tests of the initial 110-item questionnaire were carried out with 20 online users in order to refine the instrument. The resulting modified 80-item pool was presented to German users of e-banking portals in the course of an online survey. Respondents were asked to refer to their own banking portal which they use regularly. 280 fully usable questionnaires were received. Factor analysis was conducted on the set of 80 items with the help of principal component analysis. Scale purification was conducted by eliminating items with high cross loadings and led to a significant reduction in the number of items. A second exploratory factor analysis carried out with the remaining 68 items resulted in the extraction of the same factor structure. These 68 items were reduced to six fundamental quality dimensions. According to the loadings of the factors on the six dimensions, were identified as security and trust, basic services, cross-buying services, added value, transaction support and responsiveness.

Leelapongprasut et. al. (2005)<sup>93</sup> studies the level of Internet Banking services quality in Thailand. Quota sampling was used to select the

internet banking users. The data is collected through the questionnaires which adapted from the tools that are used to evaluate the service quality called 'The dimension of quality by David A. Garvin' by evaluating the quality of eight dimensional services: Performance, Features, Reliability, Conformance, Durability, Aesthetics, Serviceability and Perceived quality. During the survey 300 questionnaires that were answered completely. Data is analyzed through Chi-square test and coefficient of correlation test were used to analyze the data. The Multiple Regression model is used to test the hypothesis. The result suggests that the users of internet banking service gave importance to the eight perspectives of quality. The most importance one was the reliability, serviceability and durability respectively.

Loonam et. al. (2008)<sup>99</sup> study of the Irish retail banking sector explored consumers' e-banking interactions and experiences in addition to assessing the dimensions critical to e-banking service quality. Qualitative research in the form of semi-structured interviews was utilized. A purposive sampling technique was employed to recruit 20 consumers representing the desired range of demographic characteristics (sex, age and profession), previous internet experience levels and product-related knowledge. Through extant review of the literature, ten e-service dimensions were proposed and evaluated empirically in the context of e-banking service quality. These ten dimensions are: web usability, security, information quality, access, trust, reliability, flexibility, responsiveness, service recovery and personalization/customization. Among these ten dimensions web

usability, trust, access, information quality, service recovery and flexibility emerged as important to e-banking service provision.

Migdadi (2008)<sup>105</sup> identify the quality of internet banking service provided by the retail banks in Jordan. The bank's websites were evaluated by using the web site quantitative evaluation method (QEM), evaluated using the five main components: categories, factors, weights, ratings and total score. The quality indices for each bank are computed by summing the categories indices. To test the normality of data One-Sample kolmogorov-Smirnov test is conducted. T-test is used to identify the significance of the quality of internet banking service quality of retail banks in Jordan. The findings suggest that the quality of internet banking service encounter is significant positive, the most significant quality dimensions are Navigability and content, the banks web sites are rich in the informational content more than other dimensions, the second dimension is the communication and the third is the transactional. Also the speed and navigation dimensions should be developed in future by decrease the size of home page increase the number of internal and external links attached with the web sites.

Khan and Mahapatra (2009)<sup>79</sup> evaluating the service quality of internet banking services in India from customer's perspective. In order to determine the dimensions of internet banking and their relationships with the overall service quality, a questionnaire survey was conducted. The questionnaire is finalized using focus group discussion. Factor analysis is used to reduce the number of variables

into definite number of dimensions. Based on the results of factor analysis, the variables are classified into seven dimensions: Reliability, Accessibility, User-friendliness, Privacy/security, Efficiency, Responsiveness and Fulfillment. Regression analysis is used in order to gain a deeper understanding of the relationship between the overall service quality of the internet banking and the identified dimensions. The proposed seven dimensions are treated as independent variables and the overall quality of internet banking services perceived and rated by customers is treated as dependent variable. The results of regression analysis indicates that the 'Responsiveness' dimension has the greatest influence on overall service quality followed by 'Reliability', 'Accessibility'. However, two dimensions, 'Privacy/Security' and 'Fulfillment' are not statistically significant, indicating further improvement in these dimensions. They also investigated the impact of service quality dimensions on the demographic profile of the respondents by conducting a two-sample *t*-test.

Zahid et. al. (2010)<sup>157</sup> investigated the effects of perceived usefulness, security and privacy, and quality of internet connection on acceptance of online banking in Pakistan. The questionnaire used in this research was adopted from the consumer acceptance of online banking. To know the relationships between variables Pearson Product moment correlation was used. Results indicate that perceived usefulness, quality of internet and privacy & security are positively correlated with adoption of online banking services. To know the impact of three explanatory variables on acceptance of online banking Regression

analysis was also applied. The framework developed for the study proposed that acceptance of online banking is influenced by perceived usefulness, quality of the internet and security and privacy. The customers of banks are well satisfied with the security measures their banks are providing to them therefore this factor also showed insignificant influence of privacy and security, thus in the research perceived usefulness was found to be the strong predictor of online banking services.

Ahangar R.G. (2011)<sup>2</sup> investigates the customer's preferences and satisfaction with five service quality dimensions and its effect on satisfaction. Primary data were collected from six different banks in Iran like Saman, Persian, Melli, Keshavarzi, Tejarat and Sepah banks during the year 2010. The internet banking users of public and private banks in Tehran district were identified. The data was collected through structured questionnaire. Sample of 300 respondents who uses internet banking were identified through non-probabilistic convenience sampling technique. Hypothesis testing was done using ANOVA and F-test. Factor analysis is applied on the responses. Five factor solutions were extracted from factor analysis are: responsiveness, reliability, efficiency, privacy of transactional information and easiness to use. From the results of ANOVA and f-test, null hypothesis is rejected which confirms that there is no relation between age, profession of consumer, gender and the preference of bank. The factors determines the satisfaction level of customers except efficiency and privacy are independent of age, profession and

status of usage .the results also suggests that the satisfaction level of customer is independent of the number of bank usage.

Kadir et. al. (2011)<sup>75</sup> tries to identify the effects of services offered by Malaysian banks through online media and ATMs on customer satisfaction. Responses were collected from 500 students from different universities in Malaysia. Two analyses are employed to fully reflect the effect of online and ATM services on their satisfaction level. The first one was service quality model which compares the difference between satisfaction and expectation level in order to find out which dimensions need to be improved. Second analysis was Two-Way ANOVA analysis which tried to identify the relationship between demographic factors and service quality dimensions. Results of Two-Way ANOVA analysis on satisfaction level indicates that among independent variables, race and marital status have significant impact on satisfaction level of online users related to the ease of navigation. Education level, age and gender don't have significant impact on satisfaction level. There is no relationship between independent variables and Trust/assurance. The independent variables: gender and age have significant impact on satisfaction of online users in relation to privacy of bank's website. Education level of online users also has significant impact on expectation level of the privacy of bank's website. The Lower age group users are more satisfied in terms of responsiveness as compared to higher age group customers. Race also has positive influence, Indian have more expectations on responsiveness of bank's website whereas Chinese have the lowest expectation.

#### **4.5 *Service Quality and Structure Equation Modeling***

Structural equation modeling (SEM) encompasses diverse statistical techniques as path analysis, confirmatory factor analysis, causal modeling with latent variables, and even analysis of variance and multiple linear regressions. SEM is a series of statistical methods that allow complex relationships between one or more independent variables and one or more dependent variables. It investigates relationship among multiple and dependent constructs simultaneously in a single, systematic and comprehensive analysis by creating model. SEM also test the construct validity and reliability

Rod et. al.(2008)<sup>133</sup> examine the relationships among three dimensions of service quality that influence overall internet banking service quality and its subsequent effect on customer satisfaction in a New Zealand banking . A total of 300 individualized questionnaires were distributed by mail to a systematic random sample of customers of a major New Zealand retail bank with internet banking services as well as branches. The researcher empirically test the relationships between three broad conceptual categories related to internet banking service quality, these categories are: Online customer service quality; online information system quality; banking service product quality. Second, we examine the relationship between overall internet banking service quality and customer satisfaction. The data analysis involved model estimation using the soft-modeling SEM methodology partial least squares method. Convergent validity of the measurement model was assessed by three measures: item reliability, construct (composite)

reliability, and average variance extracted (AVE). Discriminant validity was also assessed using cross-loadings of the constructs and the by comparing the square root of the AVE for each construct with the correlation between the construct and other constructs in the model. The results show that online customer service quality and online information system quality are significantly and positively related to overall internet banking service quality. Although banking service product quality does not have a significant relationship with overall internet banking service quality. The structural model results also show a significant and positive relationship between perceptions of overall internet banking service quality and customer satisfaction.

Zhao et. al. (2010)<sup>163</sup> investigates the roles of trust and perceived risk on consumers' Internet Banking Services (IBS) usage intention. This research was undertaken in two stages combining quantitative and qualitative approaches. A convenience sample of Chinese university students was considered appropriate. In this study, the overall perceived risk was measured on a multidimensional scale covering security, performance, privacy and finance concerns. An exploratory factor analysis (EFA) was applied to the 13 risk variables to reveal the underlying dimensions of perceived risk. Three factors were identified. The first factor contains finance and privacy risk and is concerned with a loss of either money and/or personal details. It can thus be interpreted as 'control risk'. The second factor is concerned with specific security and performance risks and is named 'system risk'. The last factor comprises just two variables that relate to general functionality risks of IBS use and is thus called 'functionality risk'.



The Structure Equation Modeling (SEM) approach was adapted to validate the proposed structural framework. Results indicate that perceived risk has a significant negative effect on behavioral intention to adopt IBS. The results indicate that trust in the bank has a significant positive influence on the trust in its competence in operating IBS.

Hamid C. (2010)<sup>63</sup> investigates the impact of quality of online banking on customer satisfaction. Three data collections were made of the online banking users in Morocco. The first was conducted using an online survey. To measure satisfaction, they chose to assess the cumulative satisfaction as overall assessment from a set of experiments. Confirmatory factor analysis is used in order to construct mode for service quality of online banking and its relationship with satisfaction and commitment. Three hypotheses were constituted for establishing the impact of perceived quality on satisfaction and commitment. Different index show that the model is acceptable and present good fit. In the context of Internet banking, the results indicate that satisfaction does not mediate the influence of perceived quality on commitment. The predictive power of perceived quality on commitment is less when it is mediated by satisfaction. The causal chain perceived quality to satisfaction and satisfaction to commitment is not validated. The perceived quality directly influences the commitment of users to Internet banking.

Zaribaf and Fakharian (2010)<sup>158</sup> proposed a modified SERVQUAL instrument for assessing the impact of services quality on customers'

satisfaction in 4 and 5 stars hotels in the area of Mashhad, Iran. A sample of 267 respondents collected using the questionnaire that consists of seven dimensions: Assurance, Empathy, Responsiveness, Reliability, Tangibles, Overall service quality, and Satisfaction. SEM investigated the effect of SERVQUAL dimensions as independent variables on overall service quality and customer satisfaction separately as dependent variables. It also examined effect of overall service quality as independent variable on customer satisfaction in 4 and 5 stars hotels. Structural equation modeling showed all the five dimensions play a significant role in overall service quality, which in turn affects customers/tourists' satisfaction. Further, overall service quality describes 88 percent of change in customer satisfaction which means more the service quality; the more will be the customer satisfaction.

Kumbhar (2011)<sup>86</sup> studied the relationship between perceived service quality, brand perception and perceived value with satisfaction in e-banking. Using judgmental sampling method, 190 usable questionnaires were obtained from a survey on customers of public and private sector banks in Satara city of Maharashtra. Structural equation modeling was employed to determine the causal relationship between service quality, brand perception, perceived value and customer satisfaction. In the model all 14 variables were found significant and good predictors of overall satisfaction in e-banking services. However, SEM analysis found that data supports to eBankQual model and dimensions Compensation, Convenience, Contact Facilities, Easy to Use, Responsiveness, Cost Effectiveness

and System Availability including brand perception and perceived value were important factors in the eBankQual model. Study suggests that e-banking service designers and policy makers should concentrate their efforts to enhance these facilities in e-banking.

Suleiman et. al. (2012)<sup>147</sup> examined the causal relationships between four antecedents of customer loyalty in the electronic banking in university of Northern Malaysia. This study identified four dimension : Customer Satisfaction, Reliability, Responsiveness and Empathy. Data was analyzed using the structural equation modeling (SEM). Three exogenous variables: reliability, responsiveness and empathy and two endogenous variables: satisfaction and loyalty were used. It showed that responsiveness, satisfaction and reliability are direct predictors of customer loyalty while reliability and responsiveness are antecedents of customer satisfaction. Empathy showed a negative direct relationship to loyalty which means special individual attention is not a factor for customer loyalty to bank services. The revised model accomplished model fit and supports three direct effects. Reliability is a significant positive antecedent of customer satisfaction via loyalty, then responsiveness to loyalty, satisfaction to loyalty.

Konuk, F., & Konuk, F. (2012)<sup>84</sup> explored the relationship between customers' service quality, economic and switching costs and behavioral intentions in retail banking context. A conceptual model based on literature review was proposed and structural equation modeling technique was applied to the data. Measurement model is evaluated in terms of validity and reliability by using confirmatory

factor analysis. A cross-sectional survey design was used to collect data in Sakarya situated in Turkey. Using convenience sampling technique, sample of 397 retail banking customers was obtained. Findings revealed that service quality, economic and switching costs are antecedents of loyalty and word-of-mouth intentions in retail banking context. Service quality has positive effect on economic and switching costs and these costs have positive effect on both loyalty and word-of-mouth intentions. Study identifies positive relationship between service quality, loyalty and word-of-mouth intentions whereas negative relationship exists between economic costs and switching costs and behavioral intentions. In addition, the model explained 18% of the variance in economic costs, 29% in switching costs, 45% in loyalty and 37% in word-of-mouth intentions.

#### ***4.6 Mobile Banking Service Quality and its Comparison***

Over the last few years, the mobile and wireless market has been one of the fastest growing markets in the world and it is still growing at a rapid pace.

Mallat et al. (2004)<sup>103</sup> study mobile banking services and its types in European context. For mobile banking services different solutions should be developed for different services, depending on the size of the payment (micro or macro) and location (remote or local, manned or unmanned). There are several possible trends where different services are offered by different key players, mainly still by banks, the mobile operators, and credit card companies. Mallat et. al.(2004)<sup>103</sup> also suggested three solutions, first, that financial institutions and

operators can cooperate and provide mobile services together by dividing the responsibilities according to their core competencies. Second, operators act alone and develop solutions such as separate accounts or their own clearinghouse or credit institution where banks are not involved. Third, it is possible that banks develop payment solutions where operators are not involved. Bank-based solutions may emerge especially in POS and Internet payments and when the mobile network is used as a data carrier only.

Laforet and li (2005)<sup>90</sup> investigate the market status for online/mobile banking in China. A total 300 respondents from six major cities of China using survey method. The items in the questionnaire were constructed based on the consumer attitude and adoption of electronic banking literature. Attitudes of users and non-users of online and mobile banking were compared with respect to five most common attributes identified for these services. From the t-test significant association was detected for the factors, except for confidential and security. With regard to consumers' attitudes to online and mobile banking, perceived risks were found most important factor that encouraged or discouraged Chinese adoption of online/mobile banking.

Bigne, Ruiz and Sanz (2007)<sup>20</sup> study the key drivers of the use of mobile commerce among the Spanish mobile users. The key drivers are Age, attitude towards mobile commerce; previous internet shopping experience is the main predictors of mobile commerce.

Laukkanen and Pasanen (2008)<sup>91</sup> aims to study how mobile banking innovators and early adopters differ from other users of online banking services. An internet survey was conducted among customers of a large Scandinavian bank in Finland. The results indicate that only age and gender differentiate these two groups of customers, while education, income, occupation and size of the household are not able to differentiate mobile banking innovators and early adopters.

Kim and Garrison (2009)<sup>80</sup> developed a model, referred to as the Mobile Wireless Technology Acceptance Model (MWTAM) which test the relationship between theoretical constructs spanning technological influence processes (Perceived Ubiquity, and Perceived Reachability) and cognitive influence processes (Job Relevance, Perceived Usefulness, and Perceived Ease of Use) and their impact on Behavioral Intention. Results provide evidence to support that MWTAM as both the technological and cognitive influence processes accounted for individual's Behavioral Intention toward using mobile wireless technology.

Yang (2009)<sup>156</sup> identified Factors associated with adopting and resisting mobile banking technologies were investigated among university students in Taiwan. Adoption factors included the belief that mobile banking helps fulfill personal banking needs, provides location-free conveniences, and is cost effective. Findings show that mobile banking adoption is encouraged by the speed of transactions and special reductions in transaction service fees, including; rapid transaction reply speed, advantageous transaction reply fees, practical

banking services, and reduced banking transaction fees affects the adoption of mobile banking among the university students in Taiwan.

Lewis, Palmer and Mol (2010)<sup>96</sup> investigated the barriers for adopting mobile banking services among young people resident in Germany. The structure equation modeling (SEM) approach was applied as it tests hypothesized causal relationships among multiple variables simultaneously. The results suggests men were significantly more likely to use m-banking than women. Also they find that compatibility, perceived usefulness, and risk are significant indicators for the adoption of m-banking services. Compatibility not only had a strong direct effect but was also identified as an important antecedent for perceived ease of use, perceived usefulness and credibility. Trust and credibility are crucial in reducing the overall perceived risk of m-banking.

Laukkanen and Kiviniemi (2010)<sup>92</sup> investigated the effect of information and guidance offered by a bank on five adoption barriers – usage, value, risk, tradition, and image – in a mobile banking context in Finland. A questionnaire that was based on the theory of innovation resistance and the existing literature on internet and mobile banking was placed in the log-out page of the bank's online service. The measurement items were validated by measurement model using SEM and then test the hypothesized relationship using structure equation model. The results suggest that the information and guidance offered by a bank has the most significant effect on perceived functional usability of the innovation but also significantly increases

the positive image associated with the innovation. The results also suggest that information and guidance significantly increase the perceived value added provided by mobile banking and decrease the perceived risks related to the innovation.

Riquelme and Rios (2010)<sup>132</sup> test the factors that can influence adoption of mobile banking among current users of internet banking in Singapore and gender as a moderating variable. The results suggest that Ease of use has a stronger influence on female respondents than male, whereas relative advantage has a stronger effect on perception of usefulness on male respondents. Social norms (or the importance of others in the decision), also influence adoption more strongly among female respondents than male in Singapore.

Cruz and Laukkanen (2010)<sup>43</sup> investigate the perceived obstacles to the adoption of mobile banking services among Brazilian internet users and search for patterns according to socio-demographics variables. The results indicate that the majority of respondents do not use any kind of mobile banking service. Perception of cost, risk, low perceived relative advantage and complexity were revealed to be the main reasons behind the reluctance to use the service.

Mishra et. al.(2010)<sup>106</sup> proposed two structural equation models (SEMs), one for public and another for private sector banks in India, to show the relationship between customer satisfaction on bank services and the attributes of the perceived service quality. Using structured questionnaire, a usable sample of 387 customers was obtained which includes 242 from public banks and 145 from private



banks. For SEM, Exogenous latent variables are measured by the 22 perceived service quality attributes of SERVQUAL and the observed variable 'customer satisfaction' is measured by the gap indicators of perceptions and expectations. Using EFA, four latent variables ('Responsiveness and Empathy', 'Reliability and Tangibility', 'Assurance' and 'Reliability') for public sector banks and six latent variables (Reliability / Assurance, Responsiveness / Empathy, Tangibility, Empathy, Reliability / Responsiveness and Assurance / Empathy) for private sector banks were identified. Study observed that the degree of customer satisfaction is best explained by factor Responsiveness / Empathy in public sector banks, while in case of private banks, by Assurance / Empathy factor.

Alsheikh and Bojei, (2012)<sup>6</sup> the value held by bank customers toward the use of mobile banking services. Also propose a new model to establish a better understanding of mobile banking usage based on perception value using benefit factors (performance expectancy and effort expectancy) in conjunction with sacrifice factors (cost and risk). Improving customer usage rate of m-banking would have the effects of expanding the information and telecommunications sector along with the financial services industry. Hence, this paper may enable banks to develop a marketing strategic plan based on perceived value from the customer's point of view.

Lin (2012)<sup>98</sup> investigated mobile banking service for customers. The study lists three measurement dimensions: system quality, information quality and service quality. Mobile banking service quality assessment

requires analysis of the full interface design. In the mobile network environment, the system quality is a very important factor to assess the extent of the message system resources, message quality is the quality of the system output messages, rather than the system itself quality. The DEMATEL and ANP framework of mobile banking innovation service is constructed to measure the criteria for decision selection and achieve effective problem-solving. DEMATEL is widely applied in market strategies, R&D projects, e-learning evaluations, management systems, control systems, and flight safety. The ANP approach provides a network structure that represents a real decision problem, and the relative importance or strength of each effect on a given element is measured by a ratio scale. The two approaches provide a decision model and the result of the priority for consumers' inclination first is "willing to use", second is "do not exclude to use", and third is "unwilling to use".

Lin and Shin (2013)<sup>97</sup> study aimed to promote the use of mobile transaction services and identify thirteen service items affecting mobile banking transactions, functional programs, and accessibility programs. The designed questionnaire using ANP (the Analytic Network Process) proposed by the experts having five years of experience are from the financial industry and academics. Suggestions were proposed for functional programs that could be provided to the banking industry as a basis for decision-making regarding service systems and service quality enhancement, thus further boosting user confidence in the transaction platforms of mobile banking systems.

Adewoye (2013)<sup>1</sup> studies the Impact of mobile banking on service delivery in the Nigerian commercial banks at Lagos stage. The data collected was analyzed using frequency table, percentage and mean score analysis while the non-parametric statistical test Chi- square was used to test the formulated hypothesis to examine the impact of mobile banking on service delivery and also look at the relationship between mobile banking and service delivery in the sampled banks. The findings suggests that mobile banking improve banks service delivery in a form of transactional convenience, savings of time, quick transaction alert and save of service cost which has recuperate customer's relationship and satisfaction. Thus the banks management should create awareness to inform the public about the benefits derived on the e-banking service products, collaboration among banks should perfectly maintain, skilled manpower and computer wizard should be employed by every bank, in order to prevent fraudulent personal and hackers from manipulating the banks data and stealing money from the Banks accounts.

#### **4.7 Research Gap**

Mobile banking services foster strong relationship between the banks and its customers. Mobile banking helps to improve the overall service quality provided by the banks as the customers of the banks can perform transaction at their convenience.

Although there is a lot of research made on the evaluation of traditional banking services quality (Parsuraman, Zeithmal and Berry ,(1985)<sup>115</sup>,(1988)<sup>121</sup>,(1994)<sup>122</sup>; Cronin and Taylor,(1992)<sup>40</sup>;

Johnston,(1995)<sup>73</sup>; Gerrard and Cunningham ,(2000)<sup>55</sup>; Safakli,(2007)<sup>135</sup>; Ladhari ,(2009)<sup>89</sup>, technology enabled service quality(Parsuraman et. al.,(2000)<sup>120</sup>; Zeithaml ,(2002)<sup>159</sup>; Santos,(2003)<sup>136</sup>; Parsuraman, Zeithaml and Malhotra, (2005)<sup>119</sup>; Ombati et. al, (2010)<sup>111</sup>, internet banking services quality(Wang Y.S ,(2003)<sup>154</sup>; Jayawardhena,(2004)<sup>69</sup>; Loonam et. al.,(2008)<sup>99</sup>; Migdadi,(2008)<sup>105</sup>; Khan and Mahapatra,(2009)<sup>79</sup>; Ahangar ,(2011)<sup>2</sup>, internet banking service quality using structured equation modeling(Rod et. al.,(2008)<sup>134</sup>; Zhao et. al.,(2010)<sup>162</sup>; Hamid ,(2010)<sup>63</sup>; Kumbhar,(2011)<sup>86</sup>; Suleiman et. al.,(2012)<sup>147</sup>; Konuk, & Konuk, (2012)<sup>84</sup>, adoption of mobile banking (Laforet and li,(2005)<sup>90</sup>; Laukkanen and Pasanen,(2008)<sup>91</sup>; Kim and Garrison,(2009)<sup>80</sup>; Yang,(2009)<sup>156</sup>; Riquelme & Rios,(2010)<sup>133</sup> ; Cruz and Laukkanen ,(2010)<sup>43</sup>).

Most of the previous academic research is focused mainly on traditional banking services quality; technology enabled service quality; internet banking services quality; internet banking service quality using structured equation; adoption of mobile banking.

Most of the research on mobile banking is based on adoption of mobile banking. Only few researches are done on mobile banking service quality provided by the banks.

Moreover, the researcher believes that the research results of previous studies on service quality of mobile banking cannot be entirely applied to Indore district, because the Indore's Mobile banking environment is competitive and unique. As a consequence, it is

valuable to conduct research specifically in Indore district of Madhya Pradesh and this is a significant motivation to the researcher. Further, as far as the comparison of mobile banking service quality is concerned, no literature was found on comparison of public and private sector banks with respect to the service quality of mobile banking in Indian context.

Considering the gap in literature, the researcher intends to compare the mobile banking service quality offered by public and private sector banks of Indore district of Madhya Pradesh.

#### ***4.8 Research Questions and Objectives***

The purpose of this research is to compare mobile banking service quality of public and private sector banks. Based on the literature review and the research gap, the main research question arises as:

**Is there any difference between mobile banking service quality of public and private sector banks in Indore?**

The following supporting research questions emerged to answer the overall research question.

1. Is there any difference between demographic information of mobile banking users of public and private sector banks in Indore?
2. What are the preferred mobile banking services by the customer of public and private sector bank in Indore?
3. How to measure mobile banking service quality provided by the public and private sector banks in Indore?

4. What are the important mobile banking service quality dimensions for public and private sector bank in Indore?
5. Is there an association between mobile banking service quality dimensions and mobile banking user's satisfaction?
6. Is there any comparison between mobile banking service quality and satisfaction for public and private sector banks in Indore?

Based on the literature review and research questions the main objective of this study is:

**To compare mobile banking service quality of public and private sector banks in Indore.**

The researcher sets the goal of investigating the present status of mobile banking by comparing the mobile banking service quality for public and private sector banks operating in Indore district of Madhya Pradesh and to provide recommendations for the banks. So, based on mobile banking service quality, there are seven research objectives built especially for Indore perspective:

1. To profile mobile banking customer of private and public sector banks of Indore using demographic, socio-economic factors.
2. To examine customer's preference for mobile banking service provider among public and private sector banks in Indore.
3. To examine preferred mobile banking services by the customer of public and private sector banks in Indore.
4. To develop an instrument to measure the mobile banking service quality.

5. To identify service quality dimensions of mobile banking of public and private sector banks in Indore.
6. To develop and confirm a measurement model for service quality of mobile banking for public and private sector banks in Indore.
7. To compare service quality dimensions of mobile banking of public and private sector banks in Indore.

These seven objectives presented above are essentially related to study mobile banking service quality status in Indore district of Madhya Pradesh. Through accomplishing those objectives, the researcher also looked at future trends and defined the requirements of the mobile banking services most suitable for the users of Indore district of Madhya Pradesh.

The first research objective will be answered by using demographic statistics. The second and third research objectives will be answered by using preferred mobile banking services statistics. The fourth research objective will be answered by developing a measurement scale suitable for measuring mobile banking service quality for public and private sector banks situated in Indore. The fifth research objective will be answered by applying factor analysis and confirmatory factor analysis for developing model for public and private sector banks. The sixth and seventh research objective will be answered by developing a structured model and testing the hypotheses using structured equation modeling.

# *CHAPTER - 5*

## **RESEARCH METHODOLOGY**

- 5.1 Overview of Methodology and Research Process*
- 5.2 The Research Design*
- 5.3 Sample and Data Collection*
- 5.4 Methods for Data Analysis*
- 5.5 Scale Development*



### ***5.1 Overview of Methodology and Research Process***

The philosophical stance of the researcher is explored which clarify the reasons for the choice of methodology used in this research. Therefore, the main purpose of this part is to present the research methodology and methods used in this study in order to answer the research questions and to achieve the research objectives. To answer the research questions, a measurement scale is created to measure mobile banking service quality of public and private sector banks in Indore district of Madhya Pradesh and this developed scale is used to measure and compare mobile banking service quality of public sector bank and private sector banks in Indore using Structured Equation Modeling. The process used to develop the measurement scale and the techniques used to collect and analyze the data will be discussed in detail. This part begins with the elements of the research process which include the epistemology, theoretical perspective, the methodology and methods used in the research. Subsequently, the section explains the methods used for data collection and analysis. The first step for the research is to develop measurement scale for measuring mobile banking service quality.

Phase one of the study is conducted and after factor analysis the reduced variables of the modified mobile banking service quality scale was used for final data collection in the main study. Here, it should be emphasized that the main method of data collection is through questionnaire. This is followed by a discussion on the validity

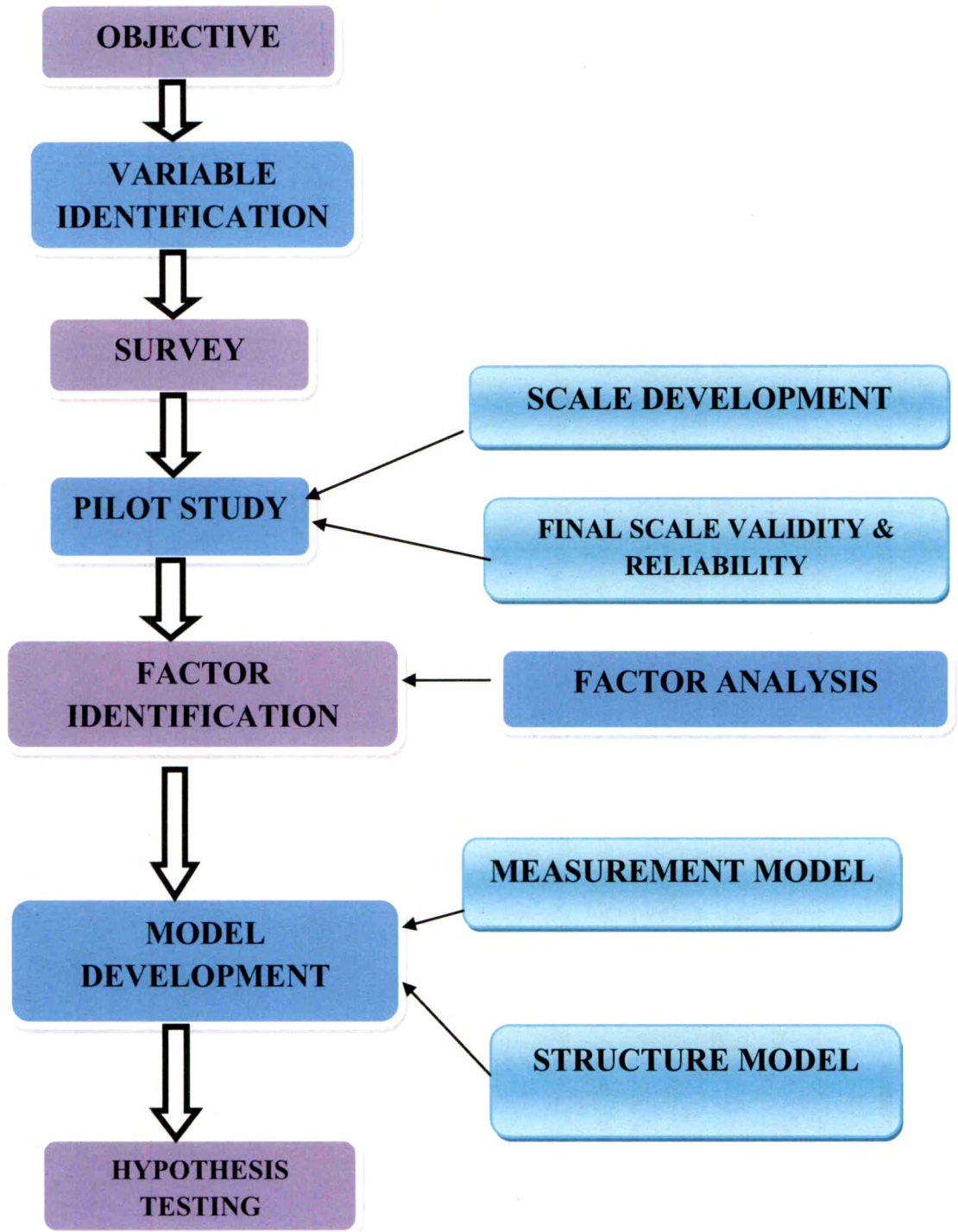
and reliability of the scale where a scale's validity is especially important when a scale is being developed.

The choice of research design depends on the objectives of the research in order to be able to answer the research questions (Crotty, 1998)<sup>42</sup>. There are four elements of research process epistemology, theoretical perspective, methodology and methods.

The first level (figure 5.1) shows that the researcher of this study follows an objective epistemology, a positivist approach and used surveys for data collection. The second level shows that the survey is conducted in three steps first pilot study, factor identification and model building. The third level explains detail steps taken for pilot study, factor analysis and structure equation modeling using hypothesis testing.

In this study the researcher follows an objective epistemology, a positivist approach and a deductive logic. Epistemology provides the researcher with a philosophical stance upon which the researcher builds the methodology that is used in his/her research (Crotty, (1998)<sup>42</sup>; Creswell, (2009)<sup>39</sup>). Epistemology can be viewed as a continuum with objectivism at one end and subjectivism at the other (Johnson and Duberley, 2000)<sup>71</sup>. Objectivism assumes that the researcher and the area being researched are independent and this

**Figure 5.1: Mobile Banking Service Quality Research Process for Public and Private sector Banks.**



means that the researcher has the capability to study the area of research independently without being influenced by his own views (Johnson and Duberley, 2000)<sup>71</sup>.

Researchers that follow an objective epistemology are mainly concerned with a positivist approach which was historically used for natural sciences such as biology and physics and later adopted by social science (Crotty, 1998)<sup>42</sup>. There are two major philosophies, the positivist and the interpretivist (Collis and Hussey, 2003)<sup>36</sup> with interpretivist seen as a direct contrast to positivism (Bryman and Bell, 2007)<sup>25</sup>. The positivist approach has an objective epistemology that usually follows deductive logic and uses a quantitative method reliant on hypothesis testing for generalizations from the sample of the population. The samples tend to be large to allow for generalizations and usually surveys are used that produce findings with high reliability and low validity (Collis and Hussey, 2003)<sup>36</sup>. It is believed that Francis Bacon the sixteenth century philosopher is the founder of positivism (Crotty, 1998)<sup>42</sup>, however many attribute positivism to Auguste Comte the father of sociology which is debatable (Crotty, (1998)<sup>42</sup>; Blaikie, (2007)<sup>22</sup>). Positivism is also associated with empirical science and assumes that scientific knowledge is objective, accurate and certain (Crotty, 1998)<sup>42</sup>.

There are eight main features of positivism (Hussey and Hussey, 1997)<sup>67</sup>: First, a quantitative method is usually used, although it is possible to use qualitative methods. Second, large samples are usually used in order to generalize the findings. Third, hypotheses are tested;

a hypothesis is usually tested by statistical analysis and a decision is made to reject or accept the null hypothesis. Fourth, data is specific; researchers attempt to measure the data and reach conclusions. Fifth, location; investigations of the problem are not usually conducted in the field. Sixth, reliability; concerned with the repetition of the test, if the test is repeated will the same results be obtained? Seventh, validity; do the findings represent the real situation? Eighth, generalization is made from the samples; here confidence tests may be used to suggest that the researcher is 95% - 99% confident that the sample represents the population.

Deductive logic places emphasis on arguing from the general to the particular (Plano Clark and Creswell, 2008)<sup>124</sup>. According to Bryman and Bell (2007)<sup>25</sup> the deduction process is as follow: theory, hypothesis, data collection, findings, hypothesis confirmation or rejection and revision of theory.

Hence this study follows an objective epistemology, a positivist approach and a deductive logic because it has used a scale to gather information from a large sample to be analyzed and then generalized through hypothesis.

The positivist approach is the approach used by many researchers in service quality and is predominately used because of the complex nature of service quality (Schembri and Sandberg, 2002)<sup>141</sup>. Parasuraman, Zeithaml and Berry (1998)<sup>118</sup> who originally developed the SERVQUAL scale, used a positivist approach to measure service quality. Additionally Dabholkar, Thorpe and Rentz, (1996)<sup>45</sup>

developed the RSQS scale using a positivist approach. Ladhari (2008)<sup>88</sup> researched 30 industry specific scales and reported that all of the studies used a positivist approach.

## **5.2 The Research Design**

The study is based on empirical research, conducted to compare service quality of mobile banking of public and private sector banks located in Indore. The nature of study is exploratory as well as descriptive and the time horizon of the study is cross sectional.

Based on the objectives of this study, a quantitative method has been used for the development of the mobile banking service quality scale. Quantitative approach is used to test an objective theory which is done by collecting numerical data and analyze it statistically. In general, there are two types of quantitative research methods (Creswell, 2007)<sup>38</sup>: survey and experiment.

This study has used survey method where the data is collected by using a questionnaire to discover the opinion of a population, based on sample of the population.

Factor analysis and Structure Equation model is applied to explore the dimension and their association with satisfaction in case of mobile banking service quality of public and private sector banks.

The next stage of the research is to identify service quality dimensions of mobile banking. During this stage, the researcher collected final data by means of a structured questionnaire finalized in the previous stage. The final questionnaire is operationalised on a sample of 478

mobile banking users of various public and private sector banks of Indore. Out of 478 responses, 24 invalid questionnaires were eliminated and 454 questionnaires retained for the analysis. Thus the response rate is 95.7%.

In order to meet the fourth, fifth and sixth objective, the researcher split the final data into two samples, sample-I (n=200) and sample-II (n=254). Sample-I is used to meet fourth objective by applying exploratory factor analysis. Exploratory factor analysis is used to identify the (factors) dimensions related to mobile banking service quality on sample-I using Principal component analysis method using SPSS package. Sample-II is used to fulfill the fifth and sixth objective using structure equation modeling using AMOS software. Structure equation modeling is applied in two stages, Confirmatory factor analysis and structure model. During confirmatory factor analysis the measurement model is proposed in order to evaluate the goodness of fit, construct reliability and validity of the measurement instrument. In order to meet the sixth objective structure equation modeling is applied on Sample II in order to compare service quality dimensions of mobile banking of public and private sector banks in Indore.

**Survey:** Surveys usually record the perception of respondents about opinion, attitude or belief and it is a way of understanding consumer preferences Black, (1993)<sup>21</sup>; Fowler, (2002)<sup>51</sup>. Surveys are an inexpensive and efficient way of gathering information about the population or a sample of it (Hague, 2002)<sup>59</sup>.

The researcher has used likert scale which a popular method of collecting data for survey. Likert scales are a dominant method used for measuring service quality. The researcher has used likert scales to measure mobile banking service quality and satisfaction which require respondents to choose a statement from a number of options that range from 'strongly disagree' to 'strongly agree'. Moreover, the questionnaire is organized in a way that places similar questions of same category at different places to avoid biasness of the respondent. The researcher used a likert scale that adopted a seven point scale for his study; instead of a five point likert scale because seven point scales increases the level of respondents, and increases the rate and quality of the responses (Buttle, (1996)<sup>27</sup>; Prayag, (2007)<sup>127</sup>).

**Pilot Study:** According to Zikmund *et al.* (2010)<sup>165</sup> a pilot study is a small scale research project that collects data from respondents similar to those that will be used in the full study. Pilot studies are conducted to uncover any weaknesses in the design of the scale and it should follow the same method of data collection as the main study (Cooper & Schindler, 2008)<sup>37</sup>. The size of the sample in the pilot study could range from 25 to 100 (Cooper and Schindler, 2008)<sup>37</sup>. The pilot study is important because it provides confirmation that the procedures used are suitable helps to refine the survey questions and makes sure that the survey used in the main study is appropriate (Zikmund *et al.*, 2010)<sup>165</sup>. The main purpose of pilot study in our research is to validate the measurement instrument to be used in the main study. Hence the researcher used a pilot study before conducting the main study. According to Zeithaml *et al.* (1996)<sup>162</sup> “the only criteria that count in



evaluating service quality are defined by customers. Only customers judge quality; all other judgments are essentially irrelevant". Therefore, 105 undergraduate and graduate college students of Devi Ahilya University with sufficient exposure to computers were considered to participate in our pilot study. The college students as young adults are the most active web users consume more entertainment and media and conduct more personal businesses online than the overall web audience. Second, the population of college students is younger and better educated than the population of the conventional customer . Gefen et al. (2003)<sup>54</sup> also contend that students are the most innovative users of technology. Using a homogenous population like college students can decrease the effect of variance when not exposed to all factors (structure, roles, and responsibilities) of the real world environment (Legris et al. 2003)<sup>94</sup>.

### ***5.3 Sample and Data Collection***

The primary data has been collected by means of structured questionnaire in two ways i.e. personally and through e-mail. A sample is taken from the target population being researched. If the sample is adequate it will have the same characteristics of the population (Zikmund, 2003)<sup>166</sup> and the findings are usually used to make conclusions about the population (Field, 2009)<sup>49</sup>. In this study the final questionnaire was operationalised on a sample of 454 mobile banking users of public and private sector banks of Indore during the month of December, 2011 to March, 2012. Out of 478 responses, 24 invalid questionnaires were eliminated and 454 questionnaires were

retained for final analysis. The response rate is 95.7%. The larger the sample is, the more likely that the generalizations are an accurate reflection of the population (Saunders, Lewis & Thornhill, 2009)<sup>140</sup>. Sample sizes depend on factors such as the time and money available to collect the data (Hair, 2006)<sup>61</sup>; they also depend on the statistical analysis used in the study (Saunders, Lewis & Thornhill, 2009)<sup>138</sup>. According to Hair (2006)<sup>61</sup>, small or very large samples have a negative impact on the statistical tests because either the sample is either not big enough to make generalizations or too big to reach any conclusions. Hair (2006)<sup>61</sup> suggested that a sample size larger than 100 is needed for factor analysis and as a general rule of thumb the observations should be 3 times the number of variables. The number of variables in this study before factor analysis is 39 questions and sample size is 454 which satisfy Hair (2006)<sup>61</sup> condition.

All the mobile banking users of Indore district are population of the study. As it was difficult to identify sample frame i.e. total number of mobile banking users in Indore district, hence non-probabilistic convenient sampling method was used for the purpose of sampling. To some extent snowball sampling technique was also used. Snowball sampling is a non probabilistic sampling technique where existing study subjects recruits future subjects from among their acquaintance. Thus the sample group appears to grow like a rolling snowball. As the sample builds up enough data is gathered to be used for research. Snow ball sampling technique is often used in hidden population, as in this study, which is difficult for researcher to access.

#### **5.4 Methods for Data Analysis**

The study has applied factor analysis and structured equation model for the purpose of analyzing the data.

##### **5.4.1 Factor Analysis**

One of the major uses of factor analysis is to summarize the data to be more manageable without losing any of the important information therefore making it easier to test theories Field, (2009)<sup>49</sup>; Johnson and Wichern, (2002)<sup>72</sup>; Tabacnick and Fidell, (2007)<sup>151</sup>. There are three main reasons for using factor analysis (Field, 2009)<sup>49</sup>: to develop a scale to measure an underlying theme such as mobile banking service quality, to reduce the variables to a manageable size and to have a better understanding of the variables.

According to Cooper and Schindler (2008)<sup>37</sup> factor analysis is a technique used for specific computational techniques. These factors, also called latent variables, aim to measure things that are usually hard to measure directly, such as attitudes and feelings (Field, 2009)<sup>49</sup>. This is a way to explain the relationships among variables by combining them into smaller factors (Coakes and Steed, (2001)<sup>34</sup>; Zikmund, (2003)<sup>166</sup>. The scales usually start with many questions, and then by using factor analysis are reduced to a smaller number (Pallant, 2007)<sup>114</sup>. These reduced results are then used for checking reliability and validity of the scale and building measurement model using confirmatory factor analysis. The structured equation modeling is used for testing model fit and causal relationship between various latent variables.

There are two methods of factor analysis observed by Kinnear and Gray (2010)<sup>81</sup>, the exploratory factor analysis and the confirmatory factor analysis. The purpose of the exploratory factor analysis is to find the number of factors that explain the correlations; while in the confirmatory factor analysis the researcher predicts the number of factors with specific loading (Kinnear and Gray 2010)<sup>81</sup>. Another important point to consider when performing factor analysis is factor loadings. Factor loadings are the correlation of the variable with the factor. When the loading is clear then the interpretations of the factors become easier (Zikmund *et al.*, 2010)<sup>165</sup>. Some variables have a loading or correlation with more than one factor. The mathematical technique for simplifying the results of the factor analysis results is called factor rotation (Zikmund *et al.*, 2010)<sup>165</sup>.

The most common method of factor analysis is the principal component (Cooper and Schindler, (2008)<sup>37</sup>; Kinnear and Gray, (2010)<sup>81</sup>) and the most common method of factor rotation is the varimax rotation (Kinnear and Gray, (2010)<sup>81</sup>; Zikmund *et al.*, (2010)<sup>163</sup>. Principal component technique looks at the correlation of different variables to reveal the relationship between them, and then reduces the variables by empirically summarizing them or combining them into a small number of factors under common themes (Tabacnick and Fidell, 2007)<sup>152</sup>. Factor rotation is used as a method to interpret the factors by showing the variables that group together (Pallant, 2007)<sup>114</sup>. Two tests are performed to ensure that the data is suitable for factor analysis, the Kaiser-Meyer-Olkin (KMO) measure for sampling adequacy and the Bartlett's test of sphericity (Pallant,

2007)<sup>114</sup>. The KMO value is low if it is between 0.5 and 0.7 and excellent if it is above 0.90 (Field, 2009)<sup>45</sup>. Factors with an eigen value of 1 or greater are usually retained (Field, 2009)<sup>45</sup>.

Exploratory factor analysis using principal component analysis with varimax rotation is applied for identifying important mobile banking service quality dimensions for public and private sector bank in Indore. Confirmatory factor analysis is also applied to develop mobile banking service quality model for public and private sector banks.

#### ***5.4.2 Structural Equation Modeling***

Structural equation modeling (SEM) is a series of statistical methods that allow complex relationships between one or more independent variables and one or more dependent variables.

Structural equation modeling (SEM) provides simultaneous tests of measurement reliability and structural relations and overcome some of the limitations of traditional statistical techniques (Smith, 2004)<sup>146</sup>. Structural equation models (SEM) are the most powerful instruments for path analysis in marketing and consumer research (William and Tang, 2003)<sup>156</sup>. According to (Malhotra & Satyabhushan, 2011)<sup>95</sup> SEM is a procedure for estimating a series of dependencies relationship among a set of concepts or constructs represented by multiple measured variables and incorporate into an integrated model. In SEM through AMOS test model with numerical data obtained from survey. These structural equations are meant to represent causal relationships among the variables in the model. Structural Equation Modeling approach allows the modeling of a phenomenon by

considering both the unobserved “latent” constructs and the observed indicators that describe the phenomenon (Eboli L et al, 2007)<sup>42</sup>. Structural equation models describe relationships between variables. They are similar to combining multiple regression and factor analysis (Bacon, 1997)<sup>9</sup>. SEMs also offer some important, additional benefits over these techniques including an effective way to deal with multicollinearity, and methods for taking into account the unreliability of consumer response data.

The following definitions regarding the types of variables that occur in SEM allow for a more clear explanation of the procedure:

- a. Variables that are not influenced by another other variables in a model are called exogenous variables. Thus independent variables in a model are exogenous variables. As an example, suppose we have two factors that cause changes in GPA, hours studying per week and IQ. Suppose there is no causal relationship between hours studying and IQ. Then both IQ and hours studying would be exogenous variables in the model.
- b. Variables that are influenced by other variables in a model are called endogenous variables. Variables that depend on other variables are called ‘dependent variables’ and dependent variables in a model are endogenous variables. As an example GPA would be a endogenous variable in the previous example in (a).
- c. A variable that is directly observed and measured is called a manifest variable (it is also called an indicator variable in some circles). Observed variables have data, like the numeric responses

to a rating scale item on a questionnaire such as gender or height. Observed variables in SEMs are usually continuous. In the example in (a), all variables can be directly observed and thus qualify as manifest variables. There is a special name for a structural equation model which examines only manifest variables called path analysis.

- d. A variable that is not directly measured is a latent variable, but still we want to know about them. The 'factors' in a factor analysis are latent variables. For example, suppose we were additionally interested in the impact of motivation on GPA. Motivation, as it is an internal, non-observable state, is indirectly assessed by a student's response on a questionnaire, and thus it is a latent variable. Latent variables increase the complexity of a structural equation model because one needs to take into account all of the questionnaire items and measured responses that are used to quantify the 'factor' or latent variable. In this instance, each item on the questionnaire would be a single variable that would either be significantly or insignificantly involved in a linear combination of variables that influence the variation in the latent factor of motivation.
- e. A recursive structural equation model is a model in which causation is directed in one single direction. A non-recursive structural equation model has causation which flows in both directions at some parts of the model.

SEM allows the researcher to build, test and confirm models of complex relationships and then comprises two sub-models: measurement model and structure model.

The researcher followed the two-step procedure of SEM by first, examining scale validity from the measurement model using Confirmatory Factor Analysis (CFA), and second, focusing on testing the proposed hypotheses using the structural model.

A **measurement model** is a part of the entire structural equation model. Measurement model that allows the user to assess how well the observed variables represent the latent, unobservable constructs, they are hypothesized to measure. It is essential to have latent variables in every model. Latent variables are constructed by the measured variables used in the research. It is also used for testing the reliability and validity of the measurement model. Confirmatory factor analysis is a technique used to estimate the measurement model. it seeks to confirm if the number of factors(or constructs) and the loading of observed (indicator) variables on them confirm to what is expected on the basis of theory Confirmatory factor analysis revealed that the measurement items loaded in accordance with the pattern revealed in the exploratory factor analysis.

A **structural model** is a part of the entire structural equation model. A Structural model allows the user to estimate the strength of interrelationships amongst those unobservable or latent constructs. It is used to relate all the variables both latent and manifest. There are a



few important rules to follow when creating a structural model and they will be discussed in the next section. Together, the structural model and the measurement model form the entire structural equation model. This model includes everything that has been measured, observed, or otherwise manipulated in the set of variables examined. The structure model describes the causal relationship between latent and observed variables (measurement model).

In this study structural equation modeling (SEM) using AMOS 18.0 was used to perform the confirmatory factor analysis. A confirmatory factor analysis (CFA) model is specified to identify association among mobile banking service quality dimensions. To observe and evaluate goodness-of-fit, reliability and validity of mobile banking service quality dimensions, a measurement model is build using AMOS 18.0. Measurement model of mobile banking service quality specifies the mobile banking service quality items (identified from literature review) and its dimensions and permits the assessment of construct validity.

Further SEM is also used to explore and compare mobile banking service quality dimensions and mobile banking user's satisfaction for public and private sector banks in Indore.

### ***5.5 Scale Development***

Evidence from past research suggests that using a generic scale to measure service quality across industries is not suitable without modification (Akbaba, (2006)<sup>3</sup>; Caro & Carcia, (2008)<sup>24</sup>; Ladhari,

(2008)<sup>80</sup>); therefore, the more specific the measure is, the more valuable the potential information could be (Karatepe, Yavas and Babakus, (2005)<sup>69</sup>; Ladhari, (2008)<sup>80</sup>). It is common for scales to be modified when measuring service quality, and this has been done by many researchers who felt the need for industry specific measures (Karatepe, Yavas and Babakus, (2005)<sup>76</sup>; Chowdhary and Prakash, (2007)<sup>28</sup>) and culture specific measures (Cui, Lewis and Park, (2003)<sup>40</sup>; Karatepe, Yavas and Babakus, (2005)<sup>76</sup>; Prayag, (2007)<sup>127</sup>). To customise a scale or adapt questions that have already been used in other studies is more efficient than using questions that have not been tested, given that they are adequate for collecting the data needed by the researcher (Saunders, Lewis and Thornhill, 2007)<sup>138</sup>.

The scale can be modified through various ways including interviews (Dabholkar, Thorpe and Rentz, (1996)<sup>45</sup> ; Jabnoun and Khalifa, (2005)<sup>68</sup>; Karatepe, Yavas and Babakus, (2005)<sup>76</sup>; and Caro and Garcia, (2008)<sup>24</sup>, literature review (Akbaba,(2006)<sup>3</sup>; Ladhari, (2008)<sup>87</sup>; Zeithaml, Parasuraman and Malhotra,(2002)<sup>163</sup>; focus group (Khan,(2003)<sup>78</sup>; Aldlaigan et. al,(2002)<sup>4</sup>; Wilkins, (2007)<sup>155</sup> , observations (Dabholkar, Thrope and Rentz ,1996)<sup>45</sup>, brain storming(Jabnoun and Khalifa,2005)<sup>68</sup>, expert views(Akbaba,(2006)<sup>3</sup>; Parasuraman, Zelthaml and Berry, (1985)<sup>115</sup>).

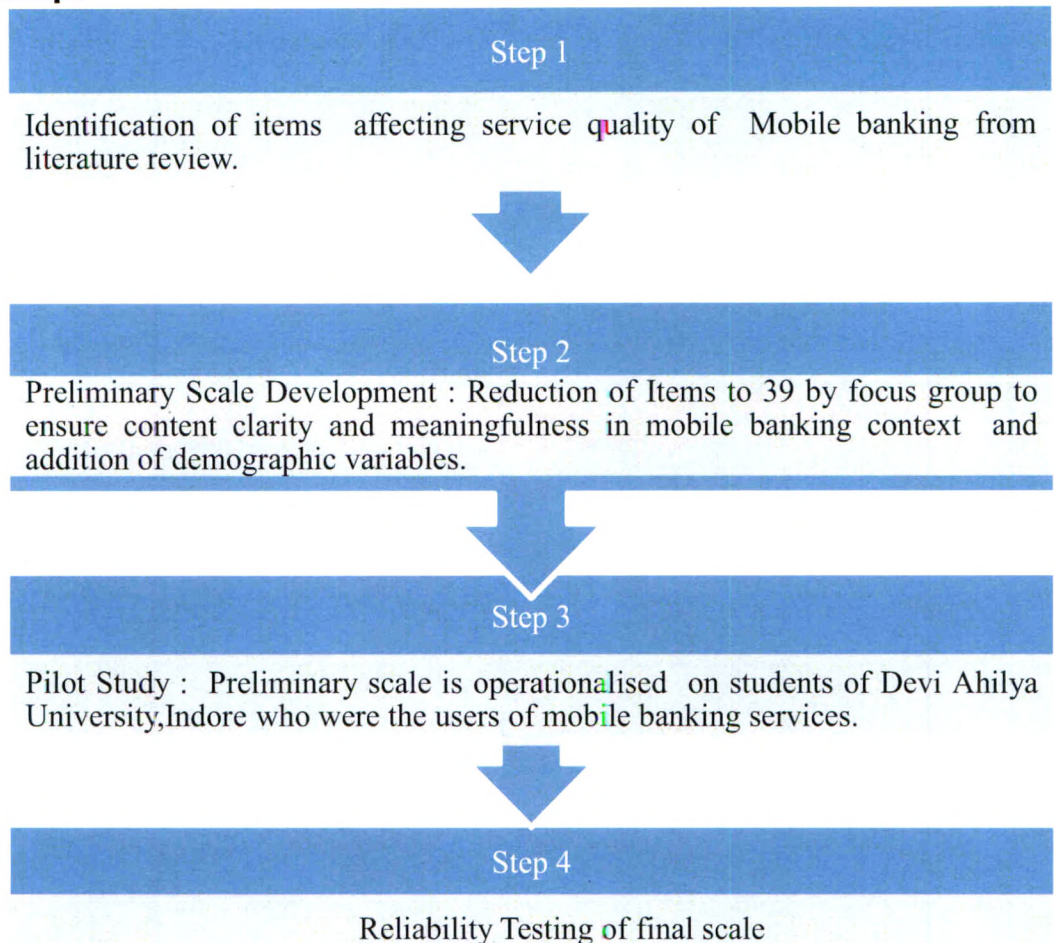
The researcher used literature review combined with focus groups to identify variables / items that affects mobile banking service quality of public and private sector banks in Indore.

The steps taken in (Figure 5.2) this research are summarized below:

**Step 1:** A critical initial step in the scale development is the correct specification of the domain from which items are to be drawn in constructing the scale (Churchill, 1979)<sup>29</sup>. Through, the study is considering a specific technology that is mobile banking, but the items used were adapted from different studies based on technology-enabled service quality because no literature is available on mobile banking studies. During the first stage of scale development the variables included in the research have been adapted from the existing literature available on service quality from different service sector like retail, banking, e-ticketing, online banking service quality. A total of 220 items were identified by the researcher from the literature review. After removing repeated and irrelevant statement 92 items were finalized for the first round.

**Step 2:** During the second stage of scale development, these 80 statements were presented in front of a focus group which constitute of two experts from the banking sector, five academicians from Devi Ahilya University and two mobile banking users who have been using mobile banking for long time. Several items were modified and deleted by focus group to ensure content, clarity and meaningfulness in the mobile banking context. On the basis of insights from the focus groups, a preliminary scale is developed containing 39 items for mobile banking service quality and satisfaction (annexure-I). The preliminary scale consisted of two parts: part A and B. Statements

**Figure 5.2: Mobile Banking Measurement Scale Development Steps**



related to mobile banking Service quality and satisfaction were kept in part A, while part B dealt with demographic information and multiple choice questions related to mobile banking usage by the users of mobile banking services of public and private sector banks. Respondents were asked to state their level of agreement with the series of statements using a seven point likert scale ranging from ‘strongly disagree’ to ‘strongly agree’.

**Step 3:** In order to develop the mobile banking service quality measurement scale pilot study is carried out by the researcher.

Respondents were the students of Devi Ahilya University who were the users of mobile banking services of different banks in Indore. Out of 105 students contacted, 56 gave the response. Five responses were eliminated so 51 responses were usable, resulting in 91.1% response rate.

**Step 4:** The collected data in the pilot study is analyzed using cronbach's alpha test for reliability, correlation matrix and communalities. The researcher removes seven items due to low communalities and high correlation with other items and then confirms thirty two items scale for final data collection for measuring mobile banking service quality of public and private sector banks of Indore. These thirty two items also contains four items for measuring mobile banking satisfaction of the users. The final questionnaire had thirty two items with seven-point likert scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

# **CHAPTER - 6**

## **DATA ANALYSIS, INTERPRETATION AND FINDINGS**

- 6.1 *Demographic profile of Mobile Banking Customer of Private and Public Sector Banks of Indore.*
- 6.2 *Customer's Preference for Mobile Banking Service Provided among Public and Private Sector Banks in Indore.*
- 6.3 *Preferred Mobile Banking Services by the Customer of Public and Private sector banks in Indore.*
- 6.4 *Preliminary Measurement Scale for Mobile Banking Service Quality.*
- 6.5 *Service Quality Dimensions of Mobile Banking Of Public and Private Sector Banks in Indore.*
- 6.6 *A Measurement Model for Service Quality of Mobile Banking for Public and Private Sector Banks in Indore.*
- 6.7 *Comparison of Service Quality Dimensions of Mobile banking of public and private sector banks in Indore.*

**6.1 Demographic Profile of Mobile Banking Customer of Private and Public Sector Banks of Indore.**

Customer of private and public sector banks of Indore are profiled using demographic and socio-economic factors. The descriptive statistics of the demographical variables are shown in table 6.1.

From table 6.1 the overall population (n=454), It is observed that 79.6% mobile banking users are males and 20.4% mobile banking users were females. Public sector mobile banking users 77.2% were male and 22.8 % were females. For private sector 81.6% mobile banking users contribute to male and 18.45% users belongs to females.

It can also be observed that 83.3 % mobile banking users are below 30 years, for public sector 71.5 % users age is below 25 years. Whereas 79.6% mobile banking users of private sector banks belong to age 21 to 30 years. Thus the majority of the users of mobile banking for public and private sector bank users are the young age group users whose is below 30 years. Thus the Public and private sector banks needs to take care of the age above 30 years as there are few users who used mobile banking.

Out of 454 respondents 22.7 % mobile banking users belong to income group of less than Rs. 2,40,000, 34.7 % mobile banking users belong to the income group of Rs. 2,40,000 – 4,20,000, 24.8 % mobile banking users belong to the income group of Rs 4,21,000 – 7,00,000 and only 17.8 % mobile banking users have income 7,00,000 or above. For public sector banks, 39.1% users income is in between Rs.

2,40,000 – 4,20,000, then come 21.9% users for income group Rs 4,21,000 to 7,00,000. Thus majority of public sector banks users comes in income bracket Rs. 2,40,000 to 7,00,000. Whereas for private sector banks 27.6% users belongs to income bracket Rs 4,21,000 to 7,00,000 and 28.3% belongs to Rs 4,21,000 – 7,00,000 and 26.3% users belong to income bracket ‘more than Rs. 7,00,000’. Thus from the results the researcher identify that public sector banks needs to target more customers of income group Rs.7,00,000 or higher. Whereas, private sector banks target equally to all income groups.

From occupation statistics 53% respondents of public sector banks are students, 32.1% have service and 13.9% have business. Thus for public sector banks, their major customers belong to Students and service class. Whereas for private sector bank have only 30.9% students, 51.3% service and 15.1 % business. For private sector banks majority of the users belongs to service and then student. As far as business as occupation is concern, both public and private sector banks needs to concentrate on the users who have business of their own.

From the Qualification statistics, for public sector banks majority of the customers belong to graduate (35.1%) and postgraduate (39.7%). Whereas for private sector banks majority of the customers are graduate (41.4%) and post graduate (44.7%).



**Table 6.1: Demographic Profile and Usage pattern of Mobile Banking Users of Public and Private Sector Banks.**

	<b>Total (in %) (n=454)</b>	<b>Public Sector (in %) (n=302)</b>	<b>Private Sector (in %) (n=152)</b>
<b>Gender</b>			
Male	79.6	77.2	81.6
Female	20.4	22.8	18.4
<b>Age</b>			
less than 21 years	21.9	24.5	15.1
21- 24 years	40.5	47	33.6
25-30 years	20.9	13.6	30.9
31-55 years	15.7	12.6	20.4
56 years & above	1.0	2.3	0
<b>Annual Income</b>			
Less than Rs. 2,40,000	22.7	25.8	17.8
Between Rs. 2,40,000 – 4,20,000	34.7	39.1	27.6
Between Rs 4,21,000 – 7,00,000	24.8	21.9	28.3
More than Rs.7,00,000	17.8	13.2	26.3
<b>Occupation</b>			
Student	44.1	53	30.9
Service	38.9	32.1	51.3
Business	15.1	13.9	15.1
Other occupation	1.8	1	2.6
<b>Qualification</b>			
Under Graduate	19.8	22.5	11.8
Graduate	37.9	35.1	41.4
post graduate	39.9	39.7	44.7
Doctorate	2.3	2.6	2
<b>Mobile banking Length of Usage (In months)</b>			
less than 3 months	34.7	34.8	34.9
3-12 months	41.3	41.1	41.4
more than 12 months	24.0	24.2	23.7
<b>Mobile banking Frequency (In Months)</b>			
up to 5 times	59.8	64.6	57.2
between 6 and 10 times	29.2	23.8	34.2
more than 10 times	11.0	11.6	8.6

The researcher tries to find how long the users are using mobile banking services more than a year. 75.9% of the mobile banking users of public sector banks and 76.3% users of private sector banks are using mobile banking for less than a year. Only 24.2% public sector bank users and 23.7% private bank users have been using this service more than a year. Thus the banks need to provide its mobile banking service to its customers in such a way that the customer feel satisfied and they keep on using mobile banking for long time.

The researcher tries to find how frequently the users are using mobile banking services. The frequency of using mobile banking usage is measured as the number of times user's uses mobile banking services in a month. From table 6.1 it is clear that 64.6% mobile banking users of public sector bank and 57.2% users of private sector banks uses mobile banking service not more than 5 times. 23.8% mobile banking users of public sector bank and 34.2% users of private sector banks uses mobile banking service between 6 to 10 times . Only 11.6% mobile banking users of public sector bank and 8.6% users of private sector banks uses mobile banking service more than 10 times. Thus mobile banking service of public and private sector banks is still not so popular. Thus the public and private sector banks needs to put lots of efforts to make mobile banking popular.

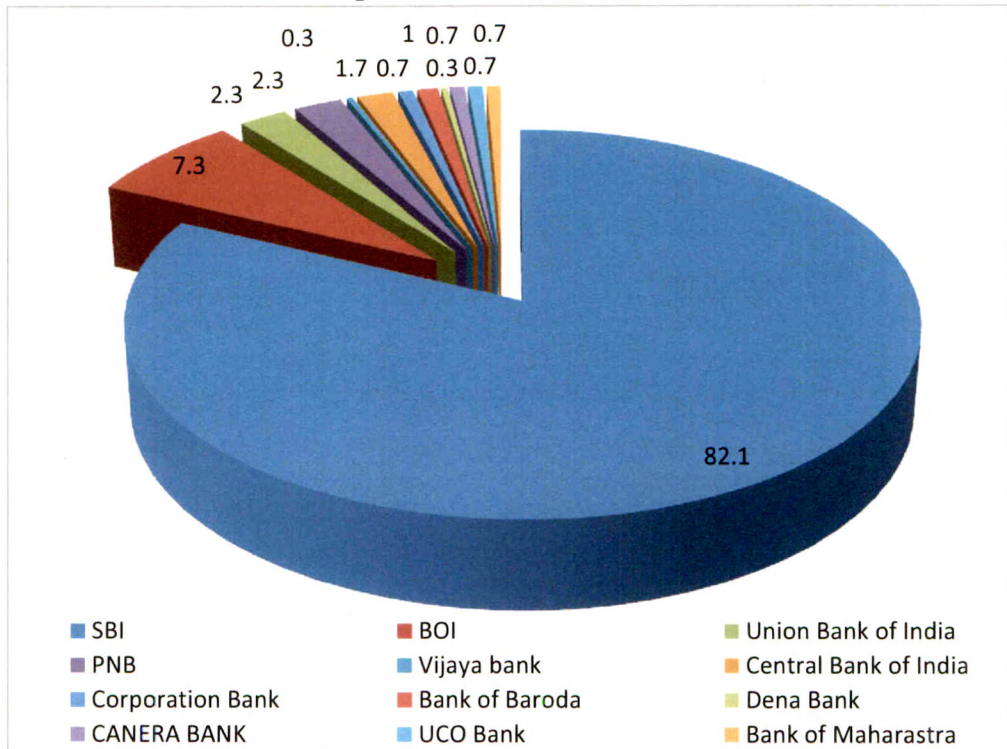
**6.2 *Customer's Preference for Mobile Banking Service Provided among Public and Private Sector Banks in Indore.***

**Mobile Banking Users of Public Sector Banks in Indore:** From the chart 6.1 it is clear that among public sector banks, State Bank of India share major contribution of 82.1% Mobile banking users. Thus we can say that State Bank of India is the only popular bank in case of public sector mobile banking services, rest all public sector banks needs to make little more efforts in order to increase users of their mobile banking services.

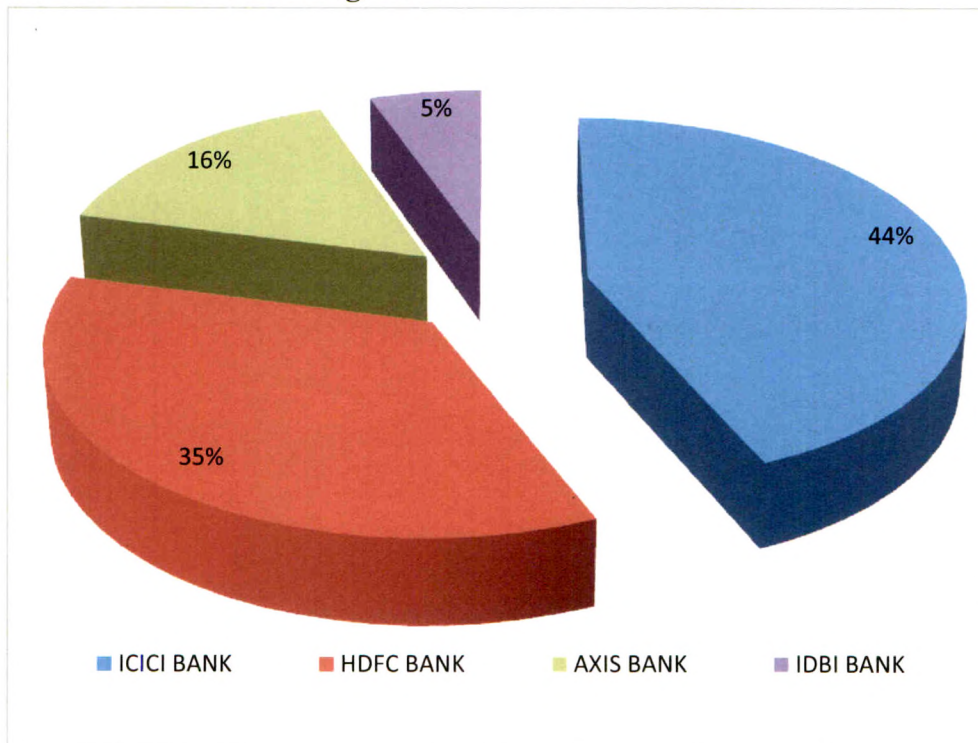
**Mobile Banking Users of Private Sector Banks in Indore:** Among private sector banks, only four banks are showing their presence in mobile banking services those are: ICICI bank; HDFC bank; Axis bank and IDBI bank. From the chart 6.2 it is clear that among private sector banks ICICI and HDFC together contributes major share i.e. 76.3 %.

It is obvious from above analysis that in case of public sector banks mobile banking users are concentrated in SBI only, but in case of private sector banks users are preferring number of banks including ICICI bank, HDFC bank and Axis bank.

**Chart 6.1: Mobile Banking Users of Public Sector Banks in Indore**



**Chart 6.2: Mobile Banking Users of Private Sector Banks in Indore**



### ***6.3 Preferred Mobile Banking Services by the Customer of Public and Private sector banks in Indore.***

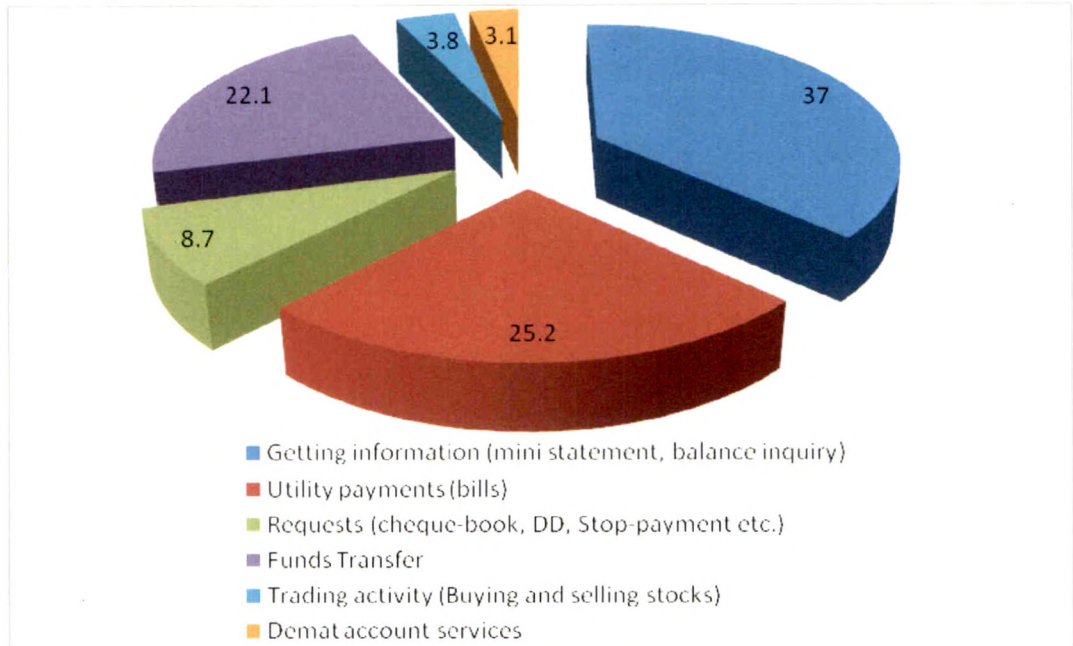
The researcher also study the mobile banking services preferred by the public and private sector bank's users of Indore. Also try to compare the preferred services by the users.

#### ***6.3.1 Preferred Mobile Banking Services by Users of Public and Private sector banks in Indore***

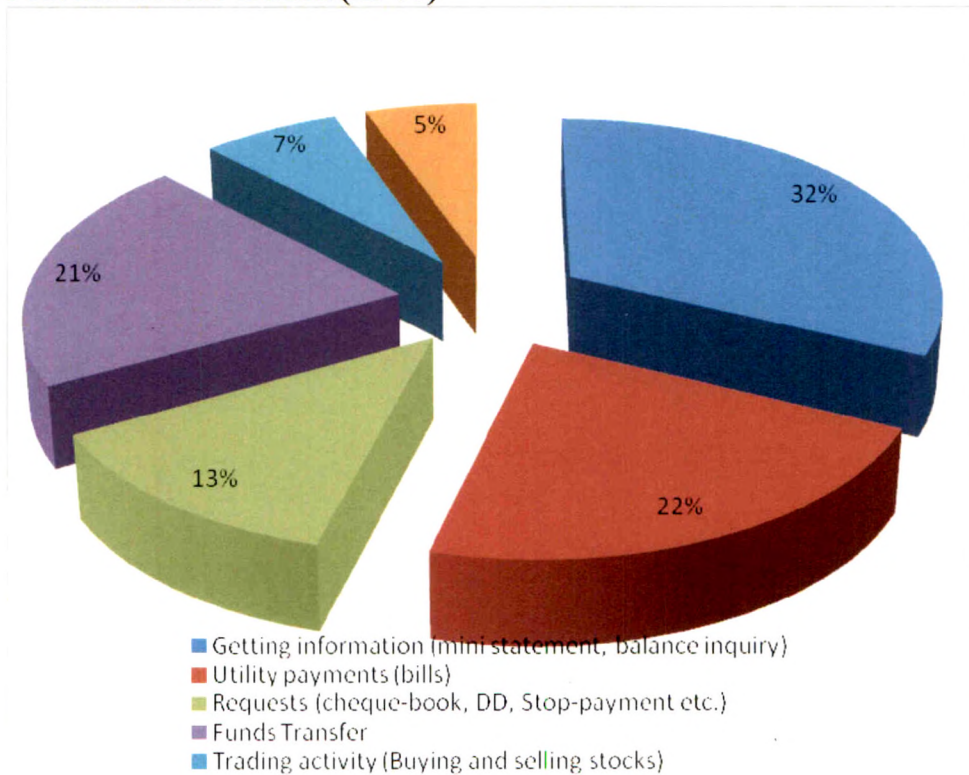
It is clear from the table 6.2 that mobile banking users of Indore preferred services like: getting information (balance enquiry, mini statement etc); funds transfer; utility payment (bills payment) are most preferred services overall contributes 80.5% among the services available on mobile banking in Indore. Whereas Requests for cheque book, Demand Draft, Stop-payment etc. and Stock trading and demat account services of mobile banking provided by various banks in Indore are not so popular.

The researcher is also interested to identify the preferred mobile banking services by the users of public and private sector banks. It is clear from the table 6.2 that getting information like mini-statement, balance inquiry; utility bill payment like telephone bills, mobile top up, electricity bills and funds transfer from one account to other account are the most preferred service by the public sector bank user's in Indore. Where sending requests using mobile like issue cheque

**Chart 6.3 : Preferred Mobile Banking Services by Users of Public Sector Banks( in %)**



**Chart 6.4: Preferred Mobile Banking Services by Users of Private Sector Banks(in %)**



book, demand draft request ,stop-payment request ,shares trading, demat account services are the least preferred services by the users of public sector banks in Indore.

**Table 6.2: Preferred Mobile Banking Service by Users of Public and Private Sector Banks in Indore.**

	All Users	Public Sector Banks	Private Sector Banks
<b>Preferred Mobile Banking Services</b>	<b>n=454 (In %)</b>	<b>n=302 (In %)</b>	<b>n=152 (In %)</b>
Information Services : balance enquiry, mini statement	35.3	37.0	32.0
Utility Payments: electricity bills payment, mobile top-up, premium payment.	23.9	25.2	22.0
Funds Transfer : interbank transfer and intra bank transfer	21.3	22.1	20.7
Requests Services: cheque-book request, Demand Draft, Stop cheque payment.	10.6	8.7	12.9
Trading Activity : Buying and Selling Stocks	5.0	3.8	6.8
Demat account services	3.9	3.1	5.5

Whereas for private sector banks from the table 6.2, getting information related to their account like mini-statement, balance inquiry, utility bill payment, funds transfer are also prefer mobile banking service by the users of private sector banks in Indore. Services like request for cheque book, demand draft and stop payment; demate account service and buying and selling of shares services are least preferred service for private banks in Indore. Chart 6.3 and chart 6.4 also explains the preferred mobile banking services by public and private sector banks.



### ***6.3.2 Gender Based Preferred Mobile Banking Services***

While comparing the mobile banking services between public sector banks and private sector banks, the researcher study gender wise preferred service for public and private sector banks. From table 6.3 the population of public sector banks, 85.8% male prefers to get information like mini-statement, balance enquiry while only 91.3% female were using information service. For utility payment services like electricity bill, mobile bills, premium of insurance policies, electricity bills 62.2% male and 49.3% females uses this service. For funds transfer mobile banking service 45.4% male user and only 6.6% female are using this service. 15.9% males and only 4.6% females prefer request services like cheque book, demand draft, stop payment service. For buying and selling stocks 8.6% males and only 0.3% females are using it. Demat account service only 7% male and 0.3% females are using this service. Thus services like cheque book , demand draft, stop payment service; buying and selling of stocks ; and demat account service are not popular among female of public sector banks.

From table 6.3 the population of private sector banks, 64.5% male prefers to get information like mini-statement, balance enquiry while only 15.8% females were using information service. For utility payment services like electricity bill, mobile bills, premium of Insurance policies, electricity bills 42.8% male and 12.5% females use this service. For funds transfer mobile banking service 44.1% male user and only 7.9% female are using this service. 28.3% males and



only 3.9% females prefer request services like cheque–book, demand draft, stop payment service.

**Table 6.3 : Gender Based Preferred Mobile Banking Services by Users of Public and Private Sector Banks**

Preferred Mobile Banking Service	Public Sector Banks				Private Sector Banks			
	Male(n=233)		Female(n=69)		Male(n=124)		Female(n=28)	
	Users	Non-user	Users	Non-user	Users	Non-user	Users	Non-user
Information Services : balance enquiry, mini statement	85.8	14.2	91.3	8.7	79	21	85.7	14.3
Utility Payments: electricity bills payment, mobile top-up, premium payment.	62.2	37.8	49.3	50.7	52.4	47.6	67.9	32.1
Funds Transfer : interbank transfer and intra bank transfer	58.8	41.2	29	71	54	46	42.9	57.1
Requests Services: cheque-book request, Demand Draft, Stop cheque payment.	20.6	79.4	20.3	79.7	34.7	64.5	21.4	78.6
Trading Activity : Buying and Selling Stocks	11.2	88.8	1.4	98.6	17.7	82.3	14.3	85.7
Demat account services	9	91	1.4	98.6	13.7	86.3	14.3	85.7

For buying and selling stocks 14.5% males and only 2.6% females are using it. Demat account service only 11.2% male and 2.6% females are using this service. Thus services like getting information like mini-statement, balance enquiry etc and utility bill payment are the preferred services and rest all services like cheque book , demand draft, stop payment service; buying and selling of stocks ; and demat account service are not popular among female of private sector banks.

### ***6.3.3 Age Group Based Preferred Mobile Banking Service***

The researcher is interested to know that which mobile banking service is popular among which age group users for public and private sector banks. Among public sector mobile banking users for getting information service accounts for 84.8 % user's age is below 30 years.

For utility payments using mobile banking 79.9 % user's age is below 30 years and 15.1 % users age is 30 years and above. Thus it is clear from the table 6.4, that young age group users prefer utility bill payment using mobile banking and the middle and older age group users still uses traditional means for paying bills.

Different request service like request for cheque book, demand draft, stop-payment ,only 16.1 % users belong to age less than 21 years,38.7 % users belong to age between 21 to 24 years,21 % users belong to 25 to 30 years ,19.4 % users belong to 31 to 55 years and 4.8 % users age is above 55 years.

For mobile banking funds transfer service , from table 6.4, 17.2 % belongs to below 21 years,49.7% to 21 to 24 years of age, 14.4% belongs to 25 to 30 years ,17.2% users belong to age group 31 to 55 years and only 1.3% belong to age above 55 years. It is clear that 81.3% uses below 30 years of age using funds transfer service through mobile banking. Only 18.5% users of funds transfer mobile banking service belongs to above 30 years age group. Thus public sector banks need to educate 30 years above age group customers , how to transfer funds while using mobile banking.

**Table 6.4: Preferred Mobile Banking Services by Different Age Group Users of Public and Private Sector Banks.**

Preferred Mobile Banking Service	Public Sector Banks					Private Sector Banks				
	Less than 21 Yrs	21-24Yrs	25-30 Yrs	31-55 Yrs	More than 56 Yrs	Less than 21 Yrs	21-24Yrs	25-30 Yrs	31-55 Yrs	More than 56 Yrs
Information Services : balance enquiry, mini statement	4.7	46.8	13.3	13.3	1.9	10.7	32.8	33.6	23	0
Utility Payments: electricity bills payment, mobile top-up, premium payment.	22.9	45.8	16.2	12.3	2.8	14.3	31	35.7	19	0
Requests Services: cheque-book request, Demand Draft, Stop cheque payment.	16.1	38.7	21	19.4	4.8	10.2	26.5	32.7	30.6	0
Funds Transfer : interbank transfer and intra bank transfer	17.2	49.7	14.4	17.2	1.3	11.4	30.4	38	20.3	0
Trading Activity : Buying and Selling Stocks	14.8	37	14.8	33.3	0	15.4	34.6	26.9	23.1	0
Demat account services	9.1	31.8	22.7	36.4	0	4.8	38.1	33.3	23.8	0

For using trading services through mobile, only 14.8% users are below 21 years, 37% users in between 21 to 24 years, 14.8% in between 25 to 30 years, 33.3% users between 30 to 55 years and none of the users above 55 years were using trading service. Thus it is clear that trading of shares using mobile banking is not a popular service in different age groups.

For the users of demat account service using mobile banking, 36.4 % users belongs to age group 31-55 years are using this service and 31.8% users belongs to 21-24 years age group are using this service. So the demat account service using mobile banking is popular service for 21-24 and 31-55 years age group of public sector banks.

Among private sector mobile banking users for getting information service accounts for 100% user's age is below 55 years and no customers above 55 years of age is identified.

For utility payments using mobile banking 81% user's age is below 30 years and 19 % users age is above 30 years. Thus it is clear from the table 6.4, that young age group users prefer utility bill payment using mobile banking and the middle and older age group users still uses traditional means for paying bills.

Different request service like cheque book request, demand draft, stop-payment ,only 10.2% users belong to age less than 21 years,26.5% users belong to age between 21 to 24 years,32.7% users belong to 25 to 30 years ,30.6 % users belong to 31 to 55 years and no users were identified whose age is above 55 years.

So, from table 6.4, it is clear that 63.3% users of the request service users of private sector banks are found between 25-55 years age group.

For mobile banking funds transfer service , from table 6.4, 11.4 % belongs to below 21 years, 30.4% to 21 to 24 years of age, 38% belongs to 25 to 30 years ,20.3% users belong to age group 31 to 55 years and none of the user using funds transfer is identified above 55 years of age. It is clear that 79.8% user's age is below 30 years who are using funds transfer service through mobile banking. Only 20.3% users of funds transfer mobile banking service belongs to 30 to 55 years age group and no users were identified whose age is above

55 years. Thus private sector banks need use of funds transfer among 30 years and above age group customers.

For using trading services through mobile banking, only 15.4% users are below 21 years, 34.6% users in between 21 to 24 years, 26.9% in between 25 to 30 years, 23.1% users between 30 to 55 years and no user is identified whose age is above 55 years were using trading service. Thus it is clear that trading of shares using mobile banking is not a popular service in different age groups for the private sector banks located in Indore.

For the users of demat account service using mobile banking, 38.1 % users belongs to age group 21-24 years are using this service and 33.3% users belongs to 25-30 years age group are using this service. So, from table 6.4, it is clear that 71.4% users of the demat account service users of private sector banks is found between 21-30 years age group.

Thus among the mobile banking users belongs to different age group of all the private sector banks needs to concentrate on trading services, request services and demat account services.

#### ***6.3.4 Occupation Based Preferred Mobile Banking Service***

In table 6.5 the mobile banking services are classified on the basis of occupation like student, service, business and other occupation. In order to identify the preferred mobile banking service based on the occupation for public and private sector banks. From the population

for public sector bank users, 53.2% users are students; 30.4% belongs to service professionals; and 15.2% users belongs have their own business and only 1.1% users belongs to other occupations. Thus majority of the mobile banking information service user's are students and service class of public sector banks.

For utility payment service, 46.4% users are students, 38.5% users are service professionals, only 14% users have their business as occupation and only 1.1% users has other occupation.

37.1% users use request services were students, 38.7% belongs to users whose occupation as service, and 24.2% users have business of their own. Thus this service is used only by student, service and business.

**Table 6.5: Preferred Mobile Banking Services of Public and Private Sector Banks Users Based on Occupation.**

Preferred MB service	Public Sector Banks				Private Sector Banks			
	Student %	Service %	Business %	Others %	Student %	Service %	Business %	Others %
Information Services : balance enquiry, mini statement	53.2	30.4	15.2	1.1	25.4	55.7	15.6	3.3
Utility Payments: electricity bills payment, mobile top-up, premium payment.	46.4	38.5	14	1.1	27.4	59.5	11.9	1.2
Requests Services: cheque-book request, Demand Draft, Stop cheque payment.	37.1	38.7	24.2	0	26.5	53.1	20.4	0
Funds Transfer : interbank transfer and intra bank transfer	45.2	33.8	21	0	26.6	53.2	20.3	0
Trading Activity : Buying and Selling Stocks	40.7	40.7	18.5	0	34.6	46.2	19.2	0
Demat account services	31.8	50	18.2	0	38.1	42.9	19	0

Another service of mobile banking i.e. funds transfer, 45.2% users are students, 33.8 % users have service, and 21% have business as their occupation. The public sector banks need to provide funds transfer services to persons having business.

For buying and selling of stocks through mobile banking, 40.7% users are students, 40.7% users having service and 18.5% users of public sector banks have business of their own are using it.

For demat account service through mobile banking 31.8% users are students, 50% users have service as their occupation and 18.2% users have business of their own.

Thus students are using majority of the mobile banking service provided by public sector banks. Then comes the service personnel and then the business personnel are using mobile banking services.

For private sector banks (table 6.5) for the information service, 25.4% student, 55.7% users from service as their occupation, 15.6% users have business as occupation and only 3.3% users have other occupation. For utility payments like electricity bill, mobile topup, insurance premium etc. 27.4% were students, 59.5% users have service as their occupation, only 11.9% users have business and only 1.2% users have other occupation. For request information services like cheque book request, stop payment request, 26.5% users are students, 53.1% users have service and 20.4% users have business as their

occupation. From this it is clear that request services are not popular among the users of private sector banks.

Funds transfer service in which they can transfer funds from their account to other account in the same bank or another bank. 26.6% student's use funds transfer service, 53.2% service class people used this service and only 20.3% businessman uses this service. For mobile banking trading services 34.6% users were students, 46.2% users have service and 19.2% users have business as their occupation. For demat account service 38.1% users are students, 42.9% users have service and only 19% users have business as their occupation.

Thus the private sector banks need to do the needful for making funds transfer service, trading services and demat account service more popular among the students and businessman.

### ***6.3.5 Preferred Mobile Banking Service Based on Education Qualification***

It can be observed from table 6.6 that mobile banking services are preferred mostly by graduate and post graduate users in case of both public and private sector banks.

Public sector banks, 21.3% undergraduate student are using this service, 38% graduate students, 38.4% post graduate and only 2.3% users qualification like doctorate, are using information services using mobile banking.

For utility payment service, 20.7% users are under graduate and 33% user are graduate, 43% users are post graduate and only 3.4% users having doctorate as qualification.



For request services for cheque book, demand draft and stop payment, 35.5 % users are graduate and 45.2% users are post graduate. Only 12.9 % users are under-graduate and 6.5% users are having qualification doctorate for request information services.

For funds transfer services, 13.4 % are under graduate, 40.8% users are graduates, 42.7% are postgraduate and 3.2 % are doctorate users.

For trading of stocks service, only 18.5% are under graduate, 33.3% users are graduate, 37% users are post graduate and only 11.1% user having doctorate as qualification.

**Table 6.6: Preferred Mobile Banking Services of Public and Private Sector Banks Users Based on Education Qualification.**

Preferred MB service	Public Sector Banks				Private Sector Banks			
	Under Graduate %	Graduate %	Post Graduate %	Doctorate %	Under Graduate %	Graduate %	Post Graduate %	Doctorate %
Information Services : balance enquiry, mini statement	21.3	38	38.4	2.3	9.8	39.3	48.4	2.5
Utility Payments: electricity bills payment, mobile top-up, premium payment.	20.7	33	43	3.4	9.5	42.9	44	3.6
Requests Services: cheque-book request, Demand Draft, Stop cheque payment.	12.9	35.5	45.2	6.5	28.2	40.8	51	0
Funds Transfer : interbank transfer and intra bank transfer	13.4	40.8	42.7	3.2	12.7	39.2	46.8	1.3
Trading Activity : Buying and Selling Stocks	18.5	33.3	37	11.1	15.4	30.8	53.8	0
Demat account services	9.1	27.3	50	13.6	9.5	23.8	66.7	0

For demat account service, only 9.1% users are undergraduates, 27.3% users are graduate and 50 % users have post graduation and

13.6% users have doctorate as their qualification. Private sector banks, 9.8% undergraduate student are using this service, 39.3% graduate students, 48.4% post graduate and only 2.5% doctorate users are using information services using mobile banking. For utility payment service, 9.5% users are under graduate and 3.6% are doctorate. Whereas 42.9 % users are graduate and 44% users are post graduate users. For request services for cheque book, demand draft and stop payment, 40.8% users are graduates and 51% users are post graduate. Only 8.2 % users are undergraduates and none of the users having qualification doctorate for request information services. For funds transfer services, 12.7 % are under graduate, 39.2% users are graduate, 46.8% are postgraduate and 1.3 % were doctorate users. For trading of stocks service, 15.4% are under graduate, 30.8% users are graduate and 53.8% users are post graduate. Hear none of the user having doctorate is a user of this service. For demat account service, 9.5% users are undergraduate, 23.8% users are graduate and 66.7 % users have post-graduation as their qualification. None of the doctorate qualification users from private sector banks have demat accounts service.

### ***6.3.6 Income Group Based Preferred Mobile Banking Service***

The researcher is also interested to know which income group is using which mobile banking service for public and private sector banks. From the table 6.7, 27% users income is less than Rs. 2,40,000, 38.8% users annual income is in between Rs.2,40,000 to Rs. 4,20,000,20.9% users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and

13.3% users of public sector banks annual income is above Rs. 7,00,000. Thus the users of all income groups from public sector banks are using information service.

For utility payment service , 31.3% user's annual income is less than Rs. 2,40,000, 37.4% user's annual income is between Rs.2,40,000 to Rs. 4,20,000,21.2% users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and only 10.1% users of public sector banks annual income is above Rs. 7,00,000. Thus the users of all income groups from public sector banks are using utility payment service. At the same time there is a scope to increase the number of users also. For requests service like cheque book, demand draft, stop payment etc , 19.4% user's annual income is less than Rs. 2,40,000, 27.4% user's annual income is between Rs.2,40,000 to Rs. 4,20,000, 29% users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and only 24.2% users of public sector banks annual income is above Rs. 7,00,000. Thus the public sector banks needs to increase request information services among all the income groups.

For funds transfer service like same bank or to other bank account, 21% user's annual income is less than Rs. 2,40,000, 38.2 % user's annual income is between Rs.2,40,000 to Rs. 4,20,000, 25.5 % users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and 15.3% users of public sector banks annual income is above Rs. 7,00,000. Thus all the users of different income groups are using funds transfer service through mobile banking. For trading of shares service , 18.5 % user's annual income is less than Rs. 2,40,000, 51.9% user's annual

income is between Rs.2,40,000 to Rs. 4,20,000, 18.5 % users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and only 11.1% users of public sector banks annual income is above Rs. 7,00,000. Thus public sector banks needs to provide trading of shares service to all the income group users.

For demat account service, 18.2% user's annual income is less than Rs. 2,40,000, 45.5% user's annual income is between Rs.2,40,000 to Rs. 4,20,000, 27.3% users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and only 9.1% users of public sector banks annual income is above Rs. 7,00,000. Thus the demat account service is not much popular among the public sector banks customers.

From the table 6.7, 16.4% users income is less than Rs. 2,40,000, 28.7% users annual income is in between Rs.2,40,000 to Rs. 4,20,000, 25.4% users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and 29.5% users of private sector banks annual income is above Rs. 7,00,000. Thus the users of all income groups from private sector banks are using information service.

For utility payment service , 15.5% user's annual income is less than Rs. 2,40,000, 26.2% user's annual income is between Rs.2,40,000 to Rs. 4,20,000, 23.8% users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and 34.5% users of private sector banks annual income is above Rs. 7,00,000. Thus the users of all income groups from private sector banks are using utility payment service. At the same time there is a scope to increase the number of users also.

For requests service like cheque book, demand draft, stop payment etc , 8.2% user’s annual income is less than Rs. 2,40,000, 32.7 % user’s annual income is between Rs.2,40,000 to Rs. 4,20,000, 28.6% users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and 30.6 % users of private sector banks annual income is above Rs. 7,00,000. Thus the private sector banks needs to increase request information services among all the income groups so that the users get services easily.

**Table 6.7: Preferred Mobile Banking Services of Public and Private Sector Bank Users Based on Annual Income.**

Preferred MB service	Public Sector Banks				Private Sector Banks			
	Less than 240000%	240000 to 420000%	421000 to 700000%	700000 & above %	Less than 240000%	240000 to 420000%	421000 to 700000%	700000 & above %
Information Services : balance enquiry, mini statement	27	38.8	20.9	13.3	16.4	28.7	25.4	29.5
Utility Payments: electricity bills payment, mobile top-up, premium payment.	31.3	37.4	21.2	10.1	15.5	26.2	23.8	34.5
Requests Services: cheque-book request, Demand Draft, Stop cheque payment.	19.4	27.4	29	24.2	8.2	32.7	28.6	30.6
Funds Transfer : interbank transfer and intra bank transfer	21	38.2	25.5	15.3	12.7	27.8	31.6	27.8
Trading Activity : Buying and Selling Stocks	18.5	51.9	18.5	11.1	7.7	26.9	26.9	38.5
Demat account services	18.2	45.5	27.3	9.1	14.3	28.6	28.6	28.6

For funds transfer service like same bank or to other bank account, 12.7% user’s annual income is less than Rs. 2,40,000, 27.8 % user’s

annual income is between Rs.2,40,000 to Rs. 4,20,000, 31.6 % users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and 27.8% users of private sector banks annual income is above Rs. 7,00,000. Thus all the funds transfer using mobile banking service is used by all the service groups of private sector banks

For trading of shares service, 7.7 % user's annual income is less than Rs. 2,40,000, 26.9% user's annual income is between Rs.2,40,000 to Rs. 4,20,000, only 26.9 % users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and 38.5% users of private sector banks annual income is above Rs. 7,00,000. Thus private sector banks needs to provide trading of shares service to all the income group users who involve in trading of shares.

For demat account service, 14.3% user's annual income is less than Rs. 2,40,000, 28.6% user's annual income is between Rs.2,40,000 to Rs. 4,20,000, 28.6% users annual income is in between Rs 4,21,000 to Rs. 7,00,000 and 28.6% users of public sector banks annual income is above Rs. 7,00,000. Thus demat account service of private sector bank is not much popular among the private sector banks customers. The banks must put lots of efforts in order to provide demat account service through mobile banking.

**6.3.7 Frequency of Transactions Per Month by the Users of Public and Private Sector Banks**

Table 6.8 shows the frequency of usage of mobile banking services by the users of public and private sector banks is studied.

From chart 6.5, it is clear that 64.4% users of public sector banks and 57.2% users of private sector banks are using mobile banking services up to 5 times in a month.

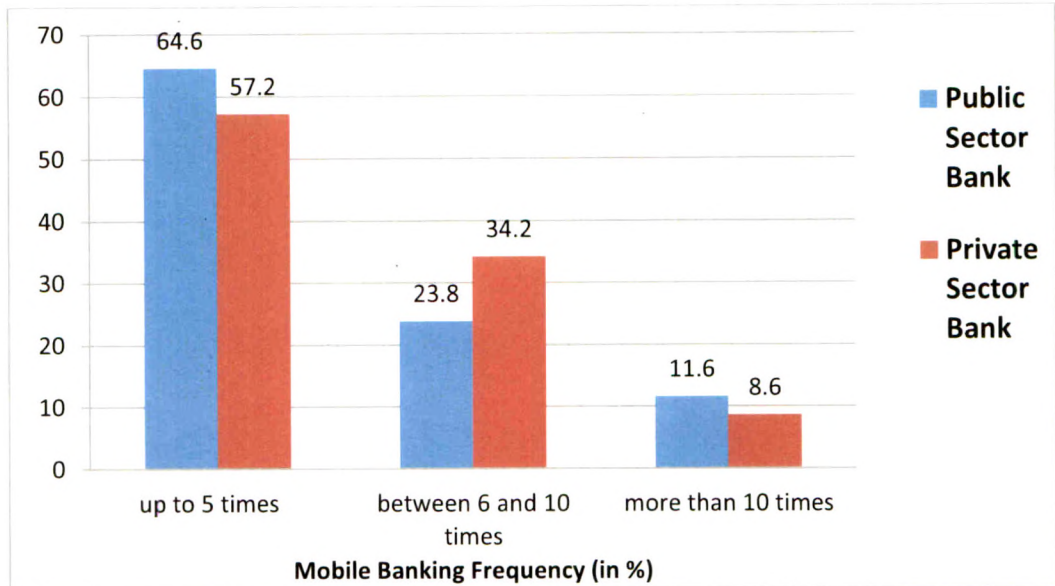
23.8% users of public sector banks and 34.2% users of private sector banks are using mobile banking services between 6 to 10 times in a month.

**Table 6.8: Frequency of Mobile Banking Services used Public and Private Sector Banks.**

Frequency(in month)	Users of Public Sector Banks in % (n=302)	Users of Private Sector Banks in % (n=152)
up to 5 times	64.6	57.2
between 6 and 10 times	23.8	34.2
more than 10 times	11.6	8.6

11.6 % users of public sector banks and 8.6 % users of private sector banks are using mobile banking services more than 10 times in a month.

**Chart 6.5: Frequency of Mobile Banking Services Used Public and Private Sector Banks**



Thus, it is observed that majority of users of public sector banks and private sectors banks are using mobile banking services maximum up to 5 times in a month.

### ***6.3.8 Duration of Mobile Banking Usage by Users of Public and Private Sector Banks***

The researcher is also interested in order to know the time from which the users are using mobile banking services of public and private sector banks. The information about the length of usage (time from which mobile banking is used) is given in table 6.9 for public and private sector banks.

**Table 6.9: Duration of Mobile Banking Services Used by Users of Public and Private Sector Banks.**

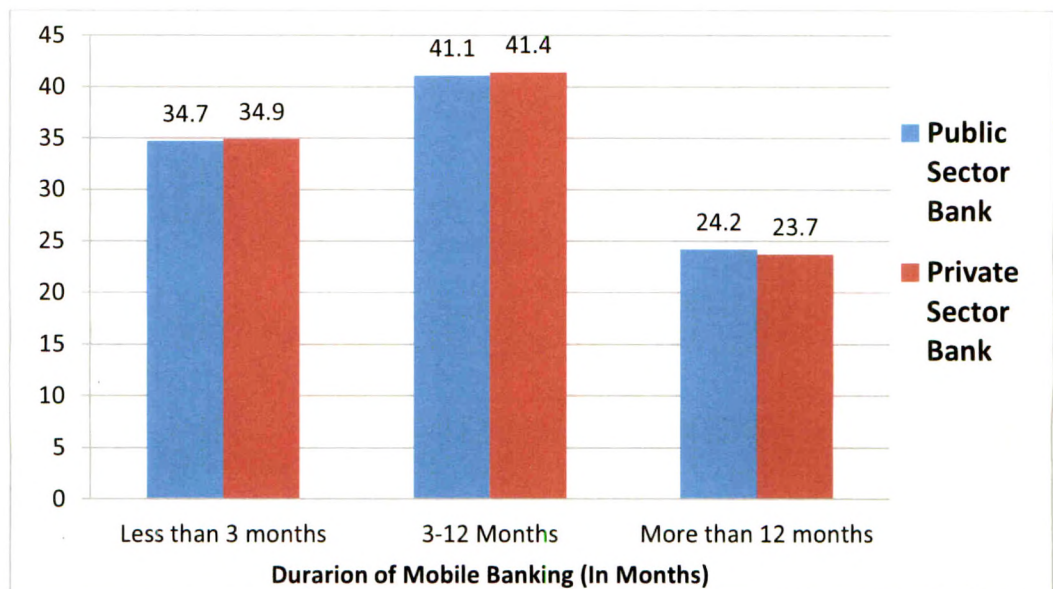
Mobile Banking Usage	Public Sector Banks in % (n=302)	Private Sector Banks in % (n=152)
less than 3 months	34.7	34.9
3-12 months	41.1	41.4
more than 12 months	24.2	23.7



From chart 6.5, it is clear that 34.7% users of public sector banks and 34.9% users of private sector banks are using mobile banking services from less than 3 months.

41.1 % users of public sector banks and 41.4% users of private sector banks are using mobile banking services from 3 to 12 months. 24.2% users of public sector banks and 23.7 % users of private sector banks are using mobile banking services from more than 12 months.

**Chart 6.6: Duration of Mobile Banking Services Used By Users Of Public and Private Sector Banks.**



Thus from the chart 6.6, it is clear that the percentage of users of mobile banking users for public and private sector banks is similar. 75.8% users of public sectors banks and 76.3% users of Private sector banks are using mobile banking services from less than 12 months,

whereas 24.2% of public and 23.7% of private sector banks are using mobile banking services from more than 12 months. Thus the majority of the users for both banks are using mobile banking services less than 12 months.

#### **6.4 Preliminary Measurement Scale for Mobile Banking Service Quality.**

A pilot study is conducted for developing a reliable measurement scale for mobile banking service quality. The collected data in the study is analyzed using Cronbach's Alpha Test of Reliability and Factor Analysis with Principle Component Analysis as an extraction method varimax as rotation method with Kaiser Normalization.

According to Nunnally and Bernstein (1994)<sup>110</sup>; Garson, (2002)<sup>47</sup> Cronbach's alpha test of reliability is the most popular estimate for measuring the internal consistency (reliability) of items in a scale. Cronbach's alpha test measures the extent to which the responses collected for given item correlate highly with each other. Cronbach's alpha test produces an R-score which range between 0 and 1. According to Garson (2002)<sup>52</sup>, the higher the R-score is, the more reliable the measured construct is. Furthermore, according to Nunnally and Bernstein (1994)<sup>110</sup> if the cronbach's alpha score is equal to or more than 0.7, indicates high internal reliability of the scale items. The cronbach's alphas score increased as the number of items in a scale increases (Garson, 2002)<sup>52</sup>.

The researcher also test the internal reliability of the scale apply cronbach's alpha Test. Applying this test specifies whether the items pertaining to scale are internally consistent and whether they can be used to measure the proposed phenomenon i.e. mobile banking service quality. The results for cronbach's alpha (table 6.10) value are 0.970 which is much higher than the required value 0.7. Thus the cronbach's alpha test of reliability verifies that each item is internally consistent and can be used to measure the proposed phenomenon of mobile banking service quality.

**Table 6.10: Reliability Statistics for Preliminary Mobile Banking Service Quality Measurement Scale.**

No. of Items in mobile banking service quality measurement scale	Cronbach's Alpha score for mobile banking service quality scale.
32	.970

According to Chatfield and Collins (1980)<sup>30</sup>, there are two main reasons for using Principal Component Analysis (PCA): reduction of the dimensionality of the data set and formulation of new meaningful variables to describe the problem. The researcher uses principal component analysis for identifying the variables for developing the measurement scale.

Principal component analysis was performed on sample of 51 respondents using preliminary mobile banking service quality measurement scale having 32 variables related to mobile banking service quality.

Communality is used to measure the percent of variance in a given variable explained by all the factors together. Communalities indicate the amount of variance in each variable that is accounted for. As such,

the communality of a variable represents the proportion of the variance in that variable that can be accounted for by all ('common') extracted factors. If the communality value of given variable is low, then this variable should be probably removed from the scale, because the factor it pertains to cannot explain its variance. According to Rietveld and Van Hout (1993)<sup>132</sup> communality of a variable is the sum of the loadings of this variable on all extracted factors. If the communality of a variable is high, the extracted factors account for a big proportion of the variable's variance. This means that this particular variable is reflected well via the extracted factors, and hence that the factor analysis is reliable. Communalities consist of Initial and Extracted Values. The Initial Values will be always 1.0 as in this case the number of factors is equal to the number of variables. The extracted value represents the percent of variance in a given variable explained by the extracted factor. Initial communalities are estimates of the variance in each variable accounted for by all components or factors. Extraction communalities are estimates of the variance in each variable accounted for, by the factors (or components) in the factor solution. Values below 0.5 are indicated as variables that do not fit well with the factor solution, and should possibly be dropped from the analysis. From (annexure-I) Communalities for all variables together was observed and found that the extraction value of the communalities of all the variables is more than 0.6 which is sufficiently high.

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy A statistic that indicates the proportion of variance in the variables that might be

caused by common underlying factors. Kaiser-Meyer-Olkin is index for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. If two variables share a common factor with other variables, their partial correlation will be small once the factor is taken into account. High values (close to 1.0) generally indicate that a factor analysis may be useful with the data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful. Bartlett's test of sphericity hypothesis that , your correlation matrix is an identity matrix (1's on the diagonal, 0's off-diagonals) which would indicate that variables are unrelated, therefore unsuitable for structure detection.

Furthermore, Bartlett's Test of sphericity and Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy were performed to confirm the suitability of the data for factor analysis. The results from KMO and Bartlett's Test from Table 6.11 shows that the result of the Bartlett's Test of sphericity is 0.000, which meets the criteria of value lower than 0.05 in order for the Factor Analysis to be considered appropriate. Furthermore, the result of the KMO Measure of Sampling Adequacy is 0.753, which exceeds the minimum value of 0.6 for a good factor analysis (Tabachnick and Fidell, 2001)<sup>151</sup>.

**Table 6.11: KMO and Bartlett's Test Results for Mobile Banking Service Quality Measurement Scale.**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.753
Bartlett's Test of Sphericity	Approx. Chi-Square	1616.471
	df	496
	Sig.	.000

Finally, through cronbach's alpha test and communalities the researcher confirms 32 items for measuring mobile banking service quality for public and private sector banks of Indore final data collection used. These 32 items also contains 4 items for measuring mobile banking satisfaction of the users. The revised questionnaire had 32 items with 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Also variables covering demographic information about the respondents, including the name of the bank they use, gender, age, length of mobile banking usage and frequency of mobile banking transactions per month are also included in the final questionnaire. Thus by developing the final questionnaire (annexure-VI) for mobile banking service quality and satisfaction, the researcher make the scale more contexts specific for the public and private sector banks located in the Indore district of Madhya Pradesh.

In order to know the mobile banking users are using mobile banking service, the researcher asks the respondent the time duration of using mobile banking services. The researcher also includes one variable related to frequently which measures how frequently the mobile banking service is used by the respondents in a month.

The researcher included multiple choice questions for knowing which mobile banking services are used by the respondent. The multiple choice options are : 'Getting information (mini statement, balance inquiry)'; 'Utility payments (bills)'; 'Requests (cheque-book, DD, Stop-payment etc.)'; 'Funds Transfer'; 'Trading activity (Buying and selling stocks)'; 'Demat account services'.

### **6.5 Service Quality Dimensions of Mobile Banking of Public and Private Sector Banks in Indore.**

The final questionnaire was operationalize on a sample of 478 mobile banking users of various public and private sector banks of Indore. Out of 478 responses, 24 invalid questionnaires were eliminated and 454 questionnaires retained for the analysis.

Further in the study the researcher split the final data into two samples, sample-I (n=200) and sample-II (n=254) as proposed by Swaid and Wigand (2009)<sup>150</sup>. Sample-I is used for identifying service quality dimensions and developing measurement model for mobile banking service quality. Sample-II is used for comparing service quality dimensions of mobile banking for public and private sector banks in Indore.

The researcher applies exploratory factor analysis in order to identify the (factors) dimensions related to mobile banking service quality on sample-I, Principal Component analysis method using SPSS package.

#### **6.5.1 Exploratory Factor Analysis (EFA) to Identify Dimensions of Mobile Banking Service Quality**

Exploratory factor analysis was performed using SPSS software using principal component analysis technique. According to Chatfield and Collins (1980)<sup>30</sup>, there are two main reasons for using Principal Component Analysis (PCA): reduction of the dimensionality of the data set and formulation of new meaningful variables to describe the problem.

Principal component analysis was performed on sample-I using the 32 variables related to mobile banking service quality and satisfaction. The obtained sample size (n = 200) satisfies the condition of having five cases to one item ratio needed in conducting factor analysis (Hair et al. (1998)<sup>62</sup>; Stevens (1996)<sup>147</sup>).

The KMO and Bartlett test of sphericity and the Measure of Sampling Adequacy (MSA) were used for confirming the suitability of the data for factor analysis. Furthermore, the result of the KMO Measure of Sampling Adequacy is exceeding the minimum value of 0.6 for a good factor analysis (Tabachnick & Fidell, 2001)<sup>152</sup>.

**Table 6.12: KMO and Bartlett's Test for Sample Adequacy for identify Service Quality Dimensions of Mobile Banking of Public and Private Sector Banks in Indore.**

Kaiser-Meyer-Olkin (KMO) test for Measure of Sampling Adequacy.		.913
Bartlett's Test of Sphericity	Approx. Chi-Square	2913.945
	Df	496
	Sig.	.000

It is observed from table 6.12, the significance of the Bartlett test was .000 and the Kaiser-Meyer-Olkin measure of sampling adequacy is also indicating the adequacy of conducting the EFA.

First of all, besides the Bartlett's test of sphericity and the KMO Measure of Sampling Adequacy, presented above, According to Hair et al. (1998)<sup>62</sup>, it is necessary before conducting Exploratory Factor Analysis (EFA) to make sure that sufficient variance exists within the variables. Hence, those variables whose correlation coefficients were lower than 0.3 were dropped from further study. The correlation



matrix also confirms the suitability of the data for factor analysis as it includes considerable number of correlation coefficients higher than 0.3.

Looking at the (annexure-II) on communalities for all variables together, it can be observed that the extraction value of the communalities of all the variables is sufficiently high. The lowest values below pertain to Q.1, Q.4, Q.11, Q.15, Q.21 and Q.27 which have communalities lower than 0.5, with 0.401 the lowest one. From these values, the communality of Q.4 is pretty low 0.401, which shows that only 40.1% of the variance of this variable is explained by all factors in the analysis meaning that this variable might be considered for removal from the model. The same goes for Q.1 with communality value of 0.469, Q.11 with communality value 0.453, Q.15 with communality value 0.459, Q.21 with communality value 0.474 and Q.27 with communality value of 0.460. From (annexure-II) six variables (easy navigate, lot of effort, good color scheme, service representative, exactly promised, available all time) were identified whose values are below 0.5. So these six variables were removed from the analysis.

The most appropriate way to split the variables into different dimensions (factors) can be found by analyzing the data presented into (annexure-III) of the Rotated Component Matrix.

The Rotated Component Matrix shows the correlation between each variable (row) and the different factors (column). Each variable should pertain to that factor with which it correlates best. In case one

variable has similar correlation values to more than one factor, this means that the variable pertains almost equally well to few factors which implied that the variable itself is not very clearly defined and as such can be dismissed from the factor model. For convenience, the rotated component matrix included in (annexure-III).

Looking at the data presented in the rotated component matrix, it can be observed that the following variables are best correlated to the first factor meaning that the highest percentage of the variance of these variables is explained by the first factor and as such they should be grouped together to represent that factor: Q.17 (77.4%); Q.19 (72.4%); Q.18 (61.4%); Q.16 (60.4%). All of these values meet the favorable level of 60% for factor loadings in likert scale cases.

Following the same reasoning, the following variables correlate best to and should be grouped together to represent the second factor: Q.7 (73.0%); Q.6 (65.1%); Q.9 (58.4%); Q.10 (55.9%); Q.2 (55.6%) and Q.8 (55.4%). Q7 and Q6 meet the favorable level of 60% for factor loadings in likert scale cases. Q.9 with 58.4%, Q.10 with 55.9 % and Q.8 with 55.4% are relatively close to 60% and can be considered to be explained enough from the second factor. Furthermore, although the communalities values for Q.10, Q.2 and Q.8 are a bit lower than

0.5, because of the good correlations (higher than 50%) presented in the rotated component matrix, these items have been retained in the model. The third factor should include the following variables which best correlate to this factor: Q.23 (72.2%); Q.24 (69.0%); Q.31 (57.9%) and Q.26 (56.9%). Both values for Q.23 and Q.24 meet the

favorable level of 60% for factor loadings in likert scale cases. Whereas Q.31 with 57.9 %and Q.26 with 56.9% are relatively close to 60% and can be considered to be explained enough from the third factor.

The forth factor should include the following variables which best correlate to this factor: Q.12 (71.8%); Q.22 (53.0%) and Q.13 (51.4%). values for Q.12 meet the favorable level of 60% for factor loadings in likert scale cases. although the communalities values for Q.22 and Q.13 are a bit lower than 0.5, because of the good correlations (higher than 50%) presented in the rotated component matrix, these items have been retained in the model.

Finally, the fifth factor should be represented by the following variables: Q.32 (53.9%); Q.30 (52.0%); Q.29 (51.3%) and Q.20 (51.0%). All the communalities values for Q.32; Q.30; Q.29 and Q.20 are a bit lower than 0.5, because of the good correlations (higher than 50%) presented in the rotated component matrix, these items have been retained in the model.

Furthermore, according to the data presented in the rotated component matrix, five variables Q.3, Q.5, Q.28, Q.14 and Q.25 are dismissed from the model, Out of these five variables, four variables Q.3, Q.28, Q.14 and Q.25 as they are not contributing to any of the factor implying that, these variables are not clearly defined. Whereas Q.5 has correlation values are almost equal for two factors, so the researcher decided to drop this variable also. Thus Q.3, Q.28, Q.14, Q.5 and Q.25 variable are dismissed by the researcher for the study.

The first variable Q.3, which has correlation value of 43.3% for first factor and 39.0% for fourth factor, These numbers show that this variable does not only correlate almost equally well with the first and the second factors, but these correlation values are also pretty low – all of them are below 50%, indicating that each of the factors explains less than 50% of this variable. Thus Q.3 is not included in the study.

The second variable Q.28, which has correlation value of 41.7% for first factor, 39.5% for second factor and 34.0% for fifth factor, These numbers show that this variable does not only correlate almost equally well with the first, second and the fifth factors, but these correlation values are also pretty low – all of them are below 50%, indicating that each of the factors explains less than 50% of this variable. Thus Q.28 is not included in the further.

The third variable Q.14, which has correlation value of 36.1% for first factor and 49.2% for third factor, These numbers show that this variable does not only correlate almost equally well with the first and the third factors, also these correlation values are also pretty low – all of them are below 50%, indicating that each of the factors explains less than 50% of this variable. Thus Q.14 is not included in the study.

The fourth variable Q.25, which has correlation value of 32.5% for fourth factor and 47.2% for fifth factor, These numbers show that this variable does not only correlate almost equally well with the fourth and the fifth factors, also these correlation values are also pretty low – all of them are below 50%, indicating that each of the factors explains less than 50% of this variable. Thus Q.25 is not included in the study.

The fifth variable Q.5, which has correlation values of 51.5% with first factor and 53.6% with fourth factors, meaning that this variable is equally well explained by both these factors. so Q.5 is also dropped from the study.

Furthermore, the column total under initial eigen values in the (annexure-IV) total variance explained shows different eigen values - what amount of the variance in all variables is explained by the corresponding number of components (dimensions in this case). One of the methods for extraction when performing Principal Component Analysis and used in this study is the Kaiser's criterion, according to which the number of factors to be extracted equals the number of eigen values higher than 1. In this case, there are five such number, meaning that five factors should be extracted from the whole data set. The (annexure-IV) also shows that 37.336% of the total variance in all the variables of the model is explained by one factor, 43.294% of their variance is explained by two factors, 47.989% of the total variance of all variables is explained by three factors, 52.252% of the total variance of all variables is explained by fourth factors and fifth factors explain 55.980% of the total variance of all variables pertaining to the theoretical model. Kaiser's criterion was used to decide the number of dimensions to retain. Considering Kaiser's criterion, an Eigen value of more than one; and the meaningfulness, usefulness and conceptual soundness of a factor (Pett et. al., 2003)<sup>123</sup>, five dimensions (principle factors) were selected. All the 21 variables (questions) are regrouped to form only four mobile banking service quality dimensions along with satisfaction dimension.

The questions pertaining to the first mobile banking service quality dimension are four and at first sight seem to be quite different in content. The questions related to first dimension are- ‘I feel safe in my transactions while doing mobile banking’; ‘I have full trust in my bank's Mobile banking services’; ‘I am sure that Bank does not misuse my personal information’ ;‘I Feel secure in providing sensitive information while doing mobile banking transaction’. Reviewing carefully the content of these questions, it can be observed that all of them consider different aspects of the assurance & security of the mobile banking services –no misuse of personal information, full trust in bank’s mobile banking services, feel safe while doing transaction and feel secure while providing sensitive information. Based on this reasoning, the researcher has decided to label this quality dimension as *MobileBanking-Assurance&Security*.

Looking at the questions included in the second mobile banking service dimension are -‘Mobile Banking transaction /services are very simple and easy to use’; ‘The interaction with the mobile banking systems is clear and understandable’; ‘Mobile Banking creates a positive experience for me’; ‘Mobile Banking enables me to complete a banking transaction quickly’; ‘Using Mobile Banking saves time compared to going to Branch, ATM or using computer’; ‘It is easy to look for banking information’. Looking at the questions included in the second quality dimension, all of them concern issues related to the Efficiency and convenience. Based on this, the researcher labeled this quality dimension *MobileBanking-Efficiency&Convenience*.

Observing at the questions included in the third mobile banking service dimension are - 'My mobile banking transaction are processed accurately'; 'My mobile banking meet my expectations' ; 'My mobile banking provides accurate records of all my transactions' ; 'All my mobile banking relevant transaction confirmation details are sent by sms or e-mail within 24 hours'. Looking at the questions included in the third quality dimension, all of them concern issues related to the Reliability. Based on this, researcher labeled this quality dimension *MobileBanking-Reliability*.

Lastly by studying at the questions included in the fourth mobile banking service dimension are -'If there is a mistake my mobile banking make it right quickly and effectively'; 'my mobile banking provides prompt responses if my transaction is not processed'; 'The Bank quickly resolve Mobile Banking related problems'. All the three questions concern the prompt responses from the bank to customer's requests in the form of prompt response, resolve problems quickly. Based on the contents of these questions, the researcher considers the response of the bank with its customers and that is why the fourth dimension has been labeled *MobileBanking-Responsiveness*.

Finally, as far as the satisfaction dimension is concerned, the questions are – 'I will recommend my friend to start using mobile banking at earliest'; 'I am satisfied with mobile banking services provided by the bank'; 'I think I did right to use mobile banking'; 'The bank's name is well-known and has good reputation so I have full confidence in the bank's mobile banking services'. As such these questions are considered to evaluate the satisfaction of the users of

mobile banking. Based on this reasoning the researcher labeled this dimension as *MobileBanking- Satisfaction*. Thus the mobile banking service quality, four dimensions are depicted in figure 6.2. Cronbach's Alpha Test of Reliability on dimensions of the Mobile Banking Service Quality: Applying Cronbach's Alpha Test of Reliability test specifies whether the items pertaining to each dimension are internally consistent and whether they can be used to measure the same construct. From table 6.13, all five dimensions including mobile banking satisfaction, are having value between 0.673 to .859, which is considered acceptable for the factor to be reliable (Hair et al., 2006)<sup>54</sup>.



**Table 6.13 : Cronbach's Alpha for Mobile Banking Service Quality Dimensions and its Factor Loading.**

<b>Dimension</b>	<b>Measurement Item</b>	<b>Factor Loading<sup>a</sup></b>
<b>MobileBanking-Assurance &amp; Security</b>  (Cronbach's Alpha: 0.859)	I feel safe while doing my mobile banking transactions.	77.4
	I have full trust in my bank's Mobile banking services.	72.4
	I am sure; bank does not misuse my personal information.	61.4
	I feel secure in providing sensitive information while doing mobile banking transaction.	60.4
<b>MobileBanking-Efficiency &amp; Convenience</b>  (Cronbach's Alpha: 0.798)	Using Mobile Banking saves time compared to going branch/ATM.	73.0
	Mobile Banking makes transactions easier, for example transferring funds, bill payments etc	65.1
	The interaction with the mobile banking systems is clear and understandable.	58.4
	Mobile Banking creates a positive experience for me	55.9
	Mobile banking enables me to complete transaction quickly	55.6
	It is easy to look for banking information while using mobile banking.	55.4
<b>MobileBanking-Reliability</b>  (Cronbach's Alpha: 0.775)	My mobile banking transactions are processed accurately.	72.2
	My mobile banking provides accurate records of my transactions.	69.0
	My mobile banking meets my expectations.	57.9
	My Mobile banking transactions' confirmation details are sent by SMS / email immediately.	56.9
<b>MobileBanking-Responsiveness</b>  (Cronbach's Alpha: 0.673)	The Bank quickly resolves Mobile Banking related problems.	71.8
	If there is any mistake, my mobile banking make it correct quickly.	53.0
	My mobile banking provides prompt responses if my transaction is not processed.	51.4
<b>MobileBanking-Satisfaction</b>  (Cronbach's Alpha: 0.784)	I will recommend my friend to start using mobile banking provided by my bank.	53.9
	Overall I am satisfied with my mobile banking services	52.0
	I think I did the right thing to choose my mobile banking.	51.3
	The bank's name is well-known and has good reputation, so I have full confidence in the bank's mobile banking services.	51.0

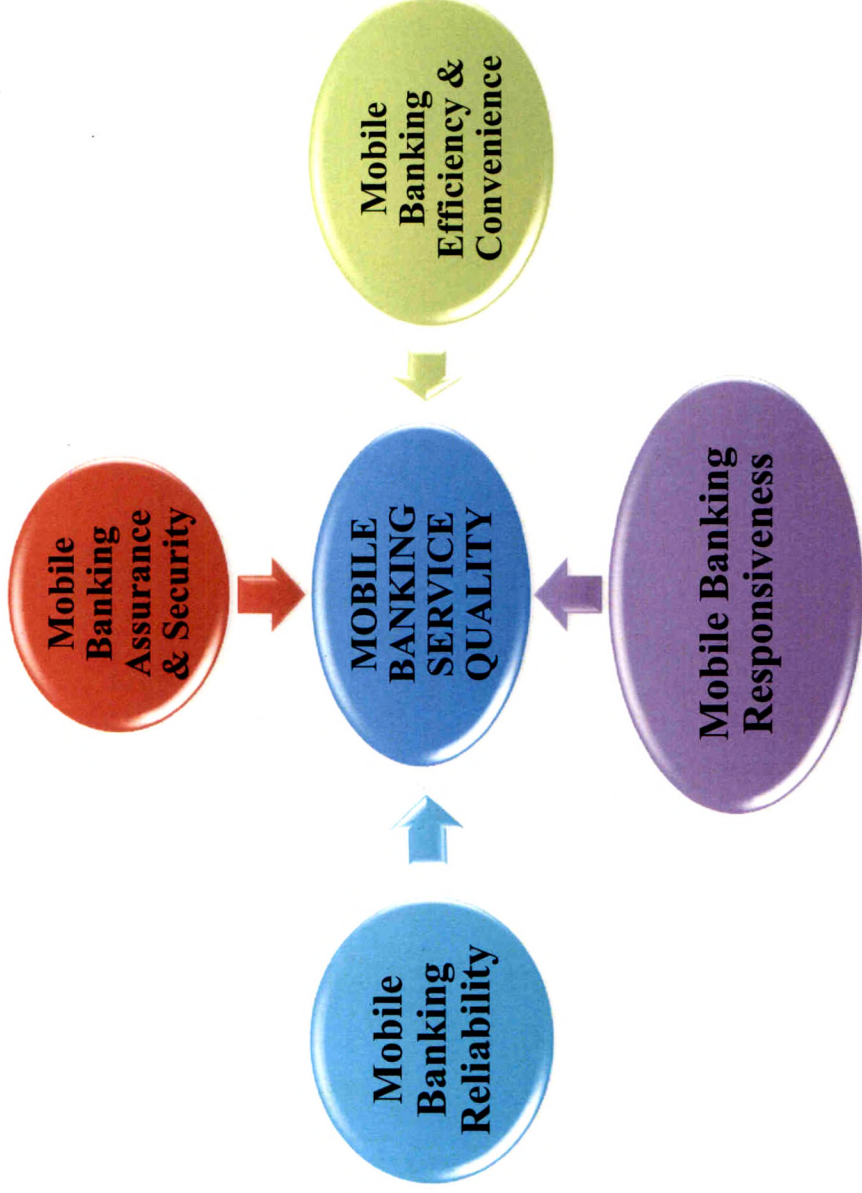
<sup>a</sup> number are the magnitude of factor loading multiplied by 100.  
The percentage of variance extracted by five factors is 55.98%.

These five dimensions with 21 items for identifying mobile banking service quality and satisfaction were identified are *MobileBanking-Assurance&Security*; *MobileBanking-Efficiency&Convenience*; *MobileBanking-Responsiveness*; *MobileBanking-Reliability*; *MobileBanking-Satisfaction*. These new dimensions are defined and review the content of the variables labeled in a meaningful way. (Table 6.14)

**Table 6.14: Definition of Mobile Banking Service Quality Dimensions and Satisfaction.**

<b>Dimension I - <i>Mobile Banking Assurance&amp;Security</i>:</b> Assurance is defined as customer perception of the confidence and trust towards the mobile banking services. Security can be defined as the degree to which the mobile banking service is safe and protects customer information. Thus security always results into assurance.
<b>Dimension II - <i>Mobile Banking Efficiency&amp;Convenience</i>:</b> Service is simple to use, and requires minimum efforts. Also the customer can use anywhere anytime banking services with speed.
<b>Dimension III - <i>Mobile Banking Reliability</i>:</b> Mobile Banking Reliability refers to the probability that services will satisfactorily perform as intended and consistently produces the same results.
<b>Dimension IV - <i>Mobile Banking Responsiveness</i>:</b> Mobile Banking Responsiveness refers to customer perception of getting the communication and help when needed by the customer.
<b>Dimension V - <i>Mobile Banking Satisfaction</i>:</b> Mobile Banking satisfaction means how well the services provided by the bank meet user's expectations.

**Figure 6.1: Mobile Banking Service Quality Dimensions**



**6.5.2 *A Measurement Model for Service Quality of Mobile Banking for Public and Private Sector Banks in Indore Using Confirmatory Factor Analysis (CFA).***

In the next stage the researcher conducted confirmatory factor analysis using AMOS software to further confirm the factors derived from exploratory factor analysis of mobile banking service quality on sample-II. In Confirmatory factor analysis, the measurement model is proposed to evaluate the goodness of fit, construct reliability and construct validity of the identified dimensions/constructs is tested.

**Confirmatory Factor Analysis:** After identifying five dimensions through exploratory factor analysis, the next stage is to confirm the factor structure for mobile banking service quality in public and private sector banks in Indore on sample-II. Structural Equation Modeling (SEM) using AMOS 18.0 was used to perform the confirmatory factor analysis.

CFA is a technique used to estimate the measurement model. It seeks to confirm if the number of factors (or constructs) and the loading of observed (indicator) variables on them confirm to what is expected on the basis of theory. Confirmatory factor analysis revealed that the measurement items loaded in accordance with the pattern revealed in the exploratory factor analysis.

CFA model is first specified to account for the measurement relationships from latent (dimension) to observable variables. Further, measurement model is build in order to evaluate the goodness-of-fit, reliability and validity. Measurement model represents the theory that specifies the observed variables for each construct and permits the

assessment of construct validity. In our case, the latent variables are the five dimensions and the observed variables are the 21 items for measuring mobile banking service quality and satisfaction. In this measurement model, 17 observed variables for service quality attributes perceived by the customers of public and private sector banks and 4 variables for measuring satisfaction are considered. The relationships among latent variables cannot be tested until a well-fitting CFA model has been reached. For evaluating the goodness-of-fit, reliability and validity of the measurement model, the sample size is 254, which is satisfactory, as it is around 12 cases per measured variable. (Bentler and Chou, 1987)<sup>18</sup>.

In order to test the measurement model the researcher freely correlate the five constructs and fix the factor loading of one indicator per construct to a value of unity. All measured indicators are allowed to load on only one construct each, and the error terms are not allowed to correlate with each other. The measurement model constructed in AMOS software is described in figure 6.3 contains seventeen variables for mobile banking service quality and four variables for satisfaction. The measurement model consists of five constructs and each construct is measured by observed variables. *MobileBanking-Assurance&Security* construct is measured by four observed variables; *MobileBanking-Efficiency&Convenience* construct is measured by six observed variables; Construct *MobileBanking-Reliability* is measured by four observed variables;

Construct *MobileBanking-Responsiveness* is measured by three observed variables and construct *MobileBanking-Satisfaction* is measured by four observed variables.

This modeling sequence stresses the importance of the goodness of fit assessment and of the re-specification of bad-fitting models. To assess the fit of measurement model, the analysis relied on a number of descriptive fit indices, which included the relative chi-square ( $\chi^2/df$ ), comparative fit index (CFI), Tucker- Lewis coefficient (TLI) or Non-normed fit index (NNFI) and root mean square error approximation (RMSEA).

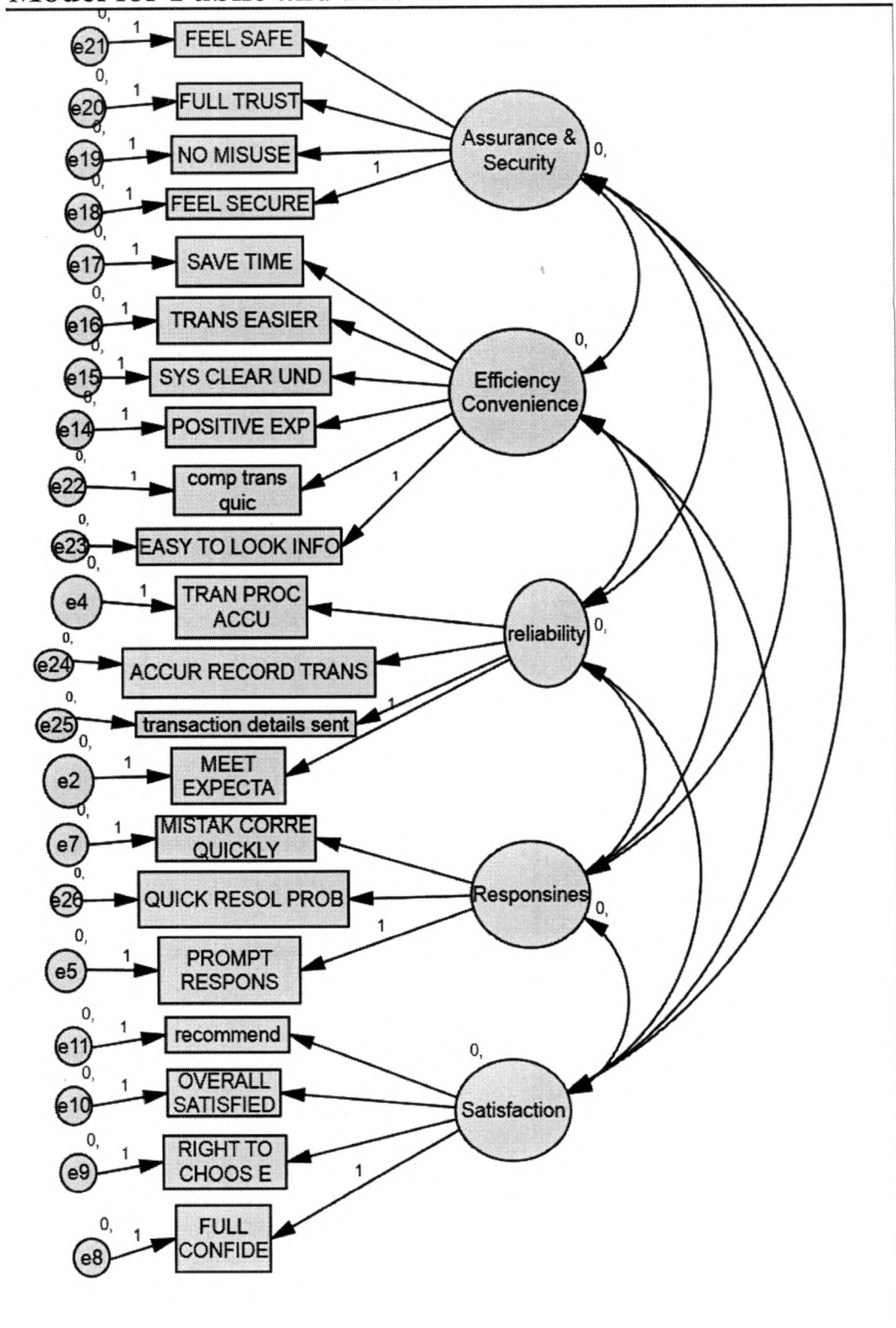
Values from the measurement model's goodness-of-fit for the public and private sector banks are determined using a variety of indices.

These goodness-of-fit statistics for initial measurement model is summarized in **table 6.15**.

**Table 6.15: Goodness of Fit Statistics (Initial Measurement Model)**

Degree of Freedom (df)	179
Chi-Square $\chi^2$ Discrepancy at p=0.000	383.402
Normed chi-square ( $\chi^2/df$ )	2.142
Root Mean Square Error of Approximation(RMSEA)	0.067
Normed Fit Index(NFI)	0.868
Non- Normed Fit Index(NNFI or TLI)	0.911
Comparative Fit Index(CFI)	0.924

**Figure 6.2 : Mobile Banking Service Quality Measurement Model for Public and Private Sector Banks of Indore**



The Chi-Square  $\chi^2$  value is the traditional measure for evaluating overall model fit and, 'assesses the magnitude of discrepancy between the sample and fitted co-variances matrices' (Hu and Bentler, 1999)<sup>66</sup>. A good model fit would provide an insignificant result at a 0.05 threshold (Barrett, 2007)<sup>14</sup>, thus the Chi-Square statistic is often referred to as either a 'badness of fit' (Kline, 2005)<sup>83</sup> or a 'lack of fit' (Mulaik et al, 1989)<sup>108</sup> measure.

As shown in table 6.15, the chi-square ( $\chi^2$ ) value for measurement model developed for the study is 383.402 which are significant at  $p < .0001$  suggesting model rejection. However, due to the sensitivity of chi-square to the sample size, it is inappropriate to be used as a measure of goodness-of-fit (Hatcher, 1994)<sup>64</sup>. Instead, several researches indicate the appropriateness of using the normed chi-square test instead. Normed chi-square ( $X^2/df$ ), which is the ratio of chi-square to the degree of freedom is 2.142 less than three, recommended by Bagozzi and Yi (1988)<sup>10</sup>, Hu and Bentler (1999)<sup>66</sup>.

The Root mean-square-error-of-approximation (RMSEA) tells us how well the model, with unknown but optimally chosen parameter estimates would fit the population covariance matrix (Byrne, 1998)<sup>26</sup> RMSEA was used in the analysis of the residuals (Hatcher, 1994)<sup>64</sup>. In this study the value of RMSEA is 0.067, which is very close to the recommended 0.06 by Hu and Bentler(1999)<sup>66</sup> thus indicating a good fit model.

The Normed Fit Index (NFI): Bentler and Bonnet, (1980)<sup>19</sup>. This NFI statistic assesses the model by comparing the  $\chi^2$  value of the model to the  $\chi^2$  value of the null model. The null/independence model is the



worst case scenario as it specifies that all measured variables are uncorrelated. Values for this statistic range between 0 and 1 with Bentler and Bonnet (1980)<sup>19</sup> recommending values greater than 0.90 indicating a good fit. More recent suggestions state that the cut-off criteria should be  $NFI \geq .95$  (Hu and Bentler, 1999)<sup>66</sup>. In this case an NFI value is 0.868 which is acceptable as it is closer to the recommended value.

As Bentler Comparative Fit Index (CFI) and Non-Normed Fit Index (NNFI) (sometimes labeled the Tucker Lewis Index) were shown to be independent of sample size (Gerbing and Anderson, 1988)<sup>56</sup>, both were used to measure the model's goodness-of-fit. The Comparative Fit Index (CFI: Bentler, 1990)<sup>17</sup> is a revised form of the NFI which takes into account sample size (Byrne, 1998)<sup>26</sup> that performs well even when sample size is small (Tabacnick and Fidell, 2007)<sup>150</sup> this statistic assumes that all latent variables are uncorrelated (null/independence model) and compares the sample covariance matrix with this null model. A value of  $CFI \geq 0.95$  is presently recognized as indicative of good fit (Hu and Bentler, 1999)<sup>66</sup>. In this study, CFI value is 0.924 and NNFI value is 0.911, which is exceeding the cut-off of 0.90, indicating a very good incremental fit. In order to improve the initial measurement model fit statistics, the researcher identified five items from the measurement model whose loadings are below 0.65 and they are 'All my mobile banking relevant transaction confirmation details are sent by sms or e-mail within 24 hours' item loading 0.59, 'My mobile banking provides accurate

records of all my transactions' whose loading is 0.49 on *MobileBanking-Reliability* latent construct and 'It is easy to look for banking information' item loading 0.59, 'Using Mobile Banking saves time compared to going to branch, ATM or using computer' whose loading is 0.64 on the construct *MobileBanking-Efficient&Convenience*. One item is also drop from *MobileBanking-Responsiveness* latent construct called 'The Bank quickly resolves mobile banking related problem's whose factor loading is 0.59. Thus the researcher drops these five items from the initial measurement model for improvement.

Gerbing and Anderson (1984)<sup>56</sup> explains the concept of correlation of error terms, as it means that there is some other issue that is not specified within the model that is causing the covariance. Correlating within-factor error is easier to justify than across latent variable correlations. From the covariance (**annexure-V**), higher values are the actual concern which affects the model fit. The researcher identify error maximum covariance between error terms e18, e19, e20 and e21. The corresponding values between errors are e19 covariate with error e21 at value of 55.056; error e19 covariate with error e20 having modification indices value 22.031; error e18 to e19 is 12.582; e8 and e20 is 17.275.

In order to further improve the model fit statistics, the researcher correlate the error terms e21 with e18 and e19 with e20. Whereas e8 is not covariate with e20 as both the errors belongs to different constructs like e8 belongs *MobileBanking-Satisfaction* construct and e20 belongs to *MobileBanking-Assurance&Security* construct. After

covariating the errors e19 with e20 and e18 with e21 the new measurement model is shown in figure 6.4.

Based on the modification indices from (**annexure-V**), five items from the initial measurement model were deleted, after 11 iterations to bring down the RMSEA from .080 to approach the required threshold of 0.064 for an adequately fit model in the revised model as shown in figure 6.4. The overall fit statistics for the final measurement model for 16-item goodness of fit statistics is summarized in **table 6.16**.

**Table 6.16: Goodness of Fit Statistics (Final Measurement Model)**

Degree of Freedom (df)	92
Minimum Fit function Chi-Square $\chi^2$ (p=0.000)	186.152
Normed chi-square ( $\chi^2/df$ )	2.023
Root Mean Square Error of Approximation(RMSEA)	0.064
Normed Fit Index(NFI)	0.924
Non- Normed Fit Index(NNFI or TLI)	0.947
Comparative Fit Index(CFI)	0.960

Values from the **table 6.16** for the final measurement model's goodness-of-fit for the public and private sector banks are determined. The chi-square ( $\chi^2$ ) value is 186.152 which are significant at  $p < .0001$ . Normed chi-square ( $\chi^2/df$ ), which is the ratio of chi-square to the degree of freedom 2.023 is less than three recommended by Bagozzi and Yi (1988)<sup>10</sup>, Hu and Bentler (1999)<sup>66</sup>. Value of RMSEA is 0.064, which is very close to the recommended 0.06 by Hu and

Bentler (1999)<sup>66</sup> thus indicating a good fit model. NFI values are 0.924 which above the recommended value 0.90. CFI value is 0.960 and NNFI value is 0.947, which is exceeding the cut-off of 0.90, indicating a very good incremental fit. Thus all the indicators of goodness of fit have improved in the final measurement model for mobile banking service quality for public and private sector banks. Thus the final mobile banking service quality dimensions and its variables are shown in **table 6.17**.

The measurement model is further assessed for composite reliability and Construct validity.

**Composite reliability (CR)** is defined as the total amount of true score variance in relation to the total score variance. It is assessed using the composite reliability index proposed by Hatcher (1994)<sup>64</sup>.

CR is computed as

$$CR = \frac{(\sum_{i=1}^p \lambda_i)^2}{(\sum_{i=1}^p \lambda_i)^2 + (\sum_{i=1}^p \delta_i)}$$

Where

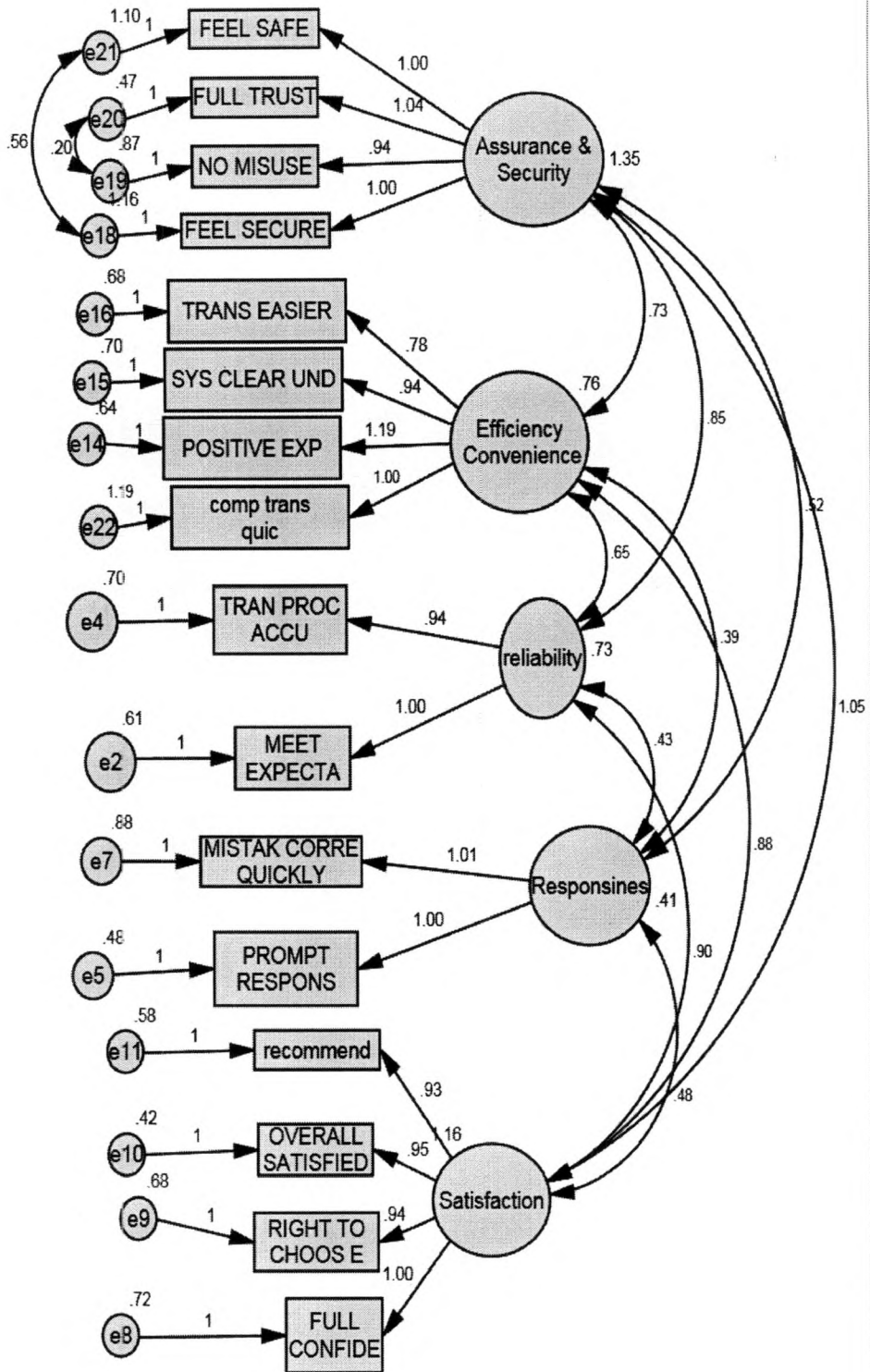
CR = composite reliability

$\lambda$  = completely standardized factor loading

$\delta$  = error variance

p = number of indicators or observed variables.

Figure 6.3: Mobile Banking Final Measurement Model



**Table 6.17: Mobile Banking Service Quality Dimensions and its Items According to Final Measurement Model**

<b>Dimension</b>	<b>Measurement Item/variable</b>
<b>MobileBanking-Assurance &amp; Security</b>	I feel safe while doing my mobile banking transactions.
	I have full trust in my bank's Mobile banking services.
	I am sure; bank does not misuse my personal information.
	I feel secure in providing sensitive information while doing mobile banking transaction.
<b>MobileBanking-Efficiency &amp; Convenience</b>	Mobile Banking makes transactions easier, for example transferring funds, bill payments etc.
	The interaction with the mobile banking systems is clear and understandable.
	Mobile Banking creates a positive experience for me.
	Mobile banking enables me to complete transaction quickly.
<b>MobileBanking-Reliability</b>	My mobile banking transactions are processed accurately.
	My mobile banking meets my expectations.
<b>MobileBanking-Responsiveness</b>	If there is any mistake, my mobile banking make it correct quickly.
	My mobile banking provides prompt responses if my transaction is not processed.
<b>MobileBanking-Satisfaction</b>	I will recommend my friend to start using mobile banking provided by my bank.
	Overall I am satisfied with my mobile banking services.
	I think I did the right thing to choose my mobile banking.
	The bank's name is well-known and has good reputation, so I have full confidence in the bank's mobile banking services.

As a general guideline, composite reliability of 0.70 or higher is recommended (Nunnally and Bernstein, 1994)<sup>110</sup>. The composite reliability for all the factors in **table 6.18** is ranging above the cutoff from 0.70 to 0.88. Only *MobileBanking-Responsiveness* construct value is 0.56 which is below the recommended 0.70 cut-off (Nunnally and Bernstein, 1994)<sup>110</sup>. Though the *MobileBanking-Responsiveness* construct value is little less than required cutoff, still researcher continue to considering the construct for further analysis considering

importance of this construct in comparing mobile banking service quality of public sector and private sector banks.

**Table 6.18: Composite Reliability and Construct Validity for Mobile Banking Service Quality and Satisfaction.**

			<b>Correlation Matrix For Mobile Banking Service Quality Dimensions</b>				
<b>Dimensions</b>	<b>C.R.</b>	<b>AVE</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1. Reliability</b>	0.70	0.51	<b>0.71</b>				
<b>2. Responsiveness</b>	0.56	0.40	0.62	<b>0.63</b>			
<b>3. Satisfaction</b>	0.88	0.64	0.96	0.49	<b>0.80</b>		
<b>4. Efficiency&amp;Convenience</b>	0.78	0.50	0.77	0.48	0.87	<b>0.71</b>	
<b>5. Assurance&amp;Security</b>	0.86	0.60	0.71	0.50	0.71	0.51	<b>0.77</b>
C.R. = Construct Reliability, AVE= Average Variance Extracted							

**Construct Validity** occurs when the theoretical constructs accurately represent the real-world situations they are intended to model. Construct validity of measurement model is an assessment of the quality of model. In absence of measurement models construct validity; researcher may likely draw incorrect conclusions from the research. The construct validity is analyzed together by convergent validity and discriminant validity from **table 6.18**.

**Convergent validity** measures the extent to which the items of the construct correlates positively with the other items of the same construct. The size of the factor loading provides the evidence of convergent validity. Higher factor loading indicates that the observed items converge on the same construct. Loading of 0.7 or higher indicates that the construct is explaining 50 percent or more of the variation in the observed variable/items. From **Table 6.13** all factor loading are higher than 50 percent which indicates that the observed

variables/items converge on the same construct. Another measure used to calculate convergent validity is Average variance extracted (AVE). According to (Fornell and Larcker, 1981)<sup>50</sup> AVE is defined as the variance in the indicator or observed variables (in this research items) that explained by the latent construct (in this study dimensions). AVE varies from 0 to 1 and it represents the ratio of the total variance that is due to the latent variables. It is calculated as:

$$AVE = \frac{\sum_{i=1}^p \lambda_i^2}{\sum_{i=1}^p \lambda_i^2 + \sum_{i=0}^p \delta_i^2}$$

AVE= average variance extracted

$\lambda$ = completely standardized factor loading

$\delta$ =error variance

p = number of indicators or observed variables

AVE is calculated for the latent construct/ dimensions. The AVE values for all the constructs is ranging from 0.51 to 0.64 as recommended minimum of 0.50 (Hair et. al., 1992)<sup>60</sup>, here only responsiveness construct value is 0.40 which is less than the recommended value 0.50.

**Discriminant validity** is the degree to which measures of distinct concepts differ (Bagozzi and Phillips, 1982)<sup>11</sup>. According to (Malhotra & Satyabhushan, 2011)<sup>102</sup> in order to establish discriminant validity, researcher must show that the construct is distinct from other constructs and thus makes a unique contribution. First, individual



observed variables/items should load on only one latent construct. Cross loadings indicate lack of distinctiveness and present potential problems in establishing discriminant validity. Discriminant validity occurs where constructs that are expected not to relate, such that it is possible to discriminate between these constructs. Convergence and discrimination are often demonstrated by correlation of the measures used within constructs.

The discriminant validity of the measurement model is achieved by comparing the average variance extracted (AVE) with the corresponding inter-construct squared correlation estimates, if the square root of the average variance extracted is larger than the correlation coefficients( Fornell and Larcker,1981).<sup>50</sup>

The **table 6.18** shows the shared variance between factors which are lower than the average variance extracted by the individual factors, which confirms discriminant validity. Values on the diagonal of the correlation matrix represent the square root of the AVE. The researcher compares the correlation between the construct with their respective square root of AVE. It can be observed from **table 6.18** that AVE values for the dimensions *MobileBanking-Reliability; MobileBanking-Satisfaction; MobileBanking-Efficiency&Convenience ; MobileBanking-Assurance&Security* is within the specified range i.e. below the correlation between the construct with their respective square root of AVE. Discriminant validity is achieved in all the dimensions except responsiveness where the correlation between the construct with their respective square root of AVE is little more in

case of *MobileBanking-Satisfaction*, *MobileBanking-Efficiency&Convenience* .

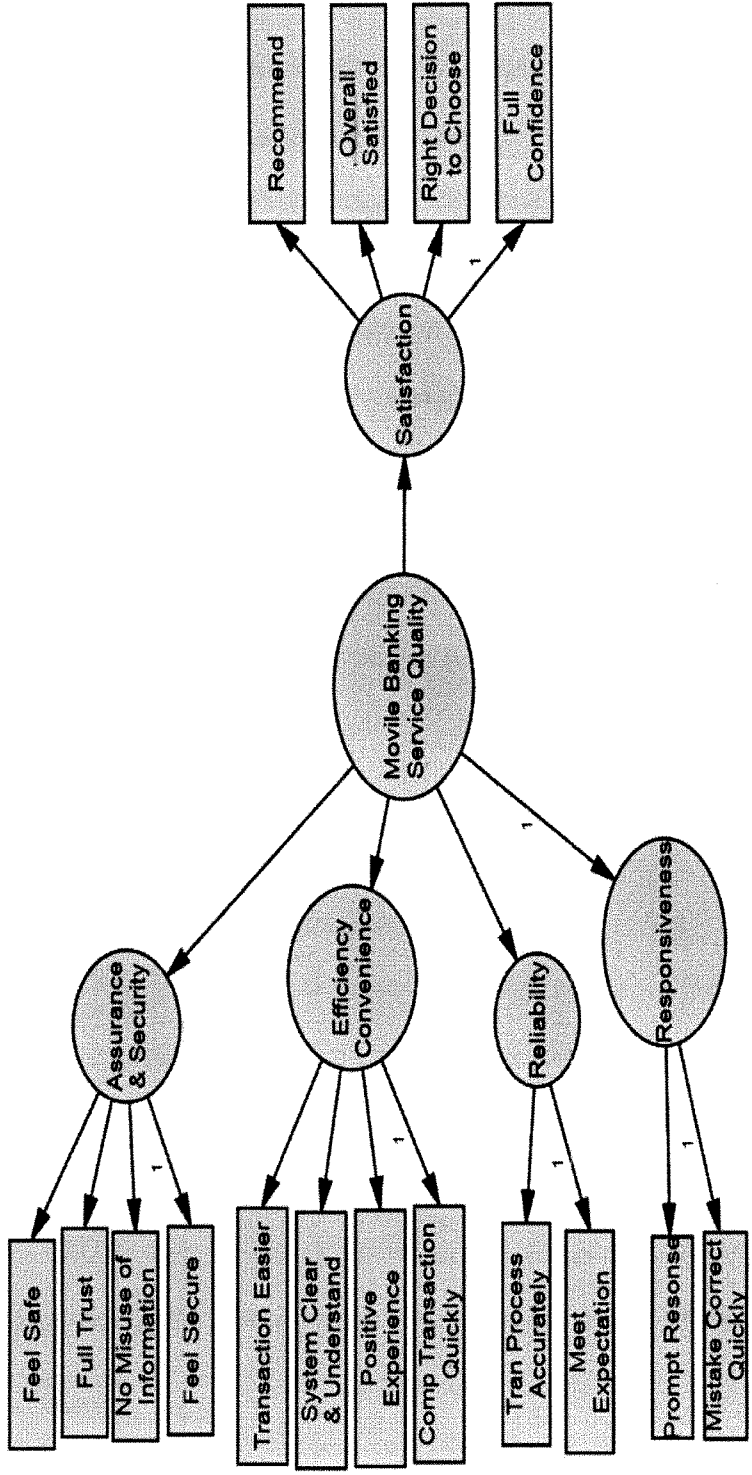
Thus, the measurement model for measuring *Mobile Banking Service Quality* and *Satisfaction* for public and private sector banks has achieved acceptable construct validity and reliability. Based on the theoretical consideration and above confirmed measurement model, the researcher hypothesized *Mobile Banking Service Quality* as higher order construct consisting of four dimensions *MobileBanking-Assurance&Security*; *MobileBanking-Efficiency&Convenience*; *MobileBanking-Responsiveness*; *MobileBanking-Reliability*; *MobileBanking-Satisfaction*. In figure 6.5 Rectangular and circular symbols are for observed/items and unobserved variables/dimensions respectively. A single headed arrow show dependencies between dimensions and observed item. Thus these four dimensions are the indicator of *Mobile Banking Service Quality* of public and private sector banks in Indore. Whereas *Mobile Banking Satisfaction* dimension indicates that it is receiving the arrow head from *Mobile Banking Service Quality*. Thus *Satisfaction* depends on *Mobile Banking Service Quality*.

The proposed second order structure equation model for mobile banking service quality and satisfaction is shown in figure 6.5. The entire second order structure model have five constructs and all the measured items are allowed to load only on one construct and the error terms are not allowed to correlate with each other. It can be

observed that arrows flows from *Mobile Banking Service Quality* to dimensions of mobile banking service quality.

Also the second order *Mobile Banking Service Quality* is linked with *MobileBanking-Satisfaction*. The latent construct/dimension, *MobileBanking-Satisfaction* is the indicator of degree of satisfaction among mobile banking users and this variable depends on *Mobile Banking Service Quality* construct, which is measured by four latent constructs *MobileBanking-Assurance&Security* ;*MobileBanking-Efficiency&Convenience*; *MobileBanking-Responsiveness*; *MobileBanking-Reliability*. *Mobile banking Service Quality* depends on *MobileBanking-Assurance&Security*; *MobileBanking-Efficiency&Convenient*; *MobileBanking-Responsiveness*; *MobileBanking-Reliability*.

Figure 6.4: Second Order Structure Equation Model for Mobile Banking Service Quality.



## **6.6 Comparison of Service Quality Dimensions of Mobile Banking of Public and Private Sector Banks in Indore**

After proposing the second order structured equation model for *Mobile Banking Service Quality* dimensions and verifying the construct reliability and validity of the proposed model, the researcher now compare the service quality dimensions of mobile banking of public and private sector banks in Indore. For the purpose of comparing, two separate second order structural equation models are proposed, one for public sector bank and another for private sector bank. For this purpose sample-II data (n=254) is considered and it is split into two parts, for public sector bank (n=102) and private sector bank (n=152).

For the purpose of comparing mobile banking service quality of public and private sector bank researcher established a causal relationship based on second order structure equation model for mobile banking service quality. The following null hypotheses will answer the fifth and sixth objectives of the research study formulated for public and private sector banks.

**Null H<sub>1-1</sub>:** *MobileBanking-Assurance&Security* does not have positive and significant influence on overall *Mobile Banking Service Quality* of public sector banks in Indore.

**Null H<sub>1-2</sub>:** *MobileBanking-Assurance&Security* does not have positive and significant influence on overall *Mobile Banking Service Quality* of private sector banks in Indore.

**Null H<sub>2-1</sub>:** *MobileBanking-Efficiency&Convenience* does not have positive and significant influence on overall *Mobile Banking Service Quality* of public sector banks in Indore.

**Null H<sub>2.2</sub>:** *MobileBanking-Efficiency&Convenience* does not have positive and significant influence on overall *Mobile Banking Service Quality* of private sector banks in Indore.

**Null H<sub>3.1</sub>:** *MobileBanking-Reliability* does not have positive and significant influence on overall *Mobile Banking Service Quality* of public sector banks in Indore.

**Null H<sub>3.2</sub>:** *MobileBanking-Reliability* does not have positive and significant influence on overall *Mobile Banking Service Quality* of private sector banks in Indore.

**Null H<sub>4.1</sub>:** *MobileBanking-Responsiveness* does not have positive and significant influence on overall *Mobile Banking Service Quality* of public sector banks in Indore.

**Null H<sub>4.2</sub>:** *MobileBanking-Responsiveness* does not have positive and significant influence on overall *Mobile Banking Service Quality* of private sector banks in Indore.

**Null H<sub>5.1</sub>:** *Mobile Banking Service Quality* does not have positive and significant influence on user's *MobileBanking-Satisfaction* of public sector banks in Indore.

**Null H<sub>5.2</sub>:** *Mobile Banking Service Quality* does not have positive and significant influence on user's *MobileBanking-Satisfaction* of private sector banks in Indore.

In order to hypothesize the causal relationship between the *Mobile Banking Service Quality* dimensions and *MobileBanking-Satisfaction*, structured equation model is drawn and analyzed separately both for public and private sector bank by the help of Amos software package, which are shown in figure 6.6 and 6.7.

The results for goodness of fit statistics, the computed regression weights for the *Mobile Banking Service Quality* model for public and private sector banks are shown in tables 6.24 to 6.26.

The results of the second order structural equation modeling for public sector banks indicate an adequate model fit with the data chi-square ( $X^2 = 223.664$ ,  $df = 99$ , at  $p < 0.001$ ; CFI = .875; TLI = 0.848; IFI = .877; RFI = .757; NFI = 0.800 and RMSEA = .112) as recommended (Hatcher, 1994)<sup>64</sup>, Bagozzi and Yi (1988)<sup>10</sup>, Hu and Bentler (1999)<sup>66</sup>. The value of these indices is within the prescribed range as discussed in measurement model; therefore the model for public sector bank is quite good.

Results of the second order structural equation modeling for private sector banks indicate an adequate model fit with the data chi-square ( $X^2 = 215.901$ ,  $df = 99$ , at  $p < 0.001$ ; CFI = .914; TLI = 0.896; IFI = .916; RFI = .824; NFI = 0.854 and RMSEA = .088) as recommended (Hatcher, 1994)<sup>64</sup>, Bagozzi and Yi (1988)<sup>10</sup>, Hu and Bentler (1999)<sup>66</sup>. The values of these indices are within the prescribed range as discussed in measurement model; therefore the model for private sector bank is also good fit.

Thus it can be observed from **table 6.19** that the tests of the goodness of fit are satisfactory for both: public sector banks and private sector banks. But while comparing on the basis of goodness of fit statistics of both public and private sector banks researcher found that the causal relationship between the mobile banking service quality dimensions and satisfaction is more stronger in case of private sector banks. It means that customer satisfaction of mobile banking users of both: public sector banks and private sector banks are affected by service quality.

**Table 6.19 : Goodness of Fit Indexes**

	Public Sector Bank	Private Sector Bank
Df	99	99
Chi-square $\chi^2$ (Discrepancy)	223.664	215.901
Normed Chi-Square ( $\chi^2 / df$ )	2.259	2.181
Root mean square error of approximation (RMSEA)	.112	.088
Normed Fit Index (NFI)	.800	.854
Non-Normed Fit Index (NNFI or TLI)	.848	.896
Comparative fit index (CFI)	.875	.914

But it is observed in this study, that private sector banks mobile banking users are more sensitive to mobile banking service quality as compared to mobile banking users of public sector banks.

In order to test the hypothesized relationship of the structure model, the researcher examines the significance of individual structural paths representing the impact of one latent construct(dimension) on another or the latent construct(mobile banking service quality) on the observed variable.

Specifically, the parameters estimated (regression weights), the standard error (S.E.), the critical ratio (C.R.), and the level of statistical significance (P) of each variable are reported in tables 6.20 for public sector banks and table 6.21 for public sector banks and private sector banks. Each unstandardized regression coefficient represents the amount of change in the dependent variable (i.e. mobile banking service quality in this study) for each one unit change in the variable predicting it (i.e. mobile banking service quality dimensions in this study). The probability value associated with the hypothesis



that the coefficient values are equal to zero is displayed under P-Level column. The C.R. or Z- value is treated as t-values (Schreiber, J.B., 2006)<sup>141</sup>. The hypothesis is accepted when the t-values or C.R. Values are not in the range of -1.96 to 1.96 (Hair et al., 1998)<sup>62</sup>.

Thus result of regression analysis indicates relationship between service quality with *MobileBanking-Efficiency&Convenience*, *MobileBanking-Assurance&Security*, *MobileBanking-Reliability* and *MobileBanking-Responsiveness*. Also the relationship between *Mobile Banking Service Quality* is identified with *MobileBanking-Satisfaction*. The regression weights for mobile banking service quality model for public sector banks and private sector banks are shown in table 6.20 and table 6.21 respectively.

**Figure 6.5: Second Order Structure Equation Model for Public Sector Banks**

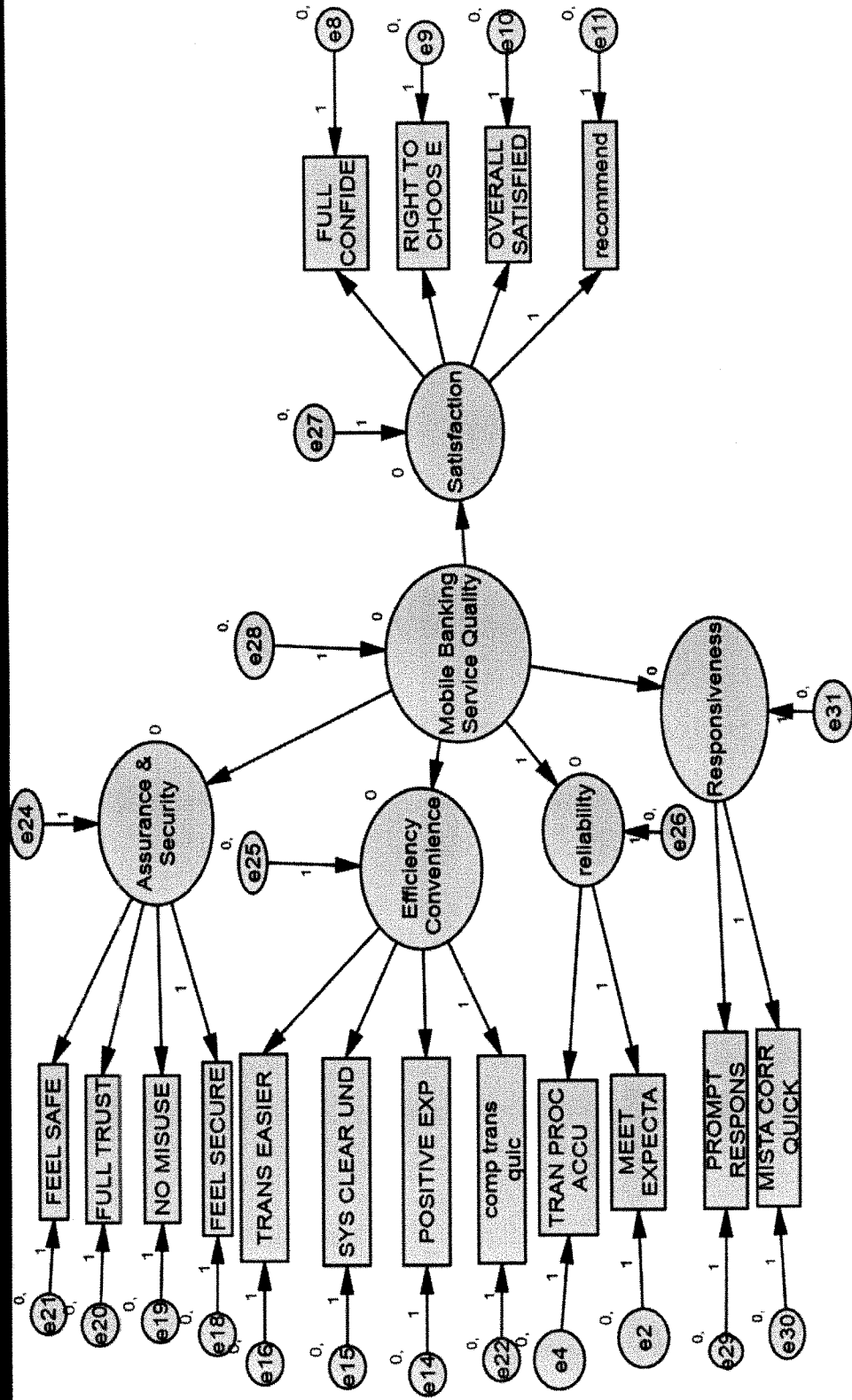
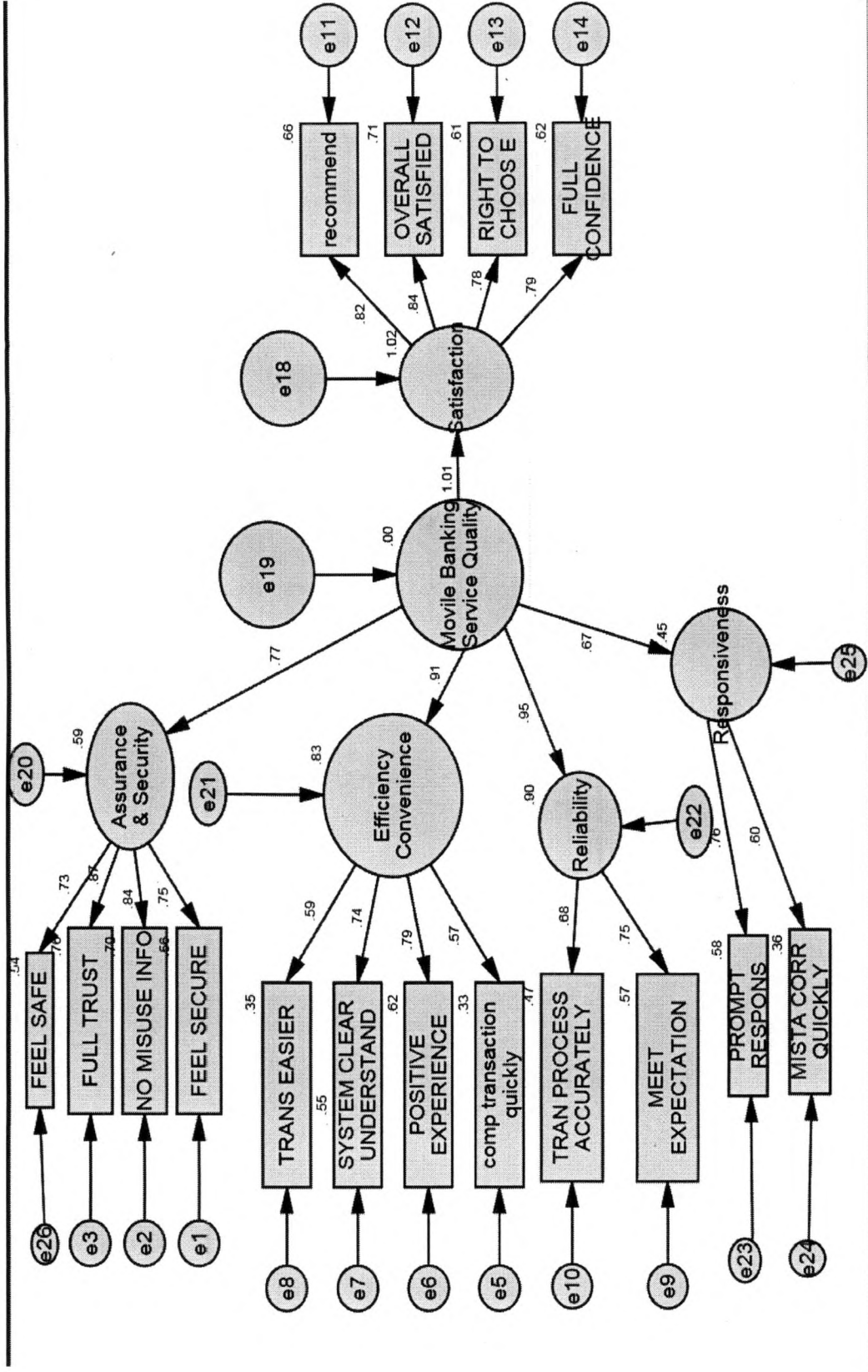


Figure 6.6: Second Order Structured Equation Model for Private Sector Bank



As results shows in table 6.20, public sector banks, *MobileBanking-Assurance&Security* does not have positive and significant influence on overall Mobile Banking Service Quality as  $\beta= 0.850$  and  $z=3.560$ . It means the probability of getting a critical ratio as large as 3.560 in absolute value is less than 0.001. In other words, the regression weight for *MobileBanking-Assurance&Security* in the prediction of Mobile Banking Service Quality is significantly different from zero at the 0.001 level. Thus null hypothesis  $H_{1-1}$  is rejected which means that *MobileBanking-Assurance&Security* has positive and significant effect on *Mobile Banking Service Quality* of public sector banks in Indore.

For Private sector bank (table 6.21)  $H_{2-1}$  *MobileBanking-Assurance&Security* does not have positive and significant influence on overall Mobile Banking Service Quality as  $\beta= 0.768$  and  $z=4.577$ . The probability of getting a critical ratio as large as 4.577 in absolute value is less than 0.001. In other words, the regression weight for *MobileBanking-Assurance&Security* in the prediction of Mobile Banking Service Quality is significantly different from zero at the 0.001 level .Thus null hypothesis  $H_{2-1}$  is rejected which means that *MobileBanking-Assurance&Security* has positive and significant effect on *Mobile Banking Service Quality* of private sector banks in Indore.

**Table 6.20: Regression Weights for Mobile Banking Service Quality of Public Sector Banks**

Unstandardized Estimate						Standardized Estimate
	Estimate	S.E.	C.R. (Z)	P	Estimate (β)	
Satisfaction ← Mobile Banking Service Quality	2.108	.589	3.582	***	.991	
Assurance&Security ← Mobile Banking Service Quality	2.657	.746	3.560	***	.850	
Efficiency&Convenience ← Mobile Banking Service Quality	2.026	.587	3.453	***	.922	
Reliability ← Mobile Banking Service Quality	1.906	.533	3.574	***	1.032	
Responsiveness ← Mobile Banking Service Quality	1.000				.822	
Note : Note = C.R. (Critical Ratio) z = Estimate /S.E. , *** indicates significance at .0001 level						

**Table 6.21: Regression Weights for Mobile Banking Service Quality of Private Sector Banks.**

Unstandardized Estimate						Standardized Estimate
	Estimate	S.E.	C.R. (Z)	P	Estimate (β)	
Satisfaction ← Mobile Banking Service Quality	2.345	.475	4.932	***	1.008	
Assurance&Security ← Mobile Banking Service Quality	1.997	.436	4.577	***	.768	
Efficiency&Convenience ← Mobile Banking Service Quality	1.650	.383	4.311	***	.909	
Reliability ← Mobile Banking Service Quality	1.848	.383	4.827	***	.951	
Responsiveness ← Mobile Banking Service Quality	1.000				.673	
Note : Note = C.R. (Critical Ratio) z = Estimate /S.E. , *** indicates significance at .0001 level						

This finding is consistent with Swaid et. al.(2009)<sup>149</sup>; Bedi (2010)<sup>16</sup> that assurance is a key factor in describing overall service quality where as Munhurrun and Naidoo (2000)<sup>109</sup> identify Security as one of the dimension which predict internet banking service quality.

In case of public sector banks(table 6.22) for testing  $H_{2-1}$  , *MobileBanking-Efficiency&Convenience* does not have positive and significant influence on overall Mobile Banking Service Quality has  $\beta= 0.922$  and  $z=3.453$ . It means that the probability of getting a critical ratio as large as 3.453 in absolute value is less than 0.001. In other words, the regression weight for *MobileBanking-Efficiency&Convenience* in the prediction of Mobile Banking Service Quality is significantly different from zero at the 0.001 level. Thus the null hypothesis  $H_{2-1}$  is rejected which means that *MobileBanking-Efficiency&Convenience* is has direct and positive effect on *Mobile Banking Service Quality* for public sector banks in Indore.

From table 6.22 , null hypothesis  $H_{2-2}$ , *MobileBanking-Efficiency&Convenience* does not have positive and significant influence on overall Mobile Banking Service Quality whose values are  $\beta= 0.909$  and  $z=4.311$ . This means that probability of getting a critical ratio as large as 4.311 in absolute value is less than 0.001. In other words, the regression weight for Mobile Banking Service Quality in the prediction of *MobileBanking-Efficiency&Convenience* is significantly different from zero at the 0.001 level. Thus the null hypothesis  $H_{2-2}$  is rejected, which means *MobileBanking-Efficiency&Convenience* have positive and significant influence on

overall Mobile Banking Service Quality for private sector banks in Indore.

MobileBanking-Efficiency&Convenience finding for public and private sector bank is also similar with the finding of Parsuraman et. al(2005)<sup>118</sup> where Efficiency is one of the important factor in order to measure the website service quality and Bedi (2010)<sup>16</sup> where convenience with assurance, responsiveness and product availability is among the major factor which significantly predict service quality and customer satisfaction of public and private sector banks in India.

Null hypothesis  $H_{3-1}$ , *MobileBanking-Reliability* does not have positive and significant influence on overall Mobile Banking Service Quality and values from table 6.25 for  $\beta = 1.032$  and  $z = 3.574$ . The probability of getting a critical ratio as large as 3.574 in absolute value is less than 0.001. In other words, the regression weight for *MobileBanking-Reliability* in the prediction of Mobile Banking Service Quality is significantly different from zero at the 0.001 level Thus the null hypothesis  $H_{3-1}$  is rejected, which means that *MobileBanking-Reliability* have positive and significant influence on overall Mobile Banking Service Quality for public sector banks in Indore.

Null hypothesis  $H_{3-2}$ , *MobileBanking-Reliability* does not have positive and significant influence on overall Mobile Banking Service Quality values are  $\beta= 0.951$  and  $z=4.827$ . The probability of getting a critical ratio as large as 4.827 in absolute value is less than 0.001. In other words, the regression weight for *MobileBanking-Reliability* in

the prediction of Mobile Banking Service Quality which is significantly different from zero at the 0.001 level. Thus the null hypothesis is rejected which means that MobileBanking-Reliability has a positive and significant influence on Mobile Banking Service Quality private sector banks in Indore.

The results from MobileBanking-Reliability is also supported by Bedi (2010)<sup>16</sup> that reliability is an important dimension for service quality ; Qureshi et. al. (2012)<sup>127</sup> also investigate reliability as one of the dimension predicting service quality of Islamic banks in Pakistan; Swaid et.al. (2009)<sup>149</sup> identify reliability among six e-service quality dimensions.

Null hypothesis  $H_{4-1}$ , *MobileBanking-Responsiveness* does not have positive and significant influence on overall mobile banking service quality has  $\beta = .822$  since we have fix the regression weight of *MobileBanking-Responsiveness* to 1 for scaling purpose the z-values are not generated.

Null hypothesis  $H_{4-2}$  in the study, *MobileBanking-Responsiveness* does not have positive and significant influence on overall Mobile Banking Service Quality value is  $\beta = 0.673$ . Since, the researcher fixes the regression weight of *MobileBanking-Responsiveness* to 1 for scaling purpose. Thus the z-values are not generated for *MobileBanking-Responsiveness*.

Responsiveness has been shown to be an important factor, supporting earlier studies. Parsuraman et. al.(2005)<sup>118</sup> identify responsiveness as important dimension for recovery from mistakes by the website while



developing electronic service quality scale called E-S-Qual and E-Res-Qual. Swaid et. al (2009)<sup>149</sup> also identify responsiveness as e-service quality dimension among information quality, website usability, reliability, assurance and personalization dimensions. Qureshi et.al (2012)<sup>127</sup> also confirms that responsiveness has significant relationship with service quality.

Null hypothesis H<sub>5-1</sub>, Mobile Banking Service Quality does not have positive and significant influence on user's *MobileBanking-Satisfaction* of the public sector bank values are  $\beta= 0.991$  and  $z=3.582$ . The probability of getting a critical ratio as large as 3.582 in absolute value is less than 0.001. In other words, the regression weight for Mobile Banking Service Quality in the prediction of *MobileBanking-Satisfaction* is significantly different from zero at the 0.001 level. Thus the hypothesis H<sub>5-1</sub> is rejected, which means that Mobile Banking Service Quality have positive and significant influence on user's *MobileBanking-Satisfaction* for public sector banks in Indore.

Null hypothesis H<sub>5-2</sub>, *Mobile Banking Service Quality* does not have positive and significant influence on user's *MobileBanking-Satisfaction* of the private sector banks ( $\beta= 1.008$ ,  $z=4.932$ ). The probability of getting a critical ratio as large as 4.923 in absolute value is less than 0.001. In other words, the regression weight for Mobile Banking Service Quality in the prediction of *MobileBanking-Satisfaction* is significantly different from zero at the 0.001 level (two-tailed). Thus the null hypothesis H<sub>5-2</sub> is rejected which means

that *Mobile Banking Service Quality* have positive and significant influence on user's *MobileBanking-Satisfaction* of the private sector banks in Indore.

Thus null hypothesis  $H_{1-1} - H_{5-1}$  for public sector banks is rejected and the hypothesized relationship is established in the second order structure model for public sector banks. Thus *MobileBanking-Assurance&Security*, *MobileBanking-Efficiency&Convenience*, *MobileBanking-Reliability*, *MobileBanking-Responsiveness* is significantly contributing towards *Mobile Banking Service Quality*.

Also *Mobile Banking Service Quality* is effectively contributing towards the *MobileBanking-Satisfaction* among the mobile banking users of public sector banks. Also from standardized estimates allow evaluating the relative contributions of each predictor variable to each outcome variable and these are given in separate columns of table 6.21. The loadings (regression weights) for *MobileBanking-Assurance&Security* are 0.850 which indicates that *Mobile Banking Assurance&Security* explains 72.25% of the variance in *Mobile Banking Service Quality*. The loading for *MobileBanking-Efficiency&Convenience* is 0.922 which indicates that *MobileBanking-Efficiency&Convenience* explains 85.00 % of the variance in *Mobile Banking Service Quality*, Similarly *MobileBanking-Reliability* is 1.032, which indicates that *MobileBanking-Reliability* explains 100 % of the variance in *Mobile Banking Service Quality*. Also *MobileBanking-Responsiveness* is .822 which indicates that *MobileBanking-Responsiveness* explains 67.56 %

of the variance in responsiveness. Similarly *Mobile Banking Service Quality* is 0.991 which indicates that the variance in *MobileBanking-Satisfaction* explains 98.20 %, which means more the mobile banking service quality; the more will be the customer satisfaction in case of public sector banks.

The result of regression analysis (table 6.22) indicates relationship between *Mobile Banking Service Quality* with *MobileBanking-Efficiency&Convenience*, *MobileBanking-Assurance&Security*, *MobileBanking-Reliability* and *MobileBanking-Responsiveness*. Also the relationship between service quality is identified with *MobileBanking-Satisfaction* of the mobile banking users of public sector bank.

Thus null hypothesis  $H_{1-2} - H_{5-2}$  for private sector banks is rejected. Thus *MobileBanking-Assurance&Security*, *MobileBanking-Efficiency&convenience*, *MobileBanking-Reliability*, *MobileBanking-Responsiveness* is significantly contributing towards service quality of mobile banking. Also Service quality is effectively contributing towards the *MobileBanking-Satisfaction* among the mobile banking users of private sector banks.

For private sector banks, the loadings for *MobileBanking-Assurance&Security* are 0.768 which indicates that *MobileBanking-Assurance&Security* explains 58.98 % of the variance in *Mobile Banking Service Quality*. The loading for *MobileBanking-Efficiency&Convenience* is 0.909, which indicates that *MobileBanking-Efficiency&Convenience* explains 82.62 % of the

variance in *Mobile Banking Service Quality*, similarly *MobileBanking-Reliability* is 0.951 which indicates that *MobileBanking-Reliability* explains 90.44 % of the variance in *Mobile Banking Service Quality* and *MobileBanking-Responsiveness* is 0.673 which indicates that *MobileBanking-Responsiveness* explains 45.29 % of the variance in *Mobile Banking Service Quality*. Similarly *MobileBanking-Satisfaction* is 1.008 which indicates that the variance in *Mobile Banking Service Quality* explains 100 % of the variance in *MobileBanking-Satisfaction* for private sector banks.

*MobileBanking-Assurance&Security* for public sector banks explains 72.25% and for private sector banks is 58.98 %. Thus the mobile banking users of public sector feels more assure and secure while using mobile banking. The private sector banks must ensure that the users of their mobile banking service feel safe and secure, assure that their personal information is not going to be misused while transecting. (trust & security) The private sector banks needs to implement more security measures in order to have security and assurance among its mobile banking users.

**Table 6.22: Hypothesis Testing**

Hypothesis		Independent Variable	Dependent Variable	Z Score	Standardized factor loading	P level	Result
H <sub>1.1</sub>	Public Sector Banks	MobileBanking-Assurance&Security	MobileBanking Service Quality	3.560	72.25%	1%	Rejected
H <sub>2.1</sub>		<i>MobileBanking-Efficiency&amp;Convenience</i>	Mobile Banking Service Quality	3.453	85.00%	1%	Rejected
H <sub>3.1</sub>		<i>MobileBanking-Reliability</i>	Mobile Banking Service Quality	3.574	100%	1%	Rejected
H <sub>4.1</sub>		<i>MobileBanking-Responsiveness</i>	Mobile Banking Service Quality	--	67.56%	1%	--
H <sub>5.1</sub>		Mobile Banking Service Quality	<i>MobileBanking-Satisfaction</i>	3.582	98.20%	1%	Rejected
H <sub>1.2</sub>	Private Sector Banks	MobileBanking -Assurance&Security	MobileBanking Service Quality	4.577	58.98%	1%	Rejected
H <sub>2.2</sub>		<i>MobileBanking-Efficiency&amp;Convenience</i>	Mobile Banking Service Quality	4.311	82.62%	1%	Rejected
H <sub>3.2</sub>		<i>MobileBanking-Reliability</i>	Mobile Banking Service Quality	4.827	90.44 %	1%	Rejected
H <sub>4.2</sub>		<i>MobileBanking-Responsiveness</i>	Mobile Banking Service Quality	--	45.29 %	1%	
H <sub>5.2</sub>		Mobile Banking Service Quality	<i>MobileBanking-Satisfaction</i>	4.932	100 %	1%	Rejected

*The MobileBanking-Efficiency&Convenience* contributes 85.00% for public sector banks and 82.62% for private sector bank. Thus the users of both: public sector banks and private sector banks, feel that the mobile banking is efficient and convenient for them. One possible reason for the similarity is that mobile banking services for both banks is provided by the technology service providers.

*The MobileBanking-Reliability* explains 100% in case of public sector banks and 90.44% in private sector banks. The result suggests that the users of both: public and private sector banks feel that the mobile banking services provided by their bank are more reliable. Thus both banks mobile services are reliable as they provide accurate record of transaction, also provides confirmation of transaction with SMS or e-mail.

Thus *MobileBanking-Responsiveness* contributes 67.56 % and 45.29 % for public sector banks and private sector banks. This suggests that private sector banks needs to improve communication with their customers by giving prompt mobile banking services to the customers; telling the customers exactly when the mobile banking will be performed; if there is a problem, the willingness of the bank to discuss and resolve problem related to mobile banking users . This will improve the mobile banking service quality and satisfaction level of the customers. The researcher also feels that there is a scope of improvement in providing mobile banking services in a mobile banking responsiveness.

For public and private sector banks Mobile Banking Service Quality has positive effect on user's mobile banking satisfaction. For public sector banks the effect is 98.20% and 100% for private sector banks. Thus the users of both: public and private sector banks are satisfied while using mobile banking services. The service quality dimensions are equally contributing towards mobile banking satisfaction of users of public and private sector banks. Therefore more the mobile banking service quality more will be the customer satisfaction.

# CHAPTER-7

## CONCLUSION, RECOMMENDATIONS, LIMITATIONS AND *FUTURE RESEARCH DIRECTIONS*

7.1 *Conclusion*

7.2 *Recommendations*

7.3 *Limitations and Future Research Directions*



## **7.1 Conclusion**

Mobile-based banking is the next frontier for banking in India. The rapid growth in users and wider coverage of mobile phone networks have made this channel an important platform for extending banking services to customers. With the rapid growth in the number of mobile phone subscribers in India, banks are using mobile phones as an alternative channel of delivery of banking services.

To retain existing customers and to attract new customers, banks are trying to make customers satisfied with their high quality banking services. Service quality is one of the critical success factors that influence the competitiveness of an organization. Mobile banking service quality is a significant factor to enhance a bank's reputation, improve its customer retention, attract new customers, and increase its financial performance and profitability. Hence, mobile banking service quality, a key factor to satisfy customers is an important dimension for comparing mobile banking services provided by the banks. This study has compared mobile banking service quality provided by the public and private sector banks operated in Indore district of Madhya Pradesh in India.

This study has followed an objective epistemology, a positivist approach and a deductive logic to answer research questions. In order to study the mobile banking service quality dimensions and its relationship with user's satisfaction for public sector banks and private sector banks, a questionnaire survey was conducted on a

sample of mobile banking users of public and private sector banks of Indore.

The study results suggested that 'Assurance & Security', 'Efficiency & Convenience', 'Responsiveness' and 'Reliability' dimensions are predictors for mobile banking service quality of public and private sector banks of Indore.

The study further confirms that 'Assurance & Security' is measured through feeling of safety, trust and security. 'Efficiency & Convenience' is measured through simple and easy to use, clear and understandable instructions, positive experience of use, quickness in performing transaction, time saving, easy availability of banking information. Similarly 'Responsiveness' is measured through promptness in response, quick and effective rectification. Also 'Reliability' is measured through accurate transaction processing and record keeping, expectation fulfillment, quick confirmation of transaction.

The study also confirm association between mobile banking 'service quality' and 'customer satisfaction' which is measured through feeling of satisfaction, recommendation for services and confidence in the mobile banking services.

The results of the study imply that there are some similarities and some differences regarding the extent to which the four dimensions predict overall mobile banking service quality which ultimately effect customer satisfaction of mobile banking users of public and private sector banks in Indore.

The study results confirms that in both types of banks, all four dimensions *MobileBanking-Assurance&Security*; *MobileBanking-Efficiency&Convenience*; *MobileBanking-Reliability*; *MobileBanking-Responsiveness* are found to be good predictors of overall mobile banking service quality. Also *Mobile Banking Service Quality* as a whole contributes towards *MobileBanking-Satisfaction* of its users. Whereas among these, *MobileBanking-Efficiency&Convenience* and *MobileBanking-Reliability* are better predictor of overall mobile banking service quality in case of both the banks. But *MobileBanking-Assurance&Security* and *MobileBanking-Responsiveness* contribute little less in predicting mobile banking service quality in case of both public and private sector banks.

Overall *MobileBanking-Reliability* is the highest predictor of mobile banking service quality dimension among all four dimensions in case of public and private sector banks in Indore. This finding is attributed to accuracy of transactions and customers expectations.

Mobile banking responsiveness is the poorest predictor of overall mobile banking service quality among all four dimensions in case of public and private sector banks. The results recognize the possible reasons like no prompt response from the bank to the customer when the transaction are not processed and the mistake are not corrected quickly by the bank. These results are in continuance with report (RBI, 2012)<sup>128</sup> , public sector banks accounted for bulk of the complaints (70%) within public sector banks, the State Bank group

alone accounted for almost 38 per cent of total complaints received during 2011-12.

The similarities in the results are probably because of the fact that mobile banking is technology oriented service. The mobile banking service provider for both banks is the third party agencies and these third party agencies are using same technology for public and private sector banks. Still there are certain dissimilarities as far as *MobileBanking-Assurance&Security* and *MobileBanking-Responsiveness* is concern. *MobileBanking-Assurance&Security* is better predictor of mobile banking service quality in case of public sector banks. Because of the image of public sector banks, customer has more trust towards public sector banks which is reflected in the results. *MobileBanking-Responsiveness* is poor predictor of mobile banking service quality for both the banks, in public sector banks probably because of work culture and in private sector banks probably because of overburden employees and this may be further researched.

*The MobileBanking-Efficiency&Convenience* contributes equally towards service quality i.e. 85.00 % for public sector banks and 82.62 % for private sector bank. Thus the users of both: public sector banks and private sector banks, feel that the mobile banking is efficient and convenient for them. One possible reason for the similarity is that mobile banking services for both banks is provided by the technology service providers.

The *MobileBanking-Reliability* explains 100% in case of public sector banks and 90.44 % in private sector banks. The result suggests that the

users of both: public and private sector banks feel that the mobile banking services provided by their bank are more reliable. Thus, both banks mobile services are reliable as they provide accurate record of transaction, also provides confirmation of transaction with SMS or e-mail. For public and private sector banks Mobile Banking Service Quality has positive effect on user's mobile banking satisfaction. The service quality dimensions are equally contributing towards mobile banking satisfaction of users of public and private sector banks. Thus the users of public and private sector banks are satisfied while using mobile banking services. Therefore more the mobile banking service quality more will be the customer satisfaction.

## **7.2 Recommendations:**

Cut throat competition and highly stressed profits have introduced the new marketing practices in the Indian banking sector and has also brought the customer satisfaction to the center of the focus. It has become very important for the banks to retain their existing customer base as well as to enlarge the same. As the number of banks is increasing, customer expectation of service quality is growing. Product differentiation is impossible in a competitive environment like the banking industry. Banks everywhere are delivering the same products. Thus, bank management tends to differentiate their firm from competitors through service quality. Service quality is an imperative element impacting customers' satisfaction level in the banking industry And same has been confirm by this study that

mobile banking service quality is an important driver of customer satisfaction of public and private sector banks in Indore.

The study is also relevant in the light of the recommendations of several committees constituted by Government of India and the Indian Parliament, which argued that banks of India need to design effective customer service system so as to compete effectively in the liberalized market.

A satisfied customer is six times more likely to repurchase a product and share his experience with five or six other people (Gronroos, 2000)<sup>58</sup>. Similarly unsatisfied customers can also banish the business. This study has also suggests a strong and positive relationship between mobile banking service quality dimensions and customers satisfaction in public and private sector banks in Indore and has concluded that mobile banking service quality is predicted through four dimensions which are 'Assurance & Security', 'Efficiency & Convenience', 'Responsiveness' and 'Reliability'.

A fair understanding of the impact of these dimensions on customer satisfaction and service quality can help the service managers of banks to formulate proper strategies to instill customer confidence. Hence, in order to satisfy the mobile banking users of public and private sector banks of Indore, it is recommended that, policy makers and bank management must focus their attention on the mobile banking service quality dimensions identified in the study which are 'Assurance & Security', 'Efficiency & Convenience', 'Responsiveness' and 'Reliability'.

Though the study has suggested that mobile banking service quality is predicted by four dimensions 'Assurance & Security', 'Efficiency & Convenience', 'Responsiveness' and 'Reliability', It can be recommended based on study results that the customers of both public and private sector banks are more concern with efficiency & convenience, reliability aspect of service quality. Hence both public sector and private sector banks should concern more on efficiency & convenience, reliability for making its customers more satisfied.

To enhance mobile banking service quality and customers satisfaction, it is recommended that policy makers and bank management should focus more on efficiency, convenience and reliability while providing mobile banking services to the customers of public and private sector banks. That means policy makers of both, public and private sector banks of Indore should attempt to make their mobile banking services quick, simple and easy to use. The instructions related to mobile banking should be clear and understandable, so that customer should have a positive experience of the services. Bank management should also assure to mobile banking customers that mobile banking transaction processing is accurate and fulfilling their expectations. Mobile banking service reliability may be improved by quick confirmation of the transactions.

For making mobile banking services convenient and reliable, it is recommended that banks should provide live support i.e. chatting with the personnel using 3G or 4G over mobile phones along with email and SMS. Also it is recommended, that banks must provide mobile

banking services in multiple languages like English, Hindi and other regional language.

Overall, it is recommended that bank management should assure that mobile technology must become an integral part of the business. Management need to increasingly seek to use mobile technology in innovative ways in order to gain a competitive age and drive business growth while building greater trust with customers by adopting proactive rather than reactive approach.

As mobile devices are transferring power to individual and becoming the key to successful systems of direct engagement with customers, management should hire a chief mobility officer to create mobile engagement guide and develop a mobile app architecture blueprint for banks.

### ***7.3 Limitations and Future Research Directions***

Every research has its limitation. In designing the study the researcher attempted to be as scientific as possible, the present study nevertheless has some limitations. Firstly, the limitation concerns the nature of the measures used. The measures included in this research were all based upon the literature review of technology enabled service quality participating different mobile banking customers from public and private sector banks. Therefore, the potential for data inaccuracies due to item misinterpretation or predisposition to certain responses on the part of the participant does exist.

Secondly, as stated mobile banking service quality, and customer satisfaction have been found to change over time, a cross-sectional



research design does not offer nearly the same insight into the dynamics of customer relationships with a firm as a longitudinal design. A longitudinal design would afford greater insight. Due to limitation of time, cross-sectional data collection method was adopted, thus follow-up studies can collect longitudinal data to re-verify the proposed model.

Thirdly, this study covers the mobile banking customers of public and private sector banks in Indore. The foreign banks that have a role in the retail banking industry in Indore were excluded from the study. Future research work can be extended by comparing mobile banking services provided by public and private sector banks with foreign banks.

Further, the current study has considered convenient sampling which is non-probability sampling technique, and the sample size of the current study is 454. The future researcher may use a probability sampling technique and may use a bigger sample size to find out more accurate results about mobile banking service quality and customer satisfaction for public and private sector banks of Indore.

Apart from service quality and customer satisfaction there are number of other criteria like investment in technology, loyalty of customers etc. on which public and private sector banks may be compared in future research work.

The finding of this study can serve as guide towards further research in this area by exploring other options like testing whether there is a possibility of a multi-tier service quality model for technology based

banking services. The same approach can be replicated for other technology based services like trading account, internet banking, ATM etc. Future research could similarly examine moderation effects. The effect of customer demographics such as age, gender, income, relationship characteristics such as duration, frequency of contact would be a worthwhile avenue for research. Further, the impact of the certain environmental variables such as price may also be considered for future research.

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# ANNEXURE

**ANNEXURE-I**

**Table 6.12 Communalities of Preliminary Mobile Banking Service Quality Measurement Scale.**

	Initial	Extraction
It is easy to navigate i.e. get anywhere using mobile banking.	1.000	.721
Mobile banking enables me to complete transaction quickly.	1.000	.635
Mobile Banking is very simple and easy to use.	1.000	.796
Using Mobile Banking does not require lot's of efforts.	1.000	.741
The Mobile Banking registration process is simple.	1.000	.714
Mobile Banking makes transactions easier, for example transferring funds, bill payments etc.	1.000	.752
Using Mobile Banking saves time compared to going branch/ATM.	1.000	.813
It is easy to look for banking information while using mobile banking.	1.000	.819
Interaction with mobile banking systems clear and understandable.	1.000	.724
Mobile Banking creates a positive experience for me.	1.000	.764
Mobile Banking screen incorporates a good color scheme, is easy on the eye, visually attractive and has an effective layout.	1.000	.744
The Bank quickly resolves Mobile Banking related problems.	1.000	.668
My mobile banking provides prompt responses if my transaction is not processed.	1.000	.659
The bank provides all communication medium like sms, email, toll free number to communicate problems related to mobile banking.	1.000	.861
I can speak to a customer service representative if there is a problem related to mobile banking transaction.	1.000	.734
I feel secure in providing sensitive information while doing mobile banking transaction.	1.000	.802
I feel safe while doing my mobile banking transactions.	1.000	.776
I am sure, bank does not misuse my personal information.	1.000	.795
I have full trust in my bank's Mobile banking services.	1.000	.770
The bank's name is well-known and has good reputation, so I have full confidence in the bank's mobile banking services.	1.000	.898
Mobile banking provides me the services exactly as promised.	1.000	.808
If there is any mistake, my mobile banking make it correct quickly.	1.000	.734
My mobile banking transactions are processed accurately.	1.000	.926
My mobile banking provides accurate records of my transactions.	1.000	.760
Mobile banking charges related to transactions are clearly informed to me.	1.000	.690
My Mobile banking transactions' confirmation details are sent by SMS / email immediately.	1.000	.831
My Mobile Banking is available all the time.	1.000	.762
I know exactly when my transaction will be performed.	1.000	.751
I think I did the right thing to choose my mobile banking.	1.000	.810
Overall I am satisfied with my mobile banking services.	1.000	.826
My mobile banking meets my expectations.	1.000	.850
I will recommend my friend to start using mobile banking provided by my bank.	1.000	.807

**ANNEXURE-II**

**Communalities for Identify Variables for Service Quality Dimensions of Mobile Banking for Public and Private Sector Banks in Indore**

	<b>Initial</b>	<b>Extraction</b>
1. It is easy to navigate i.e. get anywhere using mobile banking.	1.000	.469
2. Mobile banking enables me to complete transaction quickly.	1.000	.536
3. Mobile Banking is very simple and easy to use.	1.000	.656
4. Using Mobile Banking does not require lot's of efforts.	1.000	.401
5. The Mobile Banking registration process is simple.	1.000	.567
6. Mobile Banking makes transactions easier, for example transferring funds, bill payments etc.	1.000	.597
7.Using Mobile Banking saves time compared to going branch/ATM.	1.000	.594
8. It is easy to look for information while using mobile banking.	1.000	.535
9. Interaction with mobile banking system clear, understandable.	1.000	.541
10. Mobile Banking creates a positive experience for me.	1.000	.513
11. Mobile Banking screen incorporates a good color scheme, is easy on the eye, visually attractive and has an effective layout.	1.000	.453
12. The Bank quickly resolves Mobile Banking problems.	1.000	.604
13. My mobile banking provides prompt responses if my transaction is not processed.	1.000	.471
14. The bank provides all communication medium : sms, email, tollfree number to communicate problems mobile banking.	1.000	.582
15. I can speak to a customer service representative if there is a problem related to mobile banking transaction.	1.000	.459
16. I feel secure in providing sensitive information while doing mobile banking transaction.	1.000	.599
17. I feel safe while doing my mobile banking transactions.	1.000	.715
18. I am sure, bank does not misuse my personal information.	1.000	.597
19. I have full trust in my bank's Mobile banking services.	1.000	.724
20. The bank's name is well-known and has good reputation, so I have full confidence in the bank's mobile banking services.	1.000	.607
21. Mobile banking provides me the services exactly as promised.	1.000	.474
22. If there is any mistake, my mobile banking make it correct quickly.	1.000	.644
23. My mobile banking transactions are processed accurately.	1.000	.617
24. My mobile banking provides accurate record of transactions.	1.000	.648
25. Mobile banking charges transactions are clearly informed.	1.000	.583
26. My Mobile banking transactions' confirmation details are sent by SMS / email immediately.	1.000	.511
27. My Mobile Banking is available all the time.	1.000	.460
28. I know exactly when my transaction will be performed.	1.000	.507
29. I think I did the right thing to choose my mobile banking.	1.000	.583
30.Overall I am satisfied with my mobile banking services	1.000	.530
31. My mobile banking meets my expectations.	1.000	.623
32. I will recommend my friend to start using mobile banking provided by my bank.	1.000	.513

**Communalities for Identify Variables for Service Quality Dimensions of Mobile Banking for Public and Private Sector Banks in Indore**

	<b>Initial</b>	<b>Extraction</b>
1. It is easy to navigate i.e. get anywhere using mobile banking.	1.000	.469
2. Mobile banking enables me to complete transaction quickly.	1.000	.536
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5. The Mobile Banking registration process is simple.	1.000	.567
6. Mobile Banking makes transactions easier, for example transferring funds, bill payments etc.	1.000	.597
7.Using Mobile Banking saves time compared to going branch/ATM.	1.000	.594
8. It is easy to look for information while using mobile banking.	1.000	.535
9. Interaction with mobile banking system clear, understandable.	1.000	.541
10. Mobile Banking creates a positive experience for me.	1.000	.513
11. Mobile Banking screen incorporates a good color scheme, is easy on the eye, visually attractive and has an effective layout.	1.000	.453
12. The Bank quickly resolves Mobile Banking problems.	1.000	.604
13. My mobile banking provides prompt responses if my transaction is not processed.	1.000	.471
14. The bank provides all communication medium : sms, email, tollfree number to communicate problems mobile banking.	1.000	.582
15. I can speak to a customer service representative if there is a problem related to mobile banking transaction.	1.000	.459
16. I feel secure in providing sensitive information while doing mobile banking transaction.	1.000	.599
17. I feel safe while doing my mobile banking transactions.	1.000	.715
18. I am sure, bank does not misuse my personal information.	1.000	.597
19. I have full trust in my bank's Mobile banking services.	1.000	.724
20. The bank's name is well-known and has good reputation, so I have full confidence in the bank's mobile banking services.	1.000	.607
21. Mobile banking provides me the services exactly as promised.	1.000	.474
22. If there is any mistake, my mobile banking make it correct quickly.	1.000	.644
23. My mobile banking transactions are processed accurately.	1.000	.617
24. My mobile banking provides accurate record of transactions.	1.000	.648
25. Mobile banking charges transactions are clearly informed.	1.000	.583
26. My Mobile banking transactions' confirmation details are sent by SMS / email immediately.	1.000	.511
27. My Mobile Banking is available all the time.	1.000	.460
28. I know exactly when my transaction will be performed.	1.000	.507
29. I think I did the right thing to choose my mobile banking.	1.000	.583
30.Overall I am satisfied with my mobile banking services	1.000	.530
31. My mobile banking meets my expectations.	1.000	.623
32. I will recommend my friend to start using mobile banking provided by my bank.	1.000	.513
Extraction Method: Principal Component Analysis.		

**ANNEXTURE-III**

**Rotated Component Matrix<sup>a</sup> for Mobile Banking Service Quality  
Dimensions for Public and Private Sector Banks in Indore.**

		Dimensions and Loadings				
		1	2	3	4	5
Q17	I feel safe while doing my mobile banking transactions.	.774	.129	.197	.138	.201
Q19	I have full trust in my bank's Mobile banking services	.724	.035	.131	.158	.395
Q18	I am sure, bank does not misuse my personal information.	.614	.019	.181	.228	.367
Q16	I feel secure in providing sensitive information while doing mobile banking transaction.	.604	.048	.272	.243	.313
Q21	Mobile banking provides me the services exactly as promised.	.493	.289	.250	.236	.173
Q4	Using Mobile Banking does not require lot's of efforts.	.491	.131	.086	.362	.071
Q3	Mobile Banking is very simple and easy to use.	.434	.294	.098	.390	-.075
Q28	I know exactly when my transaction will be performed.	.417	.395	.148	.197	.340
Q7	Using Mobile Banking saves time compared to going branch/ATM.	.030	.730	.180	.026	.166
Q6	Mobile Banking makes transactions easier, for example transferring funds, bill payments etc	.113	.651	.050	.125	.378
Q9	The interaction with the mobile banking systems is clear and understandable.	.202	.584	.103	.366	.121
Q10	Mobile Banking creates a positive experience for me	.053	.559	.198	.395	.050
Q2	Mobile banking enables me to complete transaction quickly	.396	.556	.256	-.002	.070
Q8	It is easy to look for banking information while using mobile banking.	.054	.554	.309	.354	.066
Q1	It is easy to navigate i.e. get anywhere using mobile bankin	.413	.422	.307	-.029	-.160
Q23	My mobile banking transactions are processed accurately.	.042	.198	.722	.176	.155
Q24	My mobile banking provides accurate records of my transactions.	.245	.307	.690	.112	.068
Q31	My mobile banking meets my expectations.	.338	.287	.579	.240	.354
Q26	My Mobile banking transactions' confirmation details are sent by SMS / email immediately.	.182	.366	.569	-.006	.353
Q14	The bank provides all communication medium like sms, email, toll free number to communicate problems related to mobile banking.	.361	.239	.492	-.020	.211
Q12	The Bank quickly resolves Mobile Banking related problems.	.197	.020	.047	.718	.218
Q22	If there is any mistake, my mobile banking make it correct quickly.	.100	-.135	.494	.530	-.005
Q13	My mobile banking provides prompt responses if my transaction is not processed.	.207	.223	.137	.514	.309

Comparative Study of Mobile Banking of Public and Private Sector Banks in Indore.

Q15	I can speak to a customer service representative if there is a problem related to mobile banking transaction.	.308	.177	.432	.043	.380
Q11	Mobile Banking screen incorporates a good color scheme, is easy on the eye, visually attractive and has an effective layout.	.183	.187	.096	.601	.122
Q5	The Mobile Banking registration process is simple.	.515	.251	.089	.536	.101
Q32	I will recommend my friend to start using mobile banking provided by my bank.	.244	.293	.388	.319	.539
Q30	Overall I am satisfied with my mobile banking services	.200	.269	.254	.287	.520
Q29	I think I did the right thing to choose my mobile banking.	.285	.466	.146	-.004	.513
Q20	The bank's name is well-known and has good reputation, so I have full confidence in the bank's mobile banking services.	.447	.418	.095	.020	.510
Q25	Mobile banking charges related to transactions are clearly informed to me.	.098	.108	.069	.325	.472
Q27	My Mobile Banking is available all the time.	.285	.056	.307	.144	.472
Extraction Method: Principal Component Analysis.						
Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 10 iterations.						



**ANNEXURE-IV**

<b>Total Variance Explained</b>									
<b>Dimensions</b>	<b>Initial Eigenvalues</b>			<b>Extraction Sums of Squared Loadings</b>			<b>Rotation Sums of Squared Loadings</b>		
	<b>Total</b>	<b>% of Variance</b>	<b>Cumulative %</b>	<b>Total</b>	<b>% of Variance</b>	<b>Cumulative %</b>	<b>Total</b>	<b>% of Variance</b>	<b>Cumulative %</b>
1	11.947	37.336	37.336	11.947	37.336	37.336	4.542	14.193	14.193
2	1.907	5.958	43.294	1.907	5.958	43.294	3.938	12.306	26.499
3	1.502	4.695	47.989	1.502	4.695	47.989	3.319	10.371	36.870
4	1.364	4.263	52.252	1.364	4.263	52.252	3.088	9.651	46.522
5	1.193	3.728	55.980	1.193	3.728	55.980	3.027	9.458	55.980
6	1.098	3.433	59.412						
7	1.039	3.247	62.659						
8	.975	3.048	65.707						
9	.883	2.759	68.467						
10	.848	2.650	71.117						
11	.754	2.356	73.473						
12	.733	2.290	75.763						
13	.671	2.098	77.860						
14	.644	2.012	79.872						
15	.610	1.907	81.779						
16	.579	1.809	83.588						
17	.514	1.605	85.193						
18	.501	1.566	86.759						
19	.465	1.452	88.211						
20	.396	1.238	89.449						
21	.387	1.209	90.658						
22	.378	1.180	91.839						
23	.351	1.096	92.935						
24	.323	1.010	93.945						
25	.318	.993	94.939						
26	.282	.881	95.820						
27	.274	.856	96.676						
28	.249	.777	97.452						
29	.242	.756	98.209						
30	.223	.696	98.904						
31	.189	.590	99.495						
32	.162	.505	100.000						

Extraction Method: Principal Component Analysis.

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**ANNEXTURE-V**

**Covariances**

			M.I.	Par Change
e24	↔	assurance & security	7.357	-.160
e24	↔	Satisfaction	5.259	.079
e23	↔	assurance & security	4.327	-.123
e22	↔	Satisfaction	4.350	.076
e21	↔	Satisfaction	5.052	-.076
e21	↔	Responsiveness	4.318	.085
e20	↔	Satisfaction	6.604	.068
e20	↔	Responsiveness	4.297	-.066
e20	↔	e23	4.632	-.117
e20	↔	e21	11.301	-.172
e19	↔	Efficiency Convenience	8.012	-.098
e19	↔	Reliability	7.347	.095
e19	↔	e22	6.361	-.170
e19	↔	e21	4.223	-.126
e19	↔	e20	22.031	.220
e18	↔	e21	55.056	.511
e18	↔	e20	7.563	-.146
e18	↔	e19	12.582	-.224
e16	↔	e22	6.034	.150
e16	↔	e19	5.068	-.116
e15	↔	e24	4.844	-.130
e15	↔	e22	5.383	-.145
e14	↔	e15	6.250	.124
e11	↔	e15	6.270	-.111
e9	↔	assurance & security	4.687	-.102
e9	↔	e10	4.115	.077
e8	↔	assurance & security	25.142	.248
e8	↔	e21	4.274	-.121
e8	↔	e20	17.279	.191
e8	↔	e10	7.982	-.112
e7	↔	Reliability	4.684	.080
e6	↔	e23	6.022	.190
e6	↔	e14	4.089	-.132
e6	↔	e8	4.251	-.135
e5	↔	e16	5.179	.096
e5	↔	e8	4.856	.097
e4	↔	e22	5.331	-.141
e4	↔	e19	5.767	.124
e4	↔	e15	4.076	.097
e3	↔	Responsiveness	6.144	-.120
e3	↔	Reliability	4.843	.095
e3	↔	e24	4.383	.172
e3	↔	e19	5.804	.177
e3	↔	e14	6.276	.174
e3	↔	e6	6.594	-.229
e3	↔	e4	4.708	.144
e2	↔	e24	4.168	-.112
e2	↔	e10	7.990	.103
e2	↔	e8	8.478	-.136

Comparative Study of Mobile Banking of Public and Private Sector Banks in Indore.

**ANNEXTURE-V**

**Covariances**

			M.I.	Par Change
e24	↔	assurance & security	7.357	-.160
e24	↔	Satisfaction	5.259	.079
e23	↔	assurance & security	4.327	-.123
e22	↔	Satisfaction	4.350	.076
e21	↔	Satisfaction	5.052	-.076
e21	↔	Responsiveness	4.318	.085
e20	↔	Satisfaction	6.604	.068
e20	↔	Responsiveness	4.297	-.066
e20	↔	e23	4.632	-.117
e20	↔	e21	11.301	-.172
e19	↔	Efficiency Convenience	8.012	-.098
e19	↔	Reliability	7.347	.095
e19	↔	e22	6.361	-.170
e19	↔	e21	4.223	-.126
e19	↔	e20	22.031	.220
e18	↔	e21	55.056	.511
e18	↔	e20	7.563	-.146
e18	↔	e19	12.582	-.224
e16	↔	e22	6.034	.150
e16	↔	e19	5.068	-.116
e15	↔	e24	4.844	-.130
e15	↔	e22	5.383	-.145
e14	↔	e15	6.250	.124
e11	↔	e15	6.270	-.111
e9	↔	assurance & security	4.687	-.102
e9	↔	e10	4.115	.077
e8	↔	assurance & security	25.142	.248
e8	↔	e21	4.274	-.121
e8	↔	e20	17.279	.191
e8	↔	e10	7.982	-.112
e7	↔	Reliability	4.684	.080
e6	↔	e23	6.022	.190
e6	↔	e14	4.089	-.132
e6	↔	e8	4.251	-.135
e5	↔	e16	5.179	.096
e5	↔	e8	4.856	.097
e4	↔	e22	5.331	-.141
e4	↔	e19	5.767	.124
e4	↔	e15	4.076	.097
e3	↔	Responsiveness	6.144	-.120
e3	↔	Reliability	4.843	.095
e3	↔	e24	4.383	.172
e3	↔	e19	5.804	.177
e3	↔	e14	6.276	.174
e3	↔	e6	6.594	-.229
e3	↔	e4	4.708	.144
e2	↔	e24	4.168	-.112
e2	↔	e10	7.990	.103
e2	↔	e8	8.478	-.136

**ANNEXTURE-VI  
QUESTIONNAIRE**

**I am conducting research on mobile banking. If you are a mobile banking user kindly extend your cooperation in filling this questioner.**

**PART A**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Disagree somewhat</b>	<b>Undecided</b>	<b>Agree somewhat</b>	<b>Agree</b>	<b>Strongly Agree</b>

	←————→						
1. It is easy to navigate i.e. get anywhere using mobile banking.	1	2	3	4	5	6	7
2. Mobile banking enables me to complete transaction quickly.	1	2	3	4	5	6	7
3. Mobile Banking is very simple and easy to use.	1	2	3	4	5	6	7
4. Using Mobile Banking does not require lot's of efforts.	1	2	3	4	5	6	7
5. The Mobile Banking registration process is simple.	1	2	3	4	5	6	7
6. Mobile Banking makes transactions easier, for example transferring funds, bill payments etc.	1	2	3	4	5	6	7
7. Using Mobile Banking saves time compared to going branch/ATM.	1	2	3	4	5	6	7
8. It is easy to look for banking information while using mobile banking.	1	2	3	4	5	6	7
9. The interaction with the mobile banking systems is clear and understandable.	1	2	3	4	5	6	7
10. Mobile Banking creates a positive experience for me.	1	2	3	4	5	6	7
11. Mobile Banking screen incorporates a good color scheme, is Easy on the eye, visually attractive and has an effective layout.	1	2	3	4	5	6	7
12. The Bank quickly resolves Mobile Banking related problems.	1	2	3	4	5	6	7
13. My mobile banking provides prompt responses if my transaction is not processed.	1	2	3	4	5	6	7
14. The bank provides all communication medium like sms, email, toll free number to communicate problems related to mobile banking.	1	2	3	4	5	6	7
15. I can speak to a customer service representative if there is a problem related to mobile banking transaction.	1	2	3	4	5	6	7
16. I feel secure in providing sensitive information while doing mobile banking transaction.	1	2	3	4	5	6	7
17. I feel safe while doing my mobile banking transactions.	1	2	3	4	5	6	7
18. I am sure, bank does not misuse my personal information.	1	2	3	4	5	6	7

Comparative Study of Mobile Banking of Public and Private Sector Banks in Indore.

19. I have full trust in my bank's Mobile banking services.	1	2	3	4	5	6	7
20. The bank's name is well-known and has good reputation, so I have full confidence in the bank's mobile banking services.	1	2	3	4	5	6	7
21. Mobile banking provides me the services exactly as promised.	1	2	3	4	5	6	7
22. If there is any mistake, my mobile banking make it correct quickly.	1	2	3	4	5	6	7
23. My mobile banking transactions are processed accurately.	1	2	3	4	5	6	7
24. My mobile banking provides accurate records of my transactions.	1	2	3	4	5	6	7
25. Mobile banking charges related to transactions are clearly informed to me.	1	2	3	4	5	6	7
26. My Mobile banking transactions' confirmation details are sent by SMS / email immediately.	1	2	3	4	5	6	7
27. My Mobile Banking is available all the time.	1	2	3	4	5	6	7
28. I know exactly when my transaction will be performed.	1	2	3	4	5	6	7
29. I think I did the right thing to choose my mobile banking.	1	2	3	4	5	6	7
30. Overall I am satisfied with my mobile banking services.	1	2	3	4	5	6	7
31. My mobile banking meets my expectations.	1	2	3	4	5	6	7
32. I will recommend my friend to start using mobile banking provided by my bank.	1	2	3	4	5	6	7

**Part B**

**Please provide the following information:**

33. Name (Optional): Mr./Ms./Dr. \_\_\_\_\_ 34. Gender:  Male  Female
35. Occupation:  Student  Service  Business  any other \_\_\_\_\_
36. Age:  less than 21 years.  21-24 years  25-30 years  
 31-55 years  56years & above
37. Educational Qualification:  Under Graduate  Graduate  
 Post Graduate  Doctorate
38. Family Income :  Less than Rs. 2,40,000  Between Rs. 2,40,000 – 4,20,000  
 Between Rs 4,21,000 – 7,00,000  More than Rs.7,00,000.
39. Name of the bank of which you are using mobile banking services  
 ICICI  HDFC  SBI  AXIS  IDBI  BOI  
 Any Other Bank (please mention name) \_\_\_\_\_
40. Length of Mobile Banking Usage:  less than 3 months  3-12 months  
 more than 12 months
41. Frequency of Mobile Banking Transactions per month:  
 up to 5 times  between 6 and 10 times  more than 10 times
42. You are using mobile banking for the purpose of (may tick more than one):  
 Getting information (mini statement, balance inquiry)  Utility payments (bills)  
 Requests (cheque-book, DD, Stop-payment etc.)  Funds Transfer  
 Trading activity (Buying and selling stocks)  Demat account services