Antecedents of Wallet App Adoption

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ABSTRACT

Emerging economies like India are witnessing rapid technological changes. To penetrate in the emerging markets and ensure smooth adoption of mobile wallets it is important to study the constructs that trigger mobile adoption. The study presents a cumulative finding of the research carried out in the field of wallet app adoption by using weight analysis. The study systematically identifies various constructs studied by researchers, delineates significant and non-significant relationships between the constructs and mobile adoption, and performs weight analysis to identify the important constructs of wallet app adoption. The study presents a list of strong, frequently utilized significant predictors of app adoption and experimental predictors (i.e., independent variables not frequently used but tested to be significantly impacting app adoption are also presented). To the best of the author's knowledge, no published work presents the cumulative illustration of the constructs to explain the wallet app adoption is available so far.

KEYWORDS

Attitude, Behavioural Intention, Predictor, Satisfaction, TAM, Trust, UTAUT, Wallet Apps, Weight Analysis

INTRODUCTION

With advancement in wireless and mobile technologies mobile phones are becoming a key enabler for entrepreneurship (Pal, 2016). The digital landscape has enabled entrepreneurs to reach millions of potential customers with limited budget, efficient operations (Aggarwal and Lamba, 2014) and disrupt more established players (Henry, 2016). Mobile technology has facilitated the marketers and consumer in buying and selling online, and making online payments (Patel, 2016a). Mobile wallets are providing a new makeover to the businesses by helping them to flourish more in competitive market (Palumbo and Dominici, 2015).

Mobile wallet refers to a software application in form of virtual payment option which is similar to conventional wallet, which has cards, tickets, loyalty cards, vouchers etc in it (Dixit, Singh and Chaturvedi, 2017).This term first came into parlance when Mr Sam Pitroda coined a term "digital wallet" and defined as "a liquid crystal display not much bigger than a regular plastic bank card, with preferably a touch-sensitive screen and simple user interface that lets the user flip through the digital wallet in the same manner he/she flips through a leather wallet" (Dixit, Singh and Chaturvedi, 2017).

The convergence of two of the fastest growing industries, the internet and mobile communications, comes as an opportunity for marketers to capture this new technology making it a safe, convenient and easy way to close the business transactions (Jussila, 2015).Mobile wallets facilitates basic financial access, converting mobile phones into pocket-banks bringing on board a large section of the unbanked population of the emerging economies (Asongu, 2013). India alone has 233 billion people who are not included in formal banking services. The cash crunch created due to demonetization drive of Indian government in 2016 forced people to adopt electronic mode of payment. Wallet app provided affordable convenient service to the users by facilitating phone based money transfer and storage thereby relieving the hassle of carrying cash in the pockets (Megadewandanu, Suyoto and Pranowo, 2017).Mobile wallet providers tapped this opportune time to become mini banking institutions (e.g. Paytm, Airtel etc.). Fast adoption of smart phones (Alwahaishi and Snášel, 2013) rising trend of mobile shopping (Groß, 2015) and India being a huge remittance market (Afram, 2011) creates a fertile ground for mobile wallet providers to flourish. The wallet app providers need to create unique selling prepositions to ensure that the consumer makes the next transaction using their app.

Consumer acceptance or rejection is one of the strongest accelerator or inhibitor of technology adoption (Ram and Sheth, 1989). This premise finds support in literature (Priem, Li and Carr, 2012), thus rationalizing the need to understand what triggers consumer acceptance and adoption of new technology like wallet apps. This research paper addresses this question.

RQ1: What factors trigger consumers' adoption of wallet apps?

Studies based on technology adoption have cited various factors like trust (Unnikrishnan and Jagannathan, 2017); perceived usefulness (Puriwat and Tripopsakul, 2017); risk (Gandhi and Sheorey, 2017); perceived security (Ramos-de-luna, Montoro-Rıos and Lie´bana-Cabanillas, 2016); social influence (Yang et al., 2012), utilitarian value (Bulent Ozturk et al., 2017); perceived benevolence and perceived ability (Gao and Waechter, 2017) and many more have been identified as the important accelerators of adoption of mobile wallet.

Although varied published work on mobile wallets using diverse theoretical approaches, a cumulative adoption research is yet to be examined. Emerging economies like India are witnessing rapid technological changes. To penetrate in the emerging markets and ensure smooth adoption of mobile wallets it is important to study the constructs that trigger mobile adoption of wallet apps.

This study aims to presents a cumulative finding of the research carried out in the field of wallet app adoption so far. Mobile apps have replaced e-commerce, and these handy hand held devices are gaining popularity among marketers to connect, engage and do business with customers. This establishes a need to perform a comprehensive analysis of the existing empirical publications to visualize the performance of the various predictors of technology adoption and their relevance in the mobile adoption research. This paper fills this gap. It will allow the researchers to identify the theoretical gaps in the existing knowledge, and suggests the further lines of research. This study follows a systematic process to accomplish its objective. Firstly, it identifies various constructs studied by researchers so far, finds the significant and non-significant relationships between the leading constructs and mobile adoption, and performs weight analysis to identify the important constructs of wallet app adoption. The results and findings of this study are comprehensively presented, with suggestions for future research.

The structure of the paper is follows: The study briefly introduces the theoretical frameworks used by the researches to explain wallet app adoption. Ensuing section deals with research methodology followed by the findings based on the weight-analysis. A tabular representation of the selected 30 empirical studies with their significant and non-significant relationships has been presented along with their weights. In the last, discussion and findings have been presented along with implications, limitations and suggestions for future research.

Table 1. Theories used in studies related to mobile wallet adoption

Theory	Author(s)
TAM (Technology acceptance model)	Davis (1989) proposed that two factors namely perceived usefulness, and perceived ease of use results in adoption of new information technologies by an individual.
ISS (The information system success measures model)	DeLone and McLean (1992) proposed that system quality, information quality, use, user satisfaction, individual impact, and organizational impact are the main pillars of any information system success.
DIT (Diffusion of innovation theory)	Roger (1995) propounded that "the process by which an innovation is communicated through certain channels over time among the members of a social system".
TAM2 (Technology acceptance model 2)	Venkatesh and Davis (2000) incorporated 2 additional constructs in original TAM namely social influence processes (subjective norm, voluntariness, and image), and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use).
UTAUT (the unified theory of acceptance and use of technology)	Venkatesh *et al.*, (2003) was framed on the previous eight theories of technology adoption i.e. TRA, TAM, MM, TPB, TAM2, DOI, SCT, and model of personal computer use. This theory comprises of four factors: performance expectancy, effort expectancy, social influence, and facilitating conditions, which leads to intention to adopt information systems or information technology.
BRT (Behavioral reasoning theory)	Westaby (2005) proposed behavioural reasoning theory, stating that "reasons" play an important role in linking people's beliefs, global motives, intentions, and behaviour.

THEORETICAL FRAMEWORKS

Theoretical frameworks like Technology Acceptance Model [TAM] (Davis, 1989) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) have been the two most extensively studied models. These models originally provided a framework to study the technology acceptance in organization context (Slade, Williams and Dwivdei, 2013). However, these theories have also been used to study technology acceptance among individuals (Amoroso and Magnier-watanabe, 2012; Aydin and Burnaz, 2016; Madan and Yadav, 2016; Megadewandanu, Suyoto and Pranowo, 2016; Patel, 2016a; Rathore, 2016; Kumar, Sivashanmugam and Venkataraman, 2017). A number of theories were proposed to explain consumers' acceptance of new technologies and their intention to use. These included, but were not restricted to, the Theory of Diffusion of Innovations (DIT) (Rogers, 1995) that started in 1960; the Theory of Reasonable Action (TRA) (Fishbein and Ajzen, 1975); Theory of Planned Behavior (TPB) (Ajzen, 1991); the Theory of Task-technology fit (TTF) (Goodhue and Thompson, 1995), Decomposed Theory of Planned Behaviour, (Taylor and Todd, 1995), Technology Acceptance Model 2 (TAM2) (Venkatesh and Davis, 2000), and Technology Acceptance Model 3 (Venkatesh and Bala, 2008). Focussing on consumers' behavioural intention, BRT theory considers "reasons for and against" as the main link between the people's beliefs, motives, intentions, and behaviour. This theory includes the different psychological processes varying the context of decision making (Westaby, 2005). However researchers (Lee, Warkentin and Choi, 2004; Amin, 2008; Patel, 2016a; Ramos-de-luna, Montoro-Rıos and Lie´bana-Cabanillas, 2016; Bailey et al., 2017; Sarfaraz, 2017; Liébana-Cabanillas et al., 2018) have extensively used TAM and UTAUT as the core theories in their studies. Researchers have provided a bouquet of theories to investigate technology adoption which have been used in the context of mobile adoption. Table 1 summarizes few of the theories used by the researchers for studying technological adoption among consumers.

The researchers over the period have extended and contextualised these theories and by proposing different independent variables such as privacy concerns (Sinha et al., 2018); structural assurance, and ubiquity (Yan and Pan, 2015); perceived credibility (Kirana, Ratnasari and Widiastuti, 2018); perceived regulatory support and perceived benefits (Madan and Yadav, 2016) etc. The authenticity

and consistency of the various theoretical approaches being used for explaining mobile app adoption is yet to be examined. No published work presenting the cumulative illustration of the constructs to explain the wallet app adoption is available so far. This establishes a need to perform comprehensive analysis of the existing empirical publications to visualize the performance of the constructs and their relevance in the mobile adoption research.

RESEARCH METHODOLOGY

The purpose of this study is to incorporate the studies done in past on mobile wallets and to present the findings in a systematic manner. For this purpose, papers were reviewed and presented in a weight-analysis form of study. The exploration of study was started with searching the scholarly articles on mobile wallets by searching keywords like: 'mobile wallet', 'wallet app', 'mobile payments', 'm-payments', 'mobile banking app', 'adoption', 'acceptance', 'consumer adoption' in all permutations and combinations.

In the next step, the articles found relevant were further scanned to find more specific ones catering the need of the study. Studies were both empirical as well conceptual, but for our study the articles with empirical representations were considered for capturing the statistical findings between the dependent variable and independent variables, while the conceptual papers were included for gaining the insights about the wallet app adoption. A total of 100 articles were identified which were further shortlisted to30articles relevant for our study. All the 30 selected articles had used the various technology adoption models in original as well in extended forms to study the adoption of mobile wallets.

After reviewing the 30 empirical research papers on wallet app adoption, (Table 2) weight-analysis was performed for predicting the antecedents of wallet app adoption. The weights are the indicators that help in defining the predictive power of an independent variable on the dependent variable (Rana, Dwivedi and Williams, 2015). The selection of independent variable was done on the basis of the number of times they have been used various studies of mobile wallet adoption.

FINDINGS

Identification of Studies for Extensive Literature Review

The search process begins with the identification of research articles related to mobile wallets. For the same, a set of keywords such as: 'mobile wallet', 'digital wallet', m-wallet', 'm-money', 'mobile payment', 'adoption', 'technology acceptance', 'behavioural intention', and 'attitude' have been searched in data base available online. The empirical studies were only considered to be relevant for the research. Articles published from 2007 to 2018 have been included. In the initial phase 100 qualitative and quantitative studies were identified, which shortlisted to 30 after a through screening related to our research purpose. The research articles selected for the study are in a tabular form (Table 2) with details such as: year of study, theory used by author, publication, details of the respondents and the sample size and country in which the study was conducted.

Identification of Dependent Variables, Independent Variables, and Relationships Between Them

After a through read of each article, a list of dependent and independent variable has been framed. A total of 4 dependent variables and 47 independent variables emerged out from the review. Table 3 illustrates the four dependent variables emerged out of the 30 studies. Researchers have used behavioural intention, attitude, trust, and satisfaction as the major dependent variables of wallet app adoption.

Table 2. Empirical studies selected for the review

Author	Year	Theory/ Model	Sample Size	Respondents	Country	Technology
(Pousttchi and Wiedemann, 2007)	2007	TAM	1104	Online survey (mobile phone users)	Germany	Mobile payments
(Amin, 2007)	2007	TAM	108	Bank customers	Malaysia	Mobile credit card
(Amin, 2009)	2009	TAM	117	Bank customers	Malaysia	Mobile wallet
(Schierz, Schilke and Wirtz, 2010)	2010	TAM	1447	Mobile applications users	Germany	Mobile payment services
(Yang *et al.*, 2012)	2012	TAM & UTAUT	483	Users of mobile payment services	China	Mobile payment services
(Zhong *et al.*, 2013)	2013	IDT, TAM, & UTAUT	365	Mobile payment users	China	Mobile payments
(Liébana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva, 2014)	2014	TAM, (MPTAM)	2012	Internet users with a profile on social network	Spain	Mobile payment
(Thakur and Srivastava, 2014)	2014	TAM & UTAUT	774	Graduates	India	Mobile payment services
(Jaradat and Faqih, 2014)	2014	TAM 2	366	Undergraduate students	Jordan	Mobile payment adoption
(Phonthanikitithaworn, Sellitto and Fong, 2015)	2015	TAM	256	Mobile phone users experienced m-payment services	Thailand	Mobile payment services
(Amin *et al.*, 2015)	2015	TAM	104	Users of mobile wallet	Bangladesh	Mobile wallet
(Ramos-de-luna, Montoro-Ríos and Lie'bana-Cabanillas, 2016)	2016	TAM	191	Online	Spain	Mobile payments
(Aydın and Burnaz, 2016)	2016	TAM	666	Computer-aided telephone interview (CATI)	Turkey	Mobile payment applications
(Oliveira *et al.*, 2016)	2016	UTAUT2 & DOI	301	Online survey	Portugal	Mobile payment
(Madan and Yadav, 2016b)	2016	UTAUT	210	Postgraduate students and working professionals	India	Mobile wallet
(Sarfaraz, 2017)	2017	UATUT	340	Users of mobile banking for financial transactions	Jordan	Mobile banking
(Bulent Ozturk *et al.*, 2017)	2017	Valence Theory	412	Smartphone owners and frequent diners in restaurants	USA	Mobile payment
(Puriwat and Tripopsakul, 2017)	2017	TAM & MSQ	348	Owners of mobile devices and experienced mobile banking apps	Thailand	Mobile banking
(Gandhi and Sheorey, 2017)	2017	DIT	120	Users of mobile banking	India	Mobile banking
(Gupta and Arora, 2017)	2017	Behavioural reasoning theory	379	Indian banking consumers	India (Jammu)	Mobile banking
(Unnikrishnan and Jagannathan, 2017)	2017	TAM & UTAUT	232	Urban population	(India)	Mobile payment services
(Bailey *et al.*, 2017)	2017	TAM (extended)	240	Students	USA	Mobile payments

Table 2. Continued

Author	Year	Theory/ Model	Sample Size	Respondents	Country	Technology
(Gao and Waechter, 2017)	2017	Valence framework, ISS model, and initial trust	851	M-payment adopters	Australia	Mobile payment services
(Goswami, 2017)	2017	TAM & Roger's model	233	Bank customers	India	Mobile technology for banking transactions
(Megadewandanu, Suyoto and Pranowo, 2017)	2017	UTAUT 2	372	Online survey	Indonesia	Mobile wallet
(Ramos *et al.*, 2018)	2018	TAM	272	Users of financial mobile apps	Brazil	M-banking
(Hossain, Hossain and Jahan, 2018)	2018	N/A	328	Users who has completed college education	Bangladesh	Mobile payment
(Shah, 2018)	2018	TAM	150	Organized retailers	India	Paytm- digital wallet
(Su, Wang and Yan, 2018)	2018	TAM & IDT	922	Mobile users	China	Mobile payment
(Liébana-Cabanillas *et al.*, 2018)	2018	TAM	191	Users of smartphones	Spain	Mobile payment acceptance

Table 3. Dependent variables identified and used in the study and their definitions

Dependent Variable	Definition
Behavioural Intention	"Measure or degree of intensity of an individual's intention to perform a specific behaviour". (Fishbein and Ajzen, 1975).
Attitude	"Attitude is defined as an individual's positive or negative feelings (evaluative affect) about performing the target behaviour". (Fishbein and Ajzen, 1975)
Trust	"Refers to the extent to which consumers perceive mobile wallet application providers to be trustworthy with respect to the security and privacy policies followed by them" (Madan and Yadav, 2016b).
Satisfaction	"An overall psychological state resulting when the emotion sur- rounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience"(Oliver, 1981).

A thorough review of the selected 30 empirical studies, total of 47 independent variables have been identified which acts as predictors of the wallet app adoption among individuals. Table 4 lists the number of independent variables. The independent variables identified from the review of 30 articles are a part of different technology adoption theories like perceived usefulness and perceived ease of use being a part of technology acceptance model (TAM); performance expectancy, effort expectancy, social influence, and facilitating conditions being a part of the unified theory of acceptance and use of technology (UTAUT) theory; habit, price value, and hedonic motives (UTAUT2). These technology acceptance theories have also been extended by the researchers over the years for their study by adding new constructs. Like (Madan and Yadav, 2016) extended UTAUT2 theory by adding constructs like perceived regulatory support, and perceived benefits for their study mobile wallet. (Thakur and Srivastava, 2014) framed their conceptual model to study mobile payment services in India on the basis of original TAM and UTAUT model and proposed adoption readiness, personal innovativeness, and perceived risk as the predictors of usage intentions

Table 4. List of Independent variables identified from the literature

No.	Independent Variable	No.	Independent Variable
1	Adoption readiness	24	Perceived convenience
2	Affinity	25	Perceived cost
3	Amount of information	26	Perceived credibility
4	Attitude	27	Perceived ease of use
5	Compatibility	28	Trust
6	Utilitarian attitude	29	Perceived enjoyment
7	Effort expectancy	30	Perceived fee
8	e-payment habit	31	Perceived privacy
9	Facilitating conditions	32	Perceived relative advantage
10	Familiarity	33	Perceived risk
11	Gender	34	Perceived security
12	Habit	35	Perceived usefulness
13	Hedonic attitude	36	Performance expectancy
14	Hedonic motivation	37	Price value
15	Image	38	Result demonstrability
16	Individual mobility	39	Rewards
17	Innovativeness	40	Satisfaction
18	Interconnection	41	Self-efficacy
19	Internet experience	42	Social influence
20	Knowledge about wallet apps	43	Subjective norm
21	Mobile service quality	44	Transaction convenience
22	Output quality	45	Transaction speed
23	Perceived benefits		

on individual towards mobile payment technologies. A brief definition of the identified independent variables is shown in the Appendix.

CONSTRUCT RELATIONSHIPS AND WEIGHT ANALYSIS

Table 5 portrays cumulative information of all constructs and their involved relationships which were used to investigate the mobile app adoption among individuals. It is observed that perceived usefulness and perceived ease of use were found as the most commonly used independent variables and used most of times to measure behavioural intentions, attitude, trust, and satisfaction towards mobile wallet adoption. Rana, Dwivedi and Williams (2015) have proposed a method to identify the most effective predictors and classified them into 2 categories, namely "well-utilized", and "experimental". According to the author well-utilized predictors are those who have been examined in studies five or more than five times, and experimental predictors are those who have not been examined so. However, (Jeyaraj, Rottman and Lacity, 2006) in their study mentioned that specific cut-off can be done as being lenient or stringent as per study. Hence, in our study we defined "well-utilized" predictors as those who have been studied 3 or more than 3 times, and "experimental" predictors as those who have

Table 5. Independent variables, dependent variable identified from the review and their weight-analysis

No.	Independent Variable	Dependent Variable	Sig.	NS	Total	Weight
1	Perceived usefulness	Behavioural intention	8	2	10	0.8
2	Perceived ease of use	Behavioural intention	7	3	10	0.7
3	Perceived risk	Behavioural intention	4	2	6	0.66
4	Compatibility	Behavioural intention	07	0	07	1
5	Innovativeness	Behavioural intention	5	0	5	1
6	Perceived security	Behavioural intention	5	1	6	.83
7	Trust	Behavioural intention	3	1	4	0.75
8	Performance expectancy	Behavioural intention	3	1	4	0.75
9	Social influence	Behavioural intention	6	1	7	0.85
10	Effort expect**ancy**	Behavioural intention	2	1	3	0.66
11	Facilitating conditions	Behavioural intention	0	3	3	0
12	Perceived credibility	Behavioural intention	2	0	2	1
13	Perceived cost	Behavioural intention	2	0	2	1
14	Hedonic motivation	Behavioural intention	1	1	2	0.5
15	Price value	Behavioural intention	0	2	2	0
16	Transaction speed	Behavioural intention	1	0	1	1
17	Transaction convenience	Behavioural intention	1	0	1	1
18	Privacy concerns	Behavioural intention	2	0	2	1
19	Mobile service quality	Behavioural intention	1	0	1	1
20	Amount of information	Behavioural intention	1	0	1	1
21	Perceived enjoyment	Behavioural intention	1	0	1	1
22	Knowledge about wallet apps	Behavioural intention	1	0	1	1
23	Attitude	Behavioural intention	1	0	1	1
24	Individual mobility	Behavioural intention	1	1	2	.5
25	Perceived benefits	Behavioural intention	1	0	1	1
26	Perceived convenience	Behavioural intention	2	0	2	1
27	Utilitarian attitude	Behavioural intention	2	0	2	1
28	Habit	Behavioural intention	2	0	2	1
29	Interconnection	Behavioural intention	1	0	1	1
30	Adoption readiness	Behavioural intention	1	0	1	1
31	Affinity	Behavioural intention	1	0	1	1
32	Satisfaction	Behavioural intention	1	0	1	1
33	Internet experience	Behavioural intention	1	0	1	1
34	Relative advantage	Behavioural intention	1	0	1	1
35	Perceived fee	Behavioural intention	1	0	1	1
36	Output quality	Behavioural intention	1	0	1	1

Table 5. Continued

No.	Independent Variable	Dependent Variable	Sig.	NS	Total	Weight
37	Result demonstrability	Behavioural intention	1	0	1	1
38	Gender	Behavioural intention	0	1	1	0
39	Image	Behavioural intention	0	1	1	0
40	Self-efficacy	Behavioural intention	0	1	1	0
41	Rewards	Behavioural Intention	0	1	1	0
42	Perceived ease of use	Attitude	5	2	7	0.71
43	Perceived usefulness	Attitude	7	0	7	1
44	Individual mobility	Attitude	4	0	4	1
45	Subjective norm	Attitude	6	0	6	1
46	Perceived security	Attitude	3	0	3	1
47	Personal innovativeness	Attitude	0	2	2	0
48	Perceived credibility	Attitude	1	0	1	1
49	Trust	Attitude	1	0	1	1
50	Perceived risk	Attitude	1	1	2	.5
51	Facilitating conditions	Attitude	0	1	1	0
52	Perceived cost	Attitude	1	0	1	1
53	Perceived relative advantage	Attitude	1	0	1	1
54	Familiarity	Trust	1	0	1	1
55	Perceived usefulness	Trust	1	0	1	1
56	Perceived ease of use	Trust	1	0	1	1
57	Perceived security	Trust	1	0	1	1
58	Perceived privacy	Trust	1	0	1	1
59	Perceived usefulness	Satisfaction	1	0	1	1
60	Perceived ease of use	Satisfaction	1	0	1	1

*SIG: Significant, *NS: Not-significant

been studied less than 3 times. Perceived usefulness, perceived ease of use, compatibility, perceived risk, personal innovativeness, trust, perceived security, performance expectancy, social influence, subjective norms, and effort expectancy have been emerged out as the well-utilized predictors of behavioural intention and perceived security, perceived ease of use, perceived usefulness, subjective norm, and individual mobility have been emerged out well-utilized predictors of attitude towards wallet applications adoption.

After identifying well-utilized predictors, next we find out the experimental predictors on the basis of the above-mentioned criteria i.e. independent variables studied less than 3 times. So, on the basis of these criteria factors a total of 32 predictors in case of behavioural intention, 07 in case of attitude, 5 in case of trust, and 2 in case of satisfaction were confirmed as the experimental predictors. However, it does not mean that these factors are not of much importance in predicting the consumers' attitude; they need to be more explored in the future to give the final decision.

Weight analysis is a technique by which the power of an independent variable over dependent variable is examined (Rana, Dwivedi and Williams, 2015).Thirty studies were selected for weight-analysis. Table 2 lists the studies included for weight-analysis.

To assign weights, the significant relationships of the independent variables with dependent variable and total number of relationships studied between the constructs have been considered. Table 5 shows all significant relationships, non-significant relationships and the total no of studies using the particular independent variable. Forty-seven variables have been identified from the papers shortlisted, out of which 44 were examined only once, 8 variables were examined twice, 4 variables were examined thrice, 5 variables were examined four times, 3 variables were examined five times, 1 variable was examined six times, 2 variables were examined seven times, and 2 variables have been examined 10 times in total.

Significant relationships include both positive and negative relationships of the independent variables with the dependent variables. Non-significant relationships imply that there is no relation between independent variable and dependent variable. And total number of studies refers to the total of significant and non-significant relationships between the independent and dependent variables. For example, (Madan and Yadav, 2016), in their study on intention to adopt mobile wallet found a significant positive relationship between behavioural Intention (dependent variable) and performance expectancy of mobile wallet (independent variable) at p< 0.001. Thus, this relationship has been recorded as '+'. In the same study, perceived risk (independent variable) to using mobile wallet influences negatively behavioural intention (dependent variable) to adopt mobile wallet at p-value 0.031, hence relationship has been coded as '-'. And the last, effort expectancy (independent variable) to use mobile wallet has no relationship with behavioural intention (dependent variable). To determine the strength of the relationship between independent and dependent constructs of mobile adoption, two aspects were taken into consideration i.e. number of times a particular relationship between constructs is examined, and secondly, how many of the examined relationships were significant. Dividing the second data value by the first provided the weight significance of a relationship. Hence, it has been coded as '0'. Weights were assigned to each independent variable, for example; perceived usefulness has been studied 10 times to study the mobile wallet adoption and found significant 8 times in case of behavioural intention, hence the weight of independent variable will be counted as (8/10= .8).

The weight '1' indicates that the relationship between two variables is significant throughout all studies, whereas '0' indicates this relationship to be non-significant across all studies examined (Jeyaraj, Rottman and Lacity, 2006). A criterion was set to scrutinise the well-utilized predictors on the basis of having weights more than 0.5. Factors which were found to be most well-utilized predictors of behavioural intention are: perceived usefulness has been examined 10 times and found significant 8 times, perceived ease of use has been examined 10 times and found significant 7 times, perceived risk has been examined 6 times and found significant 4 times, compatibility has been examined 5 times and found significant 5 times, innovativeness has been examined 5 times and found significant 5 times, perceived security has been examined 6 times and found significant 5 times, trust has been examined 4 times and found significant 3 times, performance expectancy has been examined 4 times and found significant 3 times, social influence has been examined 4 times and found significant 3 times, subjective norm has been examined 3 times and found significant 3 times, and effort expectancy has been examined 3 times and found significant 2 times. And in case of attitude towards mobile wallet adoption the final well-utilized predictors are: perceived security being examined 3 times and found significant 3 times, individual mobility being examined 4 times and found significant 4 times, subjective norm being examined 4 times and found significant 4 times, perceived usefulness being examined 7 times and found significant 7 times, and perceived ease of use being examined 7 times and found significant 5 times.

DISCUSSIONS

Numerous studies have been published on consumer adoption of mobile wallets. This study presents a cumulative finding of the research carried out in the field of wallet app adoption. A detailed analysis of the thirty empirical studies from 2007 to 2008 on mobile wallet app adoption was conducted. The findings reveal that the technology adoption model (TAM) and unified theory of acceptance and technology (UTAT) has been widely used by the researchers. Total of forty seven independent variables were studied by various researcher to explain the relationship with dependent variables i.e. behavioural intention to use wallet apps, attitude towards wallet apps, trust in app leading to its adoption and satisfaction leading to continuance usage of the wallet app. Few of the independent variables, for example "perceived ease of use" was studied for more than one dependent variable, therefore sixty relationships for forty seven independent variables were studied. Out of the total sixty-two relationships between independent and dependent variables, few independent variables were studied more often than others. Based on the frequency of being used in the study the sixty independent variables were classified into "well utilized" and "experimental" variables.

Weight analysis was conducted to identify strong predictor of wallet app adoption. It was observed that compatibility, perceived usefulness, subjective norm, individual mobility and innovativeness were the strongest "well utilised" predictors with weights as '1". These were followed by perceived ease of use, perceived risk, perceived security, performance expectancy, trust, compatibility and social influence. These predictors were extensively used and had significant impact on the consumers' attitude and their behavioural intention to adopt mobile wallets.

Experimental predictors are variables used less than three times in the empirical studies reviewed. Independent variables which are classified as experimental predictors need a close scrutiny as a weight of more than 0.5 suggests that they too have a role in explaining the consumer adoption of wallet apps. Consumer is a complex being. Psychologist argues that an individual factor in relation to processing information for app adoption is important and many factors influence the comprehension and solicitation of information (McGuire, 1976). Therefore, it is important for researchers to extend and adapt the existing frameworks to study the adoption behaviour of their consumers. The findings reveal that perceived credibility, perceived cost, transaction speed and convenience, privacy concern are strong predictors of app adoption. These strong experimental predictors suggest further research and study to probe their role in predicting the wallet app adoption by the consumers.

CONCLUSION AND IMPLICATIONS

Over the last few years, advancement in mobile technology has emerged as an area for academicians and marketer to research on. In emerging economies like India, which is characterised by being the second largest user of mobile phones, has a large chunk of unbanked population, rising trend in internet usage and of mobile shopping, create huge potential for e wallet companies. Though the future looks quite promising but with numerous players the market is highly fragmented. Only the wallet providers who know the pulse of their consumers will survive. Therefore, in depth understanding of consumers' motivation to use wallet apps is critical for the success of an entrepreneur (appreneur).

This study presents a cumulative finding of the research carried out in the field of wallet app adoption so far.

Wallet app service providers, start-ups, banks etc are in the fray of capturing a large share of the swelling wallet app market of India. This study provides the wallet appreneurs, the information of factors that determine the app adoption by consumers. To stay afloat in the competitive digital market space of wallet apps the appreneurs need to ensure that they woo the prospective app users and keep them loyal by focussing on the "strong predictors". Strong experimental predictors provide a direction to appreneurs, consultants and researchers to research further the strength of the construct. For instance, constructs like familiarity, perceived credibility and perceived hedonistic value though

not researched extensively have emerged as strong predictors of app adoption. These predictors may give insight about the consumers and therefore gives the appreneurs an edge over the competitors in the fight for market share.

The implication of the study can be summed up as given below:

1. The findings represent the number of predictors which helps in adoption wallet apps, which can be considered by the researchers, marketers, entrepreneurs while they are focusing on various mobile technology activities related to wallet apps' Usage.
2. The experimental predictors which are not much explored yet, but may emerge as a promising predictor if they are further explored in the future studies.
3. Perceived usefulness has emerged as one of the main predictors of the wallet app adoption (Amin, 2009, Zhong et al., 2013), which makes marketers to focus on while they are launching their presence in the market.
4. Attitude of consumes towards wallet app lead to their intention to use wallet app (Schierz, Schilke and Wirtz, 2010; Liébana-Cabanillas, Sánchez-Fernández and Muñoz-Leiva, 2014). So, if the consumers are able to accept the wallet app positively in their lives, this can result in further use of wallet apps.Wallet apps providers must consider users' past experiences, behaviour and their value system in mind while making wallet app as an option of financial transactions and must consistent with the above mentioned (Schierz, Schilke and Wirtz, 2010); (Zhong et al., 2013).
5. Compatibility also emerged as one of the important factors which cannot be ignored.
6. Social influence plays an important role in adoption of wallet app as the consumers are influenced by the society they live in (Ramos-de-luna, Montoro-Rıos and Lie´bana-Cabanillas, 2016). Entrepreneurs may plan promotional campaigns that create positive social influence around the concept of app usage.
7. Factors, such as perceived security (Ramos-de-luna, Montoro-Rıos and Lie´bana-Cabanillas, 2016) and privacy (Musa, Khan and AlShare, 2015) are the major predictors and plays a significant role in adoption of wallet apps. If the consumers are not finding wallet apps as a secure method of doing their financial transactions, they withdraw from the wallet app usage. Thus, wallet app providers must make sure that the applications are robust and the same is communicated well to the prospective users.

LIMITATIONS AND FUTURE SCOPE OF RESEARCH

This paper intends to provide an insight of wallet app adoption with the help of systematic literature review and weight-analysis. However, this study consists of few limitations. The first limitation is that only 30 empirical papers were used in the study as not much published work in the context of app adoption was available. Qualitative papers were studied to gain an insight into the world of wallet app adoption, but they were not included in the study. A more holistic work can be presented by including both qualitative and quantitative studies on app adoption. This study focuses on the customer perspective to capture the technological entrepreneurship success in the market; however, factors like marketers perceptive, merchants' acceptance, and organizational readiness can be explored for the same. Further, lack of accessibility to the right journals related to wallet apps also turned as another obstruction in providing more insightful of this area. The weight-analysis can be further extended by concluding meta-analysis so that more rigid results can be drawn from the study.

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APPENDIX

Table 6. List of independent variables identified from the literature

No.	Independent variable	Definition	Reference
1	Adoption readiness	Adoption Readinessrefers to readiness on an to adopt a new technology.	(Thakur and Srivastava, 2014)
2	Affinity	Affinity is defined as "perceived importance of the medium in an individual'slife".	(Rubin, 1981)
3	Attitude	Attitude which represents a person's evaluation is defined as"a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor".	(Eagly and Chaiken, 1993)
4	Compatibility	compatibility can be understood as the degree to which an innovation is perceived consistent with the values, needs and past experiences ofpotential users.	(Rogers, 1983)
5	Convenience	convenience is defined as as "consumers' time and effort perceptions related to buying or using a service"	(Berry, Seiders and Grewal, 2002)
6	Effort expectancy	Effort Expectancy is the degree to which a person will beable to use a system effortlessly.	(Venkatesh et al., 2003)
7	Facilitating conditions	Facilitating Conditions is the degree to which a personbelieves that an existing infrastructure will support him/her to use a system.	(Venkatesh et al., 2003)
8	familiarity	According to Gefen (2000), familiarity is one of the factors that directly or indirectly influences the use intention of the Internet for both information and transaction purposes.	(Gefen, 2000)
9	Habit	Habit is the degree to which a person tends to performbehavior as an effect of learning.	(Limayem, Hirt and Cheung, 2007)
10	Hedonic motivation	Hedonic Motivation is the degree to which a person getspleasure from the technology he/she uses.	(Brown, S.A. and Venkatesh, 2005)
11	Image	Image is defined as the degree to which an individual believes that use of a technology will enhance his or her status in a social system.	(Venkatesh and Bala, 2008)
12	Individual mobility	mobility i.e., ability to access to the roaming time throughwireless mobile networks.	(Hossain, Hossain and Jahan, 2018)
13	innovativeness	Innovativeness is the tendency for an individual to be a pioneer in adopting new technologies or being an opinion leader in relation to technology.	(Rogers, 2003)
14	Interconnection	interconnect refers to connecting one mobile payment application with other applications and other payment methods and their accounts.	(Zhong et al., 2013)
15	Internet experience	Experience can affect people's attitudes towards new phenomena, new context, or new situation (Bandura 1977).	(Su, Wang and Yan, 2018)
16	Knowledge about wallet apps	Knowledge refers as a combination of instincts, ideas, rules and procedures that guide actions and decisions (Alter, 2002).	(Alter, 2002)
17	Mobile service quality	Mobile banking service quality refers to a global consumer judgment of the quality and excellence of mobile content delivery in the context of mobile banking.	(Puriwat and Tripopsakul, 2017)
18	Output quality	Output quality is the degree to which an individual believes that the system performs tasks necessary to his or her job.	(Venkatesh and Bala, 2008)
19	Promotional benefits	Promotional Benefits may include various kinds of benefits such as app download cash rewards, coupon codes, cash discounts, loyalty points and other freebies which are offered by companies involved in providing mobile wallet services.	(Madan and Yadav, 2016)
20	Perceived credibility	perceived credibility is one's judgment on the privacy and security issues.	(Amin, 2009)
21	Perceived ease of use	It is defined asthe belief that the individual forms regarding the absence of effort in learning to use a new technology.	(Ramos et al., 2018)

Table 6. Continued

No.	Independent variable	Definition	Reference
22	Perceived regulatory support	PRS may be defined as the degree to which consumers believe in the prevailing regulatory framework's capability to safeguard their interests, in the cases of any disputes arising at any stage, while performing a mobile wallet transaction	(Madan and Yadav, 2016)
23	Perceived enjoyment	Enjoyment is defined as perceived intrinsic motivation based on the pleasure or fun experienced when using an electronic device.	(Puriwat and Tripopsakul, 2017)
24	Perceived fee (perceived cost)	Monetary expenses for using mobile payments.	(Yang et al., 2012)
25	Perceived relative advantage	Relative advantage refers to the degree to which an innovation is perceived as providing more benefits than its predecessor	(Moore, C. and Benbasat, 1991)
26	Perceived risk	Perceived risk can be defined as "a consumer's perception about the uncertainty and the adverse consequences of a transaction performed by a seller".	(Gupta and Kim, 2010)
27	perceived usefulness	The construct perceived usefulness expresses how much an individual considers that a technology can improve their productivity or performance in a given task.	(Davis, 1989)
28	Performance expectancy	Performance Expectancy is the degree to which a personbelieves that using a system will improve his/her job performance.	(Venkatesh et al., 2003)
29	Privacy	Information privacy is defined as "the ability (i.e. capacity) of the individual to control personal (vis-a-vis other individuals, groups, organizations, etc.) information about one's self".	(Stone et al., 1983)
30	Price value	Price value is about a person's perception of the cost he/shespends to use a system toward its perceived benefits.	(Dodds, Monroe and Grewal, 1991)
31	Result demonstrability	Result Demonstrability refers to"the degree to which pharmacist believes that the results of using a system are tangible, observable, and communicable".	(Ng et al., 2015)
32	Rewards	Rewards, in the form of tangible benefits (monetary incentives, coupons, free sample gifts, sweepstakes etc.), can motivate consumers.	(Aydin and Burnaz, 2016)
33	Satisfaction	Satisfaction is a general evaluation of a product whether that product meets the customer need and want or not.	(Hossain, Hossain and Jahan, 2018)
34	Self-efficacy	Self-efficacy (SE), when applied to the mobile domain, is defined as the degree to which an individual believes that he or she has the ability to organize and execute courses of action to accomplish a particular task/job using mobile device.	(Compeau and Higgins, 1995)
35	Social influence	The degree to which an individual's behavior is influenced by reference group and degree to which reference group perceives appropriateness of usage of mobile money services is termed as social influence.	(Unnikrishnan and Jagannathan, 2017)
36	Subjective norm	SN refers to the degree to which an individual pays attention to and is influenced by the opinions of people who are important to him/her while considering a particular activity (Fishbein &Ajzen, 1975).	(Fishbein and Ajzen, 1975)
37	Transaction convenience	It refers to the convenience experienced by consumers in using technology.	(Chen and Nath, 2008)
38	Transaction speed	The extent to which consumers perceive that improves Speed (TS)the speed of transaction.	(Chen and Nath, 2008)
39	Trust/perceived security	Mayer et al. (1995) defined trust as the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trust or irrespective of the ability to monitor or control that other party.	(Mayer, Davis and Schoorman, 1995)
40	Utilitarian attitude	Utilitarian value is defined as "assessment about the instrumental value of the brand's functional attributes" (Batra and Ahtola, 1991).	(Batra and Ahtola, 1991)

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