How perceived trust mediates merchant's intention to use a mobile wallet technology

Nidhi Singh[a], Neena Sinha[b,*]

[a] *Jaipuria Institute of Management, Noida, India*
[b] *University School of Management Studies, GGSIP University, India*

A B S T R A C T

As mobile wallets are in constant demand and growing over the past few years, there is a need to identify views of different stakeholders involved in the process. Several studies have been done to investigate consumers' perspective intensively. On the other hand, review of perception and adoption of wallet services by other participants, in particular merchants, is often neglected. The present study aims to fill this gap. This study used an empirical model to measure merchant's intention to use a mobile wallet technology. The study includes the variables, perceived compatibility, perceived usefulness, awareness, perceived cost, perceived customer value addition and perceived trust, and aims to determine their influence on intention to use. Our study also tested the mediating effect of perceived trust on the influence of perceived usefulness to predict merchant's intention. The study includes results of the survey of 315 Indian merchants by an online survey method. We find the highest effect of perceived customer value addition on merchant's intention, followed by perceived usefulness of technology. The proposed mediation effect of perceived trust was small but significant on perceived usefulness. The results of the study can help mobile payment companies to understand factors that are relevant to increase adoption of technology in the context of merchants.

1. Introduction and merchants' views on technology adoption

Merchants' work is dynamic and challenging because customer needs and lifestyles change with the changing times. They require a robust, safe and reliable payment system to enhance trustworthiness and effectiveness. Mobile payment system is a blessing for merchants as it requires less maintenance and is cost effective for them (Plouffe et al., 2001; Carlos and Taylor, 2008). Mobile payment system includes wallets services which can help customers in numerous ways, and also provide merchants a system that is simple, and easy to use and handle. Mobile payment is a service that is delivered through a mobile device. We have different types of mobile payment services for various remote and physical payment options. Point of sales services such as near-field communication (NFC) payments, sound waves based-payments provide a medium of card transactions to retailers through a secure portal. We have remote payment technologies such as mobile wallets, which need to be installed in the smartphone to allow the consumer to store his money and perform transactions directly from the wallet (Madan and Yadav, 2016). We also have a few other remote payment services such as internet payments, SMS, mobile banking etc. (Sorensen, 2018). Mobile payments help merchants to approach retail customers in remote locations since penetration of electronic payment methods are on the rise among customers situated in far flung locations in a large countries like India (Michael, 2006; Singh et al., 2017). This provides an opportunity to merchants to provide numerous online services including loyalty and promotional programs. Merchants view mobile wallet system as an opportunity to improve the payment process and enhance overall customer experience. Merchants who use barcodes, cloud technology, quick response codes, and who have been unhappy with card services and delays in processes, are more inclined to mobile wallet technologies (Plouffe et al., 2001).

Mobile wallet technology, generally used to conduct financial transactions, is suitable to various business models, integrating a variety of payment methods for the convenience of merchants and small business owners. Such transactions generally involve two parties, customer and merchant. Both the parties play equal and significant roles in the success of mobile wallet technology and both the parties avail benefits and satisfaction with the use of technology (Markendahl et al., 2010). Hence, not just views of customers, but merchants' views are also equally important to understand the adoption of mobile service technology (Petrova and Wang, 2013).

Adoption of technology by merchants began in interoperable

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manner but is still not at complete scale as is required for the success and adoption of any payment method (Lee and Shin, 2018). Government has offered several incentives, discounts and waivers to merchants to go digital; for example, incentives like waiver in service tax of 15 percent on online transactions worth INR 2000, discounts in digital purchase and payments for tickets, toll tax, insurance between 0.5 percent to 10 percent based on transactions value. However, digital transactions are low and are perceived as a challenge by merchants who are tech-unfriendly; they prefer cash and physical access to various transactions (Dave, 2016). Entrance of payment providers such as Truepay, Phonepe, Tez, Paytm target merchants to drive digital transactions but they continue to be at ease with use of cash and debit/credit cards. Data shows that only 3 million merchants are accepting digital mode of payments in retail, which constitutes only 1–2 percent of total the merchant population in India; the remaining 40 million merchants (approximately 98 percent) are still using offline methods of payments. The findings revealed that inclusion of Value Added Tax (VAT) and Good and Service Tax (GST) is a crucial barrier which affects revenue margins, pricing, and increases complexities of digital transactions. Merchants perceive that failing to comply with such tax liabilities and service obligations may lead to severe penalties and may affect merchant's reputation in the market This further gets complicated with different VAT and GST liabilities associated with various stakeholders in the supply chain of the business (Heydari and Bailey, 2016).

Now, the question is how long this trend will continue and when will merchants begin to accept mobile-based payment systems which has become crucial to bring financial inclusion and social change in India. This trend can be changed with education of merchants and consumers about the technology, tax liability and perceived value added benefits associated with it. Data estimates show that success of digital transactions and electronic systems such as Unified Payments Interface (UPI) depend on aggressive use of technology by merchants. Currently, consumers use digital mode to pay rents, mobile bills and recharges; but after the successful implementation of UPI based transactions with small merchants and kirana shops (neighborhood shops), digital payments will become a game changer in India (Mittal, 2018). Fig. 1 explains various factors acting as barriers and opportunities to

merchant's adoption of mobile payment services; it also highlights the importance of factors such as perceived value added services, awareness, perceived cost, product compatibility, usefulness, and other technical factors and their influence on merchants' adoption of a technology.

There are very few studies which have reviewed the above constructs and their impact in the context of merchants (Li, 2018; Liébana Cabanillas et al., 2016, 2017; Możdżyński, 2018). We feel a research gap exists in evaluating merchants' perception of adoption of mobile wallet technology, which is vital to achieving financial inclusion and social change in India (Ehrenhard et al., 2017). Merchants are surveyed in past studies related to the use of e-commerce, mobile commerce, hospitality, food services etc. (Singh, 2016; Gupta, 2018; Mittal, 2018). We have noticed very few studies where merchants' or retailers' perceptions are reviewed in the context of mobile payments or wallet services (Dahlberg et al., 2008; Mallat and Tuunainen, 2008; Li, 2018). Theoretically, the present study suggests a conceptual model, by including a few most relevant factors as explained in Fig. 1 namely, perceived compatibility, perceived usefulness, awareness, perceived trust, perceived customer value addition and perceived cost, to measure overall merchant's behavioral intention with mobile wallet technology. Furthermore, the study contributes by determining the mediating effect of perceived trust and giving it a central role in the model. Seeing merchants' concern about the security, fraud and low awareness issues, trust plays an important role in the adoption process of a technology (Liébana Cabanillas et al., 2016). The study offers a few managerial implications and suggests payment companies to develop an application that is user-friendly, compatible and provides value added services. Practitioners must review issues and challenges that are highlighted in the study, related to trust, cost, usefulness and awareness of a technology, and promote features of the service to gain merchants' trust (Dahlberg et al., 2008). The current study presents literature review and theoretical background of various mobile payment and mobile wallet adoption studies. It further explores various dimensions of new technology adoption from the view point of merchants. Further, we present data analysis, discussion of the results and conclusions of the study. It also highlights the implications, both theoretical and practical
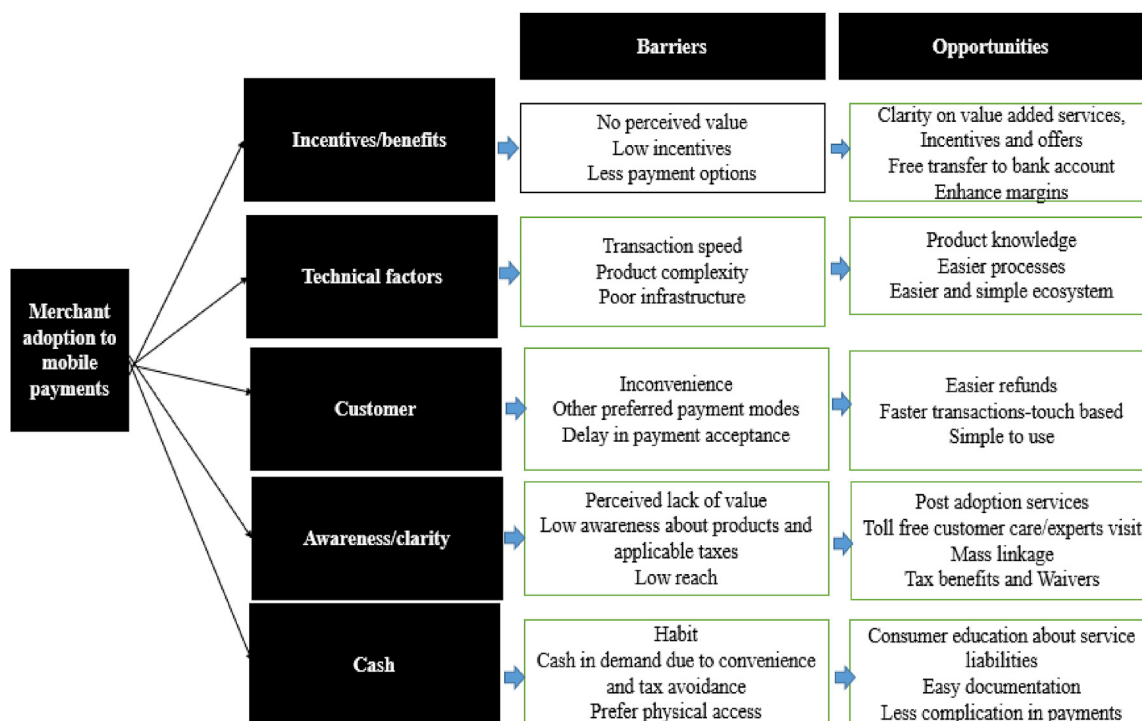

Fig. 1. Outline of the situation of mobile payment systems in India, Author compilation (Source: BCG analysis, 2016).

contribution, to various technology adoption theories.

2. Theoretical background

In previous years, several studies have summarized merchants' behavioral intention to use a new technology (Brown and Dant, 2008a; 2008b; Grewal and Levy, 2007; Grewal et al., 2009). These studies have reviewed existing literature and provided important insights on technology adoption behavior. Previous studies show that nearly one in five retailers globally have increased their investment in mobile payments, wallets but prefer only payment transactions mode. However, growth is slightly lower than expected due to the critical nature of mobile payment process and inefficient infrastructure support. Mallat and Tuunainen (2008) confirmed this trend in their research and found that mobile wallet services are mostly used in restaurants, by fast food vendors, service stations and petrol pumps; wider adoption and acceptance is slow and has not increased as expected (Grewal et al., 2009). Previous studies have stated various instances where retailers have stopped using mobile wallet transactions in their business such as the SimPay consortium (Mallat, 2007). This highlights the gap in identifying merchants' expectation from a technology and factors contributing towards technology acceptance and usage (Duarte et al., 2018). Intention and acceptance issues of a new mobile payment technology has been researched over a long period of time (Mallat and Tuunainen, 2008; Li, 2018); Liébana Cabanillas et al. (2016); Liébana-Cabanillas et al., 2018). Various frameworks and conceptual models namely, Technology Acceptance Model (TAM), Innovation Diffusion Theory (DOI), Theory of Planned Behavior, Unified Theory of Acceptance and Use of Technology (UTUAT2) and social cognitive theory have been suggested in literature to identify factors that may influence adoption of a technology (Dahlberg et al., 2008; Ondrus et al., 2009; Venkatesh et al., 2012). These conceptual models include numerous factors to measure the behavioral outcomes on mobile wallet systems. Dahlberg et al. (2015) reviewed several previous studies published in the area of mobile payment services by using UTAUT and TAM; these studies found perceived compatibility, perceived ease of use are the most influencing variables, followed by perceived trust and risk. All these studies confirmed the importance of TAM, UTUAT2 and other technology adoption models as a foundation theory and measured the relationship between various constructs in the context of merchant's or consumer's, to use a mobile payment technology (Hayashi, 2012c; Singh, 2016; Abhishek and Hemchand, 2016; Singh and Srivastava, 2018).

The current study reviews previous literature on technology adoption in the context of merchants and aims to include factors that are relevant to enhance intention to use a technology (See Table 1).

Role of mobile payments is changing radically with time as various parties in the system get involved and increase their use of technology (Liébana-Cabanillas et al., 2017b, 2018). There are numerous studies which have discussed factors about the outer and inner issues relating to mobile wallet adoption (Mallat and Tuunainen, 2008; Hayashi,

2012c; Liébana Cabanillas et al., 2016, 2017; Li, 2018; Możdżyński, 2018). Outer factors are contingency factors namely, factors related to government policy, regulatory changes, technological and infrastructural changes, social and cultural environment and commercial changes (Ondrus and Pigneur, 2006). On the other hand, inner factors are competitive factors that are related to customers, merchants, network and payment providers (Hayashi, 2012c; Liébana Cabanillas et al., 2016, 2017). Both factors talk about users and suppliers of mobile wallet technology, and are associated with new and old payment technology services. Various previous studies have stated that these factors may pose barriers to adoption of a technology and affect the trust of merchants in adopting a technology (Liébana Cabanillas et al., 2016, 2017). Another factor, which is found crucial in the context of merchants, is perceived benefit and value addition with the use of mobile wallet services. Value addition is defined as, 'the level of satisfaction of a service's customer, which is based on customer's emotional, physical, social response and perceived rating given to the service or retailer' (Varki and Mark, 2001). For merchants and small business owners, the key to success is to understand customers' expectations and provide them the desired service value. Mallat and Tuunainen (2008) confirmed that mobile payment services provide value to merchants as it helps in facilitating payments in remote locations and enhance their user base. Use of mobile wallets offers several opportunities to merchants to sell their services to consumers in time, conveniently and ensuring consumer satisfaction. Li (2018) identified the significant influence of facilitating conditions, convenience, perceived benefits and mobile efficacy on merchant's' intention to use mobile wallet services; their findings revealed that merchants have to possess knowledge and awareness about the use, functionalities and capacities of payment technologies before offering it to their consumers. In a similar study by Możdżyński (2018) on the acceptance of mobile payments by merchants, they confirmed the significant influence of perceived cost, perceived trust and experience, on the behavioral intentions of merchants. In the emerging market context, very few studies analyzed UTAUT and TAM variables in the context of merchants (Singh and Srivastava, 2018). Perceived cost and perceived trust are the key influencing determinants for merchants. Carlos and Taylor (2008) confirmed that mobile wallet services provide cost effective payment facilities to merchants with the use of different code based and cloud based systems for funding requirements. They further confirmed that merchants prefer these systems as they are more cost effective than traditional near field communication (NFC) based mobile payment methods by using debit and credit cards (Liébana Cabanillas et al., 2016). Several researches have highlighted various factors namely, cost, risk, awareness, convenience, efficacy, which influence merchants' trust and intention to adopt a mobile wallet system (Ondrus and Pigneur, 2006; Hu et al., 2008; Możdżyński, 2018).

In the context of consumers, determinants such as perceived ease of use, perceived usefulness, social norms, trust, risk, innovation, habits etc. have been widely used in previous literature (Dahlberg et al., 2008; Venkatesh et al., 2012; Madan and Yadav, 2018; Singh et al., 2017; Xu

Table 1
Reviewing research in Mobile payment technology in the context of merchants.

Variables	Authors
Perceived usefulness, customer knowledge, lack of information, perceived trust, perceived lack of security, technological issues, sales turnover, convenience, new tools	Liébana-Cabanillas et al. (2017)
Performance expectancy, effort expectancy, social influence, facilitating conditions, gender, age, experience, voluntariness of use	Możdżyński (2018)
Merchant's knowledge, trust, usefulness, ease of use, drivers and barriers	Liébana Cabanillas et al. (2016)
Mobile Efficacy, Facilitating Conditions, Perceived Convenience, Perceived Costs, Perceived Benefits, Perceived Risks, Social Influence	Li (2018)
Knowledge, increasing sales, costs of payment processing, complexity of the systems, unfavorable revenue sharing models, lack of critical mass, and lack of standardization	Mallat and Tuunainen (2008)
Feasibility, convenience, sales, merchants, intentions, cost	Ondrus and Pigneur (2006)
Experience, Quality, Perceived Value, Perceived Cost	Chen and Chen (2010)
Customer Value addition, perceived cost, perceived trust, compatibility, infrastructural issues	Hayashi and Bradford (2014)

and Du, 2018). These studies confirmed that perceived ease of use, perceived usefulness and social norms are the most significant determinants to influence consumers' acceptance and adoption of a technology (Barbuta et al., 2012; Oliveira et al., 2016; Liébana-Cabanillas et al., 2018). On the other hand, in the context of merchants, the most significant variables identified were perceived cost, perceived trust and facilitating conditions (Hu et al., 2008; Liébana Cabanillas et al., 2016; Możdżyński, 2018). These studies highlighted the main difference in perception and attitude of consumers and merchants; they described that consumers are more inclined to psychological and behavioral traits associated with a technology such as convenience, personal innovation, habits, risk, social norms etc. (Abhishek and Hemchand, 2016; Madan and Yadav, 2018). On the other hand, merchants mainly focus on the technical and functional aspects of a technology or services (Liébana Cabanillas et al., 2016, 2017; Li, 2018).

However, we have a few studies where UTAUT variables are used and reviewed in the context of merchants, but we still lack similar studies on mobile payment or wallet services in India Ondrus and Pigneur (2006); Slade et al., (2014); Mallat and Tunnainen (2008). The current study discusses a few such issues in detail and evaluates several factors that are relevant in the Indian context. These factors identify opportunities in retail market for consumers and merchants, and evaluate risk which may arise while using payment systems online.

2.1. Conceptual framework and research hypotheses

2.1.1. Conceptual model

Fig. 2 illustrates the proposed technology adoption model based on the relationships established by hypotheses from previous researches. The study aims to identify key factors of merchant's intention to use a technology. We propose the significant direct and indirect influence of perceived compatibility, perceived usefulness, awareness, perceived cost, perceived customer value addition and perceived trust on intention to use; we propose positive influence of perceived compatibility, perceived usefulness, awareness, perceived customer value addition and perceived trust on intention to use, and negative influence of perceived cost on intention to use.

2.1.2. Perceived compatibility

Compatibility is defined by researchers as the degree of consistency in maintaining existing values, needs and expectations of technology adopters (Mallat, 2007; Mallat and Tuunainen, 2008; Schierz et al.,

2010; Yang et al., 2012). Various previous studies have shown that compatibility is a crucial factor to understand merchant's adoption behavior of a technology (Karnouskos and Fokus, 2004; Constantiou et al., 2006; Schierz et al., 2010; Ehrenhard et al., 2017). Kim et al. (2010a) investigated factors that directly influence perceived usefulness and behavior intentions of a user; findings revealed that innovativeness, perceived compatibility, user-friendly process are a few key variables to measure ease of use and perceived usefulness of a technology. Kuo and Yen (2009) confirmed that perceived compatibility is an antecedent of perceived usefulness, ease of use, and it directly influences user's intention to use a technology. Perceived compatibility supports perceived usefulness and behavioral intention to adopt a technology. Merchants perceive technology service as vital, and expect it to be compatible and easy to use (Van der Heijden, 2002; Benitez et al., 2018). Considering the growth rate of mobile wallet adoption by merchants in India, perceived compatibility of the system is an influencing variable and we propose to evaluate the influence of perceived compatibility on usefulness of a mobile wallet service and thus formulate our first hypothesis -

H1. Perceived compatibility positively influences perceived usefulness of mobile wallet services.

2.1.3. Awareness

Awareness is defined as the communication strategy that makes consumers aware about the benefits and utility of a technology and motivate them to purchase and use a new technology such as mobile payment system (Koukova et al., 2008; Hayashi, 2009). Lack of awareness about the use of a technology is a major roadblock in developing countries like India (Gupta, 2018). Lack of awareness of a system leads to concerns in the minds of consumers who resist adopting the new technology. Merchants believe that consumers' awareness about a technology influences their behavioral intention. A consumer who is concerned about loss of personal data, third party control on personal information and misuse of data by a third party, will always try to minimize use of technology, thus affecting acceptance of the technology.

Stepcic and Kabanda (2016) found a strong association between user's awareness and usefulness of a technology; they revealed that by assessing consumer's awareness, attitudinal shifts, perceived risk of a system, the merchants could be prepared in advance to use a technology. Merchants can understand the issues and take action to mitigate
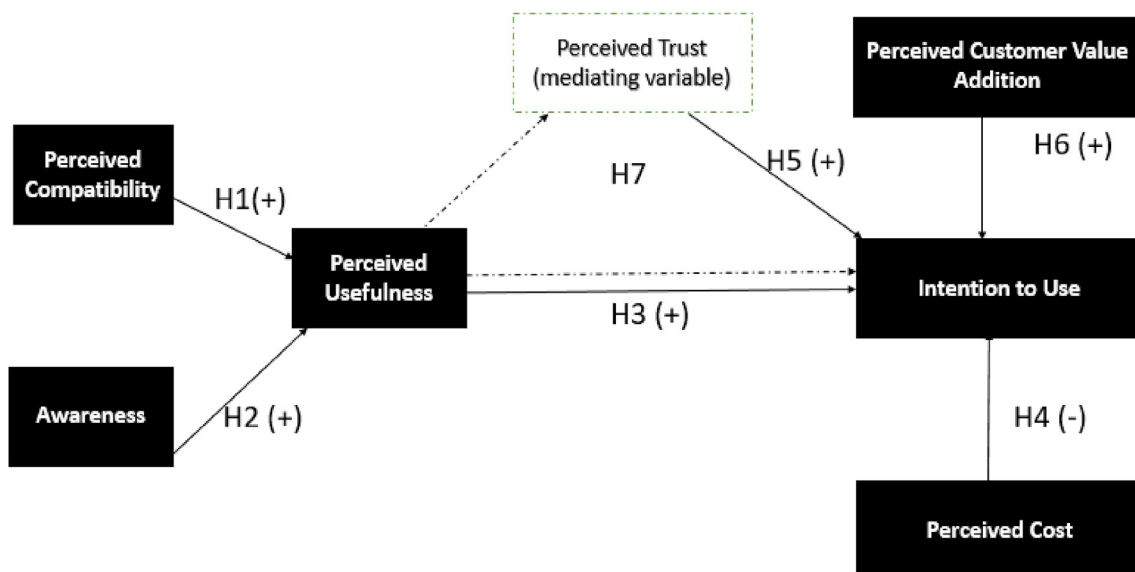
Fig. 2. Conceptual Model. Source: Author's Survey. Weighted arrows denote direct effects and dotted arrows denote mediating effect of perceived trust.

users' concerns to enhance technology acceptance. Various previous researchers have investigated awareness level of merchants and consumers about mobile wallet system (Hayashi, 2009; Singh, 2016; Madan and Yadav, 2018). Hence, we propose our second hypotheses to measure the impact of awareness on perceived usefulness of a mobile wallet service.

H2. Awareness positively influences perceived usefulness of a mobile wallet service.

2.1.4. Perceived usefulness

Various previous studies used perceived usefulness as an important influencing factor in mobile payment adoption (Mallat and Tuunainen, 2008; Youris and Kauffman, 2008; Barbuta et al., 2012; Oliveira et al., 2016). Perceived usefulness of a technology is defined as the user's expectation that using a system will improve performance of a job in the context of an organization (Davis, 1989). In online technology system, usefulness is defined as use of a technology that is useful to the user to perform a certain task (Madan and Yadav, 2016; Natarajan et al., 2017). In this regard, Barbuta et al. (2012) confirm that perceived usefulness, along with perceived security and scalability, influences merchant's behavioral intention and acceptance of a mobile wallet system. Kim et al. (2010b) explain that perceived security and usefulness influence trust and merchant's intention to use a wallet system. In addition, Ramos de Luna et al. (2019) and Schierz et al. (2010) found significant impact of user's perceived ease of use, perceived usefulness and perceived attitude on intention to use a technology. There are various previous studies where perceived usefulness, along with perceived ease of use, is used to measure user's behavioral intention (Youris and Kauffman, 2008; Koukova et al., 2008; Singh and Srivastava, 2018).

In other studies related to technology acceptance and mobile payment adoption, the significance of perceived usefulness has been proven, which implies that higher level of usefulness of a technology leads to greater intention to use it by merchants (Shin, 2009; Kim et al., 2010a, 2010b; Abhishek and Hemchand, 2016; Madan and Yadav, 2018; Liébana-Cabanillas et al., 2018). Hence, we propose the following hypothesis -

H3. Perceived usefulness positively influences merchant's intention to use a mobile wallet service.

2.1.5. Perceived cost

Key motivation for merchants to adopt an online payment system is cost reduction. Cost includes cost of payment processes, cost of investment to adopt a mobile wallet system, operating costs and other security related costs. Mallat (2007) explains that merchants incur various costs while adopting a technology; these perceived costs may be related to software installation, connection to NFC/wireless system and cost related to employees training to use a new payment system. They further confirm the relevance of such perceived costs to merchant's perception and their significant effect on intention to use a technology.

Hayashi and Bradford (2014) shared merchant's perspectives about perceived cost; their findings revealed that perceived cost is the second most important factor of mobile payment adoption. Small retailers believes that mobile wallet system may reduce cost of frauds and processing cost of each transaction; hence, it is preferred by merchants. Various previous studies include cost as a key influencing factor to merchant's adoption behavior (Chong et al., 2010; Dwivedi et al., 2017). Results of these studies found that perceived cost of a technology affects the consumer's or merchant's intention to use mobile wallet services. Since cash payment involves no cost, they expect mobile wallet service cost to be very minimum or zero (Karnouskos and Fokus, 2004). Hence, we propose the following hypothesis -

H4. Perceived cost has a significant and negative influence on intention to use a mobile wallet service.

2.1.6. Perceived trust

Perceived trust is a key component in technology adoption and helps merchants to build strong customer relationship (Reichheld and Schefter, 2000). Perceived trust is defined as an emotional state that encourages one to trust another, which is based on satisfactory behavior of the other. Various researches conducted in the field of technology adoption highlighted the importance of trust as an instrument to enhance customer relationship, and increase credibility and perceived security of the system (Liébana-Cabanillas et al., 2018). Merchants must understand various technological innovations, which might consider favorable or unfavorable, but enhance or diminish trust on the system and ultimately influence intention to use a technology (Morgan and Hunt, 1994; Ehrenhard et al., 2017).

Hayashi and Bradford (2014) confirmed in their study that majority of merchants believed trust to be an important attribute of mobile payments; results confirm that merchants are concerned about security and privacy issues of a system and believe that such issues affect trust of the merchant and consumers on mobile wallet service. We propose our fifth hypothesis as below -

H5. Perceived trust has a significant and positive influence on merchant's intention to use a mobile wallet service.

2.1.7. Perceived customer value addition

Customer value addition is explained as the overall benefits and experience perceived or received by consumers, based on the utility and usefulness of a product (Hayashi, 2009; Michael, 2006). Customer value addition in an online technology environment can be defined as the value received, which is perceived as worth what is paid for, based on relative performance and utility of a technology (Varki and Mark, 2001).

Ondrus and Lyytinen (2011) stated that use of mobile wallets enhance customer relationship with merchants by offering loyalty and promotional schemes; their findings investigated the strong positive influence of perceived customer value addition on merchant's intention to use mobile wallet services. Merchants have an opportunity to enhance customer services by adding loyalty benefits, rewards and cash back schemes to mobile wallet technology and built their relationship with consumers (Karnouskos and Fokus, 2004; Mallat and Tuunainen, 2008; Michael, 2006). Merchants prefer technology that is perceived valuable by the customer and provide overall satisfactory services. This increases technology usage and merchants' acceptance of a new technology service. Additionally, service convenience, smooth processes and information feasibility are a few other key important factors that influence perceived customer value addition and adoption of a new technology including mobile payments or wallets (Sumeet et al., 2017; Liébana-Cabanillas et al., 2018; Xu and Du, 2018). We propose our sixth hypothesis as follows -

H6. Perceived customer value addition has a significant and positive influence on intention to use a mobile wallet service.

2.1.8. The role of perceived trust as a mediator

Consumers perceive mobile wallet as useful and this influences merchant intention to use (Kim et al., 2010a, 2010b); findings of their study show the direct association between usefulness and intention to use. Schierz et al. (2010) confirmed the significant positive influence of usefulness, along with ease of use and trust, on behavioral intention of a customer. However, consumers who have low trust in the mobile wallet may perceive mobile wallet less useful and therefore, be less inclined to use the payment service (Shaw, 2014). We follow the methodology suggested by Baron and Kenny (1986) to test the mediation effect of perceived trust and propose the following hypothesis -

Table 2
Descriptive statistics of respondents.

		Frequency	Percentage
Gender	Males	222	70.5
	Females	93	29.5
Age	20–30 years	34	10.8
	31–40 years	20	6.3
	41–50 years	232	73.7
	Above 50 years	29	9.7
Business Monthly Income (USD):	144 or less	24	7.6
	145 to 720	46	14.6
	721 to 2159	80	25.4
	2160 to 4318	82	26
	4319 to 7197	41	13
	More than 7198	42	13.3
Do you currently use Mobile wallet services	Yes	281	89.2
	No	34	10.8

Source: Author's Survey.

H7. Perceived trust mediates the influence of perceived usefulness on intention to use a mobile wallet.

3. Research methodology

3.1. Instrument development

The present study had seven constructs: perceived compatibility, perceived cost, awareness, perceived trust, perceived usefulness, perceived customer value addition and intention to use. All the constructs and the items loadings used to identify merchant's behavioral intention are explained (see Appendix A). In the study, we have measured all the items on a five-point Likert scale, ranging from 'strongly disagree' to 'strongly agree'. Scales for perceived usefulness and intention to use were adapted from Venkatesh et al. (2012). Perceived compatibility, perceived cost, awareness and perceived customer value addition scale were adapted from Hayashi and Bradford (2014). The perceived trust scale was adapted from Shaw (2014). Details of the scales used are included in Appendix A.

3.2. Data collection

Detailed explanation of the data collection process is given below. Firstly, initial literature review was performed and a first draft questionnaire was designed including all the significant factors suggested by classic theories and recent studies on mobile payments and mobile wallets. Further, first version of the questionnaire was created in a series of personal interviews and discussions with academicians, marketing managers, experts and a few merchants in the m-payments (mobile payments) sector and Fintech sector. This stage was followed by existing literature review, based on the suggestions. After collecting opinions, the questionnaire was reviewed and modified with two categories: control questions and questions about the research objectives. Once the final version of the survey form was finalized, a pilot testing was conducted on 150 merchants located in Delhi and NCR (National Capital Region) in India. The main objective of conducting a pilot testing was to assess the degree of acceptance, scalability, reliability and validity of the proposed behavioral scales. As there was no accessible sampling frame, researchers used purposive sampling which is a non-probabilistic sampling technique. We selected merchants who are registered with justdial.com and located in the Delhi/NCR region for the survey purpose. Merchants were selected based on their monthly business income ranging between INR 10,000–500,000. Firstly, we send an invitation email to be a part of the survey to a small group of retailers and merchants, and personally contacted, where email ids were

not available. These merchants were then requested to spread the email among their networks and business contacts. Researchers personally contacted the merchants and shared the link to the online questionnaire with the help of personal networks, websites, Facebook and available email lists, reaching out to more than 1000 merchants. We received responses from 340 retailers of which 315 responses were used for the study. Rest of the forms were incomplete and hence rejected.

The study assessed the minimum sample size requirement as suggested by Bartlett et al. (2010). They suggested ten cases per predictor as a cut off sample size. In our case, the most complex regression was on intention, which involves four paths. Hence, minimum sample size requirement is 40. The current study adopted 315-sample size, which is greater than the minimum sample size required for analysis. Moreover, the current sample also meets the criteria of minimum sample size suggested by Bentler and Chou (1987) which is the ratio of sample size to number of parameters, with minimum threshold for normal distributions as 5:1. In our case, the value estimated is 10.86.

To enhance curiosity of the research and its importance among merchants, the following measures were taken: (1) We sent the invitation email explaining the purpose of the research; (2) Name, position and official email of the researchers were given to the merchants for avoid any discrepancies; (3) Privacy and secrecy of personal data were guaranteed; (4) We intimated the maximum time involved in filling the questionnaire which was between 7 and 10 min; (5) The questionnaire has an average of ten items per page; (6) Most of the questions and their designs were clear and close-ended; (7) Sensitive questions such as demography information were included in the final segment of the questionnaire. Table 2 lists out descriptive statistics of the participant merchants.

3.3. Measurement model: reliability and validity

We have conducted Exploratory Factor Analysis (EFA) to reduce 46 items into 29 factors as these factors have factor loadings more than 0.6; the remaining items were removed due to low factor loading (less than or equal to 0.6). Kaiser-Meyer-Oklin value was 0.884 which is significantly above the accepted threshold value of 0.70 and the Bartlett's test of sphericity (Bartlett, 1954) was found to be very small (0.000). We have high factor loading of the constructs, which shows higher and significant correlation between various items and factors. All the constructs were used to determine merchant's intention to use mobile wallet services (INT). These constructs are Perceived compatibility (PCOMP), Perceived cost (PCOS), Awareness (Aware), Perceived Trust (PTRU), Perceived usefulness (PUSE), Perceived customer Value Addition (PCVA). These six factors were used to determine user's perception and intention to use a new technology. Several previous studies have confirmed the implication of these determinants on new technology adoption (Madan and Yadav, 2018; Xu and Du, 2018; Oliveira et al., 2016). The Cronbach's alpha coefficient of all the factors stretched from 0.65 to 0.78. Literature showed that the accepted value for alpha coefficient is 0.70 (Nunnally, 1978). Table 3 confirms reliability,

Table 3
Composite reliability and discriminant validity.

Constructs	Cronbach's Alpha	FL	AVE	CR	MSV	ASV
PCOMP	.893***	.77–.89	.69	.89	0.32	0.24
PCOS	.850***	.78–.88	.69	.90	0.49	0.39
AWARE	.910***	.76–.88	.67	.89	0.47	0.31
PTRU	.856***	.81–.88	.71	.90	0.47	0.32
PUSE	.878***	.76–.86	.67	.89	0.52	0.36
PCVA	.845***	.71–.88	.66	.90	0.36	0.29
INT	.867***	.77–.88	.69	.90	0.49	0.29

Source: Author's Survey. Significance at ***P < 0.001, **P < 0.01; FL = Factors Loadings, CR = composite reliability, AVE = Average variance extracted, MSV = Maximum Shared variance, ASV = Average Shared Variance.

Table 4
Correlations and square root of Average Variance Extracted.

Constructs	PCOMP	PCOS	AWARE	PTRU	PUSE	PCVA	INT
PCOMP	**.836**						
PCOS	0.565	**.833**					
AWARE	0.45	0.513	**.821**				
PTRU	0.33	0.664	0.691	**.842**			
PUSE	0.457	0.615	0.651	0.432	**.818**		
PCVA	0.501	0.575	0.454	0.6	0.579	**.813**	
INT	0.569	0.700	0.434	0.508	0.345	0.435	**.836**

Source: Author's Survey. Diagonal values are square root of Average variance extracted. Off diagonal values are shared variance.

Table 5
Fit indices of structural model.

Fit Indices	Measurement Model	Structural Model	Recommended Value	References
x^2/df	1.523	1.527	< 5	Hair et al. (2010)
GFI	.921	.902	> 0.90	
AGFI	.876	.851	> 0.80	
NFI	.902	.900	> 0.90	
CFI	.964	.963	> 0.90	
TLI	.956	.955	> 0.90	
IFI	.964	.963	> 0.90	
RFI	.957	.954	> 0.90	
RMSEA	.046	.042	< 0.08	

Source: Author's Survey. NFI should be as low as 0.80 (Hooper et al., 2008). Note: x2/df is the ratio between Chi-square and degrees of freedom; GFI: Goodness of Fit Index; AGFI: Adjusted Goodness of Fit Index; CFI: Comparative Fit Index; NFI: Normed Fit Index; RMSEA: Root Mean Square Error of Approximation.

composite and discriminant validity of the constructs. Composite reliability (CR) of all the factors is greater than 0.7; on the other hand, average variance extracted (AVE) of all the constructs is greater than 0.5; maximum shared variance (MSV) and average shred variance (ASV) values are smaller than AVE values (Hair et al., 2010). Table 4 explains the correlation between various factors and square root of Average Variance Extracted for each construct. The findings shows that the square root of each factor's AVE is greater than its corresponding correlation coefficients with the other factors. Hence, discriminant validity has been confirmed. To avoid multicollinearity issue, correlations between all the constructs should be in the range of plus or minus one (Hair et al., 2010). Table 4 shows that all the constructs had a correlation less than or equal to 0.70; this implies no multicollinearity issue in the study. Indices fit criteria of measurement and structural model are shown in Table 5. All the values are above the accepted level and supports past findings. In conclusion, measurement and structural model demonstrated the model fit, reliability, convergent validity and discriminant validity.

We used Harman's single factor to check the Common Method Bias (CMB). All items were assessed using EFA (exploratory factor analysis) with unrotated principal components factor analysis. We have accustomed all the items around one factor, which found percentage of variance as 29.53, much below the recommended level of 50 percent (Yang et al., 2012). Hence, no CMB exists in the present study.

4. Results

4.1. Hypothesis testing

Path coefficients results of the structural model were measured using SEM (structural equation modelling) with AMOS (see Table 6). We calculated standardized regression weights and critical ratios of all the constructs to measure the significance on intention to use a mobile

Table 6
Hypothesis testing results of the Structural Model.

Hypothesis	IV	DV	Path Coefficients	t-value	P value	Supported
H1	PCOMP	PUSE	.190	4.135	.000	**YES**
H2	AWARE	PUSE	.592	12.864	.000	**YES**
H3	PUSE	INT	.162	2.883	.004	**YES**
H4	PCOS	INT	.067	1.235	.217	**NO**
H5	PTRU	INT	.121	2.223	.025	**YES**
H6	PCVA	INT	.383	6.683	.000	**YES**

Source: Author's Survey. Significance at ***P < 0.001, **P < 0.01.

wallet. We ran the bootstrapping method with 315 samples to measure the significance of each path coefficient by using replacement method. We also calculated the R^2 value for each endogenous variables in the structural model. R^2 value for perceived usefulness was 0.498, while R^2 value of merchant's intention to use a mobile wallet was 0.339, which is moderate for the current study.

Results explain that perceived compatibility and awareness have significant and positive influence on perceived usefulness of a mobile wallet with R^2 value 0.498; findings indicate that user's awareness has higher influence on perceived usefulness (β = 0.592, p = 0.000) than perceived compatibility (β = 0.190, p = 0.000). Benitez et al. (2018), in a similar study support our findings and confirm that perceived compatibility promotes usefulness of a service, which eventually influences behavioral intention to adopt a technology. There are similar previous studies available where perceived compatibility is found significant to influence perceived performance and usefulness of a service in the emerging market context (Van der Heijden, 2002; Karnouskos and Fokus, 2004; Schierz et al., 2010). Moreover, determinant awareness is used widely in previous studies to explore its influence on user's intention (Koukova et al., 2008; Hayashi, 2009; Gupta, 2018); these studies confirmed that high awareness level enhances the perceived image or usefulness of a system, and increases adoption of a technology. This agrees our hypotheses H1 and H2.

We also confirm that perceived usefulness and perceived trust have significant and direct influence on intention to use a mobile wallet technology. Results show that both the factors positively influence merchant's behavioral intention. This proves our hypotheses H3 (β = 0.162, p = 0.004) and H5 (β = 0.121, p = 0.025). However, we found perceived cost insignificant to intention to use. Hence, our hypothesis H4 is rejected (β = 0.067, p = 0.217). In addition, findings of the study indicate that perceived customer value addition has a positive and highest influence on merchant's intention to use. This confirms our hypothesis H6 (β = 0.383 p = 0.000). Mallat and Tuunainen (2008) found in a similar study on merchants that perceived usefulness, customer perceived value are the most significant factors to influence behavioral intention. There are similar studies available in the context of developing and developed economies, where factors such as usefulness, value addition, trust are found positive and significant to influence merchant's intention (Michael, 2006; Liébana Cabanillas et al., 2016; Xu and Du, 2018). However, in contrast to our findings, several past studies perceived cost as very important to merchant's adoption (Chong et al., 2010; Hayashi and Bradford, 2014); these studies confirmed that costs namely, installation cost, processing cost, training cost, play a major role in adoption of a technology by merchants. Overall, all the key factors except perceived cost have significant direct and indirect effects on merchant's intention to use a mobile wallet, with R^2 value 0.339 (see Fig. 3).

4.2. Perceived trust as a mediator

We used bootstrapping with 315 observations and 315 samples for bootstraps. Two steps were used in order to test the mediating effect suggested by Baron and Kenny (1986). In the first step, the conceptual model was investigated without using trust as a mediator; findings
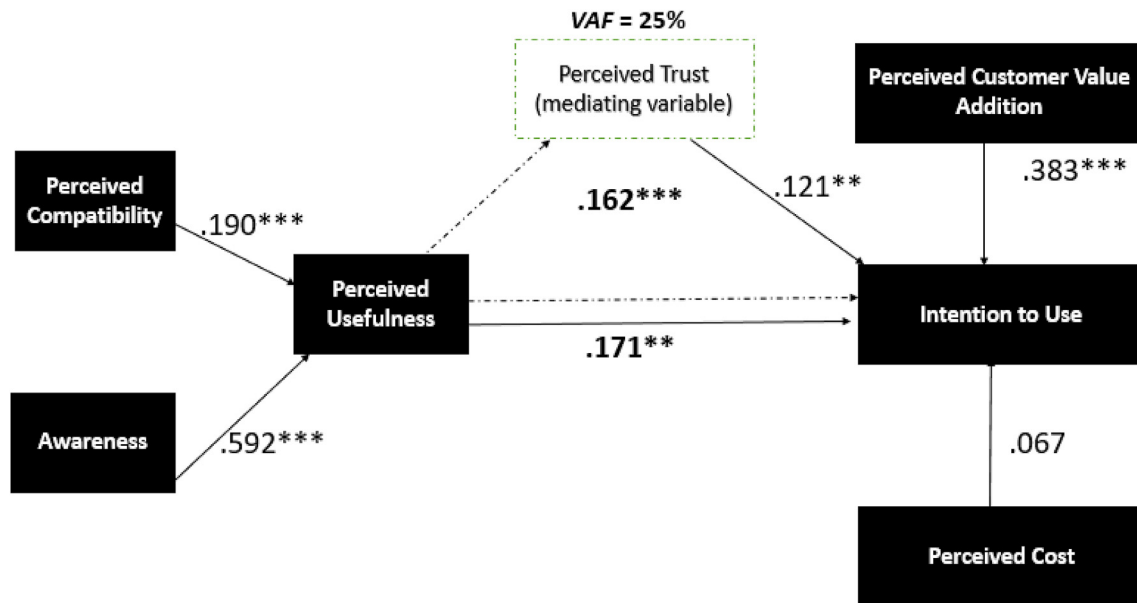
Fig. 3. Structural Model. Source: Author's Survey. Significance at ***P < 0.001, **P < 0.01. Weighted arrows denote direct effects and dotted arrows denote mediating effect of perceived trust.
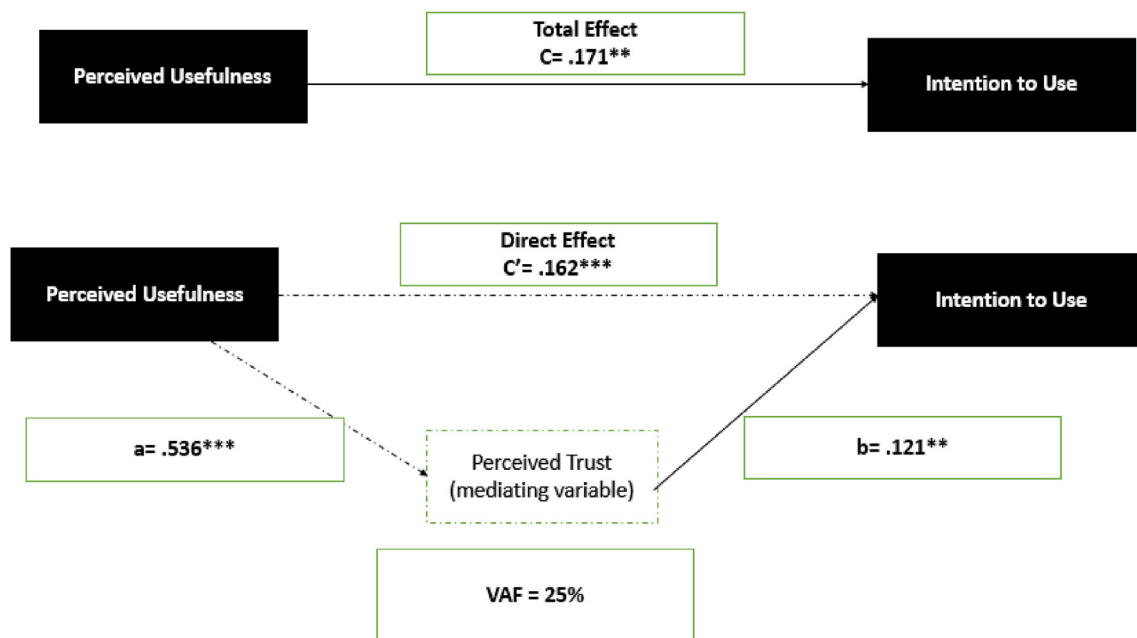

Fig. 4. Mediation effect, source: Author's survey. Significance at ***P < 0.001, **P < 0.01.

explain that the total direct effect c, perceived usefulness, on intention to use a mobile wallet was positive and significant (c= 0.171, p = 0.000). In the second step, the model was run with trust as a mediator; the indirect effect was estimated as the product of a and b and direct effect c', was calculated (c'= 0.162, p = 0.000). We estimated the two tailed significance of total direct and indirect effects of bootstrap samples which are significant at the 1% level (p < 0.01). Fig. 4 further explains the mediation effect of trust, with paths significance at p < 0.01, hence our hypothesis H7 is accepted. We also calculated variance accounted factor (VAF) as follows:

VAF = ab/(ab + c') = 25%.

VAF= 100 percent denotes full mediation. 25 percent explains moderate VAF level (Hair et al., 2010). Here we conclude that trust mediates the influence of perceived usefulness on intention to use a mobile

wallet by 25% variance. In a similar study, Hayashi and Bradford (2014), they suggested that majority of the merchants found trust as an important determinant to adopt a mobile payment service; and it affects user's intention due to various security and privacy issues associated with the service. Shaw (2014) supports our findings in a study that used trust as a mediator to influence intention to use a service in the context of consumers. We extend their literature by applying the mediation effect of trust in the context of merchants.

5. Discussion, Theoretical and managerial implications

5.1. Discussion

The most influencing variable in the model was perceived customer value addition with the highest effect on merchant's behavioral

intention. Our study supports the findings of Reichheld and Schefter (2000); they found that perceived customer value addition determines overall user's benefit that is received by the use of a technology (Hayashi, 2009; Hayashi, 2012a, 2012b). Merchants perceive that the adoption and success of a new technology such as mobile wallet is based on the value added services of a technology. These services can be measured on low processing cost, reward points and cashbacks, customer data control and other system related factors such as flexibility and operability (Dave, 2016). Indian government is coming up with several incentives and discounts programs to induce merchants to go digital; merchants are offered tax waiver of 15 percent on payment transactions worth INR 2000, and other discounts such as 0.5 percent to 10 percent on various transactions to pay bills and recharges (Mallat, 2007).

Varki and Mark (2001) explained that merchant measures performance and value of a technology by comparing the price paid for the technology, which effects merchant's inclination and intention to use that technology. Merchants offer mobile payment platforms to end users, while enhancing their shopping experience with perceived value added services (Hayashi and Bradford, 2014). Shopping experience becomes more convenient with mobile wallet services, as it helps in finding stores, best products, offering shopping list, deal of the day and other rewards/discounts while using payment services. Merchants believe that enhanced shopping experience with such value added services is a prime benefit of using any kind of mobile payment application and will certainly benefit brick and mortar merchants to remain competitive while adopting mobile payment applications (Hayashi, 2012a). Data shows that a large number of merchants have shifted their business to digital and online mode since it enhances their experience, reachability, sales turnover and most importantly, they are able to target larger base of consumers to achieve competitive edge (Singh et al., 2017).

The second most influencing factor in the study was perceived usefulness (PU). Various past studies have shown that perceived usefulness has a larger effect on intention to use a mobile payment service (Slade et al., 2013; Slade et al., 2014; Liébana-Cabanillas et al., 2014a, 2014b). Merchants use online system because it is convenient and useful to achieve a desired outcome. Merchants perceive mobile wallets faster, useful, high in performance and convenient while processing payments; this enhances productivity and turnover in the long term (Slade et al. 2013, 2014; Liébana Cabanillas et al., 2016). Our study confirmed that perceived usefulness is positively influenced by perceived compatibility and awareness of a technology; findings revealed that awareness has a higher influence on perceived usefulness than perceived compatibility. Fig. 1 confirms that product complexity and low awareness are important barriers to merchant's adoption to use a new technology; our findings suggested that merchants' education about product complexities and usefulness is crucial to promote digital transactions in India (Heydari and Bailey, 2016). In a similar study, Stepcic and Kabanda (2016) found a strong influence of awareness on perceived usefulness of a technology. They further confirmed that technology which is known and has high awareness and information, is perceived useful and influences merchant's perception significantly. In our study, perceived compatibility was also found very crucial to measure perceived usefulness of a mobile wallet. Various past studies have shown that compatibility measures the degree of consistency of the service offered by the technology, while enhancing usefulness of a system (Mallat and Tuunainen, 2008; Schierz et al., 2010; Yang et al., 2012; Heydari and Bailey, 2016). Kim et al. (2010a) confirmed the strong association between perceived compatibility and perceived usefulness, which ultimately influence merchant's behavior intention. Merchants perceive a technology useful if it is compatible and easy to use (Karnouskos and Fokus, 2004). Our study supports previous findings and confirms the significance of the factors perceived compatibility, awareness and perceived usefulness on merchant's behavioral intention to use a mobile wallet (see Fig. 1).

In the review of our results, we found a strong influence of trust on merchant's intention to use. Trust is measured on the confidence an individual shows on the usefulness and security of a technology (Shaw, 2014). This implies that merchants prefer to use a mobile wallet application when they assured that mobile wallet is trustworthy, useful, and their payments and transactions will be processed without any errors and frauds (Hayashi and Bradford, 2014; Liébana-Cabanillas et al., 2018; Verkijika, 2018). We also found the mediation effect of trust on perceived usefulness of a mobile wallet; results have shown that perceived usefulness has a small and significant effect on intention to use and it was partially mediated by trust. This implies that perceived usefulness results into higher user's intention; however, those who have low trust in a technology, may perceive mobile wallet less useful and therefore have less intention to use (Shaw, 2014; Verkijika, 2018). Hayashi and Bradford (2014) confirmed that merchants perceived trust as a key influencing factor in mobile wallet adoption; results supported our findings and shared that majority of merchants believe that user holds low trust due to security and privacy issues of a mobile wallet application and this affects their business processes and service quality.

5.2. Theoretical implications

The current study aims to investigate factors influencing merchant's intention to use mobile wallet services. There are large number of past studies available on technology adoption that measure user behavioral intention (Abhishek and Hemchand, 2016; Madan and Yadav, 2018); however, very limited work is done to understand merchant's behavioral intention to use a mobile wallet (Mallat and Tuunainen, 2008; Hayashi and Bradford, 2014; Liébana-Cabanillas et al., 2018). Our first theoretical contribution is that this research is the first attempt in an Indian context that measures merchant's intention to use a new technology such as mobile wallet. Role of the merchant is very crucial for the success of mobile wallet applications. Consumers use new technologies such as UPI, NFC, QR code, cloud, mobile wallets in collaboration with merchants; merchants believe that these mobile payment applications are useful and beneficial (Hayashi and Bradford, 2014; Mittal, 2018).

Another contribution is the extension of TAM model in the context of user acceptance of a mobile wallet. We have used perceived usefulness, perceived trust, perceived cost and few innovative influencing variables such as perceived compatibility, awareness and perceived customer value additions, to measure merchant's behavioral intention (Shin, 2009; Riquelme and Rios, 2010). This study focuses on a detailed analysis of these variables to test merchant's perception because, unlike TAM variable, there is limited research available on perceived compatibility, awareness and perceived customer value additions, and on merchant's intention to use a mobile wallet. Except perceived cost, all the variables were found significant on intention to use.

This is a pioneer study that considered the mediating effect of trust on the impact of perceived usefulness on intention to use a mobile wallet. Merchants are concerned with the performance, usefulness and security threats of a technology and have not developed complete trust on mobile payment providers, which results in low intention and adoption of a technology (Hayashi and Bradford, 2014; Stepcic and Kabanda, 2016). They believe that misuse of customer data may create serious issues affecting their business and sales; hence, they would prefer less use of technology. We incorporated perceived usefulness, trust and intention into the conceptual model, which has not been studied together in the same framework (Xin et al., 2013). With this combination, we derive the mediation effect of trust on the influence of perceived usefulness on intention to use. This confirms the effectiveness of trust as a key influencing variable in the Indian context.

5.3. Managerial implications

From a managerial point of view, this study reviews the perception

of merchants on mobile wallet applications and intention to adopt in their business model. This article focuses on the key dimensions to be considered to design flexible and compatible mobile wallet applications. The study reveals a few implications to payment providers such as Paytm, Phonepe, Tez, who are targeting merchants to initiate payment transactions; merchants are still not comfortable with electronic wallet system due to the habit of using cash and are worried about technology usage, product knowledge, lack of perceived value and awareness about the system. The results of the study can assist payment firms by identifying factors such as perceived customer value addition, perceived usefulness, awareness, perceived compatibility, and confirm them as some influencing factors to measure merchant's adoption to a new technology.

In the context of mobile payment technologies, the present study found customer value addition very important in influencing merchant's behavioral intention (Guo and Bouwman, 2016). The study suggests that mobile wallet services are gaining popularity among merchants because it provides several value added services under one application and enhances online payment experience (Roy et al., 2017). The study further recommends that manufacturers and mobile wallet providers must promote and create awareness about the value added services of a payment device. Companies must design a campaign to highlight the value addition features of the mobile wallet devices and should target merchants and retailers.

This study also reviews the significant effect of perceived usefulness on merchant behavioral intention; this result will help app developers to promote user-friendly processes and benefits of the system among merchants. Moreover, the study reflects the importance of awareness and perceived compatibility on perceived usefulness of the service. This means that merchants prefer to use the system that is compatible with other devices and is flexible to use. Payment providers must target both large, small and medium enterprises (SMEs) to increase awareness and reach of mobile wallet services by underlining the main benefits of the service namely, compatibility, usefulness, easiness, fast process and stress free transactions; this may induce offline merchants to use mobile wallet services.

In terms of perceived trust, the study determined the significant direct and mediating effect of perceived trust on merchant's behavioral intention. The central role of trust is found in the study, specifying how trust mediates the effect of perceived usefulness on merchant's intention to use. Practitioners must assess perceived usefulness and effectiveness of the system and how much these features effects merchant's trust. In this regard, manufacturers and payment providers involved in the development of the wallet services should keep risk and trust issues as top priority while offering a service. They should promote awareness that mobile wallet systems are secure and safe to use, which will make the service more trustworthy to merchants (Kim et al., 2010a, 2010b). Mobile payment providers must review existing standards and procedures of mobile wallet applications and provide useful solutions for related security and trust issues (Hayashi and Bradford, 2014). This could be achieved by payment industry, network providers but may require government interventions (Hayashi, 2012c).

6. Conclusion, limitations and future scope

6.1. Conclusion

New technologies coming up in a mobile payment environment creates many opportunities for merchants and consumers to use these new technologies, which are considered more beneficial than traditional and near field communication (NFC) channels. Thus, merchants are found very active in implementing and offering services of mobile wallet applications to their consumers to gain the competitive edge (Hayashi, 2012c). Retailers use mobile wallet system to collect consumer's information, feedback of products, and customer relationship management. They also use the application to integrate various

consumer loyalty programs and offers in the payment process, to increase customer's mobility and inclination to use technology-based services. The current study aims to identify and analyze factors influencing merchant's intention and adoption of a mobile wallet. We created an empirical model of factors derived from literature and further explored them in relation to technology adoption by merchants. We used structural equation modelling to perform factor analysis and to understand the linear relationships between different factors which are: perceived usefulness, perceived trust, perceived cost, perceived compatibility, awareness and perceived customer value additions, on merchant's behavioral intention. In addition, we also tested the mediation effect of trust, using bootstrapping methodology suggested by Baron and Kenny (1986). Our study can be considered distinctive owing to evaluation of merchant's intention, as there is limited research available on merchants (Mallat and Tuunainen, 2008; Hayashi, 2012a; Liébana-Cabanillas et al., 2018). In addition, we also included a few innovative factors such as perceived compatibility, awareness and perceived customer value additions, unlikely TAM variables to measure behavioral intention to use mobile payment services (Shin, 2009; Riquelme and Rios, 2010; Oliveira et al., 2016; Ramos de Luna et al., 2019). Findings revealed the efficiency of most of the selected constructs except perceived cost, and supported previous literature on mobile payment or wallet technology acceptance. We found perceived customer value addition has the highest and positive influence, followed by perceived usefulness, on merchant's perception to use a mobile wallet (Varki and Mark, 2001). In the current study, we also confirmed the mediation effect of perceived trust (Shaw, 2014) on perceived usefulness and finally, on merchant's intention (Alalwan et al., 2017; Xu and Du, 2018; Ramos de Luna et al., 2019). This can influence acceptance or rejection of a wallet service by the user. This paper recommends mobile payment providers to stress upon the application design, and offer compatible and useful technology to gain user's trust and enhance perception.

6.2. Limitations and future scope

The study holds a few limitations. First, we used convenience sampling of merchants of Delhi/NCR (National Capital Region) in India. The results are, therefore, not generalized to all the merchant population; hence future study may consider this issue and examine merchants based on different age groups and income groups. Moreover, the study can be tested across merchants of different countries and a broader general population, with variance of demographics and other business legislations.

Given the importance of customer value addition, future studies may explore the antecedents of customer value addition, which eventually leads to loyalty and long term relationship with the merchants. Second, merchants' business details were not collected during the survey and current study, and therefore, did not review the use and suitability of mobile wallet services to different business lines and products. This provides an opportunity to study merchants' perception and usefulness of a mobile wallet service for different business and revenue models. Moreover, the present study includes both psychological factors and technical factors, which are related to behavioral intention and adoption of mobile wallet services in the context of Indian merchants. We suggest to include a few additional variables in future studies to understand merchant's perception more carefully in relation to such new modern technologies. We have used a few very new and distinctive factors such as perceived compatibility, awareness, perceived customer value addition; in this sense, we propose to review a some more important attributes of merchant's acceptance, i.e., customer shopping experience, perceived security, perceived risk, habits, motives, word of mouth, innovativeness, customer data control and role of fragmented markets (Hayashi and Bradford, 2014; Alalwan et al., 2017). These factors are often found significant on merchant's perception and are cited as a benefit, concern or both, to use a new technology.

Next, our research suggests to investigate the influence of mobile wallet services by comparing it with other services used by merchants such as QR or biometrics. As merchants have a choice of adoption of more than one mode of mobile payment, future study may evaluate the perceptions of merchants towards various apps and their providers. After the implementation of GST and other complicated VAT/GST liabilities for merchants and other stakeholders in business, merchants become skeptical to use digital transactions (Heydari and Bailey, 2016). We suggest exploring the awareness level of merchants about GST, VAT, service tax liability and the related benefits associated with digital transactions adoption by merchants.

Our study confirmed the mediating effect of perceived trust on intention to use; findings revealed that merchants are concerned with trust issues and desire to build trustworthy application for users. Future study may evaluate trust and risk aspects of a mobile wallet in detail. Kapoor et al. (2015) recommended different types of risks associated with technology. Future research may identify various types of risk such as personal, performance risk and psychological risk, related to technology usage.

Finally, we suggest to future academicians and researchers to take a step further and include post adoption behavior of merchants by including merchant's continued intention and recommendations, as constructs to explain complete adoption and usage of mobile wallet services in an Indian context. We may also test the result by including some demographic characteristics namely, gender, age, and income, to understand their direct and moderating effect on merchant's behavioral intention.

Appendix A. Constructs measurement

Constructs	Items	References
Perceived Compatibility (PCOMP)	Mobile wallet is compatible and appropriate to my work. Mobile wallet is suitable to integrate with banking services. Mobile wallets is fit to customer lifestyle and needs. Mobile wallet is helpful and appropriate to collect customer's personal information	Adapted from Hayashi and Bradford (2014)
Perceived Cost (PCOS)	Mobile wallets installations cost is not very high. Mobile wallets reduce the cost of processing payments of my consumers. Mobile wallets is easy to connect. Hence, reduce my staff training costs. Mobile wallet is cheap to use to my consumers.	Adapted from Hayashi and Bradford (2014)
Awareness (Aware)	Mobile wallets awareness is high among the consumers. Mobile wallets awareness is high among the retailers and network providers. My consumers are aware about the use of mobile wallet effectively. My consumers are aware about the privacy aspects of mobile wallet services.	Adapted from Hayashi and Bradford (2014)
Perceived Trust (PTRU)	I trust that mobile wallet is safe and has reliable features. I trust mobile wallet apps and transactions done by mobile wallet. I trust mobile wallets keep me and my customer financial information secure. I trust mobile wallets keeps me and my customer personal information safe	Adapted from Shaw (2014)
Perceived usefulness (PUSE)	Mobile wallet is very useful to me and my consumers, Mobile wallet is accessible anywhere and convenient to use. Mobile wallet increases my work efficacy. Mobile wallet is suitable for customer payments quickly and feasibly,	Adapted from Venkatesh et al. (2012)
Perceived Customer Value Addition (P-CVA)	Mobile wallet helps me to improve my customer relationship based on the information collected. Mobile wallet allows me to offer several benefits to my consumer (rewards/cashbacks/discounts etc.), Mobile wallet is helpful to solve my customer's queries, Mobile wallet makes shopping experience pleasant for my customer. Mobile wallet adds value to me and my consumer,	Adapted from Hayashi and Bradford (2014)
Intention to Use (INT)	I intend to increase my use of Mobile wallet in the future. I intend to use the Mobile wallet in the future. I will always try to use Mobile wallet. I plan to use MOBILE WALLET frequently.	Adapted from Venkatesh et al. (2012)

Standardized Residual Covariances (Group number 1 - Default model).
Total Effects (Group number 1 - Default model).
Standardized Total Effects (Group number 1 - Default model).
Direct Effects (Group number 1 - Default model).
Standardized Direct Effects (Group number 1 - Default model).
Indirect Effects (Group number 1 - Default model).

References

Abhishek, Hemchand, S., 2016. Adoption of sensor-based communication for mobile marketing in India. Journal of Indian Business Research 8 (1), 65–76.

Alalwan, A.A., Dwivedi, Y.K., Rana, N., 2017. Factors influencing adoption of mobile banking by Jordanian bank customers: extending UTAUT2 with trust. Int. J. Inf. Manag. 37 (3), 99–110.

Barbuta, I., Dobrean, S., Gaza, M., Mihaila, M., Screpnic, A., 2012. Mobile Payments Guide 2012: Insights in the Worldwide Mobile Financial Service Market. , Accessed date: 6 November 2018.

Baron, R.M., Kenny, D.A., 1986. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. J. Personal. Soc. Psychol. 51 (6), 1173–1182.

Bartlett, J., Kotrlik, J., Higgins, C., 2010. Organizational research: determining appropriate sample size in survey research. Inf. Technol. Learn. Perform. J. 19 (1), 43–50.

Bartlett, M.S., 1954. A note on multiplying factors for various chi-squared approximations. J. R. Stat. Soc. Ser. B 16, 296–298.

BCG analysis, 2016. Digital Payments 2020 the Making of a \$500 Billion Ecosystem in India. Google The Boston Consulting group, Delhi , Accessed date: 6 December 2018.

Benitez, J., Chen, Y., Teo, T.S.H.A., 2018. AjamiehEvolution of the impact of e business technology on operational competence and firm profitability: a panel data investigation. Inf. Manag. 55, 120–130.

Bentler, P.M., Chou, C.P., 1987. Practical issues in structural modeling. Sociol. Methods Res. 16 (1), 78–117.

Brown, James R., Dant, Rajiv P., 2008a. Scientific method and retailing research: a retrospective. J. Retail. 84 (April), 1–13.

Brown, James R., Dant, Rajiv P., 2008b. On what makes a significant contribution to the retailing literature. J. Retail. 84 (June), 131–135.

Carlos, A., Taylor, V., 2008. Merchant Acceptance, Costs, and Perceptions of Retail Payments: A Canadian Survey. Discus¬sion Paper. Bank of Canada, pp. 2008–2012.

Chen, C.F., Chen, F.S., 2010. Experience quality, perceived value, satisfaction and

behavioral intentions for heritage tourists. Tour. Manag. 31, 29–35.

Chong, A.Y.L., Darmawan, N., Ooi, K.B., Lin, B., 2010. Adoption of 3G services among Malaysian consumers: an empirical analysis. Int. J. Mob. Commun. 8 (2), 129–149.

Constantiou, I.D., Damsgaard, J., Knutsen, L., 2006. Exploring perceptions and use of mobile services: user differences in an advancing market. Int. J. Mob. Commun. 4 (3), 231–247.

Dahlberg, T., Guo, J., Ondrus, J., 2015. A critical review of mobile payment research. Electron. Commer. Res. Appl. 14, 265–284.

Dahlberg, T., Mallat, N., Ondrus, J., Zmijewska, A., 2008. Past, present and future of mobile payments research: {A} literature review. Electron. Commer. Res. Appl. 7 (2), 165–181.

Dave, R., 2016. Here Are the Advantages of Cashless Payments and the Pitfalls You Should Beware of. The economic times wealth Retrieved from. https://economictimes.indiatimes.com/wealth/spend/going-cashless-is-it-good-for-you/articleshow/55908649.cms, Accessed date: 6 November 2018.

Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. Management Information System Quarterly 13 (3), 319–340.

Duarte, P., Silva, S.C., Ferreira, M.B., 2018. How convenient is it? Delivering online shopping convenience to enhance customer satisfaction and encourage e-WOM. J. Retail. Consum. Serv. 44, 161–169.

Dwivedi, Y.K., Rana, N.P., Janssen, M., Lal, B., Williams, M.D., Clement, M., 2017. An empirical validation of a unified model of electronic government adoption (UMEGA). Gov. Inf. Q. 34 (2), 211–230.

Ehrenhard, M., Wijnhoven, F., Broek, T.D., Stagno, M.Z., 2017. Unlocking how start-ups create business value with mobile applications: development of an App-enabled Business Innovation Cycle. Technol. Forecast. Soc. Chang. 115, 26–36.

Grewal, D., Michael, L., Kumar, V., 2009. Customer experience management in retailing: an organizing framework. J. Retail. 85, 1–14.

Grewal, Dhruv, Levy, Michael, 2007. Passing the baton journal of retailing 2001–2007. J. Retail. 83 (December), 371–373.

Guo, J., Bouwman, H., 2016. An ecosystem view on third party mobile payment providers: a case study of Alipay wallet. Info 18 (5), 56–78.

Gupta, K., 2018. Mobile Wallet Transactions Hit Record ₹14,170 Crore in May. https://www.livemint.com/Industry/T21bhXCN6dTi3MQPkyGNWO/Mobile-wallet-transactions-hit-record-14170-crore-in-May.html, Accessed date: 6 July 2018.

Hair, J., Black, W., Babin, B., Anderson, R., 2010. Multivariate Data Analysis, seventh ed. Prentice-Hall, Inc, New Jersey.

Hayashi, F., 2009. Do U.S. Consumers really benefit from payment card rewards? Federal Reserve Bank of Kansas City, *Economic Review* 94 (1), 37–63.

Hayashi, F., 2012a. Mobile payments: what's in it for consumers? Federal Reserve Bank of Kansas City, *Economic Review* 97 (1), 35–66.

Hayashi, F., 2012b. Discount and Surcharges: Implications for Consumer Payment Choice. Federal Reserve Bank of Kansas City, Payments System Research Briefing (June).

Hayashi, F., 2012c. The new debit card regulations: initial effects on networks and banks. Federal Reserve Bank of Kansas City, *Economic Review* 97 (4), 79–114.

Hayashi, F., Bradford, T., 2014. Mobile Payments:Merchants' Perspectives. FEDERAL RESERVE BANK OF KANSAS CITY Retrieved from. http://www.kansascityfed.org, Accessed date: 6 November 2018.

Heydari, S., Bailey, A., 2016. Managing Indirect Taxes in the Digital Age. Asia Pacific: EY. https://www.ey.com/gl/en/services/tax/vat–gst-and-other-sales-taxes/ey-managing-indirect-taxes-in-the-digital-age-ch2-ecommerce-todays-indirect-tax-challenges, Accessed date: 6 November 2018.

Hooper, D., Coughlan, J., Mullen, M.R., 2008. Structural equation modelling: guidelines for determining model fit. Electron. J. Bus. Res. Methods 6, 53–60.

Hu, X., Li, W., Hu, Q., 2008. Are mobile payment and banking the killer apps for mobile commerce? In: Proceedings of the 41st Hawaii International Conference on System Sciences, 7-10 January, Waikoloa, Big Island, HI, USA. Washington.

Kapoor, K.K., Dwivedi, Y.K., Williams, M.D., 2015. Examining the role of three sets of innovation attributes for determining adoption of the interbank mobile payment service. Inf. Syst. Front. 17 (5), 1039–1056.

Karnouskos, S., Fokus, F., 2004. Mobile Payment: a journey through existing procedures and standardization initiatives. IEEE Communications Surveys and Tutorials 6 (4), 44–66.

Kim, C., Mirusmonov, M., Lee, I., 2010a. An empirical examination of factors influencing the intention to use mobile payment. Comput. Hum. Behav. 26 (3), 310–322.

Kim, C., Tao, W., Shin, N., Kim, K.-S., 2010b. An empirical study of customers' perceptions of security and trust in e-payment systems. Electron. Commer. Res. Appl. 9, 84–95.

Koukova, N.T., Kannan, P.K., Ratchford, B.T., 2008. Product form bundling: implications for marketing digital products. J. Retail. 84 (2), 181–194.

Kuo, Y., Yen, S., 2009. Towards an understanding of the behavioral intention to use 3G mobile value-added services. Comput. Hum. Behav. 25 (1), 103–110.

Lee, I., Shin, Y.J., 2018. Fintech: ecosystem, business models,investment decisions, and challenges. Bus. Horiz. 61 (1), 35–46.

Li, Y., 2018. The strategic decision on mobile payment: a study on Merchants' adoption. In: Proceedings of the Conference Adoption and Diffusion of Information Technology (SIGADIT), AMCIS 2018, USA.

Liébana Cabanillas, F., Slade, E., Dwivedi, Y., 2016. Time for a different perspective: a preliminary investigation of barriers of merchants' adoption of mobile payments. In: Proceedings of the 22nd Americas Conference on Information Systems, San Diego.

Liébana-Cabanillas, F.L., Marinkovic, V., Luna, I.R., Kalinic, Z., 2018. Predicting the determinants of mobile payment acceptance: a hybrid SEM-neural network approach. Technol. Forecast. Soc. Chang. 129, 117–130.

Liébana-Cabanillas, F., Leiva, F.M., Fernández, J.S., 2017. Examining Merchants' Refusal to Adopt Mobile Payment Systems in Spain. Published in Book in Smartphones from an Applied Research Perspective. IntechOpenhttps://doi.org/10.5772/intechopen.

70284.

Liébana-Cabanillas, F., Marinković, V., Kalinić, Z., 2017b. A SEM-neural network approach for predicting antecedents of m-commerce acceptance. Int. J. Inf. Manag. 37, 14–24.

Liébana-Cabanillas, F., Sanchez-Fernández, J., Munoz-Leiva, F., 2014b. Antecedents of the adoption of the new mobile payment systems: the moderating effect of age. Comput. Hum. Behav. 35, 464–478.

Liébana-Cabanillas, F., Sánchez-Fernández, J., Muñoz-Leiva, F., 2014a. The moderating effect of experience in the adoption of mobile payment tools in Virtual Social Networks: the m-Payment Acceptance Model in Virtual Social Networks (MPAM-VSN). Int. J. Inf. Manag. 34 (2), 151–166.

Madan, K., Yadav, R., 2016. Behavioural intention to adopt mobile wallet: a developing country perspective. Journal of Indian Business Research 8 (3), 227–244.

Madan, K., Yadav, R., 2018. Understanding and predicting antecedents of mobile shopping adoption: a developing country perspective. Asia Pac. J. Mark. Logist. 1, 139–162.

Mallat, N., Tuunainen, V.K., 2008. Exploring merchant Adop¬tion of mobile payment systems: an empirical study. e Serv. J. 6 (2), 24–57.

Mallat, N., 2007. Exploring consumer adoption of mobile payments e a qualitative study. J. Strateg. Inf. Syst. 16, 413–432.

Markendahl, J., Smith, M., Andersson, P., 2010. Analysis of roles and position of mobile network operators in mobile payment infrastructure. In: 21st European Regional ITS Conference, Copenhagen 2010: Telecommunications at New Crossroads - Changing Value Configurations, User Roles, and Regulation 31. International Telecommunications Society (ITS).

Michael, L., 2006. Customer acquisition promotions and customer asset value. J. Mark. Res. 43 (May), 195–203.

Mittal, T., 2018. 7 Major Leading Apps and Platforms Helping Money Go Mobile. Retrieved from YOURSTORY: https://yourstory.com/2018/02/major-mobile-payment-apps-around-the-world, Accessed date: 6 July 2018.

Morgan, R., Hunt, S., 1994. The commitment-trust theory of relationship marketing. J. Market. 58 (3), 20–38. https://doi.org/10.2307/1252308.

Możdżyński, D., 2018. Acceptance of payment systems from the perspective of merchants. Inf. Syst. Manag. 7.

Natarajan, T., Balasubramanian, S.A., Kasilingam, D.L., 2017. Understanding the intention to use mobile shopping applications and its influence on price sensitivity. J. Retail. Consum. Serv. 37, 8–22.

Nunnally, J.C., 1978. Psychometric Theory, second ed. McGraw-Hill, New York, NY.

Oliveira, T., Thomas, M., Baptista, G., Campos, F., 2016. Mobile payment: understanding the determinants of customer adoption and intention to recommend the technology. Comput. Hum. Behav. 61, 404–414.

Ondrus, J., Lyytinen, K., 2011. Mobile payments market: towards another clash of the titans. In: Proceedings of the Tenth International Conference of Mobile Business (ICMB).

Ondrus, J., Pigneur, Y., 2006. A multi-stakeholder multi-criteria assessment framework of mobile payments: an illustration with the Swiss public transportation industry. In: Paper Presented at the 39th Hawaii International Conference on System Sciences, Hawaii, USA, pp. 4–7.

Ondrus, J., Lyytinen, K., Pigneur, Y., 2009. Why mobile payments fail? towards a dynamic and multi-perspective explanation. In: Proceedings of the 42nd Hawaii International Conference on System Sciences, Waikoloa, Hawaii.

Petrova, K., Wang, B., 2013. Retailer adoption of mobile payment: a qualitative study. J. Electron. Commer. Org. 11 (4), 70–89.

Plouffe, C.R., Hulland, J.S., Vandenbosch, M., 2001. Research report: richness versus parsimony in modeling technology adoption decisions—understanding merchant adoption of a smart card-based payment system. Inf. Syst. Res. 12 (2), 208–222.

Ramos de Luna, I.R., Liébana-Cabanillas, F., Muñoz-Leiva, F., Sánchez-Fernández, J., 2019. The Adoption of Mobile Payment Systems Depending on the Technology Applied. Technological Forecasting & Social Change (in press).

Reichheld, F.F., Schefter, P., 2000. E-Loyalty. Harv. Bus. Rev. 78 (4), 105–113.

Riquelme, H.E., Rios, R.E., 2010. The moderating effect of gender in the adoption of mobile banking. Int. J. Bank Mark. 28 (5), 328–341.

Roy, S.K., BalajiDr, M.S., Sadeque, S., Nguyen, B., Melewar, T.C., 2017. Constituents and consequences of smart customer experience in retailing. Technol. Forecast. Soc. Chang. 124, 257–270.

Schierz, P.G., Schilke, O., Wirtz, B.W., 2010. Understanding consumer acceptance of mobile payment services: an empirical analysis. Electron. Commer. Res. Appl. 9 (3), 209–216.

Shaw, N., 2014. The mediating influence of trust in the adoption of the mobile wallet. J. Retail. Consum. Serv. 21, 449–459.

Shin, D.H., 2009. Towards an understanding of the consumer acceptance of mobile wallet. Comput. Hum. Behav. 25, 1343–1354.

Singh, A., 2016. The Future of Mobile Wallets in India. The Hindu Business Line Retrieved from. http://www.thehindubusinessline.com/catalyst/the-future-of-mobile-wallets-in-india/article8332085.ece, Accessed date: 1 March 2018.

Singh, N., Srivastava, S., Sinha, N., 2017. Consumer preference and satisfaction of M-wallets: a study on North Indian consumers. Int. J. Bank Mark. 35 (6), 944–965.

Singh, S., Srivastava, S., 2018. Moderating effect of product type on online shopping behaviour and purchase intention: an Indian perspective. Cogent Arts & Humanities 5, 1–27.

Slade, E.L., Williams, M.D., Dwivedi, Y.K., 2013. Mobile payment adoption: classification and review of the extant literature. Mark. Rev. 13 (2), 167–190.

Slade, E.L., Williams, M.D., Dwivedi, Y.K., 2014. Devising a research model to examine adoption of mobile payments: an extension of UTAUT2. Mark. Rev. 14 (3), 310–335.

Sorensen, E., 2018. Different Types of Mobile Payments Explained. Retrieved from mobile transaction: https://www.mobiletransaction.org/different-types-of-mobile-

payments, Accessed date: 11 January 2018.

Stepcic, C., Kabanda, S., 2016. The institutionalisation of mobile payment technologies in Kenya: retailers' perspective. In: Twenty-Fourth European Conference on Information Systems (ECIS), Istanbul, Turkey, , Accessed date: 21 November 2018.

Sumeet, G., Haejung, Y., Heng, X., Hee-Woong, K., 2017. An exploratory study on mobile banking adoption in Indian metropolitan and urban areas: a scenario-based experiment. Inf. Technol. Dev. 23 (1), 127–152.

Van der Heijden, H., 2002. Factors affecting the successful introduction of mobile payment systems. In: Proceedings of the 15th Bled Electronic Commerce Conference, Bled, Slovenia.

Varki, S., Mark, C., 2001. The role of price perceptions in an integrated model of behavioral intentions. J. Serv. Res. 3 (3), 232–240.

Venkatesh, V., Thong, J., Xu, X., 2012. Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. MIS Q. 36 (1), 157–178.

Verkijika, S.F., 2018. Factors influencing the adoption of mobile commerce applications in Cameroon. Telematics. Inf. 35 (6), 1665–1674.

Xin, H., Techatassanasoontorn, A.A., Tan, F.B., 2013. Exploring the influence of trust on mobile payment adoption. PACIS 2013 Proceedings 143.

Xu, F., Du, J.T., 2018. Factors influencing users' satisfaction and loyalty to digital libraries in Chinese universities. Comput. Hum. Behav. 83, 64–72.

Yang, S., Lu, Y., Gupta, S., Cao, Y., Zhang, R., 2012. Mobile payment services adoption across time: an empirical study of the effects of behavioral beliefs, social influences,

and personal traits. Comput. Hum. Behav. 28 (1), 129–142.

Youris, A.U.A., Kauffman, R.J., 2008. The Economics of mobile payments: understanding stakeholder issues for an emerging financial technology. Electron. Commer. Res. Appl. 7 (2), 141–164.

Prof. Nidhi Singh has an experience of more than 10 years in teaching and corporate. She is an active research scholar enrolled under IP University, Delhi. She has qualified UGC Net also. She has presented many papers in various Seminars & Conferences including IIMR, IICA, NLSIU etc and published papers in journals of National & International Repute like International Journal of Information Management, International Journal of Bank Marketing, Decision-Springer publication, Management and Labour Studies -Sage Publication, International Journal of Sustainable Strategic Management -Inderscience publication, FIIM, SERD, GSCCR etc.

Prof. Neena Sinha, is a Professor in University School of Management Studies, GGSIP University. She has been actively engaged in teaching and research. In 1990-91 she was associated with Research Institute for Economics and Business Administration, Kobe University Japan. Prior to joining GGS IP University Delhi, she worked as a faculty at Birla Institute of Technology and Science (BITS) Pilani. She has published over fifty research papers in management journals and proceedings of National and International conferences.