



A Study on Consumer Adoption of Mobile Wallet

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Abstract

This paper is an attempt to understand the factors that affect consumer adoption of mobile wallet as an alternative transaction method. For this, a survey of 315 respondents was made. The result shows that Personal Innovativeness, Perceived Ease of Use, Perceived Usefulness and Variety of Services are important factors in deciding consumer adoption of mobile wallet. The findings from this research work will be good for mobile wallet service providers, as well and for financial institutions for developing a suitable framework for consumers to adopt mobile wallet service.

Keywords: Mobile wallet, Digital payments, Technology innovation

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1. INTRODUCTION

Mobile payments or mobile wallet bring together payment system, mobile devices and services to enable users to initiate, authorize, and complete financial transaction over mobile network or wireless communication technology (Chandra, 2010; Lu, 2011). India is considered to be the fastest growing smartphone market in Asia Pacific (Livemint, 2014). With the introduction of Digital India project to transform the people of India to use the government services by integrating economy using internet and mobile phones as the backbone along with the demonetization exercise carried out by the government has increased the use of mobile devices and transactions through mobile devices. It is stated in a report by IAMAI- IMRB that the internet user's number will increase to 450 million by June. It states that Urban India has close to 60% of penetration whereas Rural India has only a penetration of 17%. That is out of an estimated 444 million population in Urban India, 269 million people are using internet which reflects to the level of saturation when compared to Rural India which is the bottom of the pyramid has only around 163 million users from an estimated population of 906 million. The report also states that 48% of Rural India's internet users are daily internet users and 83% use internet once in a month as estimated. It is stated in the report that around 92% of rural users and 77% of urban users access the internet through mobile as the primary device.

Prior to the demonetization exercise, the number of users for this mobile wallet service were low even after having innumerable benefits for mobile wallet technology. The basic problem lies in the attitudes and intentions of the customers at the bottom of the pyramid whose adoption of mobile wallets would be capable of providing the required level of scale and profitability to this new technology (Shen, 2015). Since demonetization exercise the number of users is increasing and there is a change in customer behavior. Whether this change in attitude towards the usage of mobile wallet is temporary or permanent need to be seen.

2. LITERATURE REVIEW

The theoretical foundation of adoption of technology along with banking and payment were examined, with focus given on adoption of mobile technology, mobile commerce, mobile payments and wallet adoption. There is a fair amount of study carried out in developed countries to understand the factors that affect the consumer adoption of mobile wallet. Several theoretical frameworks to understand the adoption intentions for various information technologies and information systems have been developed. Few notable among them are the theory of reasoned action (Fishbein and Ajzen, 1975), the technology acceptance model (TAM) (Davis, 1989), the technology-organization and environment framework (Tornatzky and Fleischer, 1990), the theory of planned behavior (Ajzen, 1991), the diffusion of innovations theory (Roger, 1995) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). These theories have been based on behavioral science and individual psychology. Researches have been conducted in the area of mobile wallet and the theoretical framework foundation that is used TAM (Slade et al., 2015). A classical TAM consists of perceived usefulness, perceived ease of use, attitude to understand the adoption behavior.

The adoption and wide spread of innovation in ICT has been researched using holistic model (Lin, 2003), structural models which use quantitative technique such as the theory of reasoned action (TRA), TAM, the extended TAM, as well as using UTAUT (Venkatesh et al., 2003). A

holistic insights on the process of adoption in technological contexts were given by TRA which was developed in the year 1970s (Fishbein and Ajzen, 1974), such as the internet (Hoffman and Novak, 1996; Pedersen and Nysveen, 2002; Taylor and Todd, 1995). Davis (1986) included an extension to TRA into the TAM, in which the acceptance of technology and behaviors is explained. Davis theorized that the attitude towards personal computer adoption is dependent on perceived usefulness and perceived ease of use (PEOU). TAM key purpose was to analyze how internal beliefs, attitudes and intentions were affected by external factors (Davis et al., 1989).

Venkatesh et al. (2000) excluded attitude and added two essential variables like social influence and cognitive instrumental processes which was an essential factor to understand the adoption intentions while extending the original TAM model (Wu et al., 2008). Later TAM model was criticized for not considering the individual characteristics and, thus, accepting or rejecting technology on the basis of that (Agarwal and Prasad, 1999; McMaster and Wastell, 2005; Slade et al., 2015). Venkatesh et al. (2003) later researched on factors affecting the integration of new technology innovations to consumers. This helped him in forming a new model called the Unified Theory of Acceptance and Use of Technology (UTAUT) and suggested that the actual use of information technology comes from the intention to use information technology which comes from the individual reaction.

Individual psychology and behavioral sciences plays a very significant role in determining the mobile wallet adoption as suggested by (Lu, Yao and Yu 2005). They suggested that variables like PI and SI should have to be taken into consideration even if PU and PE are strong variables when determining consumer acceptance. Amoroso and Hunsinger (2009) expanded the original TAM model by including variables like perceived risk, trust, privacy, website quality, e-satisfaction, e-loyalty and expectations of internet information to better understand the consumer behavior over the intention to purchase through internet.

F. He along with Mykytyn (2007) investigated on the factors that affect the online payment services adoption for customers. They found out that the consumer had a consideration towards risk involved and apart from that everyone favored the concept of online payment. Consumer's actual use of online payment was associated with perceived usefulness, perceived ease of use and intention to use as suggested by a model developed by Rigopoulos and Askounis (2007).

3. OBJECTIVES OF STUDY

In this research paper, we intends to understand the factors that affect the consumer adoption of mobile wallet so that a strategic framework can be implemented to improve their adoption with the help of mobile wallet, mobile device manufacturers and regulatory body.

The primary objective of this research is to understand the consumer adoption status of mobile wallet. The sub objectives includes understanding of user's willingness to adopt a new system or service. Also understanding the degree to which a person believes using mobile wallet service would enhance the task performance. In this research study we try to analyze the perceived sense of risk and trust concerning the disclosure of personal and financial information's. Also we try to analyze how variety of services, offers discount effects the customer perception in using mobile wallet.

4. PERSONAL INNOVATIVENESS

Drawing upon Roger's theory of diffusion of innovations, Agarwal and Prasad (1998) found that individuals with higher personal innovativeness have better chance of adopting to a new innovation earlier. PI is known as an individual's willingness to try out a new technological innovation. The risk tasking propensity is a quality which is available in few individuals and not in others. Individuals with higher level of PI are expected to have positive perception about innovation and more positive intentions towards using a new IT/IS.

4.1 Perceived Ease of Use

Davis defined PE in his TAM as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). PE is being used by many researchers as an important factor in determining the consumer adoption of information technology related services (Lee et al., 2004; Shin, 2009; Kim et al., 2010; Schierz et al., 2010; Wang and Yi, 2012; Amoroso and Magnier-Watanabe, 2012; Pham and Ho, 2014; Yan and Yang, 2015). The UTAUT research model (Venkatesh et al., 2003) also suggested this construct variable as an important factor. It is similar to effort expectancy which is defined as "the degree of ease associated with consumers' use of technology" (Venkatesh et al., 2012).

4.2 Perceived Usefulness

PU is defined "as the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). The significance of this factor is also validated in research models like TAM2 (Venkatesh and Davis, 2000), and also in TAM3 (Venkatesh and Bala, 2008). In the UTAUT research model suggested by Venkatesh (Venkatesh et al., 2003), PE was among the important construct. For finding out the customer's perspective of mobile wallet adoption intentions, this factor was considered by other researchers (Lee et al., 2004; Shin, 2009; Schierz et al., 2010; Kim et al., 2010; Wang and Yi, 2012; Amoroso and Magnier-Watanabe, 2012; Pham and Ho, 2014; Slade et al., 2015; Yan and Yang, 2015).

4.3 Perceived Risk

Any product related, or any social or any financial risk that is perceived by the consumer's while doing an online transaction is known as PR (Wu and Wang, 2005). A large number of researchers have this factor included for their research studies and has agreed to its significance and negative impact it has on consumer's intention to adopt mobile wallet (Amoroso and Magnier-Watanabe, 2012; Pham and Ho, 2014; Liébana-Cabanillas et al., 2014; Slade et al., 2015).

4.4 Marketing & Social Influence

The consumer's decision to use a product or service usually depends on the opinions of family, friends & relatives. The extent to which consumer's decision of adoption depends is referred to as SI (Riquelme and Rios, 2010). It is defined as "the extent to which consumers perceive that important others (e.g. family and friends) believe they should use a particular technology" (Venkatesh et al., 2012, p. 159, line 64-66). This is a widely used and accepted construct variable by most of the previous researchers as a factor which is important in determining the consumers intention of adoption of technologies like mobile wallet (Lee et al., 2004; Schierz et al., 2010;

Amoroso and Magnier-Watanabe, 2012; Yang et al., 2012). TAM2 research model (Venkatesh and Davis, 2000), UTAUT (Venkatesh et al., 2003) and UTAUT2 (Venkatesh et al., 2012).

4.5 Perceived Cost

It is the perception of cost of an individual. It is a secondary attribute as it is a way in which one calculated the price relative to one's disposable income (Moore & Benbasat, 1991). It is the individual's perception of the extent to which a new technology will cost. The use of any service will be encouraged when customers believes that the usage of particular service could be advantageous to them (black et al., 2001). It can be identified that cost plays a very important role in consumer's perception of adopting a new technology (Carlsson et al., 2006; Nysveen et al., 2005). It has been noted by Moore and Benbasat (1991) that a major impact has been created by perceived cost on consumers buying behavior. Majority of the respondents (59%) emphasized on cost as a major barrier for the adoption of mobile wallet according to an extensive study conducted by KPMG international (2009) in around 19 countries.

4.6 Variety of Service

The extent to which variety of services along with offers and discounts affect the customer perception in adoption of mobile wallet. The adoption of a new technology is dependent on the variety and amount of services provided. In case of mobile wallet the selection of a particular wallet service depends on the services provided along with the offers and discounts. This is a construct which is being made for the first time to find the intention of consumer adoption of mobile wallet. The perception of the benefits it has to offer to its customer determines the adoption of mobile wallet. In case of consumer based technology adoption it is true. Variety of services include all the places where the wallet services can be used and usage of mobile wallet for other transaction purposes. Offers and discounts include various kinds of benefits such as coupon codes, app download cash rewards, referral points, cash discount, and loyalty points. The promotional codes helps in enhancing the customer experience and, thus, will help in retaining the already existing customers as well as help in gaining new customers (Bigcommerce.com, 2015). A report in UK states that on the basis of offers and promotional codes around 50% of online customers change their purchasing decisions (Rapid Campaign Report, 2015; Brooks, 2015). A similar inclination towards the promotion and offers were showed by US customers when a survey was conducted (Brooks, 2015). With the competition growing day by day by direct and indirect competitors, variety of service and offers will play an important role in consumer's adoption of mobile wallet. A customer who is rational makes a decision based on balancing the others factors as well as considering all the benefits being provided.

4.7 Usage Intention

UI is defined as ones intention to continue using a service in the post acceptance stage. It is in a way similar to the repurchase decision as in both cases decisions are influenced by the usage in the initial stage (Bhattacharjee, 2001). Analysis on both organizational level as well as individual level this research has been conducted (Limayem, Hirt and Cheung, 2007). The initial stage acceptance decision is the reason by the adopters to continue using the services and, thus, result in continued usage intention behavior (Kim, Chen and Chan, 2007). Also the initial acceptance

depends on various factors that affect the individual decision to continue using a particular service (Limayem, Hirt, and Chin, 2001).

5. RESEARCH METHODOLOGY

The proposed research model is illustrated in the figure given below (figure A). It is based on the extensive literature review which was explained in the previous section. The model advocates that the adoption of mobile wallet technology by consumer depends on the user's personal innovativeness, perceived ease of use, perceived usefulness, perceived risk, marketing, social influence, perceived cost and variety of services.

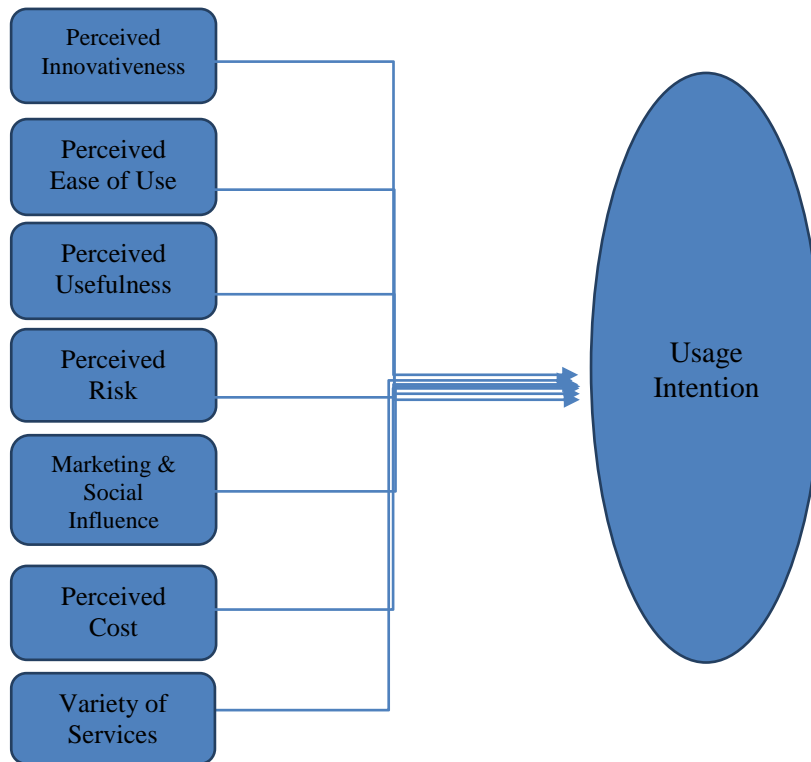


Figure A: Proposed Model of Factors affecting Usage Intention of Mobile Wallet

The respondents were from pan India while most of them were either college going students or working professionals. It was prerequisite before obtaining the data that Internet enabled smartphone and bank accounts were imperative for the respondents. India is a country with different culture and since the data was collected from pan India it will give a better and diverse data about different customer's attitude towards adoption of mobile wallet. Among the people across the country the most technologically savvy and which constitutes the largest segment of modern technology users are youngsters. (Davis, 1989; Hanafizadeh et al., 2014; Yadav et al., 2016). Therefore the sample data collected were considered to be appropriate for the research study.

There are around 7 dependent variables considered for the research study of which one have been developed for the first time. Multi scale is used for the research study which consists of around 73 questions which were identified to measure the dependent variables. All items were measured using five point Likert scale ranging from strongly agree to strongly disagree, from highly likely to highly unlikely, from most preferred to least preferred. The research instrument consist of three parts. In the first part information related to General demographic details like gender, age, education, income and the usage of mobile wallet were recorded.

The respondent's agreement or disagreement towards the selected 37 items was recorded on the second part. The third part consist of items in which customers attitude towards the rest of the payment services were recorded along with the amount to which they value each variable for those services. A pilot survey was used to pre-test the items displaying semantic differentials and creating ambiguity during the feedback response were altered and rephrased to make a better questionnaire and response output as those were not important in the mobile wallet context. During the course of this research paper personal innovativeness will be represented as PI, perceived ease of use as PE, perceived usefulness as PU, perceived risk as PR, marketing & social influence as SI, perceived cost as PC, variety of service as VS, usage intention as UI.

This research study made use of both convenience sampling to get the respondents answer the questionnaire. There were studies undertaken to understand the IT/IS adoption that were conducted in the past and this was in line with that (Pham and Ho, 2014; Amoroso and Magnier-Watanabe, 2012; Chong et al., 2012). So with the help of convenience sampling data responses for the main survey was obtained which was later analyzed to find out the consumer adoption behavior of mobile wallet.

6. DATA ANALYSIS AND INTERPRETATION

Around 315 respondents participated in the survey. The demographic details are given in Table 1.

Table 1: Demographic Analysis

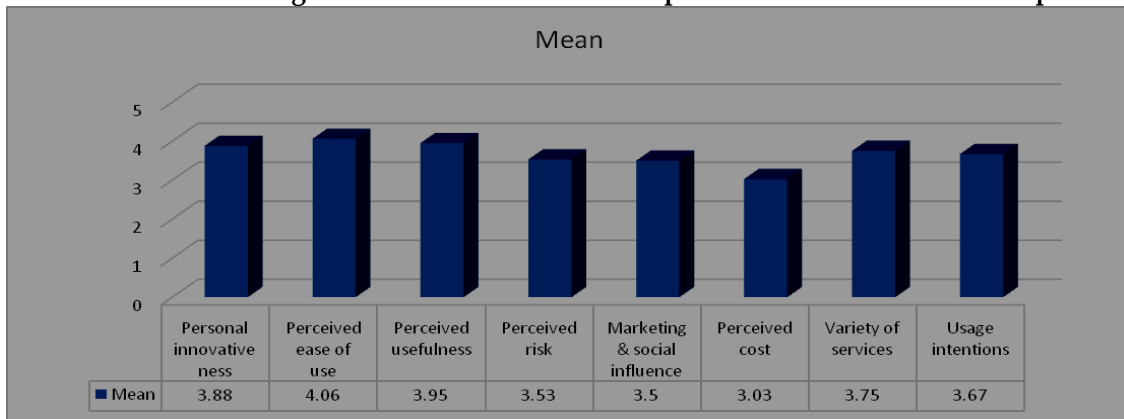
Sample Characteristics	Frequency (n=315)	Percentage
Gender		
Male	207	65.7 %
Female	108	34.3%
AGE		
18-25	160	50.8%
26-35	148	47%
35 - 59	6	1.9%
60 and above	1	0.3%
Education		
School	4	1.3%
College	132	41.9%
Working professional	167	53%
Housewife	3	1%
Entrepreneur	3	1%
Self employed	6	1.9%

Income Level		
Less than 5k	127	40.3%
5-15k	51	16.2%
15-25k	24	7.6%
25 and above	113	35.9%
Mobile wallet usage		
Everyday	14	5%
3-4 times/week	55	19.7%
Once every week	54	19.4%
1-2 times/month	60	21.5%
Less than once a month	96	34.4%

The maximum amount of respondents were college going students within the age of 18-25. Respondents in this category comprised of 50.8% which was around 160 respondents out of the total 315. Among the respondents having smartphones and internet connections, 213 respondents were using mobile wallet which appears to be a good number. It means around 67.6% used mobile wallet services. While studying the usage frequency of respondents, the amount of users using mobile wallet less than once a month was high compared to the users using it every day, 3-4 times/week, once a week, 1-2 times/month. The details of this are given in the above table along with the chart which shows the percentage of each category of frequency of usage.

Mean for all the construct variables were calculated. It was found PE is one of the main factor customers look on to when using a mobile wallet which is in line with the multiple regression result. Also along with PE, PU is another factor which is important to decision making of customers to use mobile wallet. From the Chart (Chart A) it was inferred that Personal innovativeness and variety of service was also a very important factor for any mobile wallet service. Respondents also believe to use mobile wallet more when mobile wallet is widely available in India. It can be seen that customer adoption of mobile wallet does not depend on cost involved in mobile wallet service as long as the services are good.

Chart A: Table showing the mean values of each independent variables from the responses



When the independent variable of age groups is analyzed with the dependent variables using independent ANOVA test, it can be inferred from the table (Table 2) that all age groups perception of PI, PE, PU, Marketing & social influence, PC, VS, and usage intention of mobile wallet service are same (Value of $P > 0.05$) except for their perspective of perceived risk.

Table 2: ANOVA between AGE and Independent Variables

Independent variable	Dependent variable	Significant level
AGE	Personal innovativeness (PI)	0.904
	Perceived ease of use (PE)	0.847
	Perceived usefulness (PU)	0.362
	Perceived risk (PR)	0.024
	Marketing & social influence (MSI)	0.580
	Perceived cost (PC)	0.588
	Variety of services (VS)	0.079
	Usage intention (UI)	0.139

7. REGRESSION ANALYSIS

To find out how usage intention of customers is affected by the construct being taken, a regression analysis was done. For this independent variables like PI, PE, PU, PR, SI, PC, VS was taken against UI to find out the customer perspective is about adoption of mobile wallet. It was found from the table (Table 3) out that R-Square value was 0.353 (> 0.25). This meant that around 35.3 percent of the dependent variable was explained by the coefficients of significance (Independent variables). On the basis of P-value, Null Hypothesis was rejected for PI, PE, PU, PC, and VS ($P \text{ value} < 0.05$), while it was accepted for PR and SI. This meant that PI, PE, PU and VS have a significant role to contribute towards consumer adoption of mobile wallet. Perceived cost was not that significant due to its negative value of beta ($\beta = -0.128$). From the value of Beta it can be seen that PE is the most powerful contributor towards consumer adoption of mobile wallet.

Table 3: Regression analysis between independent and dependent Variables

IV	DV	R Square	P value	Beta Value
PI	UI	0.353	0.027	0.119
PE			0.000	0.245
PU			0.031	0.138
PR			0.101	0.079
SI			0.307	0.053
PC			0.006	-0.128
VS			0.000	0.119

Based on the test analysis and the proposed model it is found that there will only be four factors which really affect the consumer adoption. The figure below is the research model according to the test analysis done.

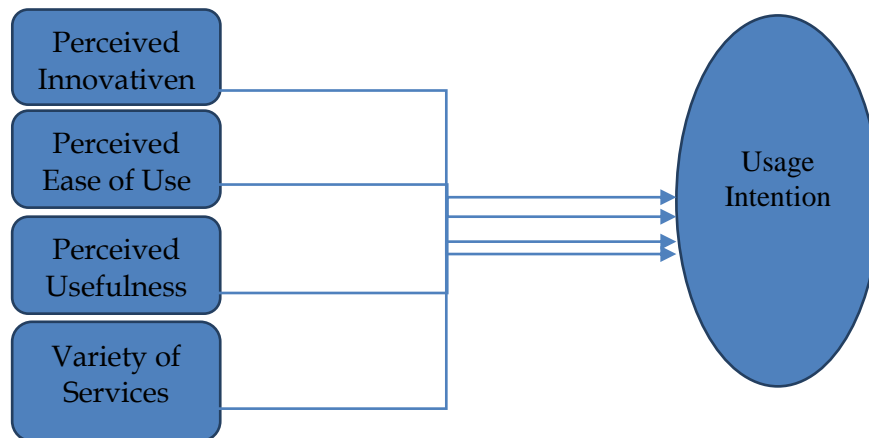


Figure B: Finalized Research Model of Factors affecting Usage Intention of Mobile Wallet.

8. FINDINGS

- It was found that these factors had a positive influence on consumer perspective of mobile wallet adoption.
- The cooperation of stakeholders who are directly or indirectly associated with the mobile service is needed for electronic wallet transition to mobile wallet and thus the success of a wallet service depends on not just the customers but also the mobile wallet service providers, technology providers, financial institutions, and government.
- Mobile wallet success depends on the countries perspective towards technology and how government is pushing towards a digital country.
- The study observed that perceived ease of use is a very significant factor when it comes to customer's perspective for adoption of mobile wallet. (Shin, 2009; Chierz et al., 2010; Kim et al., 2010; Wang and Yi, 2012; Thakur and Srivastava, 2014; Yan and Yang, 2015).
- The money transactions have been made much easier compared to the bank transaction which was previously more common before the introduction of mobile wallet service. So due to this the customer perceive that compared to traditional modes of payment, mobile wallet service is an easier and faster alternative.
- Another important factor was perceived innovativeness and perceived usefulness. Both are important in customer decision of adopting mobile wallet.
- It is understood that customers perspective about the variety of services provided by mobile wallet service providers have a significant influence on customers intention to adopt mobile wallet (Pagani, 2004; Amoroso and Magnier-Watanabe, 2012; Venkatesh et al., 2012).
- It has been noticed that the adoption also depends on how technology savvy customers are comfortable to a new technology.
- From the study it was understood that the customer still have a degree of uncertainty when it comes to sharing of personal information.

- After analysing the data it is been found that Indian customers tends to love offers and discounts. So for this reason they tends to use mobile wallet service rather than going for alternative mode of payment (Rapid Campaign Report, 2015; Brooks, 2015).
- The potential of mobile wallet service is huge and with the demonetization exercise carried out by government, the wallet service providers are getting recognition.

9. RECOMMENDATIONS

- By highlighting the factors which are key for the mobile wallet service we will be able to identify the shortcomings in the perspective of potential customers and strategize in such a way as to increase the customer adoption by bringing in new marketing techniques and offers.
- It is also important to emphasize on those constructed variables which are important from customers point of view when upgrading the product or while strategizing any marketing strategies.
- The fact that Indian customer's tends to love offers and discounted can be utilized by wallet service providers to lure more customers and this is a marketing strategy they have been using to change the customers attitude towards mobile wallet services by providing offers and discounts.
- There are customers who tends to use a technology at the introduction stage. Rest are not bothered about a new technology as they are least bothered about that. So if given proper guidance and knowledge about a new technology, it would be helpful in getting more customers.
- If the mobile wallet service providers along with the help of government and telecom operators are able to provide a better security and if they are able to maintain that level of trust among the customers, then the perspective of customers towards the service will change. There will be increase in the number of customers and also the frequency of usage among the existing customers.

10. LIMITATIONS AND FUTURE SCOPE

The research relied on response data from 315 respondents. So there is chance that the sample may suffer from selection bias. This study considers only 8 factors to determine that customer's perspective towards adoption of mobile wallet. There are lot of other factors too which can be considered and which might give a more focused perspective about customers behavior towards adoption of mobile wallet.

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