DETERMINANTS OF CUSTOMER'S INTENTIONS TO ADOPT BANKING CHANNEL INNOVATIONS IN INDIA

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MANAGEMENT

By

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DECLARATION

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V Priyadarshini

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LIST OF ABBREVIATIONS

AA	Attractiveness of Alternatives
AEPS	Aadhar Enabled Payment Systems
AI	Adoption Intention
ATM	Automated Teller Machine
AV	Additional Value
BBPS	Bharat Bill Payment System
BCs	Business Correspondents
BHIM	Bharat Interface for Money
BI	Behavioural Intention
CSC	Common Service Centre
CTAM	Combined Theory of Technology Acceptance Model
DBT	Direct Benefit Transfer
DOI	The Diffusion of Innovations Theory
DTPB	Decomposed Theory of Planned Behaviour
ECS	Electronic Clearing Service
EE	Effort Expectancy
FC	Facilitating Conditions
GOI	The Government of India
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
GST	Goods and Services Tax

HM	Hedonic Motivation
IB	Internet Banking
IBA	Indian Banks Association
IFSC	Indian Financial System Code
IMPS	Immediate Payment System
JAM	Jan Dhan Aadhar Mobile
KYC	Know Your Customer
MICR	Magnetic Ink Character Recognition
MM	Motivational Model
MMID	Mobile Money Transfer Identified Number
MPCU	The Model of PC Usage
MPIN	Mobile Personal Identification Number
NABARD	National Bank for Agriculture and Rural Development
NACH	National Automated Clearing House
NBFC	Non Banking Financial Company
NEFT	National Electronic Fund Transfer
NFC	Near Field Communications
NInC	National Innovation Council
NKC	National Knowledge Commission of India
NPAs	Non Performing Assets
NPCI	National Payments Corporation of India
OTP	One Time Password

PBC	Perceived Behavioural Control
PBs	Promotional Benefits
PC	Perceived Cost
PCI	Perceived Characteristics of Innovation
PE	Performance Expectancy
PEU	Perceived Ease of Use
PMJDY	Pradhan Mantri Jan Dhan Yojana
POS	Point Of Sales
PR	Perceived Risk
PS	Perceived Security
PSBs	Public Sector Banks
PT	Perceived Trust
PU	Perceived Usefulness
PV	Price Value
RA	Relative Advantage
RBI	The Reserve Bank of India
RD	Result Demonstrability
RRBs	Regional Rural Banks
RTGS	Real Time Gross Settlement
SCT	Social Cognitive Theory
SE	Self Efficacy
SI	Social Influence

SN	Subjective Norms
TAM	Technology Acceptance Model
TPB	The Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UID	Unique Identification Number
UIDAI	Unique Identification Authority of India
UPI	United Payment Interface
USSD	Unstructured Supplementary Service Data
UTAUT	The Unified Theory of Acceptance and Use of Technology

1 CHAPTER

INTRODUCTION

1.1 Introduction

Owing to the ever increasing and never ending competition, it has become quite essential for companies to innovate to survive as well as to gain competitive advantage. In spite of a vast body of literature on innovations, "more than half of the innovations introduced fail every year" (Morris, Schindehutte, & Allen, 2005). One important reason is "the inability to understand customer expectations properly" (Bartels & Reinders, 2011). Therefore it is important to understand how consumers perceive an innovation and its attributes. This stream of literature has gained considerable attention since the development of 'Diffusion of Innovations' theory by Rogers (Rogers, 2003). This research stream attempts to understand how perceived innovation attributes would influence the rates of diffusion and adoption of innovation. Diffusion and adoption are related processes. Diffusion describes "how informed potential adopters are about an innovation and its utility and how quickly this information spreads in a market" (Rogers, 2003). While adoption relates to "the decision-making process of an individual unit of adoption, such as an organization, a business unit, a department or an individual" (Woodside & Biemans, 2005).

According to Rogers, "Perceived innovation attributes are the most powerful factor which contribute to about 49%-87% of the influence in the adoption decision-making process" (Rogers, 2003). Several empirical studies have confirmed the fact that consumer perceptions of innovation characteristics are superior in determining adoption

than other predictors (Agarwal & Prasad, 1997; Labay & Kinnear, 1981; Ostlund, 1974).

Despite a rich body of literature in this area, the influence of consumer personal characteristics on how consumers perceive an innovation is still a neglected area. Though some researchers pointed out the significance of consumer personal characteristics such as perceived novelty, consumer innovativeness, and shopping orientations in understanding consumer adoption behaviour, the relationship was not empirically proven. Moreover most of the studies in this area are confined to studying only a single innovation while very few studies considered more than one innovation.

Therefore the present research tries to address this important gap by developing a research model which includes technology or innovation attributes, consumer personal characteristics and social characteristics and considers a wide array of channel innovations spanning the entire Indian Banking Sector while the model itself was tested on two most popular innovations.

1.2 Innovation

1.2.1 Meaning

"Innovation happens when an idea is implemented to create an impact. It has three elements: idea, implementation and impact. Innovation is nothing but the successful exploitation of new ideas. Creativity is often seen as the basis for innovation. An essential element for innovation is its application in a commercially successful way."

"Innovation is generally understood as the introduction of a new thing or method. Innovation is the embodiment, combination or synthesis of knowledge in original, relevant, valued new products, processes or services" (Luecke & Katz, 2003).

1.2.2 Definitions

Kotler (1994) stated that innovations may include any of the following - original products or services, product or service improvements, product or service modifications, and new brands (Philip, 1994). Innovations can also refer to "products that are to be introduced into the market or are perceived by consumers as newer than existing products" (Blackwell, Miniard, & Engel, 2006).

A close look in to Innovation literature reveals the fact that businesses and costumers have completely different views about new products. A product which is new to customers may not be new to companies, and vice versa. That is the reason why the definition of new products is different in different disciplines. In their work, "Towards a multidisciplinary definition of innovation, (2009)" the authors conducted a content analysis of the definitions from various disciplines economics, business management, entrepreneurship, innovation and technology, and engineering sciences to define Innovation as follows:

"Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace" (Baregheh, Rowley, & Sambrook, 2009).

The National Knowledge Commission of India (NKC) has defined Innovation as follows:

"Innovation is defined as a process by which varying degrees of measurable value enhancement is planned and achieved, in any commercial activity. This process may be breakthrough or incremental, and it may occur systematically in a company or sporadically; it may be achieved by:

- introducing new or improved goods or services and/or

- implementing new or improved operational processes and/or

- implementing new or improved organizational/ managerial processes

in order to improve market share, competitiveness and quality, while reducing costs."

1.3 Importance of Innovation

Schumpeter (1939) was foremost among the economists to highlight the importance of innovations as stimuli to financial growth. He stated that the competition created by innovations is more important than price changes in determining the market demand (Schumpeter, 1939).

Innovation is a very important economic factor which cannot be ignored. According to Maciariello (2009) "Marketing and innovation are the two fundamental functions of any financial activity" (Maciariello, 2009). Lynn et al. (1999) state that "Innovations are essential for the survival and success of organisations" (Lynn, Abel, Valentine, & Wright, 1999). According to Pauwels et al. (2004) "Innovation has become essential for companies in order to be competitive"(Pauwels, Silva-Risso, Srinivasan, & Hanssens, 2004). Further, innovations also influence brand equity (Staake, Thiesse, & Fleisch, 2009). Kaplan, (2009) highlighted the role of innovation in developing stronger brands (Kaplan, Brooks-Shesler, King, & Zaccaro, 2009).

The Indian Government also has put a high political priority on innovation and has set up the National Innovation Council (NInC) in 2010 and has declared the present decade as the decade of Innovation. Also, the recent Government has come up with 'Make in India' campaign and is also encouraging Jugaad Innovations at the grass root level.

1.4 Rationale for the Study

To understand why some innovations diffuse quickly than others and why certain innovations fail is foremost among the key issues in the field of contemporary innovation diffusion research (Gottschalk, Kalmbach, & Dannenberg, 2005). Despite a lot of research, most of the new products are not able to find an existence in the market (Srinivasan, Pauwels, Silva-Risso, & Hanssens, 2009) and more than half of the innovations introduced every year tend to fail (Morris et al., 2003). Earlier research shows that new product failure adversely affect brand image and customer satisfaction (Liao & Cheng, 2013; Smith & Bolton, 2002; Wallin Andreassen, 2000). All the investment on designing and developing innovations get wasted if consumers do not adopt innovations up to the mark.

It is therefore important to understand the potential factors for high rate of innovation failures. A potential reason is that companies do not understand customers properly, customers being the final dictators of success or failure of innovations (Hauser, Tellis, & Griffin, 2006). There is a lot of focus in the contemporary research to understand consumer adoption of modern innovations (K. Kapoor, Dwivedi, & Williams, 2013).

1.5 Perceived Innovation Attributes

Perceived Innovation Attributes or Perceived Characteristics of Innovation (PCI) are the perceptions of customers/adopters of an innovation about the characteristics/attributes of that innovation. Perceived Innovation Attributes include relative advantage, image, compatibility, ease of use, visibility, result demonstrability, trialability, and voluntariness of use (Moore and Benbasat, 1991). Technology adoption Attributes include perceived usefulness, perceived ease of use, and perceived security and trust (Davis, 1991).

The research on attributes of innovation mainly explains and predicts future rates of adoption and diffusion of an innovation. In this research area, how the adopting unit (organization or individual) perceives the innovation determines the adoption and diffusion of innovations. Researchers stress on the particular attributes that are thought to be important in that particular contexts.

Rogers and Shoemaker (1971) state that, "It is the attributes of a new product, not as seen by experts but as perceived by the potential adopters that really matters" (Rogers, 2003). Flight et al. (2011) and Wells et al. (2010) highlight the significance of customer perceptions of innovation to understand problems of adopting an innovation.

Moore and Benbasat (1991) observe that some perceived aspects of an innovation improve the rate of adoption while others smother it. It is therefore appropriate to study perceived innovation attributes to understand the determinants of adoption of an innovation.

1.6 Importance of Banking Channel Innovations

Banking is one of the most innovative sectors in India according to the reports of National Innovation Council (NInC), 2013. For a bank, "a channel is a conduit to distribute its products and services to customers, either pushed by the former or pulled by the latter" (Black et al., 2000). Channel innovations in banking refer to "marked changes or improvements within the distribution network to either existing channels or introduction of a new channel or distribution strategy that has benefited customers and/or the organization" (Morrison, 2003).

Channel innovations show an immediate impact on customer experience and therefore have become the top priority area for banking innovations. Almost half of India's population is unbanked and channel innovations play a crucial role in making banking

services available to the masses in a developing country like India. Channel innovations can augment customer engagement and experience, optimize costs, improve effectiveness and create sustainability.

The most important channel innovations in Indian banking in the recent past are IMPS, banking kiosks, Mobile wallets, Bharat QR, UPI, Biometric Payment systems, BHIM etc. The Indian government is continuously making efforts for a cashless digital economy. Introducing these innovative banking channels is a part of that effort. Demonetisation is also a major step which added to the effort.

Keeping in view the significance of banking channel innovations and the associated problems in a developing nation like India, the present research studies customer perceived attributes of two banking channel innovations in India – IMPS and Mobile Wallet Banking.

For this purpose a research model was developed which includes technology or innovation attributes – perceived usefulness, perceived ease of use, compatibility, perceived trust and security, price value; one social characteristic- social influence; two customer personal characteristics – personal innovativeness, self-efficacy. Results show that PE, PEU, PV and PST are significant predictors of adoption intention while SI is not significant.

2 CHAPTER

LITERATURE REVIEW

2.1 Main Theories

2.1.1 The theory of Diffusion of Innovations (DOI) (Rogers, 2010)

DOI theory is the earliest theory of innovation research. This theory is propounded by Everett M Rogers in 1962. It explains how an innovation diffuses among the public (Agarwal & Prasad, 1998; Karahanna, Straub, & Chervany, 1999; Rogers, 2010). DOI theory spans across various fields like anthropology, sociology, education, and Healthcare. This theory is one of the most cited theories in innovation research. Even after the advent of many other innovation theories, the DOI theory continues to be one among the most widely used theories for innovation research in many fields.

This theory propounds that the adoption of an innovation is influenced by its characteristics as perceived by the consumer. This theory identifies five perceived characteristics of innovation namely Relative Advantage (RA), compatibility, complexity, trialability, and observability. Among these 5 characteristics, the degree of complexity is said to influence the rate of adoption in a negative manner while the rest of the characteristics influence the rate of adoption in a positive way.

The DOI theory defines these 5 innovation characteristics in the following way:

Relative Advantage relates to “the degree to which an innovation is perceived as being better than the idea it supersedes” (Rogers, 2010).

Complexity relates to “the degree to which an innovation is perceived as relatively difficult to use and understand” (Rogers, 2010).

Compatibility refers to “how much consistent an innovation is with the needs, values and experiences of the adopters” (Rogers, 2010).

Trialability relates to “the degree to which an innovation may be experimented with on a limited basis” (Rogers, 2010).

Observability relates to “the degree to which the results of an innovation are visible to others” (Rogers, 2010).

This theory identifies five categories of adopters of innovation based on innovativeness. They are “early adopters, early majority, late majority and laggards”. Innovativeness refers to the readiness or willingness of an individual to adopt an innovation. According to this theory, the adoption of an innovation takes place in five stages. They are knowledge or awareness, persuasion, decision making, implementation and continuation or confirmation.

There are many extensions to the theory of diffusion of innovations. The most important among them are meta-analysis of Tornatzky and Klein (1982) and scale development by Moore & Benbasat (1991).

2.1.2 The meta-analysis of Tornatzky and Klein (1982)

Tornatzky and Klein (G. Tornatzky & Klein, 1982) have performed a review of 75 studies in which they have identified 30 characteristics. Among them, three factors-compatibility, relative advantage, and complexity are found to be the most significant characteristics influencing the adoption of innovation. In this study, they also have suggested 7 criteria for an ideal innovation study. These criteria formed the basis for further research in innovation adoption research.

The next notable work is that of Moore & Benbasat. In this study (Moore & Benbasat, 1991), they have developed an instrument to study the perceived attributes of adopting IT innovations in an organizational context. They have developed an instrument with 8 variables and 38 items which is one of the most popular scales in innovation research. These 8 variables are RA, compatibility, ease of use, voluntariness, image, trialability, result demonstrability (RD), and visibility.

2.1.3 Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1975)

TRA theory postulates that individual behaviour is driven by behavioural intentions (Fishbein and Ajzen 1975). This theory defines attitude towards behaviour "as the individual's feelings about performing certain behaviour". While, subjective norm is defined as "an individual's perception of whether the behaviour should be performed". Subjective norm refers to the motivation exerted by an individual to act in accordance with the opinions of people who are important to him (Fishbein and Ajzen 1975). The criterion variable is behavioural intentions and it refers to the degree of efforts exerted by individuals to perform certain behaviour. Generally, stronger intentions would lead to better behavioural performances (Sheppard, Hartwick, & Warshaw, 1988). Ajzen (1991) extended TRA into Theory of Planned Behaviour (TPB) with an additional construct known as perceived behavioural control.

2.1.4 The Theory of Planned Behaviour (TPB) (Ajzen, 1991)

TPB theory has an extra construct – perceived behavioural control (PBC). According to Ajzen (1991), behavioural intentions lead to actual behaviour only if the behaviour is under control. This control is referred to as PBC. This is the factor which decides whether an individual performs certain behaviour or not. This theory also argues that non-motivational factors also play an important role in determining behaviour, for

instance resource availability is a major determinant of behaviour in many situations. Hence, PBC refers to the presence of necessary conditions and resources to present a particular behaviour (Ajzen, 1991).

TPB theory states that behavioural intention is determined jointly by attitude, subjective norm, and PBC. Previous literature also supports the positive relation between control beliefs and PBC.

2.1.5 The Technology Acceptance Model (TAM) (Davis, 1989)

TAM model has its roots in TRA theory. TAM model was proposed by Davis (1989), to understand the impact of external factors on internal outcomes. TAM model is built with five main constructs to understand the impact of two external factors - perceived use (PU), and perceived ease of use (PEU) on three internal outcomes - actual usage, behavioural intention and attitude. Behavioural intention refers to "the strength of an individual's intention to perform a particular behaviour" (Chew, 2006). TAM model identifies behavioural intention as the major predictor of an individual's actual behaviour. Behavioural intention is again determined by attitude. Attitude is described as "an individual's positive or negative feelings about performing a particular behaviour" (Fishbein & Ajzen, 1975). Both PU and PEU influence attitude. PU refers to "one's beliefs about how useful a particular system is to improve one's performance." PEU is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). Since its advent, TAM model has gained a lot of theoretical and empirical support across various contexts. Many studies concluded that TAM model is capable of explaining a majority of variance in Behavioural intentions and actual usage. Therefore TAM model can be said to be among the most powerful theories for understanding technology acceptance. However, many researchers (S.-Y. Hung, Ku, & Chang, 2003; Lule, Omwansa, & Waema, 2012; Tsu Wei, Marthandan,

Yee-Loong Chong, Ooi, & Arumugam, 2009) opined that TAM model requires additional constructs to provide better understanding of usage and acceptance behaviour. This led to many extensions to TAM model.

2.1.6 The extended Technology Acceptance Models (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000)

TAM2 model was put forward by Venkatesh and Davis in the year 2000. TAM2 model provided better explanations by considering user perceptions at three stages: pre-implementation, one month post-implementation and three month post- implementation. TAM2 model argues that PU of the system is determined by users' evaluation of the trade-off between important tasks at work and the results of performing these tasks using the system (Venkatesh & Davis, 2000). The results revealed that TAM2 model fitted well in both set-ups where the use of a system is either voluntary or compulsory.

Venkatesh and Bala (2008) combined TAM2 model and the antecedents of PEU as given by Venkatesh (2000), to develop a hybrid model of technology acceptance called TAM3 model (Venkatesh & Bala, 2008). TAM3 model consists of four antecedents to perceived usefulness and perceived ease of use - system characteristics, individual differences, social norms, and facilitating conditions. TAM3 model was studied in an IT context with experience as a moderator of the relationship between PEU and PU and also between PEU and behavioural intentions.

2.1.7 The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003)

Owing to the criticism on the predictive power of TAM model (for instance- Agarwal & Prasad, 1998), UTAUT model was developed by Venkatesh et al. in 2003 after an extensive literature survey of the studies using any of the eight famous innovation adoption models including DOI theory, TPB theory and TAM model to explain

technology acceptance and use in an organisational context. UTAUT model consists of four main predictors of usage intentions and behaviour namely performance expectancy, effort expectancy, facilitating conditions and social influence.

UTAUT model is highly regarded in terms of comprehensiveness and parsimony. It captures all the important predictors in eight models namely DOI theory, TRA theory, TAM model, TPB theory, MM theory, MPCU theory, CTAM theory and TPB theory, SCT model (Venkatesh et al., 2003). UTAUT model was successfully tested and verified in six different industries to bring more validity (Venkatesh et al., 2003). Since its development, UTAUT model was the most widely used model after TAM to understand the adoption of modern technologies in many research studies.

2.1.8 UTAUT2 model (Venkatesh, Thong, & Xu, 2012)

UTAUT model was initially developed to explain technology acceptance by employees in an organisational context. UTAUT model was extended into UTAUT2 model by including three customer personal characteristics namely Hedonic Motivation, price value and habit in order to suit the consumer context of technology usage and acceptance.

2.2 Literature pertaining to the adoption of banking innovations

Banking is one of the largest and most intensive industries which are highly dependent on information technology for offering services to customers.

One of the most important uses of IT in banking is the creation of new products and services. Innovation in banking is very much essential in order to meet the ever-increasing demands of its customers. Banking innovations not only help the banks to survive but also to improve their customer base.

With the advent of the internet and mobile technologies, innovation in banking is taking place at a faster rate. Internet and mobile have emerged as the largest platforms for banking. Many mobile based and internet-based banking innovations and applications are available to the customer today. They are working as alternate banking channels to the traditional brick and mortar banking channel.

Despite the growth of innovative banking channels, their adoption is still an issue for bankers (Hoehle, Scornavacca, & Huff, 2012). Therefore there is a vast research in many countries to understand the factors affecting the adoption of banking innovations at the individual level. Here the literature pertaining to adoption of banking innovations is examined to understand the main constructs or factors being used in this stream of research. Therefore the focus would be on the constructs used in the adoption of banking innovations research.

Firstly, all the important and relevant studies on the adoption banking innovations and banking technologies are tabulated (see Table 2.1). Then the important observations from the literature are listed out

Table 2.1

Literature pertaining to the adoption of banking innovations

Sl. No.	Title	Authors/ Country/Year	Main Objective	Theory Used	Variables/ Findings
1.	"A Theoretical Model for Internet Banking: Beyond Perceived usefulness and Ease of use" (Conceptual)	Shaza W. Ezzi, Saudi Arabia, 2014	"To propose a new model - Consumer Internet Banking Model (CIBM)"	TAM + additional variables	Main factors - Trust, Perceived Privacy and Security on Attitude and Intentions To Use Other factors - Computer Self Efficacy and Responsiveness on PU, PE
2	"Extending the understanding of mobile banking adoption: When UTAUT meets TTF and ITM"	Tiago Oliveiraa et al., Portugal, 2014	"To combine Task Technology Fit (TTF) model, UTAUT and Initial Trust Model (ITM)"	UTAUT + additional variables	*Significant* Task and Technology characteristics on TTF; TTF on PE; PE, Structural Assurance and Firm reputation on Initial Trust; PE on BI *Not Significant* Personal Propensity to Trust on Initial Trust; EE on BI ; SI on BI
3.	"The effects of product-related, personal-related factors and attractiveness of alternatives on consumer adoption of NFC-based mobile	Thanh-Thao T. Pham, Jonathan C. Ho, Taiwan 2015	"To study factors that facilitate and impede the intention to adopt NFC-based Mobile payments."	DOI + additional variables	*Significant* PU, Compatibility, PR, Trialabilty, AV, Innovativeness, Absorptive Capacity, AA on AI

	payments"				*Not Significant* PEU, Cost, Trust, on AI
4.	"Mobile-banking adoption by Iranian bank clients"	Payam Hanafizadeh et al., Iran, 2014	"To study the factors affecting the adoption of M-banking in Iran"	TAM + additional variables	Significant PU, PEU, PR, Perceived Cost, Perceived Credibility, PT, Need for Interaction, and Compatibility on AI
5.	"Towards an understanding of the consumer acceptance of mobile wallet"	Dong-Hee Shin, Korea, 2009	"To study the factors affecting the adoption of Mobile wallet in Korea"	UTAUT	*Significant* PE, PEU on Attitude: Attitude, PS, PT on AI *Not Significant* SI and SE on AI
6	"The interplay of counter-conformity motivation, social influence, and Trust in customers' intention to adopt Internet banking services: The case of an emerging country"	Walid Chaouali et al., Tunisia, 2016	"To develop a model using UTAUT theoretical framework and including some relevant factors - CCM, TRIB and TRPB"	UTAUT+ additional variables	*Significant* TRIB, CCM and PE on AI; SI and TRPB on AI *Not Significant* EE on AI

7	"Examining the role of three sets of innovation attributes for determining adoption of the interbank mobile payment service"	KK Kapoor , Y K. Dwivedi & MD. Williams, India, 2015	"To compare three sets of factors taken from three popular theories on innovation by studying the customer perceptions of IMPS adoption in India"	DOI, PCI	*Significant* RA, Compatibility, Complexity, Trialability, Voluntariness, RD, SI, cost and Communicability on BI; Cost and BI on AI. *Not Significant* Observability, image, visibility and PR on BI
8	"Behavioural intention to adopt mobile wallet: a developing country perspective"	Khushbu Madan and Rajan Yadav, India, 2016	"To study the factors affecting consumers' adoption of mobile wallet in India"	UTAUT + Perceived Regulatory Support (PRS) and Promotional Benefits (PB)	*Significant* PE, SI, FC, PR, PV, PRS and PB on BI. *Not Significant* EE on BI.
9	"Understanding the Antecedents of Intention to Use Mobile Internet Banking in India: Opportunities for Microfi nance Institutions"	Douglas Bryson et.al, India, 2015	"To identify the key antecedents to consumers' intention to use mobile Internet banking in India."	TPB theory, TAM model and UTAUT model were combined with Risk And Integrity	*Main Predictors* PU, Attitude, SN and Perceived Integrity
10	"Building a Research Model for Mobile Wallet Consumer Adoption: The Case of Mobile Suica in Japan" (Conceptual)	Donald L. Amoros and Rémy Magnier-Watanabe, Japan, 2012	"To propose a model of mobile payment adoption using the case of mobile wallet Suica, in	Self Developed Model	PE, PEU, PV, PS and Privacy, PT, PR FC, SI, AA and Attitude on BI.

			Japan"		
11	"Devising a research model to examine adoption of mobile payments: An extension of UTAUT2" (Conceptual)	Emma LS, Michael DW and YK. Dwivedi, UK, 2014	"To develop a model of m-payment adoption from previous literature."	UTAUT2+ additional variables	Additional Variables - Trialability, PE, SE, Innovativeness, and PT.
12	"An empirical examination of factors influencing the intention to use mobile payment"	Changsu Kim et al., South Korea, 2009	"To analyze the adoption behaviours of m-payment users, by proposing an m-payment research model"	Self Developed Model	"Two user-centric factors (Personal Innovativeness and M-Payment Knowledge) and four m-payment system characteristics (Mobility, Reachability, Compatibility, and Convenience)" were identified.

2.3 Important Observations from the Literature

If we examine the literature, most of the research studies are based on traditional innovation theories, while some of the studies used contemporary innovation theories like UTAUT. In addition, a few authors have attempted to study self-developed models comprising various constructs. Constructs with similar meanings are often given slightly different labels by different studies. For instance perceived usefulness, relative advantage and performance expectancy are similar in nature. Similarly perceived ease of use and effort expectancy are one and the same. Similarly, social influence is synonymous with subjective norms or social norms. Also, PBC is similar to complexity.

TAM is the mostly wide used model for understanding customer adoption of technology and banking innovations. Most of the studies are empirical in nature. Survey method is the popular method. The sample sizes varied from 200 to 1500. Most of the studies examined a linear form of relationship between the predictor variables and criterion variable while very few studies considered antecedents to the independent variables. Specifically, three main criterion variables (Attitude, AI and Usage) and eight predictor variables (PU, PEU, PR, FC, PT, SI, PBC or SE and Compatibility) were used.

As a second step, the main constructs repeatedly seen in this stream of research are identified. By conducting a meta-analysis on the present literature on m-commerce (L. Zhang, Zhu, & Liu, 2012), identified PU, PEU, Subjective Norms, Compatibility, PBC, Perceived Risk and Enjoyment as the most important constructs used in understanding the adoption of mobile commerce. Similarly in a review of 247 articles spanning over thirty years of research over customer acceptance and usage of e-banking channels, (Hoehle et al., 2012) have identified the following widely used constructs - Relative Advantage, PU, PEU, Convenience, Cost, Reliability, Risk Security, SE, Service Quality and Trust. In the other literature review on mobile banking adoption by (Shaikh & Karjaluoto, 2015), identified the following important constructs - PU, PEU, Trust, Compatibility, Credibility, SI, Attitude, SE, Cost, Risk and Relative Advantage. The same constructs are identified by different names in different studies (L. Zhang et al., 2012). All these important constructs are thoroughly examined in the following sections.

2.4 Variables of Interest in the Earlier Literature

2.4.1 Perceived Trust (PT)

Trust refers to "the extent to which a customer believes that using a banking innovation is secure and has no privacy threats" (Tsu Wei et al., 2009). PT has been found to be a main determinant for understanding the adoptions of both mobile banking and internet banking innovations in many of the recent studies (Amoroso & Magnier-Watanabe, 2012; Chaouali, Yahia, & Souiden, 2016; Ezzi, 2014; Hanafizadeh, Behboudi, Koshksaray, & Tabar, 2014; Oliveira, Faria, Thomas, & Popovič, 2014; Pham & Ho, 2015; Shin, 2009; Slade, Williams, & Dwivedi, 2014).

(Luo, Li, Zhang, & Shim, 2010) have studied the role of multi-dimensional trust and multi-faceted risk in understanding the adoption of wireless internet platform (Chaouali et al., 2016) have put forward a model using UTAUT theoretical framework to study the adoptions of internet banking in Tunisia. In this model they have included TRIB and TRPB as the main predictors of adoption. Yu et al. (2015), in a research on IB usage, have examined the role of trust and TRIB. In this study they found that trust acts as a mediator between trust and IB usage (P. L. Yu, Balaji, & Khong, 2015). It has been concluded by Montazemi et.al (2013), that three dimensions of trust play a better role than PU and PEU in understanding IB adoption (Montazemi & Saremi, 2013).

2.4.2 Perceived Security (PS)

Security is one more predictor similar to trust. Security is also found to be a important predictor in understanding adoption intentions of Banking innovations (Amoroso & Magnier-Watanabe, 2012; Ezzi, 2014; Yoon & Steege, 2013). Security is defined as "protection against threat in the form of damage, disclosure and alteration of data,

denial of service, fraud and misuse" (Kalakota & Whinston, 1997). According to Polatoglu and Ekin, (2001), security construct has three dimensions namely reliability, privacy and safety.

2.4.3 Self Efficacy (SE)

The concept of SE was first put forward by Bandura in the year 1977 (Bandura, 1977). SE refers to "one's belief in one's ability to use a technology to accomplish a task" (D. R. Compeau & Higgins, 1995). SE originally comes from the DTPB and the SCT (D. R. Compeau & Higgins, 1995). SE is found to be a key determinant of technology adoption (Ezzi, 2014; Luo et al., 2010; Püschel, Afonso Mazzon, & Mauro C. Hernandez, 2010; Slade et al., 2014). However, in a study conducted by (Shin, 2009) on the adoption of Mobile wallet in Korea, the influence of SE on AI was not significant.

Slade et al. (2014), have developed a model of m-payment adoption by extending UTAUT2 model with innovativeness, SE, perceived risk, trialability and trust as the main predictors (Slade et al., 2014). SE was found to be a key predictor of mobile banking adoption by Puschel et al. (2010) in their study in Brazil (Püschel et al., 2010).

2.4.4 Perceived usefulness (PU)

PU originally comes from the TAM Model (Davis, 1985). PU relates to "the degree to which the user believes that using a particular system would improve his job performance" (Davis, 1985). PU is one of the most widely accepted constructs in innovation adoption literature. It is found to be significant in understanding adoption intentions in many studies (Amoroso & Magnier-Watanabe, 2012; Bryson, Atwal, Chaudhuri, & Dave, 2015; Ezzi, 2014; Hanafizadeh et al., 2014; Pham & Ho, 2015; Yoon & Steege, 2013).

In a recent study to understand the AI of NFC-based Mobile payments, PU was established as a key predictor of AI (Pham & Ho, 2015). In another study on the adoption of M-banking in Iran, PU was established as a key predictor of AI (Hanafizadeh et al., 2014). (Bryson et al., 2015), have identified that PU is one among the key antecedents of adoption intention of mobile Internet banking in India (Bryson et al., 2015). (Amoroso & Magnier-Watanabe, 2012), in their case study on mobile Suica adoption, the most successful mobile wallet in Japan have concluded that PU is one of the main predictors (Amoroso & Magnier-Watanabe, 2012).

2.4.5 Performance expectancy (PE)

PE is a construct similar to PU or Relative Advantage. PE is derived from UTAUT2 model (Venkatesh et al., 2012). PE refers to how much benefits a customer can obtained by using a new technology (Venkatesh et al., 2012). PE is established as a key predictor of BI in many recent studies (Lai & Lai, 2010; Luo et al., 2010; Peng et al., 2011; Wang & Yi, 2012).

2.4.6 Perceived Ease of Use (PEU)

PEU relates to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1985). PEU originally comes from the TAM (Davis, 1985). PEU is established as a key predictor of BI in almost all the studies conducted using the TAM framework (Akturan & Tezcan, 2012; Aldás-Manzano et al., 2009; Schierz et al., 2010; Shih & Chen, 2013; Wessels & Drennan, 2010; Yang, 2012; Zhang et al., 2012).

2.4.7 Effort expectancy (EE)

EE is a construct similar to PEU. EE is derived from UTAUT2 (Venkatesh et al., 2012). EE relates to "the easiness connected with the usage of a new technology by the customer" (Venkatesh et al., 2012). EE is a strong determinant of adoption intention in many recent studies (L. Wang & Yi, 2012).

2.4.8 Trialability

Trialability relates to "the degree to which a consumer can try the innovation before he actually adopts it." Trialability as a construct originally comes from DOI theory. Studies have established out that customers perceive trialability as an important determinant of adoption (Brown et al., 2003; Kapoor et al., 2013). However in a study on m-commerce adoption, trialability was found to be not significant on adoption (Chong, 2013).

2.4.9 Relative advantage (RA)

RA is the most extensively used construct in the earlier literature (Hoehle et al., 2012). RA has its roots in DOI theory (Rogers, 2010). RA refers to "the degree to which an innovation is perceived as being better than its predecessor" (Rogers, 2010). It has been widely used in innovation adoption literature (Sia et al., 2004; Shih, 2008). RA is repeatedly established as a key determinant of AI or BI in many studies.

RA has been used traditionally in innovation adoption research. Previous studies on banking innovation adoption suggest that relative advantage is one of the important attributes affecting adoption intention (Carlsson et al., 2006; Constantiou et al., 2006; Jarvenpaa and Lang, 2005). Hsu et al. (2007) have found out that RA significantly affects the adoption intentions of mobile internet. RA is more or less similar to PU. Therefore in many studies using TAM model, PU is used as a substitute to RA.

2.4.10 Compatibility

Compatibility is one more construct taken from the DOI theory (Rogers, 2010)It is continuously found by innovation adoption research that compatibility significantly affects adoption intentions. Compatibility refers to "the degree to which an innovation suits the adopters working style, values, and lifestyle"(Rogers, 2010). Previous studies found out that compatibility is a major predictor of adoption intention (Júlio, José, & José, 2010; K. K. Kapoor, Dwivedi, & Williams, 2015; C. Kim, Mirusmonov, & Lee, 2010; Pham & Ho, 2015).

In innovation adoption research compatibility is commonly evaluated in relation to the user's working style (Moore and Benbasat, 1991; Taylor and Todd, 1995). With respect to banking innovations, the customer's capacity to incorporate these innovations into their living style is a vital element of compatibility (Lee et al., 2003). Many studies confirm that compatibility is a major determining factor of adopting mobile and Internet Technologies (Teo and Pok, 2003; Wu and Wang, 2005).

2.4.11 Social influence (SI)

SI was originally developed for UTAUT model by adding constructs like subjective norms and image. SI was researched in many contexts and results are shown to be mixed in respect to its effect on adoption intention of innovations. In spite of these conflicting results, SI is accepted as an important determinant of adoption (Bourne, 1957). SI is defined as "the user's perception about whether people who are important to him think if he should use the innovation or not" (Nysveen et al., 2005). Earlier studies constantly confirm that SI is a determinant of behaviour (Venkatesh & Morris, 2000; Wu, Tao, & Yang, 2007). In particular, Shin (2007) concluded that SI is a main predictor of mobile internet adoption.

2.4.12 Personal Innovativeness (PI)

Innovativeness or personal innovativeness is an important dimension which influences the adoption of new technologies. Innovativeness refers to "the extent to which an individual is faster in adopting new technologies compared to others in a social system" (Agarwal and Prasad, 1999; Bhatti, 2007; Kwon et al., 2007). PI is confirmed as a strong determinant of AI in many research studies (Agarwal & Prasad, 1998).

Customers who have a higher degree of innovativeness tend to adopt innovations sooner than other individuals. According to Yang et.al, 2012, different customers with different degrees of innovativeness adopt mobile payment services in different manners. Therefore he concludes that innovativeness is an important predictor of mobile payment adoption (C.-S. Yu, 2012). Similarly, Aldás-Manzano et al., 2009 in their study have found out that innovativeness is a key determining variable of behavioural intentions towards mobile and internet banking. However, Zhang et al. (2012) who attempted to understand mobile banking adoption have found out that innovativeness does not have a significant effect on AI (L. Zhang et al., 2012).

2.4.13 Observability

Observability relates to "the extent to which the results of using a new technology is observable by others" (Rogers, 2010). Observability is derived from DOI theory (Rogers, 2010). Observability is an important motivator for customer adoption of innovations and new banking channels. However, in many studies, observability is found to be not significant. This is because banking activities carried out through internet and mobile technologies are not visible or observable by others (Hoehle et al., 2012). Even though observability has shown significant influence on the AI of many technological innovations, it does not have an impact on the adoption of banking

innovations. It is for this reason that many researchers have excluded observability in their studies on banking innovations.

2.4.14 Visibility

Visibility is one more construct taken from Moore & Benbasat's study, 1991. Visibility refers to how much an innovation is visible in the surroundings and community of the user (Moore & Benbasat, 1991). The more visible an innovation is, the more likely is the customer to adopt that innovation. In recent research, Visibility is replaced by new terminologies like Network Externalities or Critical Mass (Economides, 1996; Mallat, Rossi, & Tuunainen, 2004). A customer's adoption of latest technologies is greatly influenced by the amount of customers who are already using it (Szmigin & Bourne, 1999; Van Hove, 1999).

2.4.15 Perceived Behavioural control or complexity (PBC)

PBC refers to "an individual's perception about the difficulty of performing a task." PBC originally comes from TPB theory (Ajzen, 1991). This is similar to the construct called complexity in DOI theory (Rogers, 2010). Both complexity and PBC are declared to be key determining variables of AI of innovations. They are found to exert a negative impact on AI. In relation to banking innovations, PBC refers to the customer's perceptions about his own capability, skills and knowledge required to use new banking technologies (Puschel et al., 2010). PBC is concluded as a key predictor of the AI of Banking innovations (Bryson et al., 2015).

The more complex an innovation is for the user to understand and perform, the more unlikely it is for the user to adopt that innovation (Linder, Jarvenpaa, & Davenport, 2003; Nysveen, Pedersen, & Thorbjornsen, 2005; Teo & Pok, 2003b). PBC or complexity is found to be a major determining factor of AI of banking innovations

(Laukkanen & Lauronen, 2005; Szmigin & Bourne, 1999). Some features of Banking innovations make it complex for the user, to use the innovations, thereby, reducing the usability; while some features make the innovation easier for the user, to use the innovation and thereby, increasing its usability (Mallat et al., 2004; Siau, Sheng, Nah, & Davis, 2004).

2.4.16 Information

Information is one more important factor that customers consider before adopting and innovation. Various sources of innovation include radio and TV Advertisements, newspaper, internet, marketing effort, branches and other promotional tools. Information can also come from other users or customers. Useful information regarding the usage of banking innovations is very much essential for a customer before he adopts the innovation. According to Sathye (1999), low awareness of banking innovations is an important factor obstructing the use of new banking technologies (Sathye, 1999). Therefore information can promote the use of new banking technologies. This can make the users aware of the advantages and disadvantages of using new banking technologies. (Guiltinanand Donnelly, 1983).

2.4.17 Responsiveness

Responsiveness or speed is one more construct seen in banking innovations research. It is a measure of response time and accuracy (Engel, Blackwell, & Miniard, 1995; Joseph, McClure, & Joseph, 1999). Responsiveness is an important factor considered by the consumer while carrying out transactions on mobile or internet (Jun & Cai, 2001; Parasuraman, Zeithaml, & Berry, 1988). Responsiveness refers to the speed and effectiveness of response from the bank, thereby, providing the necessary information for the customer to finish the transaction (AlSudairi, 2013). Just like self efficacy

responsiveness also comes from the cognitive theory of learning (Ezzi, 2014). It affects human behaviour and attitude. In banking innovations research, responsiveness is found to affect the adoption intention of the customer in a positive manner (Nimako, Gyamfi, & Wandaogou, 2013).

In the recent innovation literature, we come across similar constructs to responsiveness with different terminologies like facilitating conditions and structural assurances. Facilitating conditions originally belong to UTAUT2 (Venkatesh et al., 2003). Facilitating conditions refer to "the customers perceptions about the availability of necessary resources and support" (Venkatesh et al., 2012). Later many research studies on mobile banking adoption and internet banking adoption have found out that FC is a key determinant of BI (Cheong et al., 2004; Lai & Lai, 2010; Yang, 2010).

Regulatory support or Structural support is a similar construct to facilitating conditions. Regulatory support refers to the entire framework or ecosystem of legislatures, government institutions and supporting agencies which create rules and regulations regarding the usage of a particular Technology (Zhu, 2009). This kind of a regulatory support structure would boost the confidence of the customer to use the innovation without any inhibition. Regulatory support or structural insurances is proven to have a positive relationship with AI of customers in recent studies. Regulatory support clears all the doubts and suspicions in the mind of the customer and promotes the adoption of the technology or innovation (Chandran, 2016). This is particularly true with financial or banking innovations. Regulatory support also increases the perceived trust and security of the customer by providing support in case of any discrepancies. Constructs which are similar to regulatory support like structural assurances or structural support or perceived regulatory support have become quite popular in the recent innovation adoption research (AlGhamdi, Nguyen, & Jones, 2013; Alqahtani, Al-Badi, & Mayhew,

2012; Haque, Tarofder, Rahman, & Raquib, 2009). Structural assurances are found to show a significant impact on the trust perceptions of the customer (Chandra et al., 2010; Cho et al., 2007; Gu et al., 2009; Kim et al., 2009; Zhou, 2012; Zhou, 2011).

2.4.18 Perceived Cost (PC)

PC refers to the costs related with the usage of new banking products and services. This is continuously found to be an inhibiting factor for customer usage of new banking technologies (Laukkanen & Lauronen, 2005; Wu & Wang, 2005). When customers find that the new banking technology is costlier than it substitute, they are more likely not to adopt the innovation. Particularly research studies on mobile banking technologies found that the costs associated with mobile banking adoption is a major inhibitor in adopting these technologies (Hoehle et al., 2012). Therefore banks are introducing many promotional offers and introductory offers to encourage the use of new banking Technologies and mobile applications and to combat the negative influence of cost on adoption (Slade et al., 2014). PC is concluded to be a major factor determining the customer's AI of Internet and mobile banking innovations (Chong, 2013; Chong et al., 2012; Peng et al., 2011; Lu et al., 2011; Luarn & Lin, 2005; Sripalawat et al., 2011; Wei et al., 2009; Wessels & Drennan, 2010; Wu & Wang, 2005; Yang et al., 2012; Yu, 2012; Zhang et al., 2012).

2.4.19 Promotional benefits (PBs)

Promotional benefits refer to the benefits or offers provided by companies to encourage the use of an innovation during its introductory stages. This scenario is especially witnessed in banking technologies and mobile or internet based banking applications. Promotional benefits refer to various offers such as cash rewards, free coupons, discounts, free tickets, freebies and loyalty points offered by companies providing new

banking technologies. They encourage the customer to try the innovation thereby breaking the initial resistance of using an innovation (Bigcommerce.com, 2015). A recent report on UK customers proves that most of the consumers base their purchase decisions on the offers made by companies. In another survey of US customers, it is found that customers are likely to adopt more because of promotions and offers (Rapid Campaign Report, 2015; Brooks, 2015). Keeping in view the entry of fresh banking companies and never-ending competition in the banking sector, promotional benefits can help banks to promote their new technologies and services more effectively. Even though this construct 'promotional benefits' is not much tested in the literature, it is still understood to be a chief construct that can influence the AI of customers. This scenario is witnessed in the recent past in relation to the Indian banking sector.

2.4.20 Hedonic motivation (HM)

HM relates to “the fun part or pleasure part associated with using an innovation or new technology” (Venkatesh et al., 2012). HM is derived from UTAUT2. Many recent studies have found that hedonic motivation is an important predictor of technology adoption and usage. If customers cannot find pleasure in using new banking Technologies, they would prefer traditional banking (Dabholkar, 1996).

2.4.21 Adoption intention (AI)

Adoption intention is used as a criterion variable in majority studies on adopting innovations. It is originally derived from DOI theory (Rogers, 2010). It is labelled with different names in different studies. It is termed as 'intention to use' in the TAM model (Davis, 1985) and UTAT model (Venkatesh et al., 2003). It is labelled as behavioural intention in UTAT2 model (Venkatesh et al., 2012). AI is found to be effective in determining the actual usage (Leong, Hew, Tan, & Ooi, 2013) and the degree of

recommendation by the customer to new customers (Oliveira, Thomas, Baptista, & Campos, 2016). Therefore it is used in most of the innovation studies as an output variable (Park, Lee, & Ahn, 2004; Schierz, Schilke, & Wirtz, 2010; C.-S. Yu, 2012). According to the theory of reasoned action, intentions are the basic driving forces for a person's attitude and behaviour (Ajzen & Fishbein, 1975). Various constructs are used to measure adoption intention of new technologies in earlier and existing research (Amoroso & Magnier-Watanabe, 2012). The use of social media is affecting adoption intentions (X. Zhang, Wang, de Pablos, Tang & Yan, 2015).

3 CHAPTER

INDIAN BANKING

3.1 Overview of Indian banking

There is a rapid expansion in the Indian banking industry during the recent past accompanied with high financial growth rate, universal banking and globalization. Banking is thought to be the life sustainer for any economy. It generates and enhances economic growth. According to KPMG-CII report on banking (2016), India is one among the largest economies in the world with distinctly low percentage of domestic credit to Gross Domestic Product and therefore the banking sector has an excellent opportunity for growth.

The Indian banking sector is one among the largest banking sectors in the world. KPMG-CII report predicts that by 2020 Indian banking is going to be the fifth largest and by 2025 it is going to be the third largest banking business in the world. The Indian banking industry is a composition of 21 PSBs alongside 25 private banking entities and 43 foreign players in addition to 62 RRBs and about 91,000 credit cooperative societies. Public sector banks are the dominant players in the Indian banking market thus leaving a less important role for their private counter parts.

3.2 Regulatory Regime

RBI is the main governing organization for the Indian banking sector, through the provisions of the banking regulations act, 1949. RBI is completely owned by the Indian government and its Central Board is appointed by the GOI. RBI functions as the supervisor of the banking and financial system, prescribing the rules and regulations for

their effective functioning. All the Indian banks, NBFCs and other entities performing banking activities should follow the directions of RBI. Banking Regulation Act, 1949 defines banking as “the acceptance of deposits of money from public for the purpose of lending or investment”. Such deposits are repayable on demand and can be withdrawn by demand draft or cheque. The two primary functions of a bank are accepting deposits from public and lending or investing those deposits. According to Section 22 of the Banking Regulation Act it is essential for every bank to get a license from the RBI before starting the business of banking.

3.3 Important Reforms and Events that changed the face of Banking

This section describes the major reforms and policy initiatives taken by the RBI and the ministry of finance together that change the face of Indian Banking. The first major evolutionary change that took place in the Indian banking industry is the nationalization of private banks in 1969. Many banks were brought under the government control making them public sector banks or PSBs. This resulted in the decrease of private banks**.**

This also lead to an increase of bad loans or Non-Performing Assets (NPAs), thereby throwing a new challenge to the Indian banking sector. Therefore RBI came up with new policy reforms starting from the year 1991. These reforms spanning over a period of two decades have strengthened the Indian financial system. This is quite evident from the manner in which India survived the Southeast Asian financial crisis during 1990s and then the financial recession during 2007 to 2009. After 1991, the entry of private banks such as ICICI intensified the competition and the gradual up-gradation of technology in public sector banks contributed to further strengthening the Indian banking sector.

A number of reforms and policies were introduced in Indian banking during the recent past. Among them, demonetization in November, 2016 is the most important historical event with intense implications for the Indian economy. The two largest denominations of currency notes - INR 500 and INR 1,000, were deprived of their legal tender status, making almost 86% of the total cash in circulation invalid. This is equal to about 10% of India's GDP.

The important objectives of demonetization are improving tax compliance, curb black money and above all making India a cashless or cash light economy. According to the PricewaterhouseCoopers (2015) report, about 68% of the customer transactions in India are carried out in cash which is very high compared to other countries. Therefore the Indian government has taken the step of demonetization to increase the use of digital payments instead of cash.

After demonetization, the Government of India has come up with many new avenues for Digital payments to encourage digital transactions among the Indian public. The new digital platforms introduced by the Government of India include the United Payment Interface (UPI), the Bharat Interface for Money (BHIM), and Aadhaar Enabled Payment Systems (AEPS). They are discussed in detail in the later sections.

3.3.1 Technology effect

The banking sector in all probability has been affected most by IT innovations. The age of information and digitalization and its move towards the adoption of advanced technology has remodeled the method banks conduct business these days. Information technology plays a significant role in determining India's modern banking activities. These days banking technology is significantly influenced by the emergence of smart-phone technology and wide accessibility of 3G networks and 4G networks. Modern

technologies have additionally developed new client expectations, multiple channeled structures and improved product offerings within banking system. One of the major concerns of Indian banking is to become proactive in using technology to make banking available to the customers anytime and anywhere. Banking technology is becoming synonymous to everyday banking concept. We can witness this as a reputable reality only through a complete conversion of banking into a robust system with cross-industry partnerships and suppliers.

Indian Banking has radically changed from 'conventional banking' to 'convenience banking'. Indian banks today, are on move towards 'digital banking' at a rapid pace. Indian banks have gained enormous benefits in numerous ways by adoption of new technologies. Internet banking has transformed the face of Indian banking and has remarkably transformed banking operations. For instance, e-banking has optimized costs and generated revenue through numerous channels. According to the latest RBI data-2016, the value of a bank transaction is estimated to range between Rs.70 and Rs.75 on Branch, between Rs.15 and Rs.16 on ATM, less than or equal to Rs.2 on internet and less than or equal to Rs.1 on Mobile. With the convenience offered through 'Anywhere Banking' there is a steady growth in customer base.

RBI is the primary force for Indian banks in framing regulations and recommendations to achieve various banking objectives. Automation and Mechanization have transformed the way commercial banks operate in India. Electronic transfer of funds, MICR based cheque processing systems, implementation of ATMs and inter-connectivity among bank branches have made 'anytime banking' and 'convenience banking' possible. RBI took strong initiatives to strengthen the payment and settlement systems in India.

According to the RBI Reports 2016-17, there are about 2, 22,476 ATMs and more than 25, 29,147 POS devices in India. Electronic payment systems like NEFT, RTGS, ECS,

Cheque Truncation System, Debit cards, Credit Cards, Prepaid cards and Mobile banking system etc became popular in Indian banking. All these are all outstanding landmarks in the digitalisation of Indian banking sector. NEFT is the most widely used method of transferring money among all Indian banks. NEFT operates on half hourly basis. While, RTGS is mainly used for high-value transactions that are 'real time' transactions. On the other hand, IMPS offers an instant transfer of funds through an electronic system and this facility is available 24x7. Additionally, the recent past has witnessed an increased usage of PPIs (Prepaid payment instruments) and mobile wallets for purchasing goods & services and for transferring funds.

According to the Indian Banks' Association's survey-2016, nearly 80 % of transactions in the new banks are carried out on digital channels. Also, RBI is encouraging competition by the materialization of digital banking models over the past few years. New classes of banking licenses like payments banks and small-finance banks are introduced. The government has launched the Jan Dhan (People's Money) program through which millions of new bank accounts were opened for previously unbanked population to improve financial inclusion. As of March 2017, more than 280 million new accounts were opened, permitting customers to receive government allowances and to access credit, insurance and other remittances. Digital platforms are introduced to promote low cost payments such as RuPay card, which is a cheaper, domestic substitute to global credit or debit card platforms like MasterCard and Visa; UPI (Unified Payment Interface), a system that allows transfer of funds between banks on mobile; and BHIM (Bharat Interface for money), a mobile wallet that runs on UPI platform.

3.3.2 Digital Payments

Cheque used to be the primary payment system for a very long time. Later with the growth of IT and communications, different types of payment instruments have evolved. After cheque, the next important payment instrument in Indian banking is debit and credit card system. With the growing number of mobile and Internet users many digital payment systems have emerged over time. The Payment and Settlement Act, 2007 defines Digital Payments and governs Digital Payments in India. Digital Payments facilitate the transfer of funds digitally, without the involvement of cash. This can happen in various modes such as e-banking, e-wallets, mobile banking, etc. The most widely used forms of digital payments are internet banking, mobile banking and banking cards. They are discussed in detail in the following sections.

3.3.3 Internet banking (IB)

Internet banking is also called e-banking or virtual banking. Internet banking enables payment using the websites of the banks. The user needs to have an internet banking account with validation from the user's bank. The user can then log in into the banks website and make transactions by using the unique combination of his internet banking account ID and password.

ICICI Bank was the first bank in India to provide internet banking facility. When banks took steps to introduce internet banking services during the mid-1990s, many customers were hesitant to transact online. Therefore RBI along with the government has taken enormous efforts to encourage online transactions and e-commerce. For this purpose, banks have tied up with some major e-commerce giants like Amazon and eBay. By the year 2000, about 80% of the Indian banks have started offering online banking services which led to a growth in the number of online banking customers slowly. Today most of

the banks have gone virtual. These virtual banks have lower maintenance costs than their physical counterparts. Numerous digital banking channels are also facilitating the payment/transaction to take place online.

Online banking is today the biggest focus on the digital transformation agenda of banks. While mobile and social channels are still in their early stages, online banking has favoured many banks as a key element in their trade and technology strategies. The shift to online banking has been driven by changing paradigms in India. By 2020, India's average age is 29 years, and the young consumer base requires Internet knowledge and online information on a real time basis. Customers are seeking comfort, convenience and commitment, which is possible on online banking. Peer debate and information gathering have raised awareness among consumers. Despite the double increase in the number of registered users, online banking transactions account to only 2% to 8% of the total transactions across all channels. Therefore, there is an enormous opportunity to trans-migrate customers towards online banking channels. There are a number of reasons for low reception rates, the main issue being - large customer categories are still not able to access the internet. The next major obstacle is the fear associated with transacting online. Though preventive measures like 3-factor authentication and one time passwords are slowly bringing difference, online security is still a major issue, particularly for the previous generation banking customers.

3.3.4 Mobile banking

Mobile banking enables to carry out transactions through the usage of remote devices like mobile phones and tablets. Mobile banking service is provided by a bank through the use of software usually called as mobile applications. Mobile applications are different from that of internet banking. The customer needs to download the mobile

banking app of his respective Bank and install it on his mobile device in order to use this mobile banking service. Then the customer needs to register his account details and other credentials into the mobile app of his bank. After getting the approval from his bank to use the mobile application he can start transacting using his mobile banking app. Mobile banking is available to the customer on a 24x7 basis. However some banks have restrictions on the amount that can be transferred through mobile banking. The cost per transaction is reduced highly by using mobile banking because the customers need not to visit the physical branch in order to carry out transactions. Mobile banking offers the advantages of being available anywhere and at anytime. It also has the advantage of hassle-free transactions because it does not involve the usage of cash unlike an ATM or physical branch. Owing to the ever-increasing number of mobile and smart phone users the concept of mobile banking is penetrating into the public day by day. Today mobile phone turned out to be a ubiquitous tool to perform all kinds of Banking transactions just with a click. Most of the mobile phones today run on Android operating systems. This has led to the increased use of special mobile apps which are downloaded to the cell phone. ICICI Bank is the first bank in India to provide complete mobile banking service application, which is called imobile in 2008. RBI published guidelines on mobile banking in 2008 for the first time and all the banks which offer mobiles banking services have to abide by these guidelines on mobile banking given by RBI. However security is still a big challenge in mobile banking.

Experts observe that the rapid penetration of smart phones, will ride digital banking in India. According to the Internet and Mobile Association of India report (2017), India currently has about 400 millions of smart phone users and it is expected to reach 530 million by 2018. Thus there is ample scope for digital banking to drive on smart phone user base and argument exponentially over the next few years. Currently, mobile

banking accounts for about 9.7% of the total banking transactions by volume (RBI, November 2017).

3.3.5 Banking cards

Banking cards are typically plastic cards issued by the banks to the account holders. Banking cards are secured by a pin and they can be used to make transactions online. Transactions through banking cards are carried out by two-level authentication which includes a pin and an OTP. The customer's name, the bank's name and the card number is printed on the banking card. On the back of the banking card, is a magnetic strip through which information can be read and accessed. These banking cards can either be an ATM card or a debit card or a point of sales card or a credit card. The first credit card in India was issued by Central Bank of India. Currently, there are 840 million debit cards and 29 million credit cards in India (RBI, February 2017).

3.3.6 National Payments Corporation of India (NPCI)

RBI is working continuously for enabling a digital payment system in the country. With this objective RBI has enabled the formation of the NPCI with the support from Indian Banks Association (IBA).

NPCI acts as the umbrella institute for all Indian retail payment systems with all principal banks as its stakeholders. The objective of NPCI is to consolidate the disparities in various payment systems thereby forming a national level uniform standard process for all digital payments in India. The objective of NPCI is to create an affordable digital payment Systems by leveraging technology and to facilitate financial inclusion.

The first step towards this direction is the implementation of National Finance Switch (NFS) by NPCI. NFS enables digital interoperability among all the banks in India, empowering the vast network of ATMs in the country. The next radical step taken by NPCI is the formation of IMPS. Before the advent of IMPS transactions in banks were based on RTGS and NEFT. The limitations of RTGS and NEFT are high transaction limits, fixed operating hours and deferred settlement in batches. IMPS overcomes all these limitations. IMPS is a real-time payment system which is available 24/7 and without any transaction limits.

The next flagship product of NPCI is the UPI. UPI enables the customer to make a transaction just by possessing a Smartphone and a bank account. UPI transactions are settled through IMPS.UPI is a mobile banking interface enabling customers to transfer money instantly among all Indian banks. Transactions on UPI are based on a virtual address and there is no need to mention the bank account. Bharat Interface for Money (BHIM) is also a product from NPCI.

Now NPCI is handling 12 payment systems including NFS, ATM clearing, NUUP, IMPS, UPI, BHIM, RuPay, Point of sales (POS), NACH, BBPS, BharatQR and AEPS. (They are discussed in detail in the later sections of this chapter). According to the latest NPCI reports July 2017, its volume of transactions has reached one billion per month. Therefore with the support from RBI, NPCI successfully implemented efficient and effective innovations which are game changers in Indian Banking.

3.4 Recent Trends and Developments in Indian Banking

The banking landscape is highly influenced with the entry of about 18 new players. Two new universal banks were given licenses in 2015 after a gap of 12 years. Recently, RBI granted licenses to 10 small finance banks and eight payments banks. Payments banks

are niche banks set up by RBI with the objective of facilitating financial inclusion. Another important development is the implementation of PMJDY in August 2014 with the objective that every Indian citizen should have a bank account. By February 2017, over 270 millions of bank accounts were created and the scheme collected almost Rs.665 billion deposits. The introduction of Goods and Services Tax (GST) in July 2017 also affected the way financial sector operates. GST is an indirect tax that is applicable throughout India and it replaces numerous central government taxes and state government taxes. Meanwhile, the State Bank of India emerged as one of the top 50 banks in the world in terms of assets after a merger with its five associate banks in 2017. The top most development is the continuous effort of the government for a cashless digital economy. Demonetisation is a major step towards achieving this objective.

Social media banking is still in its nascent stages in India. But banks have already started harnessing the power of social media to improve customer engagement, to offer better customer service and to educate the customers. All the major banks in India have their presence on Facebook, Twitter, YouTube etc. Social media banking can be an important channel for cross-selling the products and also to comfort the feelings of disappointed customers.

3.5 Financial Inclusion

Financial inclusion has been a major concern for the Indian Government since the last century. RBI defines financial inclusion as providing basic banking services to the week and poor sections and offering prompt and adequate credit services at a low cost. Many steps were taken to achieve the objective of financial inclusion such as the establishment of postal savings banks, co-operatives and RRBs. Despite all these

efforts, many rural parts of India still are not able to access even the basic banking services. (NABARD, 2016)

Some important measures to improve financial inclusion encompass involving Business Correspondents (BCs) as mediators to offer financial and banking services, introduction of Kisan credit card for farmers, and commencement of No-Frills accounts in all commercial banks. Another important scheme is PMJDY. This scheme is now identical with a country wide operation on financial Inclusion and targets universal access to banking with minimum one bank account for each family. The beneficiaries not only get access to fundamental banking services like credit, insurance and pension facility, but also a debit card with a built in accident insurance cover of Rs 100,000. The year 2014-15 is said to be the year of financial inclusion with Jan Dhan Yojana.

In 2013, only 35% of Indian adults have access to bank account. And this number has substantially increased to 64% in 2016. The number of unbanked population in India also reduced to half from 570 million in 2013 to 230 million in 2016. (Financial Inclusion Report, Jan, 2017). All these statistics show that there is a good advancement of financial inclusion because of the efforts of RBI and government. The major contribution, of course, is from PMJDY and its related programs. The DBT plan has been expanded in 121 districts across India to transfer G2P payments to 28 different schemes. This would encourage beneficiaries to use their bank accounts because of the DBT cash flows into their accounts, thereby further stimulating financial inclusion.

3.6 Innovations in the Indian Banking Sector

The Indian banks are now making use of the newest technologies such as Internet access and cell phones to make transactions and to be in touch with the public. Technology and innovation started playing a crucial role since 1990s. Novel concepts like personal

banking, total branch automation, retail banking etc were initiated. The face of Indian banking has changed with the advent of mobile and Internet. The major innovations in Banking are e-banking, core banking, corporate banking, mobile banking, investment banking, rural banking and NRI banking. Innovative banking services include total branch automation, Demat services, any branch banking, micro finance, plastic money, ATM services etc.

3.7 Banking Channel Innovations and Their Significance

Innovations in banking may happen at various levels such as the product level, channel level, process level and business level. Out of these channel innovations are the most influential in changing the banking behavior. Channel innovations refer to new ways of delivering banking services and new distribution infrastructures. Channel innovations show an immediate impact on customer experience and therefore have become the top priority area for banking innovations. Almost half of India's population is unbanked. Channel innovations play a crucial role in making banking services available to the masses in a developing country like India. Channel innovations have the following advantages: enhancing customer engagement and experience, optimizing costs, improving efficiency and agility and creating sustainability.

Some important banking channel innovations are discussed in detail in the following sections.

3.8 Important Banking Channel Innovations

3.8.1 Electronic Clearance Service (ECS)

ECS is an electronic payment system which is best suitable for transactions that are recurring and periodic in nature. Companies or government institutions use ECS to make bulk transactions towards payment of salary, interest, pension etc. Transactions under this mode happen from a single source (companies or banks or government institutions) to a wide number of destination account holders (customers or employees or investors).

The two primary forms of ECS are ECS credit and ECS debit. ECS credit is used for making payments like salary, pension, interest etc. ECS debit is used for collecting receipts like tax collections, water bills, electricity bills etc. There are about 90 local and regional ECS centres across India. A national ECS system was introduced in the year 2008 to cover all locations in the country. ECS reduces the burden of issuing and handling paper documents and thereby improves customer service. It is very effective in the processing of bulk payments.

3.8.2 National Electronic Funds Transfer (NEFT)

NEFT is maintained by RBI and is introduced in the year 2005. NEFT is a national payment system that facilitates the transfer of funds between two bank accounts on an individual basis. Under this mode of payment, customers can transfer funds electronically from one bank to another. There are no limits on the amount that can be transferred. NEFT uses the core banking system in the country. NEFT operates through electronic messages and makes settlements on an hourly basis in batches, called Deferred Net Settlement (DNS).

NEFT makes settlements by means of 23 settlements taking place from 8:00 AM to 7:30 PM during week days and on the first, third and fifth Saturdays of the month. Transactions initiated beyond this point in time are settled in the next batch. No transactions are settled on the 2nd and 4th Saturdays, Sundays and public holidays. It approximately takes 9 batches on weekdays and 4 batches on Saturdays to get the transaction completed. From July, 2017 NEFT is making settlements on half-hourly basis. Currently, more than 1,15,000 bank branches in about 100 banks are NEFT enabled in India and about 42% of the total transactions are carried out by NEFT. (RBI, January 2017).

3.8.3 Real Time Gross Settlement (RTGS)

RTGS is a special payment mechanism where the transfer of funds happens on real-time and gross-time basis. Through RTGS, settlement happens individually on an order by order basis, without netting or waiting. Therefore the settlement happens on a continuous or in other words real-time basis. Payments once processed and settled are final and are not revocable. RTGS was introduced by RBI in 2004. RTGS is especially meant for large transactions. The minimum limit for RTGS transaction is Rs. 2 lakhs and there are no upper limits.

For the purpose of RTGS and NEFT, banks enabled with core banking solutions are issued an IFSC. This is a eleven digit alpha-numeric code and is unique for every branch of a bank. The RTGS service window works from 8am to 7pm during weekdays and from 8am to 1pm during Saturdays. RTGS does not function during weekly holidays and public holidays. RTGS facility is available in about 1, 13,000 branches across India.

3.8.4 Business Correspondents (BCs)

Business correspondents are agents appointed by banks for providing basic banking services. They are also called Bank Mitr. The basic banking services provided by Business correspondents include the opening of bank accounts, cash deposits and withdrawals, balance enquiries and mini statement. The concept of BCs was started in January 2006 by RBI. RBI permitted banks to engage Business correspondents as intermediaries between customers and banks. The concept of business correspondents can make the banking services available to the customer at their door step. The concept of BCs is particularly useful for providing basic banking services in the rural villages. BCs carry devices like micro ATMs, receipt generators, and mobile devices that can scan thumb impressions and digital signatures so as to provide easy access to financial Services for rural people. This concept has proven successful in almost 6 lakh villages in the country (RBI report, 2016). Business correspondents work with the help of the respective Village Panchayat by setting up a Common Service Centre (CSC). A common service centre is a computer hub that provides the e-governance and e-banking services to rural Indians. The entities or individuals permitted by RBI to act as business correspondents include NGOs, retired bank employees, retired government employees and microfinance institutions. However, because of restricted operations and low remunerations, the BC model did not achieve its targets. Still, the contribution of BCs towards financial inclusion is enormous. Considering this fact, RBI in 2014, decided to engage BCs in Pradhan Mantri Jan Dhan Yojna scheme and to pay a minimum compensation of Rs 5000 per month for every business correspondent. The recent trend is that business correspondents are tying up with payment banks and small banks to continue their services. More than one 1.5 lakh BCs were engaged in implementing PMJDY in the country (RBI, 2015).

3.8.5 Immediate Payment Service (IMPS)

IMPS is a powerful instant, electronic payment system in India. IMPS was launched in November 2010 by NPCI. IMPS is maintained by NPCI through its National Financial Switch (NFS). IMPS enables the transfer of funds immediately across all banks in India. The most important advantage of IMPS is that, it is available 24*7 throughout the year, even on bank holidays, unlike RTGS and NEFT. IMPS can be accessed through mobile, internet, ATM, SMS, Branch and USSD platforms. There is no minimum and maximum limit for the amount to be transacted using IMPS. There are two ways of transacting through IMPS. The first method is through bank account number and IFSC code while the second method uses mobile number and MMID. IMPS offers the following advantages - instant transfer of money, easy processing, round the clock availability, and accessibility over multiple channels. Recently after demonetization, many banks have heavily reduced IMPS charges making IMPS much more accessible to the public. Currently, IMPS has 272 member banks and 25 PPIs signed up for its service. (NPCI, December, 2017).

3.8.6 NUUP (National Unified USSD Platform)

NUUP offers banking services through its USSD number *99#. USSD also known as "Quick Codes" or "Feature codes", is a code utilised by mobile phones to correspond with mobile network operators. USSD can be used for WAP browsing, prepaid backup services, mobile banking services, location-based services and information services.

*99# service is USSD based, initiated by the Government of India and developed by NPCI, to facilitate easy access banking services from a normal mobile phone. NUUP allows customer to access banking services through a single number *99# across all banks regardless of mobile network operator, mobile handset or region. It is estimated

that about 35 million Indians are using normal feature phones which do not support data or internet. USSD is specifically designed for the purpose of serving this segment. The Telephone Regulatory Authority of India (TRAI) has set the maximum cost per transaction on NUUP as Rs 1.5.

3.8.7 Micro ATMs

Micro ATMs are card swiping machines which work like mini ATMs. Micro ATMs are modified versions of point of sales devices. They can get connected to the banks terminal through GPRS or GSM and offer facilities for card swiping and fingerprint scanning. With the introduction of PMJDY, BCs are supplied with micro ATMs to offer basic banking services to remote areas. They are handy to hold and carry to remote locations. The cost of a Micro ATM is less than Rs 20,000 and it is portable.

Micro ATMs are used by BCs to leverage Aadhaar enabled payment systems (AEPS). They are helpful in conducting e-KYC and opening bank account using Aadhaar number and are very effective in offering the basic banking services to that segment of people who are rural, illiterate and remote.

The Micro ATM machine is identical to POS hardware, but comes with an in-built, keypad, printer and scanner to allow for authentication through biometric information (fingerprint).

3.8.8 Aadhar enabled payment system (AEPS)

AEPS is an interoperable online payment platform that allows the user to use his Aadhar card number connected to his bank account for making transactions. Once Aadhar card number is linked to the bank account, transactions can be made using fingerprints, a biometric form of authentication.

The basis for a digital economy was set in the JAM (Jan dhan-Aadhar-Mobile) trinity. Aadhar is the world's largest national project. This project was implemented in 2009, by the UIDAI. The objective of this project is to issue a Unique Identification number called other number to every Indian citizen. This Aadhar card number can be connected to important services such as pension schemes, bank accounts etc. UIDAI has successfully issued Aadhar to more than 99% of Indians aged above 18. (UIDAI, Nov 2017).

The Aadhar Pay app or APA is specifically designed for merchants while Aadhar Payment Bridge or APB is designed to make disbursements for Direct Benefit Transfer (DBT). AEPS was designed by NPCI and it allows customers to transact on a micro ATM provided by banking correspondent by using Aadhar number and biometric authentication. AEPS generates a number called INN to identify the bank in which the customer has his account. The basic kinds of banking transactions that are allowed on AEPS are balance enquiry, cash withdrawal, cash deposit and funds transfer from Aadhar to Aadhar. About 43% of rural transactions including DBT transfers are happening via AEPS. (NPCI April, 2017).

3.8.9 Biometric Authentication Systems

Biometric Authentication Systems are self-service cash systems that use a biometric measure to recognize customers and permit them to withdraw money. Biometric Authentication Systems provide an alternative to the regular card and pin based transaction systems. RBI made it mandatory for all the new card acceptance systems to be compliant with Aadhar and biometric scanners from January, 2017.

Biometric authentication uses biological features such as finger prints, voice, iris etc., to identify and authenticate a person. A Biometric Authentication System uses biometric

authentication unlike a conventional system which uses a pin based authentication. It offers better and stronger security contributing to financial inclusion. The recent Indian government has introduced the Aadhar Enabled Payment System (AEPS) which use a combination of biometric authentication and UID (Unique Identification Number) for making financial transactions. The first biometric ATM in India was set up by ICICI bank in Andhra Pradesh in 2005. Micro ATMs which are used by Business Correspondents, Kisan ATMs and recently Aadhar Enabled Payment Systems (AEPS) use biometric authentication. Today many banks including SBI, Canara bank, Andhra bank, Indian bank, PNB and Axis bank etc., have set up Biometric ATMs at various locations in India. RBI predicts that biometric authentication is going to replace the traditional authentication system in Indian banking in the forth coming years.

3.8.10 Banking Kiosks

Kiosks are internet enabled computer cabins that can work like an ATM. While ATMs are primarily used for cash-based transactions, kiosks are used for non-cash based transactions such as printing bank account statements, cheque book requests, fund transfers etc.

The main idea behind kiosk banking is offering banking services with less infrastructure. Kiosks are generally placed at kirana shops, ration shops, super bazars etc in rural and semi-urban areas. Therefore they require less infrastructure to maintain and can offer basic banking services in remote areas thereby contributing to financial inclusion. Kiosk transactions are biometrically secured and acknowledged with a printed receipt to ensure security. Many banks have established multifunction kiosks (MFKs) in remote areas which are capable of functioning like mini-branches. Kiosk banking is an effective alternative channel for offering basic banking services in rural and semi urban areas with less set up costs.

3.8.11 Mobile Wallets

A mobile wallet is a prepaid instrument and a virtual cash wallet used instead of a physical wallet for making instant transactions. A mobile wallet is a smart phone application provided by banks. The user can download the Mobile Wallet application from the bank's website and load money into the wallet and this money can be used to make transactions. A mobile Wallet application uses MMID number (Mobile Money Identification Number) to authenticate the customer.

The monthly balance limit on a mobile wallet is Rs 20,000. A mobile wallet is a hassle-free way, digital format of free cash. The customer can link his credit card number or debit card number to his mobile wallet app to transfer money to his mobile wallet app. Mobile wallets are effective replacements for plastic cards and can be used to make purchases using a smart phone or a tablet. Most of the banks have issued their mobile wallets such as SBI buddy, Axis Bank lime, ICICI pockets, HDFC payZapp etc. Some private non-banking entities are also offering mobile wallets such as Airtel Money, Freecharge, Paytm, Oxigen Wallet, Mrupee, Mobiqwick and Vodafone M Pesa. BHIM app is the mobile wallet app of NPCI which works on UPI platform.

A mobile wallet can work even without internet or data by using SMS or USSD. Mobile wallets use Near Field Communications (NFC) or QR code technology for their functioning. Mobile wallets are provided by either banks or non-banking private entities certified by RBI. Wallets provided by banks have higher transfer limits and they can also be used for cash withdrawal at ATMs. There are two kinds of mobile wallets available in India- Semi-closed and open loop wallets. Wallets issued by banks are open wallets which allow cash withdrawal. Wallets issued by private companies are semi-closed wallets which do not allow cash withdrawal, the customer can only use the money for payments and fund transfers.

Mobile wallet industry has got a boost from demonetization. Mobile wallet companies like Paytm have recorded the highest number of transactions during the month of demonetization in November 2016. The market share of mobile wallet industry was 39% during demonetization. However with the launch of UPI, BHIM, Bharat QR and other mobile banking innovations by banks, the mobile wallet industry is slowly losing its market share. Currently, the mobile wallet industry occupies a market share of 30% with 320 million transactions (RBI April 2017).

3.8.12 RuPay

Rupay is an Indian domestic card scheme introduced by NPCI in March 2012. The word 'rupay' is a combination of rupee and payment. Rupay is a domestic, open loop, multi-lateral card system that enables electronic payment across all Indian banks. Rupay is a cost-effective alternative to MasterCard and Visa Card schemes. NPCI offers Rupay card system internationally by tying up with discover Financial Services. Rupay cards are accepted at all ATMs and POS terminals. They are also accepted online on most of the domestic payment gateways. Rupay cards have gained prominence through PMJDY. Rupay cards are issued to all PMJDY accounts. About 180 million Rupay cards were issued by 600 banks under PMJDY until March 2017. Rupay overtook Visa in June 2017 to become the largest card network with 375 million customers and 43% market share.

3.8.13 Unified Payments Interface (UPI)

UPI is the prestigious product from NPCI launched in August 2016 with the support from RBI and IBA. UPI is an advanced version of IMPS. UPI is the next generation digital payment system that offers interoperability by bringing all the existing payment systems under one single platform. UPI can leverage existing trends such as growing

smartphone adoption, multiple Indian language interfaces and universal access to the internet. Transactions on UPI are made through a mobile pin (MPIN) and a virtual ID.

Every bank provides its own UPI app that can be downloaded and used on android, windows and IOS mobile platforms. Most of the banks are offering UPI services for free of cost. Users can download the UPI app and register. A virtual ID and MPIN are generated within a few minutes after registration. Customers can make transactions on UPI without the unnecessary hassle of giving credit or debit card details or IFSC code and passwords. UPI offers the following benefits to the customers - round the clock availability, use of virtual ID which is more secure, single application for accessing different bank accounts, no credential sharing, and two factor authentication with a single click.

3.8.14 Bharat QR

Bharat QR is an integrated payment system developed and launched by NPCI in September 2016. It enables users to transfer funds from one source to another. Funds transferred through Bharat QR are directly credited into the customer's bank account. It provides a common interface for American Express, Visa, Master card, and RuPay cards. Unlike other systems, Bharat QR is interoperable with all the banks. Bharat QR is supported on Android and IOS devices.

Bharat QR facilitates the growth of digital payments by reducing the usage of card swiping machines for payments. Bharat QR basically works on the principle of scanning QR codes. It reduces the need for debit and credit cards which are less secure than Bharat QR.

3.8.15 BHIM

BHIM (Bharat Interface for Money) is a mobile application launched by npci in December 2016. BHIM was named after Dr Bhimrao Ambedkar. Unlike mobile wallets BHIM allows transfer of funds between different bank accounts either using UPI platform. Transactions on BHIM are instant and available 24 by 7 including weekends and government holidays. BHIM supports 13 Indian languages including English and it is expected to support all the 22 official languages of India very soon. Currently, BHIM has a customer base of 125 lakh Indians. The Government of India has launched two new schemes to promote the use of BHIM - referral payments for individuals, and cash back for merchants who accept payments from BHIM.

3.8.16 Bharat Bill Payment System (BBPS)

BBPS is a unified, interoperable platform for bill payments launched by RBI in August 2016. NPCI has got approval from RBI in June 2017 to act as the authorised operator for BBPS. NPCI provides clearing and settlement of transactions processed through BBPS. BBPS functions through a system of banking agents facilitating numerous payment modes and thus providing immediate payment. The objective of BBPS is to provide a multilevel level infrastructure that can enable anytime, anywhere and any bill payment to the customer. BBPS is effective in making payments for daily utility services like electricity bills, gas bills, water bill, telephone bills etc. Currently, there are 24 certified BBPS operating units in India. (NPCI, June 2017). At present BBPS support only 5 kinds of utility bills electricity, DTH, water, gas and telephone bills. The number of transactions on BBPS are about 10000 per day. (RBI, December 2017).

3.8.17 National Automated Clearing House (NACH)

NACH is an advanced version of ECS. NACH was introduced by NPCI in 2015. NACH is similar to ECS that it is an electronic payment system meant for transactions that are recurring and are intermittent in nature. NACH was launched with the objective of integrating multiple ECS systems operating across the country and to provide a standard framework for their operation. There are two kinds of NACH - debit NACH and credit NACH. Debit NACH allows collections such as insurance premiums, loan repayment etc while credit NACH allows payments such as salaries, interest, etc. ECS is a manual process while NACH is a fully centralized electronic process. Therefore it is more accurate and quick. It takes 3 to 4 days approximately to settle the transaction on ECS while the transaction is settled on the same day on NACH. For a member, to complete the registration process it takes approximately 30 days on ECS, while it takes only 15 days on NACH. NACH also provides a unique mandate registration reference number for future reference of the transaction. NACH's Aadhar Payment Bridge (APB) System has been successful in disbursing DBT payments to the beneficiaries using their Aadhar numbers.

3.9 Channel wise contribution to digital payments

Table 3.1 shows the transactions on various banking channels by volume and value.

Table 3.1

Channel wise contribution to digital payments

Channel	Transaction Volume in Millions	Transaction Value in Rupees Billion
IMPS	65.08	562.06
m-Wallet	320.87	74.42
UPI	0.32	8
USSD	2.8	5.9
BHIM	3.9	13

Source: Digital Payment Reports, May 2017 (RBI, NPCI)

3.10 Channel Innovations Selected For This Study

The two channel innovations considered for the study are Immediate Payment Service (IMPS) and Mobile Wallet Banking. They were selected based on 3 things. First is their stage in the adoption cycle. Both of them are in early stages of adoption, according to NPCI with a rapid growth rate (IMPS recorded a growth rate of 9% while Mobile wallet recorded a growth rate of 24% from May 2016 to May 2017. Source: NPCI website). Rapid growth rate indicates that they have enough customer base to study perceptions. Early adoption stage is the right stage to study customer perceptions because once it crosses the early adoption stage customers tend to perceive the innovation in a positive manner as more and more customers adopt the innovation. Moreover it is important to study the factors influencing adoption at the early adoption stage itself to understand the real problems involved. Second is their total contribution in terms of volume of transactions to digital payments. IMPS and Mobile wallet are the top contributors to

digital payments. (Source: Digital Payment Reports, May 2017, RBI & NPCI). Third is based on the results of a field study. After a field study of all the banking channel innovations and banking expert consultation, it was concluded that IMPS and mobile wallet would suit the purpose of the study.

IMPS and Mobile wallet banking are becoming the growing choice for banking as they benefit customers in terms of time, economy and accessibility. Both IMPS and Mobile wallet banking are discussed in detail in the following sections.

3.10.1 Immediate Payment Service (IMPS)

IMPS is a powerful instant, electronic payment system in India. IMPS was launched in November 2010 by NPCI. IMPS is maintained by NPCI through its National Financial Switch (NFS). IMPS enables the transfer of funds immediately across all banks in India. This service abides by the regulations of the Mobile Payment Guidelines, 2008 issued by RBI. These guidelines stress the importance of interoperability across banks and across mobile operators in a both safe and secure manner. (Khan, 2011).

The most important advantage of IMPS is that, it is available 24*7 throughout the year, even on bank holidays, unlike RTGS and NEFT. IMPS can be accessed through mobile, internet, ATM, SMS, Branch and USSD platforms. Customers can carry out Person to Merchant (P2M), Person to Person (P2P) and Person to Account (P2A) transactions on mobile or Internet or ATM platforms. IMPS can be used for paying utility bills, mobile or DTH recharge, grocery bills, credit card bills, travel ticketing, online shopping and educational institutes' fee payments. There is no minimum and maximum limit for the amount to be transacted using IMPS.

There are two ways of transacting through IMPS. The first method is through bank account number and IFSC code while the second method uses mobile number and

MMID.To avail IMPS service, a bank customer has to register for mobile banking and the customer needs to download the application on the mobile and activate it. This is one-time activity. After the completion of registration process with participating bank, customer receives a unique 7 digit MMID and MPIN. Both the payer and payee receive SMS from their particular banks soon after the completion of transaction. Suppose the remitter enters a wrong beneficiary mobile number, the transaction is rejected on the basis of MMID. Suppose the transaction gets obstructed due to technical or other reasons, the money will be returned immediately. The duration depends on each bank.

IMPS offers the following advantages - instant transfer of money, easy processing, round the clock availability, and accessibility over multiple channels. Recently after demonetization, many banks have heavily reduced IMPS charges making IMPS much more accessible to the public.

In 2010, the NPCI initially carried out a pilot for IMPS with 4 banks as members. They are SBI, BOI, UBI and ICICI Banks and later the pilot was expanded to include Yes Bank, Axis Bank and HDFC Bank that year. IMPS was launched publicly on November 22, 2010. When it was introduced it was named as Interbank Mobile Payment Service. Later it was changed to Immediate Payment Service. Currently, IMPS has 272 member banks and 25 PPIs signed up for its service. (NPCI, December, 2017).

3.10.2 Mobile Wallets

A mobile wallet is a prepaid instrument and a virtual cash wallet used instead of a physical wallet for making instant transactions. It is a smart phone application provided by banks. The user can download the Mobile Wallet application from the bank's website and load money into the wallet and this money can be used to make transactions. A

mobile wallet application uses MMID number (Mobile Money Identification Number) to authenticate the customer.

The monthly balance limit on a mobile wallet is Rs 20,000. It is a hassle-free way of carrying free cash in a digital format. The customer can link his credit card number or debit card number to his mobile wallet app to transfer money to his mobile wallet app. Mobile wallets are effective replacements for plastic cards and can be used to make purchases using a smart phone or a tablet. Most of the banks have issued their mobile wallets such as SBI buddy, Axis Bank lime, ICICI pockets, HDFC payZapp etc. Some private non-banking entities are also offering mobile wallets such as Airtel Money, Freecharge, Paytm, Oxigen Wallet, Mrupee, Mobiqwick and Vodafone M Pesa. BHIM app is the mobile wallet app of NPCI which works on UPI platform.

A mobile wallet can work even without internet or data by using SMS or USSD. Mobile wallets use Near Field Communications (NFC) or QR code technology for their functioning. Mobile wallets are provided by either banks or non-banking private entities certified by RBI. Wallets provided by banks have higher transfer limits and they can also be used for cash withdrawal at ATMs. There are two kinds of mobile wallets available in India- semi-closed and open loop wallets. Wallets issued by banks are open wallets which allow cash withdrawal and those issued by private companies are semi-closed wallets which do not allow cash withdrawal and the customer can only use the money for payments and fund transfers.

Mobile wallet industry has got a boost from demonetization. Mobile wallet companies like Paytm have recorded the highest number of transactions during the month of demonetization in November 2016. The market share of mobile wallet industry was 39% during demonetization. However with the launch of UPI, BHIM, Bharat QR and other mobile banking innovations by banks, the mobile wallet industry is slowly losing

its market share. Currently, the mobile wallet industry occupies a market share of 30% with 320 million transactions (RBI April 2017).

Table 3.2 shows the list of mobile wallets offered by each of the banks selected for the study.

Table 3.2

Mobile Wallets Offered by Banks

BANKS	Mobile Wallet	Special features
SBI	SBI Buddy	Semi-closed prepaid wallet, available in 13 languages, non-SBI customers
PNB	PNB Kitty	Can be used by both PNB as well as non-PNB customers
Canara bank	Can m-Wallet	Wallet to wallet transactions within the bank
ICICI	ICICI Pockets	Any Indian bank account can be used to fund mobile wallet, transactions on any website
HDFC	HDFC Chillr	Transfer money to anyone in their phone contacts, only for HDFC customers
Axis	Axis Lime	Wallet can be shared with others

4 CHAPTER

THEORETICAL FRAMEWORK

4.1 Introduction

The present research aims to measure customer perceived attributes of two banking channel innovations in India – IMPS and Mobile Wallet Banking. For this purpose a research model was developed which includes technology or innovation attributes - PU, PEU (taken from TAM), Compatibility, price value, perceived trust and security; one social characteristic- social influence; and two customer personal characteristics - personal innovativeness, self-efficacy.

4.2 Research Gaps Addressed In the Present Study

1. From the literature analysis it is obvious that the influence of consumer personal characteristics on how consumers perceive an innovation is still a neglected area. Though some researchers pointed out the significance of consume personal characteristics such as consumer innovativeness, perceived novelty and shopping orientation in better understanding consumer adoption behavior, some were not explored much and some were not empirically tested. The present work includes two personal characteristics - personal innovativeness, self-efficacy.

2. Most studies in this area are confined to studying only a single innovation while very few studies considered more than one innovation. The present work studies the adoption of two banking channel innovations in India – IMPS and Mobile Wallet Banking.

3. There is a lot of work on mobile and internet banking. But perceived security and trust associated with new banking channels was not explored much. The perceived value that new banking channels are offering is also not tested much. These two variables are added in the present research model.

4. Very few studies have considered the perceptions of non-adopters while examining adoption of innovations. The present research includes both adopters and non-adopters in the sample to fulfill this gap.

5. To address these gaps a research model was developed which includes innovation attributes, social characteristics and personal characteristics and was tested on two banking channel innovations in India - IMPS and Mobile Wallet Banking.

6. Indian banking Sector is changing very rapidly. Many banking channel innovations are coming day after day and there is no single research model to test the adoption of these channels among customers. The present research tries to address this problem.

4.3 Research Questions

- What are the factors influencing the adoption of Innovative banking channels in India?

- How does Demonetisation affect the adoption of Innovative banking channels in India?

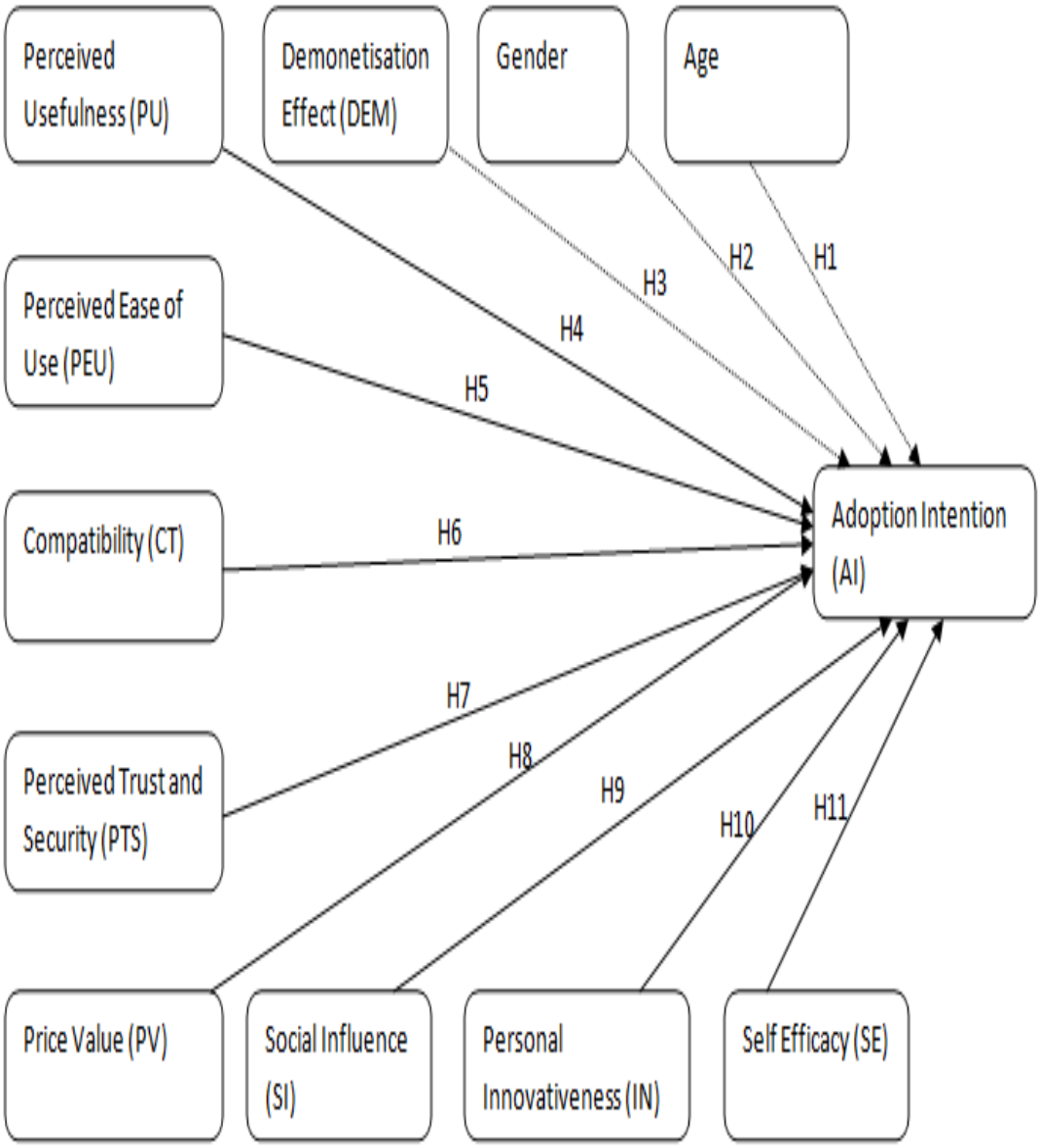
- Do consumer demographics affect the adoption of Innovative banking channels in India?

4.4 Objectives

- To study how Perceived Innovation Characteristics determine the adoption intentions of IMPS and Mobile Wallet.
- To study how customer demographics determine the adoption intentions of IMPS and Mobile Wallet.
- To study how customer personal characteristics determine the adoption intentions of IMPS and Mobile Wallet.
- To study how customer social characteristics determine the adoption intentions of IMPS and Mobile Wallet.
- To study how Demonetization effect determines the adoption intentions of IMPS and Mobile Wallet.

4.5 Research Model

The present research model has eight independent variables including five technology or innovation attributes – perceived usefulness, perceived ease of use, compatibility, perceived trust and security, price value; one social characteristic- social influence; two customer personal characteristics – personal innovativeness, self-efficacy and one dependent variable – Adoption Intention. It also contains three control variables namely age, gender and demonetization effect (represented in dotted arrows).



4.6 Variables and Hypotheses

Based on the above research objectives and the variables in the research model the following hypotheses are framed.

4.6.1 Hypothesis Related To Demographic Characteristics

Many research studies have shown that demographic factors like age and gender significantly influence the adoption intentions of customers (Ezzi, 2014; Maduku, 2013; Munusamy, De Run, Chelliah, & Annamalah, 2013). Abushanab et.al (2010), included age and gender as moderators in their framework based on UTUAT and they found that age and gender were significant moderators of perceived usefulness and usage intentions (Abushanab, Pearson, & Setterstrom, 2010). Al-Somali et al. have opined that age and gender would strongly influence the usage intentions of banking customers (Al-Somali, Gholami, & Clegg, 2009). Many research studies found that there is a strong relationship between age and behavioural intentions towards internet and mobile banking (Ezzi, 2014; Munusamy et al., 2013; Y.-S. Wang, Wang, Lin, & Tang, 2003). Similarly gender was found to strongly moderate the relationship between PE, PU and behavioural intentions (Y.-S. Wang et al., 2003; Yuen, 2013). In some studies gender was found to be a strong predictor of internet and mobile banking adoption (Ezzi, 2014; P. Hung, 2006; Mermod, 1970). Some research studies have shown that men are more likely to adopt innovations than women (Chen & Wellman, 2004).

Therefore in this study age and gender were included as predictors in the research model. However the main focus of the study is to understand the influence of innovation attributes on adoption. So the variance explained by age and gender needs to adjusted to understand the true effect explained by the model. Therefore age and gender were used

as control variables in the present study. It is hypothesised that both age and gender would significantly influence the adoption intentions of customers.

H1a. Age of the customer significantly influences customer's intentions to adopt IMPS.

H1b. Age of the customer significantly influences customer's intentions to adopt Mobile Wallet Banking.

H2a. Gender of the customer significantly influences customer's intentions to adopt IMPS.

H2b. Gender of the customer significantly influences customer's intentions to adopt Mobile Wallet Banking.

4.6.2 Definition, Meaning, Items, Sources and Hypothesis Related to Effect of Demonetisation (DEM)

A new variable titled "Demonetisation effect" has been added to capture the effect of demonetisation on the adoption of banking channels. Items for this variable were developed by consulting banking experts. It consists of 6 items.

Definition: "The withdrawal of a coin, note, or precious metal from use as legal tender."

Meaning: Demonetization" is the process of removing certain form of currency from circulation. Demonetization has been done three times in the history of India, first in 1946, 1978 and then in 2016. On 8th Nov 2016, RBI discontinued 500 and 1000 Rupee notes from being treated as a legal tender.

Items for Demonetisation Effect

D1- "I have adopted this channel only after demonetisation."

D2- "Demonetisation has made the usage of this channel compulsory."

D3- “Demonetisation has increased my usage of this channel.”

D4- “If not for the effect of demonetisation I would have not used this channel.”

D5-“I am happy and comfortable with other channels of banking before demonetisation.”

D6- I am happy that I have adopted this channel because of demonetisation.

Pilot study was carried out immediately after demonetisation. i.e. during December 2016 to February 2017. Therefore there is ample scope that demonetisation effect might have influenced the results. Therefore demonetisation effect was captured for the first time and adjusted for its effect by using it as a control variable. It is hypothesised that demonetisation will significantly affect the adoption intentions of customers.

H3a. Demonetization Effect significantly influences customer’s intentions to adopt IMPS.

H3b. Demonetization Effect significantly influences customer’s intentions to adopt Mobile Wallet Banking.

4.6.3 Meaning, Items, Sources and Hypothesis Related to Perceived usefulness (PU)

Meaning: “the degree to which the user believes that using a particular system would improve his job performance.”

PU originally comes from the Technology Acceptance Model (Davis, 1985). Perceived usefulness refers to “the degree to which the user believes that using a particular system would improve his job performance” (Davis, 1985). PU is one of the most widely accepted constructs in innovation adoption literature. PU is found to be significant in understanding adoption intentions in many studies (Amoroso & Magnier-Watanabe, 2012; Bryson, Atwal, Chaudhuri, & Dave, 2015; Ezzi, 2014; Hanafizadeh et al., 2014; Pham & Ho, 2015; Yoon & Steege, 2013). PU positively affects the adoption of mobile

and internet banking services (Shaikh and Karjaluoto, 2015). Many research studies have found that PU shows a direct significant influence on intention to use a particular banking channel (Hanafizadeh et al., 2014; Mohammadi, 2015; Shaikh and Karjaluoto, 2015).

In a recent study on the intention to adopt NFC-based Mobile payments, PU was found to be a significant predictor of adoption intention (Pham & Ho, 2015). In another study on the adoption of M-banking in Iran, PU was found to be a significant predictor of adoption intention (Hanafizadeh et al., 2014). Bryson et al. (2015) have identified that PU is one of the main antecedents of adoption intention of mobile Internet banking in India. Amoroso & Magnier-Watanabe, (2012) in their case study on mobile Suica adoption, the most successful mobile wallet in Japan have concluded that PU is one of the main predictors.

PU of IMPS is high because it can be used on all platforms - mobile, Internet or ATM. It is highly convenient for the customer to carry out transactions even while travelling. Mobile wallet banking allows the customer to pay in single-tap unlike net banking that calls for opening several browser pages which is time consuming. Therefore mobile wallet banking is also useful. Hence PU is considered to affect the adoption intentions of both IMPS and mobile wallet banking. The more useful it is perceived by the customer, the more likely is the customer to adopt the innovation. Therefore PU is hypothesised to effect adoption intention in a positive manner.

H4a. Perceived usefulness positively influences customer's intentions to adopt IMPS.

H4b. Perceived usefulness positively influences customer's intentions to adopt Mobile Wallet Banking.

Sources: Tan et al. (2013), Mallat et al. (2009), Tan and Teo (2000), Davis (1989), Moore and Benbasat (1991)

Items:

PU1- "Mobile Wallet Banking/IMPS provides flexibility and mobility."

PU2- "Mobile Wallet Banking/IMPS helps me complete all my financial transactions on time."

PU3- "Mobile Wallet Banking/IMPS helps me to make better decisions in making a purchase."

PU4- "Overall, Mobile Wallet Banking/IMPS is a useful option for making transactions."

4.6.4 Meaning, Items, Sources and Hypothesis Related to Perceived ease of use (PEU)

Meaning: "the degree to which a person believes that using a particular system would be free of effort".

PEU originally comes from TAM Model (Davis, 1985). PEU is the most often cited factor affecting customers' intention to use innovative banking services. Innovative banking need to be easy to use, otherwise customers would be reluctant to use innovative banking channels. Numerous studies conclude that PEU is a major attribute of Internet banking and mobile banking (Mazhar et al., 2014). Innovative banking channels that have user friendly interfaces are likely to be perceived as easy to use, and it develops positive intentions to use them. PEU refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1985). PEU is found to be a significant construct in almost all the studies conducted using the TAM framework (Akturan & Tezcan, 2012; Aldás-Manzano et al., 2009; Schierz et al., 2010; Shih & Chen, 2013; Wessels & Drennan, 2010; Yang, 2012; Zhang et al., 2012). Many research studies have empirically proven the significance of PEU (Alalwan et al., 2016; Al-Somali et al., 2009; Kesharwani and Bisht, 2012; Rodrigues et al., 2016 and Wang et

al., 2003) in building customers' intentions and perceptions towards innovative banking channels.

In the context of IMPS, PEU depends on which platform the customer is accessing IMPS and the customer's level of adaptability to that platform. However in the case of mobile wallet banking, the case is different. Only users who are convenient with mobile as a banking platform find it easy to use. The set-up and interface of mobile wallet banking is somewhat different to other mobile banking applications. Therefore it depends on customer's skills and adaptability to use mobile platform for banking.

PEU is considered to affect the adoption intentions of both IMPS and mobile wallet banking. The more easy it is perceived by the customer, the more likely is the customer to adopt the innovation. Therefore PEU is hypothesised to effect adoption intention in a positive manner.

H5a. Perceived ease of use positively influences customer's intentions to adopt IMPS.

H5b. Perceived ease of use positively influences customer's intentions to adopt Mobile Wallet Banking

Sources: Davis et al. (1989), Moore & Benbasat (1991), Tan et al. (2013), Luarn and Lin (2005)

Items:

PEU1- "Learning to use Mobile Wallet Banking/IMPS is easy."

PEU2- "Payment procedures using Mobile Wallet Banking/IMPS is clear and understandable."

PEU3- "Mobile Wallet Banking/IMPS is easy to interact with."

PEU4- "Getting the necessary information from Mobile Wallet Banking/IMPS is easy."

4.6.5 Meaning, Items, Sources and Hypothesis Related to Compatibility (CT)

Meaning: "the degree to which an innovation suits the adopters working style, values, and lifestyle."

Compatibility is one more construct taken from the DOI theory (Rogers, 2010). It is continuously found by innovation adoption research that compatibility significantly affects adoption intentions. Compatibility refers to "the degree to which an innovation suits the adopters working style, values, and lifestyle" (Rogers, 2010). Previous studies found out that compatibility is a major predictor of adoption intention (Júlio, José, & José, 2010; Kapoor, Dwivedi, & Williams, 2015; C. Kim, Mirusmonov, & Lee, 2010; Pham & Ho, 2015).

In innovation adoption research compatibility is commonly evaluated in relation to the uses style of work (Moore and Benbasat, 1991; Taylor and Todd, 1995). With respect to banking innovations, the customers' capacity to incorporate these innovations into their living style is a vital element of compatibility (Lee et al., 2003). Many studies confirm that compatibility is a major determining factor of adopting mobile and Internet Technologies (Teo and Pok, 2003; Wu and Wang, 2005).

Compatibility with customer's personal values is generally found to be a significant factor for using innovative banking channels. If consumers do not find new banking channels as compatible with their values, they would not adopt them. In the context of IMPS and mobile wallet banking, compatibility depends on how the customer finds it similar or different to the existing banking channels while transacting on IMPS or mobile wallet banking.

Compatibility is considered to affect the adoption intentions of both IMPS and mobile wallet banking. The more compatible it is perceived by the customer, the more likely is

the customer to adopt the innovation. Therefore Compatibility is hypothesised to effect adoption intention in a positive manner.

H6a. Compatibility positively influences customer's intentions to adopt IMPS.

H6b. Compatibility positively influences customer's intentions to adopt Mobile Wallet Banking.

Sources: Moore and Benbasat (1991), Yang et al. (2012), Tan and Teo (2000), Thompson et al. (1991), Venkatesh et al. (2003)

Items:

CT1- "Mobile Wallet Banking/IMPS is compatible with all my financial transactions."

CT2- "Mobile Wallet Banking/IMPS fits well with my style as a customer."

CT3- "I have the required resources and knowledge to use Mobile Wallet Banking/IMPS."

CT4- "My mobile phone is compatible with Mobile Wallet Banking/IMPS application."

4.6.6 Meaning, Items, Sources and Hypothesis Related To Perceived Trust and Security (PTS)

Meaning: "the extent to which a customer believes that using a banking innovation is secure and has no privacy threats." Trust refers to how safe and less risky it is for the customer to access banking services through the specific channel. A higher level of trust is proposed to show a positive influence on adoption intentions.

Perceived trust and security is a major concern for mobile and internet banking channels. Trust refers to "the extent to which a customer believes that using a banking innovation is secure and has no privacy threats" (Tsu Wei et al., 2009). Trust has been found to be one of the main predictors in understanding the adoption of both mobile banking and internet banking innovations in many of the recent studies (Amoroso &

Magnier-Watanabe, 2012; Chaouali, Yahia, & Souiden, 2016; Ezzi, 2014; Hanafizadeh, Behboudi, Koshksaray, & Tabar, 2014; Oliveira, Faria, Thomas, & Popovič, 2014; Pham & Ho, 2015; Shin, 2009; Slade, Williams, & Dwivedi, 2014).

Luo, Li, Zhang, & Shim, (2010) have examined the role of multi-dimensional trust and multi-faceted risk in understanding the adoption of wireless internet platform. (Chaouali et al., 2016) have developed a model based on UTAUT theoretical framework to understand the adoption of internet banking in Tunisia. In this model they have included TRIB and TRPB as the main predictors of adoption. Yu et al. (2015), in a research on IB usage, have examined the role of trust and TRIB. In this study they found that trust acts as a mediator between trust and IB usage (P. L. Yu et al., 2015). It has been concluded by Montazemi et al. (2013), that three dimensions of trust play a better role than PU and PEU in understanding IB adoption (Montazemi & Saremi, 2013).

Security is one more predictor similar to trust. Security is also found to be an important predictor in understanding adoption intentions of banking innovations (Amoroso & Magnier-Watanabe, 2012; Ezzi, 2014; Yoon & Steege, 2013). Security is defined as "protection against threat in the form of damage, disclosure and alteration of data, denial of service, fraud and misuse" (Kalakota & Whinston, 1997). According to Polatoglu and Ekin, (2001), security construct has three dimensions namely reliability, privacy and safety.

In the context of IMPS, PTS is high, because of the involvement of a regulatory framework. However, many customers are not aware of this regulatory support system. Moreover the transaction does not take place if the customer enters wrong details or wrong MMID on IMPS. In the case of mobile wallet banking transactions are performed anonymously. The payer and receiver may not necessarily know each other. This makes

the customer apprehensive and uncertain about the success of the transaction which in turn affects PTS. Therefore there is a need to study this factor in detail in the context of both IMPS and mobile wallet banking.

PTS is considered to affect the adoption intentions of both IMPS and mobile wallet banking. The more trustable and secure it is perceived by the customer, the more likely is the customer to adopt the innovation. Therefore perceived trust and security is hypothesised to effect adoption intention in a positive manner**.**

H7a. Perceived Trust and Security positively influences customer's intentions to adopt IMPS.

H7b. Perceived Trust and Security positively influences customer's intentions to adopt Mobile Wallet Banking

Sources: Kim et al. (2009), McKnight et al. (2002), Cheng et al. (2006), Changsu Kim et al. (2010)

Items:

PTS1- "I do not incur the risk of financial frauds using Mobile Wallet Banking/IMPS."

PTS2- "I am aware of the legal and technological structures and I feel secured that they adequately protect me from payment problems on Mobile Wallet Banking/IMPS."

PTS3- "I feel secure sending sensitive information across Mobile Wallet Banking/IMPS."

PTS4- "I trust the security mechanisms involved in Mobile Wallet Banking/IMPS."

4.6.7 Meaning, Items, Sources and Hypothesis Related to Price value (PV)

Meaning: "trade-off between the perceived benefits of the service and the monetary cost involved in using it."

PV relates to “the value that consumers perceive they receive in exchange for the price they pay to avail a product or service”. PV can be viewed as “a balance between what customers are receiving (in terms of quality, benefits and utilities) and what they are paying for it (primarily in terms of price)” (Zeithaml, 1988; Keeney, 1999). PV is a key construct that significantly influences the adoption intentions for internet and mobile banking technologies (Pagani, 2004; Amoroso and Magnier-Watanabe, 2012; Slade et al., 2015). PV is understood as “consumer's cognitive trade-off between the perceived benefits of the service and the monetary cost involved in using it” (Venkatesh et al., 2012). PV plays an important role in building customers’ intentions for adopting and also accepting new technologies (Mallat et al., 2008; Venkatesh et al., 2012). Moreover, marketing research recognizes PV as “how the customer perceives price for the utilities and quality received” (Dodds et al., 1991). Thus, when the utility that a consumer receives in adopting an innovative banking channel is more than the financial costs involved, PV would positively influence the customer’s intentions to adopt the channel (Venkatesh et al., 2012). Many studies have pointed out the affect of PV on customer's intentions to adopt e-banking channels but the relation was not tested empirically (Al-Hawari and Ward, 2006; Ding et al., 2007; Gerrard and Cunningham, 2006; Ho and Ko, 2008; Lee and Allaway, 2002; Sathye, 1999).

In using the IMPS application, the customers incur a certain charge per transaction and it changes from bank to bank. However, most Indian banks have reduced the charges of IMPS after demonetisation. In the case of mobile wallet banking, transaction charges are negligible and many mobile wallet companies are offering additional benefits like discounts, coupons and offers making it more economical and encouraging for the customer to use mobile wallet banking.

PV is considered to affect the adoption intentions of both IMPS and mobile wallet banking. The more valuable it is perceived by the customer, the more likely is the customer to adopt the innovation. Therefore PV is hypothesised to effect adoption intention in a positive manner**.**

H8a. Price value positively influences customer's intentions to adopt IMPS.

H8b. Price value positively influences customer's intentions to adopt Mobile Wallet Banking

Sources: Mallat et al. (2008), Koenig-Lewis et al. (2010), Yang et al. (2012), Lu et al. (2011), Pham & Ho (2014)

Items:

PV1- "The cost of making a financial transfer with Mobile Wallet Banking/IMPS is reasonable."

PV2- "Buying a phone compatible with Mobile Wallet Banking/IMPS is not expensive."

PV3- "Mobile Wallet Banking/IMPS helps me avail discounts and coupons which makes it more economical."

PV4 - "Mobile Wallet Banking/IMPS is a good value for money."

4.6.8 Meaning, Items, Sources and Hypothesis Related to Social Influence (SI)

Meaning: "the user's perceptions about whether people who are important to him think if he should use the innovation or not."

SI would result in changed attitudes and actions (Kelman, H.1958). Kelman differentiated between three different ways SI would affect a person's behavior: compliance, identification, and internalization. Compliance happens "when an individual adopts the induced behavior not because she believes in its content but with

the expectation of gaining rewards or avoiding punishments." Identification happens "when an individual accepts influence because she wants to establish or maintain a satisfying self-defining relationship to another person or group." Internalization happens "when an individual accepts influence because it is congruent with her value system."

SI was originally developed for UTAUT by adding constructs like subjective norms and image. SI was researched in many contexts and results are shown to be mixed in respect to its effect on adoption intention of innovations. In spite of these conflicting results, social influence is accepted as an important determinant of adoption (Bourne, 1957). SI is defined as "the user's perception about whether people who are important to him think if he should use the innovation or not" (Nysveen et al., 2005). Earlier studies constantly confirm that SI determines behaviour (Venkatesh & Morris, 2000; Wu, Tao, & Yang, 2007). In particular, Shin (2007) concluded that social influence is the main predictor of mobile internet adoption.

Customers often react to SI to build a favourable image within his reference group or community (Chitungo and Munongo, 2013). Aboelmaged and Gebba (2013) indicate that SI as a predictor cannot be neglected in adoption research. SI was validated in many studies on internet and mobile banking acceptance (Aboelmaged and Gebba, 2013; Chitungo and Munongo, 2013). Previous literature concludes that SI has a significant influence on AI. Therefore it is proposed that SI would significantly influence the adoption decision.

SI is considered to affect the adoption intentions of both IMPS and mobile wallet banking. The customer can be influenced either positively or negatively by SI. Therefore SI is hypothesised to effect adoption intention significantly.

H9a. Social influence significantly influences customer's intentions to adopt IMPS.

H9b. Social influence significantly influences customer's intentions to adopt Mobile Wallet Banking

Sources: Dwivedi and Irani (2009), Claudy et al. (2011), Leong et al. (2013), Yang (2010)

Items:

SI3- "People whose opinions I value prefer that I use Mobile Wallet Banking/IMPS."

SA2- "People I monetarily transact with, think I should use Mobile Wallet Banking/IMPS."

SA3- "Merchants I buy goods/services from, think I should use Mobile Wallet Banking/IMPS."

SA4- "In my social circle, I see many people using Mobile Wallet Banking/IMPS."

4.6.9 Meaning, Items, Sources and Hypothesis Related to Personal innovativeness (IN)

Meaning: "the degree to which the user believes that using a particular system would improve his job performance."

Innovativeness is a key dimension which influences the AI of new technologies. Innovativeness refers to "the extent to which an individual is faster in adopting new technologies compared to others in a social system" (Agarwal and Prasad, 1999; Bhatti, 2007; Kwon et al., 2007). IN is confirmed as a strong determinant of AI in many research studies (Agarwal & Prasad, 1998).

Customers who have a higher degree of innovativeness tend to adopt innovations sooner than other individuals. According to Yang et.al, (2012) different customers with different degrees of innovativeness adopt mobile payment services in different manners. Therefore he concludes that innovativeness is an important predictor of mobile payment

adoption (C.S. Yu, 2012). Similarly, Aldás Manzano et al. (2009) in their study have found out that innovativeness is a key determining variable of behavioural intentions towards mobile and internet banking. However, Zhang et al. (2012) have found out that innovativeness does not show a significant influence on adoption intention in their study on mobile banking adoption (L. Zhang et al., 2012).

Personal innovativeness is considered to affect the adoption intentions of both IMPS and mobile wallet banking. The more innovative the customer is the more likely is the customer to adopt the innovation. Therefore innovativeness is hypothesised to effect adoption intention in a positive manner.

H10a. Personal innovativeness positively influences customer's intentions to adopt IMPS.

H10b. Personal innovativeness positively influences customer's intentions to adopt Mobile Wallet Banking

Sources: (Yi et al., 2006)

Items:

IN1- "When I hear about a new technology, I look for ways to experiment with it."

IN2- "Among my peers, I am usually the first to try out new technologies."

IN3- "In general, I am not hesitant to try out new technologies."

IN4- "I like to experiment with new technologies."

IN5- "I know more about new technologies before other people do."

4.6.10 Meaning, Items, Sources and Hypothesis Related to Self-Efficacy (SE)

Meaning: Self- efficacy represents "the customer's beliefs about their own ability to learn new things and adopt them." Persons with more self-efficacy are shown to adopt innovations more.

The concept of SE was first put forward by Bandura in the year 1977 (Bandura, 1977). SE refers to "one's belief in one's ability to use a technology to accomplish a task" (D. R. Compeau & Higgins, 1995). SE originally comes from the DTPB and the SCT (D. R. Compeau & Higgins, 1995). SE is found to be a key determinant of technology adoption (Ezzi, 2014; Luo et al., 2010; Püschel et al., 2010; Slade et al., 2014). However, in a study conducted by (Shin, 2009) on the adoption of Mobile wallet in Korea, the influence of SE on AI was not significant.

Slade et al. (2014) have developed a model of m-payment adoption by extending UTAUT2 model with innovativeness, SE, perceived risk, trialability and trust as the main predictors (Slade et al., 2014). SE was found to be a key predictor of mobile banking adoption by Puschel et al. (2010) in their study in Brazil (Püschel et al., 2010).

SE was found to directly affect the adoption of mobile and internet banking (Dasgupta, Paul, & Fuloria, 2011; Luarn & Lin, 2005). Therefore it is proposed that SE will be positively related to adoption intention.

SE is considered to affect the adoption intentions of both IMPS and mobile wallet banking. The more SE the customer has, the more likely is the customer to adopt the innovation. Therefore SE is hypothesised to effect adoption intention in a positive manner.

H11a. Self- efficacy positively influences customer's intentions to adopt IMPS.

H11b. Self- efficacy positively influences customer's intentions to adopt Mobile Wallet Banking

Sources: Compeau et al. (1999), Venkatesh et al. (2003), Lee et al. (2011)

Items:

SE1- “I would feel comfortable using Mobile Wallet Banking/IMPS on my own.”

SE2- “I am confident of using Mobile Wallet Banking/IMPS if I have only the online instructions for reference.”

SE3- “I am confident of using Mobile Wallet Banking/IMPS even if there is no one around to show me how to do it.”

SE4- “I am confident of using Mobile Wallet Banking/IMPS even if I have never used such a system before.”

4.6.11 Meaning, Items and Sources Related to Dependent Variable - Adoption Intention (AI)

Meaning: Adoption intention is used as a criterion variable in majority studies on adopting innovations. It is originally derived from DOI theory (Rogers, 2010). It is labelled with different names in different studies. It is termed as 'intention to use' in the TAM model (Davis, 1985) and UTAT model (Venkatesh et al., 2003). It is labelled as behavioural intention in UTAT 2 model (Venkatesh et al., 2012). AI is found to be effective in determining the actual usage (Leong et al., 2013) and the degree of recommendation by the customer to new customers (Oliveira et al., 2016). Therefore it is used in most of the innovation studies as an output variable (Park et al., 2004; Schierz et al., 2010; C.-S. Yu, 2012). According to TRA, intentions are the basic driving forces for a person's attitude and behaviour (Ajzen & Fishbein, 1975). Various constructs are used to measure adoption intention of new technologies in earlier and existing research (Amoroso & Magnier-Watanabe, 2012). The use of social media is affecting adoption intentions (X. Zhang, Wang, de Pablos, Tang, & Yan, 2015).

Sources: Nysveen et al. (2005), Karahanna et al. (1999), Teo and and Pok (2003), Shih and Fang (2004)

Items:

AI1- "I intend to use Mobile Wallet Banking/IMPS whenever the opportunity arises."

AI2- "I am interested in continuing to use Mobile Wallet Banking/IMPS."

AI3- "I intend to increase my use of Mobile Wallet Banking/IMPS in the near future."

AI4- "I would recommend my friends to use Mobile Wallet Banking/IMPS for making transactions."

4.7 Sources of Variables

The meaning, theory of origin, items and sources of all the variables selected for the study are summarised in Table 4.2.

Table 4.1

Sources of Variables

Sl. No.	Variable Name	Meaning / Definition	Theory of Origin	Items	Sources
1	Perceived usefulness	"the degree to which the user believes that using a particular system would improve his job performance."	TAM	PU1- "Mobile Wallet Banking/IMPS provides flexibility and mobility." PU2- "Mobile Wallet Banking/IMPS helps me complete all my financial transactions on time." PU3- "Mobile Wallet Banking/IMPS helps me to make better decisions in making a purchase." PU4- "Overall, Mobile Wallet Banking/IMPS is a useful option for making transactions."	(Davis, 1989; Leong et al., 2013; Mallat, Rossi, Tuunainen, & Öörni, 2009; Tan & Teo, 2000)
2	Perceived ease of use	"the degree to which a person believes that	TAM	PEU1- "Learning to use Mobile Wallet Banking/IMPS is easy."	(Davis, 1989; Leong et al., 2013;

		using a particular system would be free of effort".		PEU2- "Payment procedures using Mobile Wallet Banking/IMPS is clear and understandable." PEU3- "Mobile Wallet Banking/IMPS is easy to interact with." PEU4- "Getting the necessary information from Mobile Wallet Banking/IMPS is easy."	Luarn & Lin, 2005)
3	Compatibility	"the degree to which an innovation suits the adopters working style, values, and lifestyle."	DOI	CT1- "Mobile Wallet Banking/IMPS is compatible with all my financial transactions." CT2- "Mobile Wallet Banking/IMPS fits well with my style as a customer." CT3- "I have the required resources and knowledge to use Mobile Wallet Banking/IMPS." CT4- "My mobile phone is compatible with Mobile Wallet Banking/IMPS application."	(Moore & Benbasat, 1991; Tan & Teo, 2000; Thompson, Higgins, & Howell, 1991; Venkatesh et al., 2003; Yang, Lu, Gupta, Cao, & Zhang, 2012)
4	Perceived Trust and Security	"the extent to which a customer believes that using a banking innovation is secure and has no privacy threats."		PTS1- "I do not incur the risk of financial frauds using Mobile Wallet Banking/IMPS." PTS2- "I feel assured that legal and technological structures adequately protect me from payment problems on Mobile Wallet Banking/IMPS." PTS3 – "I feel secure sending sensitive information across Mobile Wallet Banking/IMPS." PTS4- "I trust the security mechanisms involved in Mobile Wallet Banking/IMPS."	(Cheng, Lam, & Yeung, 2006; C. Kim et al., 2010; G. Kim, Shin, & Lee, 2009; McKnight, Choudhury, & Kacmar, 2002)

5	Price value	"trade off between the perceived benefits of the applications and the monetary cost for using them"	UTAUT2 model	PV1- "The cost of making a financial transfer with Mobile Wallet Banking/IMPS is reasonable." PV2- "Buying a phone compatible with Mobile Wallet Banking/IMPS is not expensive." PV3- "Mobile Wallet Banking/IMPS helps me avail discounts and coupons." PV4 – "Mobile Wallet Banking/IMPS is a good value for money."	(Koenig-Lewis, Palmer, & Moll, 2010; Leong et al., 2013; Lu, Yang, Chau, & Cao, 2011; Mallat et al., 2009; Yang et al., 2012)
6	Social Influence	''the user's perception about whether people who are important to him think if he should use the innovation or not."	TAM2, UTAUT2	SI3- "People whose opinions I value prefer that I use Mobile Wallet Banking/IMPS." SA2- "People I monetarily transact with, think I should use Mobile Wallet Banking/IMPS." SA3- "Merchants I buy goods/services from, think I should use Mobile Wallet Banking/IMPS." SA4- "In my social circle, I see many people using Mobile Wallet Banking/IMPS."	(G. Kim et al., 2009; Koenig-Lewis et al., 2010; Leong et al., 2013; Yang et al., 2012)
7	Personal innovativeness	"the extent to which an individual is faster in adopting new technologies compared to others in a social system."		IN1 – "When I hear about a new technology, I look for ways to experiment with it." IN2 – "Among my peers, I am usually the first to try out new technologies." IN3 – "In general, I am not hesitant to try out new technologies." IN4 – "I like to experiment with new technologies." IN5- "I know more about new technologies before other	(Agarwal & Prasad, 1998; Lee, Hsieh, & Hsu, 2011)

				people do."	
8	Self-Efficacy	"one's belief in one's ability to use a technology to accomplish a task."	DTPB	SE1- "I would feel comfortable using Mobile Wallet Banking/IMPS on my own." SE2- "I am confident of using Mobile Wallet Banking/IMPS if I have only the online instructions for reference." SE3- "I am confident of using Mobile Wallet Banking/IMPS even if there is no one around to show me how to do it." SE4- "I am confident of using Mobile Wallet Banking/IMPS even if I have never used such a system before."	(D. Compeau, Higgins, & Huff, 1999; Lee et al., 2011; Venkatesh et al., 2003)
9	Adoption intention		DOI, TAM	AI1- "I intend to use Mobile Wallet Banking/IMPS whenever the opportunity arises." AI2- "I am interested in continuing to use Mobile Wallet Banking/IMPS." AI3- "I intend to increase my use of Mobile Wallet Banking/IMPS in the near future." AI4- "I would recommend my friends to use Mobile Wallet Banking/IMPS for making transactions."	(Karahanna et al., 1999; Nysveen et al., 2005; Shih & Fang, 2004; Teo & Pok, 2003a)

5 CHAPTER

RESEARCH METHODOLOGY

5.1 Research Design

Research design refers to the type of study mainly in terms of the design of research (Descriptive or exploratory or experimental etc), the nature of research (qualitative or quantitative) and the number of time points for data collection (cross-sectional or longitudinal).

The present study is descriptive and quantitative in nature. It is a cross-sectional study which means data is collected at only one point of time.

5.2 Target Population

The target population refers to the total group of individuals from which the sample is drawn. All retail banking customers in India are the target population for the present study. The total banked population in India is 200 million.

5.3 Sampling Technique

Sampling refers to the process of selecting the sample respondents from the target population. There are various techniques available for sampling like simple random sampling, quota sampling etc. Some of them are probabilistic in which all the members of population have equal chances of selection while some them are non-probabilistic.

The present research uses a purposive sampling technique to select the sample. Purposive sampling is also known as a judgmental or expert sampling. It is a kind of

non-probability sampling. The main objective behind a purposive sample is to produce a sample that is a representative of the population. Random sampling could not be used because of the non availability of the complete list of all the retail banking customers in India for using it as a sampling frame. Therefore purposive sampling technique was used.

5.3.1 Sample

Two channel innovations are considered for the study - Immediate Payment Service (IMPS) and Mobile Wallet Banking. The criteria for selecting these two innovations were already discussed in the chapter on Indian banking sector.

Top four cities in terms of innovation (Digital Indian Cities survey, 2016 conducted by CEO World Magazine) and digital payments (IBEF Report on Digital Payments and Cashless cities, 2016) are considered for collecting data. They are Bangalore, Delhi, Mumbai and Hyderabad. Since only tier 1 cities were included, the study attempted to include the representation of all genders, age-groups and literacy levels so as to reduce the biasness of the selected sample.

Six major banks were selected for collecting data. These six banks were selected based on two criteria:

1. The top banks according to KPMG study of best banks, 2016 were chosen. This KPMG report was based on many factors like growth rate, market share, total income and market capitalization.

2. Among them three public sector banks namely SBI, PNB, Canara bank and three private sector banks namely ICICI, HDFC and Axis banks were selected. All the six banks have both the channel innovations - Immediate Payment Service (IMPS), and Mobile Wallet Banking.

5.3.2 Inclusive Criteria

Both adopters and non adopters were included in the sample. But the customer has to use both IMPS and Mobile Wallet banking at least 3 times to be considered for the sample.

Customers were classified as adopter or non-adopter based on the usage frequency and usage criteria (Kapoor, Dwivedi, & Williams, 2013).

5.3.3 Sample Size

The total sample size targeted is 1600 (400 per city).

A total of 1668 filled in questionnaires were received. Out of them only 1572 questionnaires were useful. Some of them were not useful owing to reasons like missing responses, double responses etc. The final sample achieved is 1572. Table 5.1 shows a distribution of the final sample across cities and banks.

Table 5.1

Distribution of Final Sample across Cities and Banks

Distribution Category	Bank	Sample
Bank wise	SBI	287
	PNB	234
	Canara bank	237
	ICICI	254
	HDFC	282
	Axis bank	278
	Total	**1572**

	Bangalore	395
	Delhi	397
City wise	Mumbai	384
	Hyderabad	396
	Total	**1572**

5.3.4 Sample Size Justification

The research instrument contains 39 items. As suggested by Hair et al. (2008) if 10 is considered as the sufficient sample size for each item then it would result in a sample size of 39*10=390 sample size. Therefore the target sample size is 400 for each city. Therefore the sample size is justified.

In Innovation research the sample sizes varied between 200 and 1500. For instance Kim et.al, (2010, in a study on mobile payments adoption in Portugal ultimately utilized 269 questionnaires for empirical analysis (Kim, Mirusmonov, & Lee, 2010). In a study on internet banking adoption in Jordan, sample size was 940 that was spread over 3 cities and 3 banks (Abushanab, Pearson, & Setterstrom, 2010). In a study on mobile payments in Germany 1447 usable responses were used for data analysis (Gerhardt, Schilke, & Wirtz, 2010).

5.4 Data Collection Methods

There are two kinds of data - primary data and secondary data. Primary data refers to first-hand original data while secondary data refers to data which is already collected and available in the form of reports, journals, magazines etc. Primary data was collected from banking customers selected for the sample for the purpose of present research.

There are several methods for collecting primary data. In descriptive research, primary data can be obtained by observation or interviews or through survey questionnaires. In a Survey, data is collected by questioning people who are thought to have desired information and then their responses are described. Survey method is particularly useful in testing concepts and reflecting perceptions and attitudes of the respondents. Since the present research attempts to study customer's perceptions and adoption intentions, survey method deemed to be the most suitable method.

5.5 Research instrument

Questionnaires are the most commonly used tool in survey research. Questionnaires can be either structured or unstructured. Structured Questionnaires contain close-ended questions with pre-categorized response options. It can be yes/no, or multiple-choice, or Likert scale, or other rating scale. Structured Questionnaires are usually used for collecting quantitative data. While unstructured Questionnaires contain open-ended questions which mostly results in qualitative data. Structured questionnaire with five point Likert scale items was used in the present research.

Therefore data was collected through survey method by administering a five- point scaled, structured questionnaire on the respondents.

5.5.1 Layout of the Survey Instrument

The questionnaire consists of two sections. The first section contains questions related to customer demographics and Banking related questions. Demographic questions were categorical in nature and were related to age, gender, marital status, income, occupation and education. Banking related questions included smart phone possession, affiliated bank, banking services, information sources, usage frequency and usage period.

The second section focuses on the core part of the research and it contains questions to understand the customers' intentions to adopt banking channel innovations (IMPS and Mobile Wallet). Questions on effect of demonetisation were placed at the end of the questionnaire. Responses for both IMPS and Mobile Wallet were collected from the same respondent through a single questionnaire. Respondents need to mark their responses separately for both IMPS and Mobile wallet. Respondents were requested not to compare between IMPS and Mobile Wallet but to respond separately for both of them.

On the top of the questionnaire a question was placed to ensure that the respondent has used both IMPS and Mobile Wallet for at least three times. Only such questionnaires were used for the study.

A five-point Likert scale was used for categorising the responses. The responses were verbally labelled as follows:

1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

Respondents were asked to rate both IMPS and Mobile wallet separately using these five rating points. An example statement was marked for the respondent to understand how to mark the responses. Using a Likert scale to understand customer behaviour is one among the most recommended scales in marketing research (Zeithaml, Parasuraman, & Berry, 1990).

5.6 Statistical Techniques

Exploratory Factor Analysis was used as a data reduction technique. Data was analysed using multiple linear hierarchical regression analysis. Descriptive Statistics were used to describe the sample demographics and banking related information.

Multiple Hierarchical Regression is a variant of the basic multiple regression procedure. It is a way to show if variables of interest explain a statistically significant amount of variance in the dependent variable after accounting for all other variables. It allows you to specify a fixed order of entry for variables in order to control for their effects and to test the effects of certain independents on the dependent after controlling for other variables. Since the research model consists of three control variables whose effect is to be controlled, eight independent variables and one dependent variable; using multiple hierarchical regression is justified.

5.7 Softwares Used

MS Excel and IBM SPSS 20 softwares were used to analyse data.

5.8 Summary

The research methodology employed in the present research can be summarised as follows:

Table 5.2

Summary of research methodology

RESEARCH DESIGN	Descriptive, Cross-sectional study
TARGET POULATION	Retail Banking customers of IMPS and Mobile Wallet
SAMPLING TECHNIQUE	Purposive sampling
SAMPLE SIZE	1600 (Target), 1572 (Final Sample)

SAMPLE JUSTIFICATION	Ten subjects per variable (Hair, Celsi, Ortinau, & Bush, 2008) 1:4 to 1:10 (Hinkin, 1998)
DATA COLLECTION METHODS	Primary data: Survey method, Structured Questionnaire
STATASTICAL TECHNIQUES	Descriptive Statistics, EFA, Multiple linear hierarchical Regression Analysis
SOFTWARES USED	MS Excel, IBM SPSS 20

6 CHAPTER

DATA ANALYSIS AND RESULTS

6.1 Field Study and Pilot Study

A field study was conducted to understand the adoption of various channel innovations. Field study was conducted on five channel innovations - IMPS, USSD based Banking, Mobile wallet banking, Biometric enabled banking systems and Banking kiosks. Field study was partly conducted in Delhi and partly in Hyderabad.

Responses on all the five innovations were captured through a single questionnaire from the same respondent. The field study has resulted in a sample of 159 usable responses for IMPS and 143 usable responses for Mobile Wallet Banking out of the 200 questionnaires distributed. The response rate for the remaining innovations was very less. It is 11/200 for Biometric Payment Systems, 7/200 for USSD and 3/200 for banking kiosks. This is because these innovations are still in their very early stages of adoption. Many mobile networks have not introduced USSD so far and USSD charges are also higher. Many banks are still preparing themselves to capture the biometric information of their users. And many customers do not identify Banking Kiosks as different from ATMs. Since it is highly difficult to carry out the study on these innovations with this low response rate, further study was continued with two innovations namely IMPS and Mobile wallet banking. Banking experts were also consulted to confirm on this selection of channel innovations for the study.

Later a pilot study was conducted on IMPS and Mobile wallet banking. Pilot study with 180 samples and 43 items was conducted to pre-test the instrument for reliability. A total of 4 items were removed owing to reliability issues and the final instrument

consisted of 39 items. Following are the results of the pilot study. The table 6.1 shows the number of items in each construct, the reliability or Cronbach Alpha value for each construct and the reliability type. All the constructs have reliability values above 0.7, indicating high reliability. Item number 3 from social influence (SI3) was removed to improve the reliability value. The last three items of demonetisation effect (D4, D5, and D6) were also removed to improve reliability.

Table 6.1

Reliability Results of Pilot Data

Variable	**Number of Items**	**Cronbach Alpha Value**	**Type of Reliability**
Perceived usefulness	4	.837	High
Perceived ease of use	5	.918	High
Compatibility	4	.791	High
Price value	4	.901	High
Perceived Trust and Security	4	.912	High
Social Influence	4	.721 (SI3*)	High
Personal innovativeness	5	.813	High
Self-Efficacy	4	.843	High
Adoption intention	4	.937	High
Demonetisation Effect	3	.719 (D4, D5, D6 *)	High

* indicates variables removed

6.2 Data Analysis

Three statistical techniques were employed in this study. They are exploratory factor analysis, hierarchical multiple regression and analysis of variance. Exploratory factor analysis was used to identify the underlying factors while hierarchical multiple regression analysis was used to test the research model with main predictors while controlling for other variables. Analysis of variance was used to compare among various categories of demographics. The whole data analysis was carried out separately for both IMPS and Mobile wallet banking.

6.2.1 Factor analysis

Factor analysis is a multivariate technique used to understand the internal relationships among variables. It is the most commonly used data reduction technique. The most important function of factor analysis is to reduce the number of variables and to understand the underlying structure of variables or factors. There are several modes of conducting factor analysis. The best suitable mode of factor analysis is determined by whether the research objective is to understand the relationships among variables or individuals or occasions (Hair et al., 1998). Here in the study, the research objective is to understand the relationships among variables from the data collected from a number of respondents on one occasion. Therefore R mode factor analysis is the most appropriate method that can be used.

6.2.2 Exploratory factor analysis

The two perspectives of factor analysis are exploratory and confirmatory. The purpose of exploratory factor analysis is to understand the underlying structure of variables and to reduce the number of variables (Garson, 2006) whereas confirmatory factor analysis

is used to confirm the number of variables that can be grouped together into a single factor. The number of variables is based on previous literature (Hair et al., 1998). In the present study exploratory factor analysis was used to understand the underlying structure of variables employed in the study.

Following are the steps involved in exploratory factor analysis:

1. Testing for determining suitability of factor analysis
2. Extraction of factors
3. Determining the number of factors to retain
4. Factor rotation and
5. Interpreting the factor structure.

6.2.2.1 Step 1: Tests for determining suitability of Factor Analysis

Before proceeding for factor analysis it is required to test whether the data set is suitable for factor analysis. There are several techniques available for this purpose. The popular techniques are Bartlett's Test of Sphericity and the Kaiser Meyer Olkin measure of sampling adequacy.

6.2.2.1.1 KMO and Bartlett's Test

KMO Test is a measure of the suitability of data for Factor Analysis. KMO value ranges between 0 and 1. The acceptable values of KMO lie between 0.8 and 1 indicating that the sampling is adequate for factor analysis. The Bartlett's Test of Sphericity is related to the significance of the research and it shows the suitability of the data collected to the research objective. Bartlett's Test of Sphericity should be less than 0.05 indicating that it is significant and the data is suitable for factor analysis.

Table 6.2 and Table 6.3 show the KMO and Bartlett's test for both IMPS and mobile wallet respectively.

Table 6.2

KMO Value and Bartlett's Test for IMPS

Kaiser Meyer Olkin’s Measure of Sampling Adequacy		.959
Bartlett's Test of Sphericity	Approx Chi-Square	5.427E4
	df	666
	Sig	.000

Table 6.3

KMO Value and Bartlett's Test for Mobile Wallet

Kaiser Meyer Olkin’s Measure of Sampling Adequacy		.969
Bartlett's Test of Sphericity	Approx Chi-Square	5.957E4
	df	666
	Sig	.000

KMO Values for both IMPS and mobile wallet are above 0.9 indicating that the sampling is adequate for factor analysis. Here in both the cases the Bartlett’s Test of Sphericity is less than 0.05 and is significant.

6.2.2.2 Step 2: Factor Extraction using Principal Components Analysis

Principal component analysis is a method of factor extraction. The objective of Principal component analysis is to extract the components that explain the maximum variance thereby making the research model more parsimonious with less number of factors explaining the maximum variance possible. Principal component analysis extracts components in descending order of the maximum variance explained (Hair et al., 1998).

Table 6.4 and Table 6.5 shows the factors extracted in both the cases – IMPS and mobile wallet respectively. The first column in Table 6.4 shows the eigen values. EFA has resulted in 9 factors whose eigen values are above 1 and they explained a total variance of 75.7 percent for IMPS. Table 6.5 shows the EFA values for mobile wallet and they explained a total variance of 77.3 percent.

6.2.2.3 Step 3: Determining the number of factors to retain

As a rule of thumb, all the components whose eigen values are greater than 1 are retained. The estimates of eigen values are the measures of the total variance explained by the newly extracted variables. The sum of all eigen values is equal to the sum of all total variances of the variables (Stewart, 1981). From Table 6.4 and Table 6.5 it is observed that EFA has extracted 9 factors whose eigen values are above 1 in both the cases - IMPS and mobile wallet. Therefore these 9 factors are retained.

6.2.2.3.1 Total Variance Explained for IMPS

Table 6.4

Total Variance Explained for IMPS

	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Var.	Cum.%	Total	% of Var.	Cum.%
1	18.977	51.290	51.290	7.827	21.154	21.154
2	1.705	4.608	55.898	3.735	10.095	31.250
3	1.556	4.204	60.102	3.251	8.785	40.035
4	1.266	3.421	63.523	3.054	8.254	48.289
5	1.096	2.961	66.485	2.994	8.091	56.379
6	1.086	2.562	69.047	2.734	7.388	63.768
7	1.054	2.520	71.567	2.172	5.870	69.638
8	1.029	2.232	73.799	1.314	3.552	73.190
9	1.002	1.969	75.768	1.054	2.578	75.768

Var - Variance, Cum - Cumulative

6.2.2.3.2 Total Variance Explained for Mobile Wallet

Table 6.5

Total Variance Explained for Mobile Wallet

	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %
1	20.014	54.092	54.092	7.649	20.674	20.674
2	1.651	4.463	58.555	3.902	10.546	31.220
3	1.402	3.791	62.345	3.820	10.324	41.543
4	1.215	3.284	65.629	3.491	9.435	50.978
5	1.120	2.758	68.387	3.073	8.306	59.284
6	1.093	2.538	70.925	2.998	8.104	67.388
7	1.087	2.354	73.279	1.731	4.680	72.068
8	1.079	2.146	75.425	1.088	2.669	74.738
9	1.007	1.914	77.340	1.063	2.602	77.340

Var - Variance, Cum - Cumulative

6.2.2.4 Step 4: Factor rotation

Before making the final selection of the factors the computed factor Matrix has to be interpreted. The factor matrix comprises the factor loadings of each variable on each factor. Factor loadings are an indication of the level of current correspondence between the variable and the respective factor. Higher factor loadings make the variable more representative of the factor. Factor Matrix can be either rotated or un-rotated. Rotation can be either orthogonal or oblique. Here in this analysis varimax rotation was used to rotate the factors. Varimax is a kind of orthogonal rotation.

Table 6.6 and Table 6.7 are the rotated component Matrices for both IMPS and mobile wallet respectively. In both the cases, all the factor loadings are above 0.7 and there are no cross-loadings.

Table 6.6

Rotated Component Matrix for IMPS

		COMPONENT								
FACTORS		1	2	3	4	5	6	7	8	9
Perceived Usefulness	PU1	.843								
	PU2	.810								
	PU3	.908								
	PU4	.955								
Perceived Ease of Use	EoU1		.798							
	EoU2		.829							
	EoU3		.795							
	EoU4		.841							
Compatibility	CMPBT1			.720						
	CMPBT2			.818						
	CMPBT3			.933						
	CMPBT4			.871						
Price value	PV1				.836					
	PV2				.780					
	PV3				.829					
	PV4				.865					
Perceived Trust and Security	PST1					.809				
	PST2					.748				
	PST3					.960				
	PST4					.760				
Social Influence	SI1						.701			
	SI2						.770			
	SI4						.850			
Personal Innovativeness	PI1							.765		
	PI2							.945		
	PI3							.907		
	PI4							.880		
	PI5							.933		
Self-efficacy	SEF1								.807	
	SEF2								.799	
	SEF3								.770	
	SEF4								.725	
Intention to adopt	INTA1									.979
	INTA2									.985
	INTA3									.804
	INTA4									.851

Table 6.7

Rotated Component Matrix for Mobile Wallet

		COMPONENT								
FACTORS		1	2	3	4	5	6	7	8	9
Perceived Usefulness	PU1	.959								
	PU2	.834								
	PU3	.946								
	PU4	.742								
Perceived Ease of Use	EoU1		.930							
	EoU2		.818							
	EoU3		.836							
	EoU4		.787							
Compatibility	CMPBT1			.839						
	CMPBT2			.894						
	CMPBT3			.961						
	CMPBT4			.861						
Price value	PV1				.760					
	PV2				.854					
	PV3				.718					
	PV4				.962					
Perceived Trust and Security	PST1					.891				
	PST2					.755				
	PST3					.808				
	PST4					.749				
Social Influence	SI1						.784			
	SI2						.715			
	SI4						.867			
Personal Innovativeness	PI1							.898		
	PI2							.865		
	PI3							.738		
	PI4							.845		
	PI5							.709		
Self-efficacy	SEF1								.835	
	SEF2								.859	
	SEF3								.859	
	SEF4								.749	
Intention to adopt	INTA1									.841
	INTA2									.956
	INTA3									.860
	INTA4									.847

6.2.2.5 Step 5: Interpreting the factor structure.

In order to interpret factors, factor loadings need to be considered. The significance of factor loadings is related to the sample size. In general larger sample sizes consider smaller factor loadings to be significant and therefore sample sizes and factor loadings are inversely related. In the factor matrices above all the factor loadings are above 0.7 and there are no cross-loadings indicating that the factors can be considered as it is without making any changes.

6.3 Final Sample

Table 6.8 gives an overview of the final sample the table shows the distribution of the sample among banks and cities. The first section shows the distribution of the sample across the 3 public sector and 3 private sector banks selected for the study. The sample is distributed almost evenly among the banks. The second section shows the distribution of the sample across the four cities selected for the study. The sample is distributed almost evenly among the cities.

Table 6.8

Final Sample Distribution

Distribution Category	Bank	Sample
Bank wise	SBI	287
	PNB	234
	Canara bank	237
	ICICI	254
	HDFC	282
	Axis bank	278
	Total	1572
City wise	Bangalore	395
	Delhi	397
	Mumbai	384
	Hyderabad	396
	Total	1572

6.3.1 Testing Final data for Reliability

The final data set was tested for reliability. Reliability refers to how consistent the instrument is in producing the same results when measured several times. Therefore it is necessary to check for reliability before proceeding for the final data analysis. This is done separately for both IMPS and mobile wallet. Table 6.9 shows the number of items in each construct for the final data and the Cronbach Alpha values of each construct for IMPS and mobile wallet separately. The last column indicates the type of reliability. All the reliability values are about 0.7 indicating that they are highly reliable.

Table 6.9

Reliability Results for Final data

Variable	No. of Items	Cronbach's Alpha for IMPS	Cronbach's Alpha for Mobile Wallet	Type of Reliability
Perceived usefulness	4	.827	.839	High
Perceived ease of use	4	.901	.909	High
Compatibility	4	.784	.800	High
Price value	4	.914	.900	High
Perceived Trust and Security	4	.926	.921	High
Social Influence	4	.705	.714	High
Personal innovativeness	5	.781	.849	High
Self-Efficacy	4	.835	.850	High
Adoption intention	4	.928	.918	High
Demonetisation Effect	3	.709	.711	High

6.3.2 Testing Final data for Validity

Validity refers to how well an instrument is measuring what it is supposed to measure. Therefore it is necessary to check the validity of the instrument before proceeding for final analysis.

Therefore the final data set was tested for Validity. Convergent and discriminant validity are the two validity measures used in the present research study. Convergent validity is a measure of how strongly the items of a construct are correlated with each other whereas discriminant validity indicates that two constructs are different from each

other. Both convergent and discriminant validity are required to make an instrument valid.

Table 6.10 and Table 6.11 show the Convergent and Discriminant Validity values for both IMPS and mobile wallet respectively. AVE indicates average variance extracted MSV indicates maximum shared variance and ASV indicates average shared variance all the AVE values are more than 0.5 which ensures convergent validity. AVE is greater than MSV and ASV which shows that the data has discriminant validity also (Fornell & Larcker, 1981).

Table 6.10

Validity Results for IMPS

Construct	No. of Items	AVE	MSV	ASV
Perceived usefulness	4	0.776	0.664	0.423
Perceived ease of use	4	0.666	0.518	0.376
Compatibility	4	0.704	0.454	0.293
Price value	4	0.678	0.354	0.275
Perceived Trust and Security	4	0.688	0.421	0.247
Social Influence	3	0.661	0.358	0.238
Personal innovativeness	5	0.789	0.625	0.426
Self-Efficacy	4	0.618	0.452	0.135
Adoption intention	4	0.825	0.669	0.436

AVE - Average Variance Extracted, MSV - Maximum Shared Variance, ASV - Average Shared Variance

Table 6.11

Validity Results for Mobile Wallet

Construct	No. of Items	AVE	MSV	ASV
Perceived usefulness	4	0.765	0.683	0.393
Perceived ease of use	4	0.676	0.498	0.389
Compatibility	4	0.792	0.586	0.392
Price value	4	0.644	0.375	0.254
Perceived Trust and Security	4	0.687	0.381	0.297
Social Influence	3	0.632	0.432	0.341
Personal innovativeness	5	0.763	0.632	0.471
Self-Efficacy	4	0.683	0.425	0.381
Adoption intention	4	0.772	0.527	0.257

AVE - Average Variance Extracted, MSV - Maximum Shared Variance, ASV - Average Shared Variance

6.4 Descriptive of Sample Demographics

Frequencies and percentages were used to describe the sample demographics. Table 6.12 shows the demographic variables namely age, gender and education. Table 6.13 shows the income and smart phone possession by the respondents.

Majority of the respondents belong to the age group between 25 to 35 which means most of them are young customers. The predominant gender is male and most of the respondents are educated. The dominant income category is 20,001- 30,000. Majority of the respondents have a smart phone while only 3% of them do not have a smart phone.

Table 6.12

Descriptive of Sample Demographics (age, gender and education)

Variable	Group	Frequency	Percentage
Age	less than 25	197	12.5
	25-35	832	52.9
	36-45	368	23.4
	46-55	119	7.6
	above 55	56	3.6
	Total	1572	100.0
Gender	Male	1072	68.2
	Female	500	31.8
	Total	1572	100.0
Education	Uneducated	6	.4
	SSC	6	.4
	Inter/Diploma	135	8.6
	Graduate	608	38.7
	PG	620	39.4
	Professionally Qualified	197	12.5
	Total	1572	100.0

Table 6.13

Descriptive of Sample Demographics (Income and smart phone possession)

Variable	Group	Frequency	Percentage
Monthly Income	Below 10,000	179	11.4
	10,001- 20,000	350	22.3
	20,001- 30,000	478	30.4
	30,001- 40,000	298	19.0
	40,001- 50,000	135	8.6
	Above 50,000	132	8.4
	Total	1572	100.0
Smart Phone Possession	Yes	1528	97.2
	No	44	2.8
	Total	1572	100.0

6.5 Descriptive of Banking Related Aspects

Table 6.14 shows the descriptive of banking related aspects namely banking services and source of information. The most frequently used banking service is savings account followed by debit and credit cards. The foremost source of information for the customers about new banking channels is the bank followed by internet.

Table 6.14

Descriptive of Banking Related Aspects

Variable	Group	Frequency	Percentage
Banking Services	Savings Accounts	843	53.6
	Current Accounts	29	1.8
	Loans	92	5.9
	Debit & Credit Cards	557	35.4
	Cash Mngt Services	4	.3
	Other services	47	3.0
	Total	1572	100.0
Source of Information	Other customers	212	13.5
	Bank	785	49.9
	Newspaper ads	99	6.3
	Internet	476	30.3
	Total	1572	100.0

6.6 Usage pattern of IMPS and mobile wallet

Table 6.15 shows the usage pattern of IMPS the first section shows the usage frequency of IMPS in a month. Most of the respondents use IMPS for about 1 to 5 times in a month. Respondents who did not use IMPS even once in a month are categorised themselves as non-adopters. The second section shows since when the respondents are using IMPS which is labelled as usage period. Most of the respondents are using IMPS since 6 months to 1 year. Respondents who did not use IMPS even a month categorised themselves as non-adopters (Kapoor et al., 2014). Table 6.16 is a similar table showing the usage pattern of mobile wallet. Most of the respondents used mobile wallet for 1 to

5 times in a month while most of the respondents have been using mobile wallet since 1 to 6 months.

Table 6.15

IMPS USAGE PATTERN

Variable	Group	Frequency	Percentage
Usage Frequency per month	Non-adopter	385	24.5
	1 to 5 times	885	56.3
	6 to 10 times	256	16.3
	More than 10 times	46	2.9
	Total	1572	100.0
Usage Period	Non-adopter	385	24.5
	1-6 months	344	21.9
	6 Months - 1 yr	711	45.2
	More Than 1Yr	132	8.4
	Total	1572	100.0

Table 6.16

MOBILE WALLET USAGE PATTERN

Variable	Group	Frequency	Percentage
Usage Frequency per month	Non-adopter	427	27.2
	1 to 5 times	722	45.9
	6 to10 times	361	23.0
	More than 10 times	62	3.9
	Total	1572	100.0
Usage Period	Non-adopter	427	27.2
	1-6 months	669	42.6
	6 Months - 1 yr	428	27.2
	More Than 1Yr	48	3.1
	Total	1572	100.0

6.7 Multiple Hierarchical Regression Analysis

After conducting factor analysis and confirming on the constructs, the next step is to test the hypothesis proposed for the research study. In the present research, 11 hypothesis were formulated to examine the relationship between the 8 independent variables and one dependent variable. Multiple regression analysis is best suitable when analyzing the relationships between a single dependent variable and several independent variables (Hair et al., 1998). Moreover, multiple regression is considered as the key basis for most statistical analysis techniques. The purpose of multiple regression is to understand the relationships between several predictors and a single Criterion variable. According to Allen and Rao (2000), Causality in multiple regression is not established but it is implied (Allen, Allen, & Rao, 2000).

Also, multiple regression is the most widely used technique of analysis in consumer behaviour research understand aspects Like customer satisfaction customer attitudes customer perceptions etc. Therefore multiple regression deemed to be the most suitable technique for the purpose of the present study.

Hierarchical multiple regression is a kind of multiple regression which can be used to understand the variance explained by the variables of interest while controlling for the variance explained by all other variables. Since in the present research model has three control variables namely age, gender and demonetization effect, hierarchical multiple regression was used to control the effect of these three control variables and to understand the effect of main predictor variables on the dependent variable.

In hierarchical multiple regression, we can define the set of variables that can act as control variables and the set of variables that can act as predictors. The first two set of variables are considered as control variables and after adjusting for the variance explained by the first set of variables that is control variables, regression is performed on the next set of variables that is main predictors. Hence regression analysis is carried out in steps and thus the name hierarchical multiple regression.

Following are the assumptions of multiple regression:

1. There exists a linear relationship between predictor variables and criterion variable.

2. There is no multi-collinearity between the independent variables.

3. The data is normally distributed.

4. There exists a homogeneity of variances which is also known as homoscedasticity.

6.7.1 Testing for multi-collinearity

Multi collinearity is a situation where one independent variable is used to predict another independent variable. Multi collinearity occurs when the correlations between the independent variables are high. The presence of multi collinearity would adversely affect the results of multiple regression. Therefore it is essential to check whether multi collinearity is present among the independent variables.

Tolerance and variance inflation factor (VIF) are the two popular methods of testing for the presence of multi collinearity. As the name indicates variance inflation factor refers to the amount of variance that is inflated. VIF value is calculated as the ratio of variants in a research model with multiple variables divided by the variance of a research model with 1 variable alone. It shows the degree of multi collinearity existing in a multiple regression analysis. VIF values are always greater than or equal to 1. The acceptable values of VIF are maximum 10 (Hair et al., 1998) and maximum 5 (Ringle, Wende, & Becker, 2015) . Tolerance is the reciprocal of VIF. Tolerance should be more than 0.2.

Tolerance and VIF values are calculated separately for both IMPS and mobile wallet. These values can be seen in Table 6.17 and Table 6.18 respectively. All the tolerance values are above 0.2 and all the VIF values are below 5 indicating that there is no multi collinearity.

Table 6.17

Collinearity Statistics for IMPS

	Tolerance	VIF
Perceived Usefulness	.376	2.657
Perceived Ease of Use	.993	1.007
Compatibility	.378	2.643
Price value	.684	1.463
Perceived Trust and Security	.363	2.756
Social Influence	.840	1.191
Personal Innovativeness	.934	1.071
Self Efficacy	.511	1.959

VIF – Variance Inflation Factor

Table 6.18

Collinearity Statistics for Mobile Wallet

	Tolerance	VIF
Perceived Usefulness	.462	2.163
Perceived Ease of Use	.335	2.985
Compatibility	.363	2.758
Price value	.675	1.481
Perceived Trust and Security	.937	1.067
Social Influence	.831	1.203
Personal Innovativeness	.366	2.729
Self Efficacy	.357	2.805

VIF – Variance Inflation Factor

6.7.2 Model Summary for IMPS

Multiple hierarchical regression was performed to understand the relationship between the predictor variables and criterion variable. Table 6.19 shows the model summary and overall fit statistics for the research model tested on IMPS. Age, Gender and demonetization are used as control variables which are given in the first step this is shown as model 1 and the predictors are independent variables are given in the second step after controlling for the variance of the control variables this is shown in model 2. All the eight independent variables were entered simultaneously and the method used was "enter".

R value indicates the variance explained by the model. The control variables accounted for only 3.9% of the variance. Model 2 shows a significant improvement in variance

accounting to about 84.4% which means after deducting the variance explained by control variables from the total variance. Therefore about 80% of the variance is explained by the independent variables or the predictors alone.

R-square shows the percentage of variance explained by all independent variables that affect the dependent variable in the research model while Adjusted R-square shows the percentage of variance explained by only those independent variables that really affect the dependent variable. The adjusted R-square is an improved version of R-square that is adjusted for the number of independent variables in the research model. The adjusted R-square increases only if the new predictor adds improvement to the research model. The R-square and adjusted R-square for model 1 are 1% and 0% respectively which shows that model 1 with control variables is explaining very low variance. The R-square and adjusted R-square for model 2 are 74% and 71% respectively which shows that model 2 with main predictor variables is explaining a good amount of variance.

R-square change is the increase in R-square on adding a second predictor. R-square change is tested by F-test, and is referred to as F-change. A significant F-change indicates that the predictors added significantly improved the model. The R square change and F-change for model 1 are 0.001 and 1.166 respectively which shows that model 1 with control variables is explaining is not significant (Sig. F Change=.312 at 3, 1568 degrees of freedom). The R square change and F-change for model 2 are 0.495 and 335.017 respectively which shows that model 2 with main predictor variables is significant (Sig. F Change=.000 at 8, 1560 degrees of freedom).

The Durbin Watson statistic is a test of autocorrelation in the residuals from a multiple regression analysis. The Durbin-Watson statistic lies between 0 and 4. A value of 2 indicates that there is no autocorrelation in the sample. Durbin Watson values in the range of 1.5 to 2.5 are considered normal. In the model Durbin-Watson d = 2.323,

which lies within the acceptable range of $1.5 < d < 2.5$ and thus it can be confirmed that there exists no linear auto-correlation of the first order in the data.

Table 6.19

Model Summary for IMPS

					Change Statistics					
Model	R	R^2	Adj. R^2	SE of Estimate	ΔR^2	ΔF	df1	df2	SigΔ F	Durbin Watson
1	.039[a]	.001	.000	.83387	.001	1.166	3	1568	.312	2.319
	.844[b]	.742	.710	.44929	.495	335.017	8	1560	.000	

a - Predictors: (Constant), DEM, Age, Gender

b - Predictors: (Constant), DEM, Age, Gender, Self Efficacy, Social Influence, Price value, Compatibility, Personal Innovativeness, Perceived Trust and Security, Perceived Ease of Use, Perceived Usefulness
Dependent Variable: Adoption Intention

6.7.3 Model Summary for Mobile Wallet

Multiple hierarchical regression was performed to understand the relationship between the predictor variables and criterion variable. Table 6.20 shows the model summary and overall fit statistics for the research model tested on Mobile Wallet. Age, Gender and demonetization are used as control variables which are given in the first step this is shown as model 1 and the predictors are independent variables are given in the second step after controlling for the variance of the control variables this is shown in model 2. All the eight independent variables were entered simultaneously and the method used was “enter”.

As already discussed, R value indicates the variance explained by the model. The control variables accounted for only 3.3% of the variance. Model 2 shows a significant improvement in variance accounting to about 86.4% which means after deducting the variance explained by control variables from the total variance. Therefore about 82% of the variance is explained by the independent variables or the predictors alone.

As already discussed, R-square shows the percentage of variance explained by all predictor variables that affect the criterion variable in the research model while adjusted R-square shows the percentage of variance explained by only those predictor variables that really affect the criterion variable. The adjusted R-square is an improved version of R-square that is adjusted for the number of independent variables in the research model. The adjusted R-square increases only if the new predictor adds improvement to the research model. The R-square and adjusted R-square for model 1 are 1% and 0% respectively which shows that model 1 with control variables is explaining very low variance. The R-square and adjusted R-square for model 2 are 75% and 73% respectively which shows that model 2 with main predictor variables is explaining a good amount of variance.

As already discussed, R-square change is the increase in R-square on adding a second predictor. R-square change is tested by F-test, and is referred to as F-change. A significant F-change indicates that the predictors added significantly improved the model. The R square change and F-change for model 1 are 0.001 and 0.838 respectively which shows that model 1 with control variables is explaining is not significant (Sig. F Change=.357 at 3, 1568 degrees of freedom). The R square change and F-change for model 2 are 0.501 and 384.796 respectively which shows that model 2 with main predictor variables is significant (Sig. F Change=.000 at 8, 1560 degrees of freedom).

As already discussed, Durbin Watson statistic is a test of autocorrelation in the residuals from a multiple regression analysis. The Durbin Watson statistic lies between 0 and 4. A value of 2 indicates that there is no autocorrelation in the sample. Durbin Watson values in the range of 1.5 to 2.5 are considered normal. In the model Durbin Watson d = 2.343, which lies within the acceptable range of $1.5 < d < 2.5$ and thus it can be confirmed that there exists no linear auto-correlation of the first order in the data.

Table 6.20

Model Summary for Mobile Wallet

					Change Statistics					
Model	R	R^2	Adj. R^2	SE of Estimate	ΔR^2	ΔF	df1	df2	SigΔ F	Durbin Watson
1	.033[a]	.001	.000	.75895	.001	0.838	3	1568	.357	
	.864[b]	.756	.734	.38369	.501	384.79	8	1560	.000	2.343

SE - Standard Error, Δ - change

6.7.4 F-test for IMPS

F-Test is used to compare two variances or in other words two statistical models, so as to determine which model best fits the population from which the sample was taken. F-statistic is used in various tests like regression and ANOVA.

Table 6.21 is the F-test for the model tested on IMPS. For Model 1 with control variables, the test is not significant with F = 1.166 and 3 degrees of freedom. On the other hand for model2, with F = 350.245 and 11 degrees of freedom the test results are highly significant, therefore it can be presumed that there exists a linear relationship between the variables in the present model.

Table 6.21

F test for IMPS

ANOVA[c]						
Model		Sum of Squares	df	Mean[2]	F value	Sig
1	Regression	1.622	3	.811	1.166	.312[a]
	Residuals	1090.995	1568	.695		
	Total	1092.617	1571			
2	Regression	777.713	11	70.701	350.245	.000[b]
	Residuals	314.904	1560	.202		
	Total	1092.617	1571			

a. Predictors: (Constant), DEM, Age, Gender

b. Predictors: (Constant), DEM, Age, Gender, Self Efficacy, Social Influence, Price value, Compatibility, Personal Innovativeness, Perceived Trust and Security, Perceived Ease of Use, Perceived Usefulness

Dependent Variable: Adoption Intention

6.7.5 F-test for Mobile Wallet

F-Test is used to compare two variances or in other words two statistical models, so as to determine which model best fits the population from which the sample was taken. F-statistic is used in various tests like regression and ANOVA.

Table 6.22 is the F-test for the model tested on mobile wallet. For Model 1 with control variables, the test is not significant with F = 0.838 and 3 degrees of freedom. On the other hand for model 2, with F = 416.863 and 11 degrees of freedom the test is highly significant, thus it can be assumed that there is a linear relationship between the variables in the present model.

Table 6.22

F test for Mobile Wallet

ANOVA[c]						
Model		Sum of Square	df	Mean[2]	F value	Sig
1	Regressions	.966	3	.483	.838	.433a
	Residuals	903.741	1568	.576		
	Total	904.706	1571			
2	Regressions	675.052	11	61.368	416.863	.000[b]
	Residuals	229.655	1560	.147		
	Total	904.706	1571			

a. Predictors: (Constant), DEM, Age, Gender

b. Predictors: (Constant), DEM, Age, Gender, Self Efficacy, Social Influence, Price value, Compatibility, Personal Innovativeness, Perceived Trust and Security, Perceived Ease of Use, Perceived Usefulness

c. Dependent Variable: Adoption Intention

6.8 Testing Of Hypotheses for IMPS

Generally, a multiple regression procedures equation takes a linear form and is represented in the following format:

y = b1x1 + b2x2 + ... + bnxn +c + e.

y is the dependent variable

x1, x2...xn are the independent variables

b1, b2....bn are the coefficients of regression

c is the constant or intercept

e is the error term in residuals

Here in the equation, b's denote the coefficients of regression and they represent the amount of change in dependent variable y with a single unit of change in the independent variables (x1, x2...xn) (Garson, 2006).

The purpose of regression equation is to explain the variance in the output variable y with the help of the variances in the independent variables. R square value tells us how good the regression equation is able to determine the variance in y (Dielman, 2001). R2 is also known as the coefficient of determination. It represents the proportion of variance in the dependent variable y explained by the regression equation. The value of R2 lies from 0 to 1. R2 values closer to 1 indicate that the regression equation is a good fit to the data. The closer the better is the fit (Dielman, 2001). F statistic is one more such measure to determine how good the regression equation fits the data. The values of R2 and F values are already discussed in the model summary section.

All the independent variables together are able to explain about 74% of the variance in the dependent variable (adoption intention). In the present research, the only dependent variable analyzed is adoption intention. The regression model results show an overall model of seven predictors that significantly predict adoption intention. The predictors that are loaded satisfactorily into the regression model are Self Efficacy, Price value, Compatibility, Personal Innovativeness, Perceived Trust and Security, Perceived Ease of Use, Perceived Usefulness. The independent variable Social Influence was not significant (p=0.19, which is greater than 0.05).This indicates that adoption intention is dependent on these predictors and its value can be predicted by the values of these predictors.

Table 6.23 shows the intercept, the regression estimates (B values) and their respective standard error terms, standardized regression coefficients (beta values or beta weights) and the significance values for all the coefficients and intercept (t values and p values) at alpha=0.05(at 95% confidence level).

The first column shows the regression estimates (B values). These estimates are used to understand the change in the dependent variable AI for every unit change in the independent variables. For instance, with a unit increase in Perceived Usefulness, 0.272 times increase in is predicted. Similarly, with a unit increase in Perceived Ease of use, 0.182 times increase in AI is predicted; with a unit increase in Compatibility, 0.069 times increase in AI is predicted; with a unit increase in Price value, 0.094 times increase in AI is predicted; with a unit increase in Perceived Trust and Security, 0.085 times increase in AI is predicted; with a unit increase in Personal Innovativeness, 0.128 times increase in AI is predicted; with a unit increase in Self Efficacy, 0.077 times increase in AI is predicted.

Beta weights are the standardized coefficients. The beta coefficients are used to compare the predictive power of independent variables on a relative basis. Beta value denotes the change in output variable for one standard deviation change in the predictor variables while all other variables are kept constant. For instance, while all other variables are kept constant , with one standard deviation increase in Perceived Usefulness, 0.291 times increase in adoption intention is predicted. Similarly, while all other variables are kept constant , with one standard deviation increase in Perceived Ease of use, 0.186 times increase in adoption intention is predicted; with one standard deviation increase in Compatibility, 0. 058 times increase in adoption intention is predicted; with one standard deviation increase in Price value, 0.095 times increase in adoption intention is predicted; with one standard deviation increase in Perceived Trust

and Security, 0.092 times increase in adoption intention is predicted; with one standard deviation increase in Personal Innovativeness, 0.134 times increase in adoption intention is predicted; with one standard deviation increase in Self Efficacy, 0.089 times increase in adoption intention is predicted. The beta values further indicate that Perceived Usefulness (0.291) has the most effect on adoption intention of IMPS. The next important predictors in order of importance based on beta values are Perceived Ease of use (0.186), Personal Innovativeness (0.134), Price value (0.095), Perceived Trust and Security (0.092) followed by Self Efficacy (0.089) and Compatibility (0.058).

The next column shows the t statistics and their associated 2 tailed p values at an alpha of 0.05. (Useful in testing if a given coefficient is significantly different from zero). The 'Sig.' column shows the significance levels of all predictors. As a rule of thumb, a beta coefficient is statistically significant if its p value is less than 0.05. The beta coefficients of all predictors are less than 0.05 and are statistically significant except for social influence (p=0.190).

Table 6.23

Testing Of Hypotheses for IMPS

	Un-standardised Coefficients		Standardised Coefficients		
Model	**B**	**SE**	**Beta**	**t**	**Sig**
1(Constant)	-4.634	3.091		-.269	.686
Age	-1.11	1.02	-.013	-.652	.278
Gender	-3.07	2.01	-.009	-3.308	.703
DEM	.009	.018	.011	.472	.637
2(Constant)	1.168	.137		8.523	.000
Age	-1.09	1.01	-.007	-.633	.203
Gender	-3.16	2.34	-.008	-3.295	.616
DEM	.004	.011	.005	.391	.696
Perceived Usefulness	.272	.031	.291	8.836	.000
Perceived Ease of Use	.182	.027	.186	6.775	.000
Compatibility	.069	.026	.058	2.574	.010
Price value	.094	.017	.095	4.321	.000
Trust and Security	.085	.022	.092	3.877	.000
Social Influence	.017	.013	.020	1.311	.190
Personal Innovativeness	.128	.022	.134	5.896	.000
Self Efficacy	.077	.026	.089	2.968	.003

a. Dependent Variable: Adoption Intention

SE - Standard Error

6.9 Testing Of Hypotheses for Mobile Wallet

In the research model for Mobile wallet, all the independent variables together are able to explain about 75% of the variance in the dependent variable (adoption intention). In the present research, the only dependent variable analyzed is adoption intention. The regression model results show an overall model of seven predictors that significantly predict adoption intention. The predictors that are loaded satisfactorily into the regression model are Self Efficacy, Price value, Compatibility, Personal Innovativeness, Perceived Trust and Security, Perceived Ease of Use, Perceived Usefulness. The independent variable Social Influence was not significant (p=0.109, which is greater than 0.05).This indicates that adoption intention is dependent on these predictors and its value can be predicted by the values of these predictors.

Table 6.24 shows the intercept, the regression estimates (B values) and their respective standard error terms, standardized regression coefficients (beta values or beta weights) and the significance values for all the coefficients and intercept (t values and p values) at alpha=0.05 (at 95% confidence level).

The first column shows the regression estimates (B values). These estimates are used to understand the change in the dependent variable AI for every unit change in the independent variables. For instance, with a unit increase in Perceived Usefulness, 0.136 times increase in AI is predicted. Similarly, with a unit increase in Perceived Ease of use, 0.109 times increase in AI is predicted; with a unit increase in Compatibility, 0.067 times increase in AI is predicted; with a unit increase in Price value, 0.128 times increase in AI is predicted; with a unit increase in Perceived Trust and Security, 0.093 times increase in AI is predicted; with a unit increase in Personal Innovativeness, 0.112 times increase in AI is predicted; with a unit increase in Self Efficacy, 0.089 times increase in AI is predicted.

Beta weights are the standardized coefficients. Beta value denotes the change in output variable for one standard deviation change in the predictor variables while all other variables are kept constant. For instance, while all other variables are kept constant, with one standard deviation increase in Perceived Usefulness, 0.145 times increase in adoption intention is predicted. Similarly, while all other variables are kept constant , with one standard deviation increase in Perceived Ease of use, 0.117 times increase in adoption intention is predicted; with one standard deviation increase in Compatibility, 0.059 times increase in adoption intention is predicted; with one standard deviation increase in Price value, 0.132 times increase in adoption intention is predicted; with one standard deviation increase in Perceived Trust and Security, 0.103 times increase in adoption intention is predicted; with one standard deviation increase in Personal Innovativeness, 0.120 times increase in adoption intention is predicted; with one standard deviation increase in Self Efficacy, 0.097 times increase in adoption intention is predicted. The beta values further indicate that Perceived Usefulness (0.145) has the most effect on adoption intention of IMPS. The next important predictors in order of importance based on beta values are Price value (0.132), Personal Innovativeness (0.120), Perceived Ease of use (0.117) followed by Perceived Trust and Security (0.092), Self Efficacy (0.097) and Compatibility (0.059).

The next column shows the t statistics and their associated 2 tailed p values at an alpha of 0.05. The 'Sig.' column shows the significance levels of all predictors. As a rule of thumb, a beta coefficient is statistically significant if its p value is less than 0.05. The beta coefficients of all predictors are less than 0.05 and are statistically significant except for social influence (p=0.109).

Table 6.24

Testing Of Hypotheses for Mobile Wallet

		Un-standardised Coefficients	Standardised Coefficients		
Model	**B**	**SE**	**Beta**	**t**	**Sig**
1(Constant)	-5.353	8.081		-4.415	.676
Age	-2.18	2.16	-2.15	-1.933	.378
Gender	-3.109	4.11	-2.766	-2.015	.598
DEM	.012	.016	.007	.023	.476
2(Constant)	1.172	.120		9.770	.000
Age	-2.03	2.01	-2.04	-1.922	.605
Gender	-3.307	3.01	-1.981	-2.116	.805
DEM	.000	.010	.000	.020	.984
Perceived Usefulness	.136	.019	.145	6.517	.000
Perceived Ease of Use	.109	.026	.117	5.419	.000
Compatibility	.067	.024	.059	2.750	.006
Price value	.128	.021	.132	6.015	.000
Trust and Security	.093	.021	.103	4.933	.000
Social Influence	.019	.012	.022	1.606	.109
Personal Innovativeness	.112	.018	.120	5.493	.000
Self Efficacy	.089	.022	.097	4.109	.000

a. Dependent Variable: Adoption Intention

SE - Standard Error

6.10 Comparisons

6.10.1 Comparison of Samples among Banks and Cities

One- way Anova is a statistical technique used to understand if there exists a significant difference between the sample means of two or more groups. Here in the present study one-way Anova was used to see if there are any significant differences in the adoption intentions of samples across banks and across cities. Table 6.25 gives the one way Anova results for differences in the adoption intentions of samples across cities and across banks. There exists no statistically significant differences between the group means of cities (F (14, 1557) = 1.302, p = 0.172) as well as the group means of banks (F (14,1557) = 1.277, p = 0.18) as determined by one-way ANOVA.

Table 6.25

Comparison of Samples among Banks and Cities

ANOVA		Sum of Squares	df	Mean^2	F	Sig
City	Between Groups	33.209	14	2.372	1.302	.172
	Within Groups	1941.775	1557	1.247		
	Total	1974.984	1571			
Bank	Between Groups	47.105	14	2.079	1.277	.180
	Within Groups	4405.755	1557	1.830		
	Total	4812.860	1571			

6.10.2 Comparison between Adopter and Non-Adopter Groups for IMPS

The sample contains both adopter and non-adopter groups for both IMPS and mobile wallet. A comparison was done between the adopter and non-adopter groups for all variables. Multi- group analysis was used for this purpose. Multi-group analysis is a statistical procedure that takes in to consideration the beta value and standard error of each group and calculates the mean beta values and mean standard errors. Then it calculates the lower confidence limits and upper confidence limits. Based on these values, it gives a decision whether the difference is significant or not.

Table 6.26 shows the model summary for both adopter and non-adopter group of IMPS. While adopter group is explaining 58.8% of variance, non-adopter group is explaining 37.7% of variance while both the models are significant.

Table 6.26

Model Summary for both adopter and non-adopter groups of IMPS

	N	R 2	Adjusted R^2	df	F	Sig
Adopter	1187	0.588	0.553	8	184.474	0.000
Non-adopter	385	0.377	0.369	8	96.441	0.000

Table 6.27 shows the beta values, standard errors and results of significance for adopter and non adopter groups of IMPS. There is a significant difference in the Perceived Ease of Use, Perceived Trust and Security and Personal Innovativeness of adopter and non-adopter categories of IMPS. Specifically, the Perceived Ease of Use, Perceived Trust and Security and Personal Innovativeness of adopters of IMPS is more than that of non-adopters of IMPS respectively.

But the sample is not evenly distributed among adopters and non-adopters. This might have affected the results of comparison. Here in the present research the purpose of including non-adopters in the sample is to reduce the sample bias. Adopters might have positive perception about the innovation since they have already adopted it. Therefore including only adopters in the sample may lead to biased results. To reduce the bias non-adopters were included in the sample (Kapoor et al., 2014). But the objective of the present study is not to compare between adopters and non-adopters. However, future research meant for a comparison of adopters and non-adopters can take enough care to see that adopters and non-adopters are distributed evenly in the sample.

Table 6.27

Comparison between Adopter and Non-Adopter Groups for IMPS

Variable	β NA	β A	Δ β	SE NA	SE A	Mean SE	Result
PU	0.231	0.247	0.016	0.066	0.035	0.074	Not Sig
PEU	0.195	0.049	0.146	0.047	0.033	0.057	Sig
CT	0.062	0.065	0.003	0.059	0.03	0.066	Not Sig
PV	0.085	0.086	0.001	0.041	0.019	0.045	Not Sig
PTS	0.081	0.188	0.107	0.052	0.024	0.057	Sig
SI	0.014	0.025	0.011	0.032	0.014	0.034	Not Sig
IN	0.13	0.369	0.239	0.061	0.023	0.065	Sig
SE	0.064	0.069	0.005	0.064	0.028	0.069	Not Sig

β NA - Beta of Non adopters, β A - Beta of adopters, Δ β - Change in Beta, SE NA- Standard Error of Non-adopter Group, SE A - Standard Error of Adopter Group

6.10.3 Comparison between Adopter and Non-Adopter Groups for Mobile Wallet

The sample contains both adopter and non-adopter groups for both IMPS and mobile wallet. A comparison was done between the adopter and non-adopter groups for all variables. Multi- group analysis was used for this purpose. Multi-group analysis is a statistical procedure that takes in to consideration the beta value and standard error of each group and calculates the mean beta values and mean standard errors. Then it calculates the lower confidence limits and upper confidence limits. Based on these values, it gives a decision whether the difference is significant or not.

Table 6.28 shows the model summary for both adopter and non-adopter group of Mobile wallet. While adopter group is explaining 66.9% of variance, non-adopter group is explaining 38.6% of variance while both the models are significant.

Table 6.28

Model Summary for both adopter and non-adopter groups of Mobile wallet.

	N	R^2	Adjusted R^2	df	F	Sig
Adopter	1145	0.672	0.669	8	254.375	0.000
Non-adopter	427	0.386	0.361	8	98.943	0.000

Table 6.29 shows the beta values, standard errors and results of significance for adopter and non adopter groups of Mobile wallet. There is a significant difference in the Perceived Usefulness, Perceived Ease of Use, Price value, Perceived Trust and Security and Personal Innovativeness of adopter and non-adopter categories of IMPS. Specifically, Perceived Usefulness, Perceived Ease of Use, Price value, Perceived Trust

and Security and Personal Innovativeness of adopters of IMPS is more than that of non-adopters of IMPS respectively.

Here also the sample is not evenly distributed among adopters and non-adopters for mobile wallet. This might have affected the results of comparison. As already mentioned, future research meant for a comparison of adopters and non-adopters can take enough care to see that adopters and non-adopters are distributed evenly in the sample.

Table 6.29

Comparison between Adopter and Non-Adopter Groups for Mobile wallet

Variable	β NA	β A	Δ β	SE NA	SE A	Mean SE	Result
PU	0.254	0.397	0.143	0.066	0.035	0.074	Sig
PEU	0.028	0.169	0.141	0.047	0.033	0.057	Sig
CMP	0.053	0.062	0.009	0.059	0.03	0.066	Not Sig
PV	0.059	0.083	0.024	0.041	0.019	0.045	Sig
PTS	0.064	0.105	0.041	0.052	0.024	0.057	Sig
SI	0.011	0.024	0.013	0.032	0.014	0.034	Not Sig
PI	0.062	0.378	0.316	0.061	0.023	0.065	Sig
SE	0.065	0.066	0.001	0.064	0.028	0.069	Not Sig

β NA - Beta of Non adopters, β A - Beta of adopters, Δ β - Change in Beta, SE NA- Standard Error of Non-adopter Group, SE A - Standard Error of Adopter Group

6.11 Results of the Study

All the hypotheses related to control variables- age, gender and demonetisation effect (H1a to H3b) got rejected while all the hypotheses related to main predictors (H4a to H11b) got accepted except H9a and H9b indicating that all independent variables significantly explain the variance in adoption intention. However, Social influence is not significant predictor of adoption intention. This is summarised in Table 6.30.

Table 6.30

Results of the Study

Sl. No.	Hypothesis	Sig	Decision
1	**H1a.** Age of the customer significantly influences customer's intentions to adopt IMPS.	.203	Rejected
2	**H2b.** Age of the customer significantly influences customer's intentions to adopt Mobile Wallet Banking.	.605	Rejected
3	**H2a.** Gender of the customer significantly influences customer's intentions to adopt IMPS.	.616	Rejected
4	**H2b.** Gender of the customer significantly influences customer's intentions to adopt Mobile Wallet Banking.	.805	Rejected
5	**H3a.** Demonetization Effect significantly influences customer's intentions to adopt IMPS.	.696	Rejected
6	**H3b.** Demonetization Effect significantly influences customer's intentions to adopt Mobile Wallet Banking.	.984	Rejected
7	**H4a.** Perceived usefulness positively influences customer's intentions to adopt IMPS.	.000	Accepted

8	**H4b**. Perceived usefulness positively influences customer's intentions to adopt Mobile Wallet Banking.	.000	Accepted
9	**H5a.** Perceived ease of use positively influences customer's intentions to adopt IMPS.	.000	Accepted
10	**H5b.** Perceived ease of use positively influences customer's intentions to adopt Mobile Wallet Banking.	.000	Accepted
11	**H6a.** Compatibility positively influences customer's intentions to adopt IMPS.	.010	Accepted
12	**H6b.** Compatibility positively influences customer's intentions to adopt Mobile Wallet Banking.	.006	Accepted
13	**H7a.** Perceived Trust and Security positively influences customer's intentions to adopt IMPS.	.000	Accepted
14	**H7b.** Perceived Trust and Security positively influences customer's intentions to adopt Mobile Wallet Banking	.000	Accepted
15	**H8a.** Price value positively influences customer's intentions to adopt IMPS.	.000	Accepted
16	**H8b.** Price value positively influences customer's intentions to adopt Mobile Wallet Banking	.000	Accepted
17	**H9a**. Social influence significantly influences customer's intentions to adopt IMPS.	.190	Rejected
18	**H9b.** Social influence significantly influences customer's intentions to adopt Mobile Wallet Banking.	.109	Rejected
19	**H10a**. Personal innovativeness positively influences customer's intentions to adopt IMPS.	.000	Accepted

20	**H10b.** Personal innovativeness positively influences customer's intentions to adopt Mobile Wallet Banking	.000	Accepted
21	**H11a.** Self- efficacy positively influences customer's intentions to adopt IMPS.	.003	Accepted
22	**H11b.** Self- efficacy positively influences customer's intentions to adopt Mobile Wallet Banking	.000	Accepted

7 CHAPTER

FINDINGS AND CONCLUSIONS

7.1 Findings of the Study

- Age, gender and demonetisation effect which were used as control variables are found to be not significant.
- The most important determinants of the intentions to adopt IMPS are perceived usefulness and perceived ease of use. This is in line with the previous findings.
- Whereas for mobile wallet the most important predictors are Price value and perceived usefulness.
- Perceived Trust and Security is significant in influencing the intentions to adopt both IMPS and mobile wallet positively. This is also in line with the earlier findings.
- Both the personal characteristics namely personal innovativeness and self-efficacy are found to be significant positive predictors of adoption intention for both IMPS and mobile wallet.
- Social influence was found to be not significant on the adoption intention of both IMPS and mobile wallet. This is because of the fact that banking is a personal and sensitive service. The need to exhibit one's personal banking transactions is dominated by the necessity to keep the transactions confidential and banking data secure.

7.2 Discussion

Since IMPS and mobile wallet innovations are in their early stages of adoption, ample care was taken to ensure that respondents have an appropriate level of exposure to these innovations (Chou, Lee, & Chung, 2004). For this purpose, screening question was used at the beginning of the questionnaire to ensure that the respondents have enough exposure to these innovations. In accordance with the past literature, it was decided that the respondents use the innovation at least 3 times so as to form perceptions about the innovation.

The questionnaire also consisted of questions on the usage pattern and usage frequency of these innovations so as to classify the respondents into adopters and non-adopters. By taking these extra efforts and care in the selection of the sample, the research was able to develop more valid responses.

The final sample is unbalanced in terms of age, education, and income. The sample consisted of a majority of young customers who are moderately/highly educated falling under middle-income group. However, this is a true representative of the population. India's population is mostly young urban adults who are educated and who earn moderately. Therefore having an unbalanced sample is justified.

The analysis of user demographics provided interesting insights about customer demographics. Even though the sample is unevenly distributed in terms of age, gender education and income; the adoption intentions of customers are not affected by these factors. Findings show that age and gender are not significant in affecting the adoption intentions of Banking channel innovations. Also, contrary to our expectations, demonetization effect did not have a significant effect on adoption intentions. Further

there were no significant differences in the adoption intentions of respondents between cities and between banks.

For both IMPS and mobile wallet customers most determinant of adoption intention, followed by ease of use. Therefore banks should enhance the usefulness associated with the usage of innovative channels along with reducing the complexity associated with their usage. The results about perceived usefulness and perceived ease of use are in line with the earlier research. Much of the earlier research on technological and banking innovations repeatedly found that usefulness and ease of use are the most important predictors of usage intentions of the customer.

The present research also validates that perceived value is a strong determinant of adoption intentions of customers. This is true for both IMPS and mobile wallet. Thus all the stakeholders involved in providing the innovative banking channel service to the customer should integrate in order to develop a multilevel security system to maximize the levels of trust and minimize the levels of risk perceived by customers who are using these innovative banking channels for making transactions.

In line with previous research, perceived trust and security is one of the foremost determinants of adoption intentions of banking channels. Majority of the customers are not aware of the bank's security policies and security measures in case of any mis-happening or discrepancy of the banking transaction. Customers are not aware of the technology measures adopted by the bank to secure customers' sensitive banking data. Therefore bank should take steps to educate the customers about the security policies of the bank. Also, information provided by the bank in this regard plays a key role. The information and also the information source play an important role in building the trust beliefs in the minds of the customers.

Additionally, the present research finds that social influence does not have any significant relationship with adoption intention. The reason behind this finding is that banking is more of a personal service than a commercial service and so it is sensitive to deal with. Therefore the need to exhibit or influence others is overcome by the need to keep the banking data safe and secure.

Interestingly, findings also suggest that many customers are using mobile wallet as an alternative to traditional payment methods not only because of the factors explained in the research model but also because of the additional benefits and discounts that are being offered by mobile wallet companies to increase the adoption rates. Breaking the initial barrier of resistance is a very important step in the adoption of innovations. This method of alluring customers with additional discounts and offers is a potential resistance breaking strategy at least in the introductory stages of innovation. Therefore bank should follow or imitate these strategies to improve the adoption of banking channel innovations.

Further, the present research also adds to the findings that both the customer personal characteristics - personal innovativeness and self-efficacy are significant predictors of adoption intention. Also, young educated customers tend to possess high innovativeness and high self-efficacy. Therefore it is essential for banks to make extra efforts to attract elder customers who may have low levels of innovativeness and self efficacy.

7.3 Theoretical Contributions

- The most important contribution of this study is the development of a unique comprehensive model which incorporates three sets of characteristics namely perceived innovation characteristics, personal and social characteristics.

- Responses were taken from both adopters and non-adopters of IMPS and mobile wallet which makes the findings of the study more valid.

- The effect of demonetisation was measured for the first time and was used as a control variable in the study.

- The research instrument was tested and validated on two innovative banking channels. So it can be useful to researchers in further developing and refining research models for innovative banking channels.

7.4 Implications for Banking Sector

- The findings show that Perceived Trust and Security is one of the important predictors of adoption intention.

- Therefore banks and banking managers should take proper care on establishing a relationship of trust with the customers from the very beginning.

- Findings show that most of the customers are not aware of the security policies of the bank (the mean value of PTS2 is 2.5/5 for IMPS and 2/5 for Mobile Wallet).

- Therefore marketing campaigns should be organized to bring awareness among the customers about the security measures and safety policies followed by the respective banks in keeping the banking data secure.

- Many customers are using mobile wallets as an alternative payment method because of the incentives and additional promotional offers offered by the mobile wallet. (Mean value of PV3= 4.5 /5).

- This is adding value to the mobile wallet as a channel. Therefore banks can use this method of alluring customers with exciting offers in order to break the initial resistance to adopt a new banking channel

- The results also show that customers with high personal innovativeness such as young working professionals and students tend to adopt innovations more than the rest of the customers.

- Therefore banks should take measures to attract customers with low personal innovativeness like the elder customers. Banks should highlight the role of interface design and structural assurances that can help customers in carrying out the transactions easily without any trouble.

7.5 Limitations

- Random sampling could not be used because of the non availability of the complete list of all banked customers in India for using it as a sampling frame, so the sampling was based on convenience method.

- As already discussed, the sample is not evenly distributed among adopters and non-adopters. However, future research meant for a comparison of adopters and non-adopters can take enough care to see that adopters and non-adopters are distributed evenly in the sample.

- Also, the data collection was limited to only top 4 cities in terms of innovation and digital payments. But recent reports on digital payments stress the fact that demonetisation and digitalisation have pushed tier 2 and tier 3 cities towards digital transaction mode. Because tier 2 and tier 3 cities were not included in the sample, the results cannot be generalised.

7.6 Future Research

- This study identified only two user categories namely adopters and non-adopters. Future research can include more categories of users like early adopters and late adopters etc., into the study.

- This is a cross-sectional study to understand the perceived attributes of banking channel innovations. Longitudinal studies in this direction is a future research avenue.

- Banking is a service that is highly dependent on the Telecom industry as an intermediary. Whether Telecom industry plays a role in the adoption of Banking channel innovations like the mobile wallet is not considered in this study. This is another limitation that future research can address.

- One more future research direction could be to conduct a comparative study between the adoption of banking channels in rural and urban India.

- Also, future researchers could attempt to understand how customers adopt multiple banking channels simultaneously to manage their banking and financial needs instead of studying each banking channel separately.

- Future research can also focus on studying the organisational adoption of banking channels rather than studying the individual adoption of banking channels.

7.7 Conclusions

Banks should put an effort on the following things:

1. Promoting the undoubted usefulness of Banking channel innovations to the customer in all the best ways possible. Findings also show that perceived usefulness is the number one determinant of adoption intention. Therefore promotional efforts should particularly focus on how useful these banking channel innovations are to the customer in managing their finances. This can not only create awareness but also enhance positive perceptions about banking channel innovations.

2. Creating and reinforcing an image of solid integrity of their bank. Creating an image of trust and integrity about their bank in the minds of customers. Research shows that the trust that a customer has on the bank is reflected in the trust the customer has on the bank's products and services. Therefore it is important for the banks to create a relationship of trust and integrity with the customer so that the customer will not have any trust and security issues while adopting banking channel innovations. Trust is one of the major issues for banks to tackle with while improving the adoption rates of banking channel innovations.

3. Taking full advantage of social media and social networks by generating powerful positive messages. Banks should be a part of social network platforms and customer portals to which majority of the customers belong to. Banks should make use of these platforms to generate curiosity and interest in the minds of the customers by publishing powerful and positive messages about the innovative banking channels. This can not only create a positive word of mouth but also can reinforce the positive image that customers have about the bank and

its innovative services. ICICI bank is one of the best examples of the modern banks which is fully taking advantage of social media networks and other social platforms to reach the customer.

4. Acting proactively in understanding customers' needs and wants and thereby creating innovative products and services that can meet the Expectations of customers in a profitable manner. Banks should allocate enough funds in marketing research to understand the needs of both potential and existing customers. This research output can be used to create valuable, product and service designs that can meet the unmet needs of the customers which can turn out to be profitable not only to the bank but also to the customer. Such innovations can offer a value to the price incurred by the customer on adopting them. This can trigger a boost for growth in the adoption of innovative banking channels.

5. The Indian banking sector today is flooded with many innovative channels like UPI, Bharat QR, BHIM, Google Tej etc. So there exist a lot of questions and confusions in the minds of customers about the real utility and value offered by these channels. Therefore banks should take extra efforts in clearing all the confusions and establishing a sound and solid platform of trust to enable the growth of these innovative channels.

By focusing on the above mentioned issues intention to adopt new banking channels can gradually be raised and ultimately these efforts can lead to a significant growth in the adoption of innovative banking channels in the future.

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QUESTIONNAIRE

DETERMINANTS OF CUSTOMER'S INTENTIONS TO ADOPT BANKING CHANNEL INNOVATIONS IN INDIA

I am V Priyadarshini, research scholar from the School of Management Studies, University of Hyderabad. Kindly mark your responses regarding the usage of Banking Channel Innovations i.e. Mobile Wallet Banking and IMPS. Information provided by you will be kept confidential and will be used only for the purpose of academic research.

Did you use IMPS and Mobile Wallet Banking at least three times in your life time?

IMPS – min 3 times □ Yes □ No

Mobile Wallet – min 3 times □ Yes □ No

PART I:

Please select the response that best describes your answer with a tick mark in the box provided

1. Age (years):

□ Less than 25 □ 25-35 □ 36-45

□ 46-55 □ Above 55

2. Gender: □ Male □ Female

3. Marital status: □ Married □ Unmarried

4. Education:

□ Uneducated □ SSC □ Intermediate/Diploma

□ Graduate □ Post Graduate □ Professionally qualified

5. Monthly Income (in Rs.):

□ Below 10,000 □ 10,001 – 20,000 □ 20,001 – 30,000

□ 30,001 – 40,000 □ 40,001 – 50,000 □ Above 50,000

6. Occupation:

□ Govt. Employee □Private Employee □ Student

□ Self-employed □ House wife □Other_____

7. I own a smart phone? □ Yes □ No

8. I am a customer of

□ SBI □ PNB □ ICICI

□ HDFC Bank □ Bank of Baroda □ Axis Bank

9. I use the following services from the bank:

□ Savings accounts □ Current accounts □ Loans

□ Debit and Credit cards □ Cash management services □ Other services

(If you are using other services please mention here what they are.)

11. I get information about new Banking channels from:

□ Other customers □ Bank □ Newspaper ads

□ Internet □ T.V. ads □Other Sources

(If you got information from other sources please mention here what they are.)

12. I use Mobile Wallet Banking / IMPS for this number of times in a month:

□ Mobile Wallet Banking __times □ IMPS __times

13. I have been using Mobile Wallet Banking / IMPS since

□ Mobile Wallet Banking __ Months/Years □ IMPS __Months/Years

PART II:

Please state your level of agreement or disagreement to the following statements regarding your attitude towards IMPS and Mobile Wallet Banking separately with a rating from 1 to 5.

1. ***Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree***

(Note: Mark your responses for both Mobile Wallet Banking and IMPS. It is not a comparison between them, you just need to mark your response (For example in terms of ease of use I can rate IMPS as 5 and also Mobile Wallet Banking as 5). There is no right and wrong response and individual responses may differ from one another. First apply the statement to the usage of mobile wallet banking and rate it in the space provided and next apply the same statement to the usage of IMPS and then rate it in the space provided. Proceed in the same way for all the statements below. One is done for you as an example below.)

	STATEMENTS	**Mobile Wallet**	**IMPS**
Ex:	I find the usage of Mobile Wallet Banking/IMPS quite interesting. This statement can be applied as: I find the usage of Mobile Wallet Banking quite interesting – My rating Strongly Agree 5 I find the usage of IMPS quite interesting - My rating Agree 4	5	4

Sl. No.	**STATEMENTS**	**Mobile Wallet**	**IMPS**
1.	Mobile Wallet Banking/IMPS provides flexibility and mobility.		
2.	Mobile Wallet Banking/IMPS helps me complete all my financial transactions on time.		
3.	Mobile Wallet Banking/IMPS helps me to make better decisions in making a purchase.		
4.	Overall, Mobile Wallet Banking/IMPS is a useful option for making transactions.		

5.	Learning to use Mobile Wallet Banking/IMPS is easy.		
6.	Payment procedures using Mobile Wallet Banking/IMPS is clear and understandable.		
7.	Mobile Wallet Banking/IMPS is easy to interact with.		
8.	Getting the necessary information from Mobile Wallet Banking/IMPS is easy.		
9.	Mobile Wallet Banking/IMPS is compatible with all my financial transactions.		
10.	Mobile Wallet Banking/IMPS fits well with my style as a customer.		
11.	I have the required resources and knowledge to use Mobile Wallet Banking/IMPS.		
12.	My mobile phone is compatible with Mobile Wallet Banking/IMPS application.		
13.	I do not incur the risk of financial frauds using Mobile Wallet Banking/IMPS.		
14.	I feel assured that legal and technological structures adequately protect me from payment problems on Mobile Wallet Banking/IMPS.		
15.	I feel secure sending sensitive information across Mobile Wallet Banking/IMPS.		
16.	I trust the security mechanisms involved in Mobile Wallet Banking/IMPS.		
17.	The cost of making a financial transfer with Mobile Wallet Banking/IMPS is reasonable.		
18.	Buying a phone compatible with Mobile Wallet Banking/IMPS is not expensive.		
19.	Mobile Wallet Banking/IMPS helps me avail discounts and coupons.		
20.	Mobile Wallet Banking/IMPS is a good value for money.		
21.	People whose opinions I value prefer that I use Mobile Wallet Banking/IMPS.		
22.	People I monetarily transact with, think I should use Mobile Wallet Banking/IMPS.		
23.	Merchants I buy goods/services from, think I should use Mobile Wallet Banking/IMPS.		

24.	In my social circle, I see many people using Mobile Wallet Banking/IMPS.		
25.	When I hear about a new technology, I look for ways to experiment with it.		
26.	Among my peers, I am the first one to try out new technologies.		
27.	In general, I am not hesitant to try out new technologies.		
28.	I like to experiment with new technologies.		
29.	I know more about new technologies before other people do.		
30.	I would feel comfortable using Mobile Wallet Banking/IMPS on my own.		
31.	I am confident of using Mobile Wallet Banking/IMPS if I have only the online instructions for reference.		
32.	-I am confident of using Mobile Wallet Banking/IMPS even if there is no one around to show me how to do it.		
33.	I am confident of using Mobile Wallet Banking/IMPS even if I have never used such a system before.		
34.	I intend to use Mobile Wallet Banking/IMPS whenever the opportunity arises.		
35.	I would be interested in continuing to use Mobile Wallet Banking/IMPS.		
36.	I intend to increase my use of Mobile Wallet Banking/IMPS in the near future.		
37.	I would recommend my friends to use Mobile Wallet Banking/IMPS for making transactions.		
38.	I have adopted Mobile Wallet Banking/IMPS only after de-monetization.		
39.	De-monetization has made the usage of Mobile Wallet Banking/IMPS compulsory.		
40.	De-monetization has increased my usage of Mobile Wallet Banking/IMPS.		

******* THANK YOU *******

List of Publications and Conferences

Research Papers and Presentations

- Published a paper titled “An Exploration of the Factors Affecting the Adoption of Mobile Wallet Banking in India” in the AGU International Journal of Management Studies and Research, e-ISSN 2455-1562, p-ISSN:2455-6092 Vol.6, Jan-Jun, 2018.
- Published an empirical paper titled “Enablers and inhibitors for the adoption of biometric ATMs in India: A study of bankers’ and customers’ perspectives” in the International Journal of Marketing Management, ISSN 2454-5007, Vol. 3, No. 2, May 2017.
- Published a paper titled “A Study of Channel Innovations and Their Impact in Indian Banking” in the National Finance Conference on “Trends in Modern Banking” held on November 20th, 2015 at HBS, GITAM University, ISBN: 978-93-5230-096-9.
- Published a paper titled “Changing Dimensions of Innovation in India and the Role of MSME’s: A Study” in the National Conference on Emerging Trends in Marketing held between 18th -19th of March,2014 at KL University, ISBN: 978-81-930638-2-8.
- Presented a paper titled “Perceived Innovation Attributes: A Study of select SBI’s Innovations” in the International Marketing Conference MARCON-2014 held between December 18-20 at IIM Calcutta.
- Presented a Research proposal on “Customer Perceived Attributes of Innovation – A Study of Channel Innovations in Indian Banking sector” in the International Conference CERE 2016 held during May 05 to 08 at IIM Indore.
- Presented and published a paper titled “An Assessment of Customer loyalty Programs with special reference to India” in the International Marketing Conference ICCPMS-2017 at School of Management Studies, University of Hyderabad, ISBN: 978-93-85101-83-0.

Research Methodology Workshops Attended

- Attended a Three Day Workshop on " Structural Equation Modeling: Basics and Advances," 23-25 September, 2016 @ IMT, Hyderabad.
- Attended a Two Day Workshop on Data analysis using SPSS for Women research Scholars in Social Sciences, Commerce and Business Management from 13/12/2013 to 14/12/2013 in the Department of Economics, University College for Women, Koti, Hyderabad.

DETERMINANTS OF CUSTOMER'S INTENTIONS TO ADOPT BANKING CHANNEL INNOVATIONS IN INDIA

by V Priyadarshini

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DETERMINANTS OF CUSTOMER'S INTENTIONS TO ADOPT BANKING CHANNEL INNOVATIONS IN INDIA

ORIGINALITY REPORT

9%	4%	8%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Ali Abdallah Alalwan, Yogesh K. Dwivedi, Nripendra P. Rana, Raed Algharabat. "Examining factors influencing Jordanian customers' intentions and adoption of internet banking: Extending UTAUT2 with risk", Journal of Retailing and Consumer Services, 2018 Publication	<1%
2	Khushbu Madan, Rajan Yadav. "Behavioural intention to adopt mobile wallet: a developing country perspective", Journal of Indian Business Research, 2016 Publication	<1%
3	Daniel Mehrad, Shahriar Mohammadi. "Word of Mouth impact on the adoption of mobile banking in Iran", Telematics and Informatics, 2017 Publication	<1%
4	aisel.aisnet.org Internet Source	<1%