Acceptance of mobile money by poor citizens of India: integrating trust into the technology acceptance model

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Abstract

Purpose – *The purpose of this paper is to understand the acceptance of mobile-money (m-money) among target populations, i.e. below-poverty-line citizens in India, using the technology acceptance model (TAM). The m-money service is a major initiative that can enable the provision of low-cost and speedy money transfer through mobile phones, especially in developing countries such as India. For a large section of the population in India, m-money can act as a way to achieve financial inclusion. However, for m-money to succeed, users should accept the initiative wholeheartedly.*

Design/methodology/approach – *The survey data were collected from 225 actual and prospective m-money users and analysed using partial least square technique.*

Findings – *The findings imply that the trust and the core constructs of TAM such as perceived usefulness, trust and attitude towards usage contribute in influencing the intention to accept m-money. Perceived ease of use neither impacts perceived usefulness nor attitude towards usage.*

Practical implications – *This research also provides possible explanations for the significant relationships between the constructs and discusses how this information can be used to enhance the acceptance of m-money among poor Indians.*

Originality/value – *This research is original and is based on primary data collection and its interpretation. It provides thorough empirical insights on the acceptance of m-money among poor Indian citizens which is currently a weakly addressed and empirically less explored area of research.*

Keywords *India, Inclusion, Poverty, Citizen, Mobile money*

Paper type *Research paper*

1. Introduction

Today, mobile phones are considered a vital tool for carrying out personal and professional activities (Masamila *et al.*, 2010). One of the emergent services, mobile-money (m-money), facilitates financial transactions such as remittance and transferring bills. It has evolved successfully in developing countries (Aker and Mbiti, 2010). Such services have the potential to integrate poor population with the financial system. A significant proportion of the population in developing countries such as India lives below the poverty line; however, even these poor people encounter the need to conduct safe and secure financial transactions such as remittance (Pope *et al.*, 2011).

Across the world, the number of mobile phone users has exceeded the number of people with bank accounts (Tobbin, 2012). In India, there are more than 900 million mobile phone subscribers (Telecom Regulatory Authority of India, 2014). The low-end mobile usage is likely to be high in India (Donner and Tellez, 2008), while the traditional connectivity options such as Internet services at home are not affordable (Pope *et al.*, 2011). Majority of the mobile phone users are poor, and this user base has the potential to produce the critical mass for m-money services (Pope *et al.*, 2011). M-money seems to be the best way to achieve the objective of financial inclusion for people below poverty line.

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In India, the expansion in mobile services, including m-money, is attributed to the recent investments in telecom infrastructure (Pope *et al.*, 2011). Bharti Airtel, an Indian multinational telecommunications services company was granted a licence to provide mobile payment services by Reserve Bank of India in 2010 (Reuters, 2010). Other operators have followed suit, e.g. Vodafone launched m-money service M-Pesa in India, which is immensely popular in African countries (NDTV Gadgets, 2013). In Kenya, M-Pesa, the m-money service, is used by more than 17 million citizens which is equivalent to more than two-third of its adult population. It transfers equivalent of around 25 per cent of country's gross domestic product (Economist, 2013). Similar success of m-money services can be achieved in India only if it is accepted by the citizens as the lack of acceptance may render such services to be fruitless.

Despite various advantages, lack of trust in a system can act as a potential obstacle to the extensive use of any technical innovation (Dahlberg *et al.*, 2003; Bélanger and Carter, 2008). Trust is the expectation that the trusted party will accomplish the task reliably (Sitkin and Roth, 1993). Some studies have studied trust's effects on acceptance of an information system (Choi and Kim, 2012; Schaupp and Carter, 2005; Xenakis and Macintosh, 2005). However, the dearth of research on understanding implications of trust on the acceptance of m-money in India makes it worthwhile to study.

As m-money is getting popular in developing countries, gaining an understanding on its hitherto sparsely studied acceptance underscores the importance of conducting this research. This research intends to fill this gap by using Technology Acceptance Model (TAM) (Davis, 1989). TAM has been a widely used tool for evaluating the acceptance of any information system (King and He, 2006). Along with utilising the core constructs of TAM, this research also integrates trust as a potential determinant for the acceptance. The results of this research provide key insights for the researchers and practitioners, specially the m-money service providers.

2. Literature review

2.1 M-money

The rapid introduction of mobile phones in developing countries is attributed to the fallen price of mobile phones and introduction of prepaid cards (Orozco *et al.*, 2007). The increased penetration of mobile phones among poor population is the key thrust behind emergence of such systems. A large number of poor people in the developing countries move away from their hometown for earning their livelihood. In such cases, they have a need to send money to their family members on a regular basis. Money transfer for the poor population can be very difficult and expensive process. In such cases, m-money can act as a suitable medium to enable financial services for them (Must and Ludewig, 2010; Pope *et al.*, 2011; Aker and Mbiti, 2010).

The objective of m-money is to enable person-to-person and person-to-merchant payments using mobile phones without the need to have bank accounts and costly equipment. The key motivations behind m-money introduction are financial inclusion and promotion of inexpensive mean of financial transaction which is easy to use, secure and convenient (Kumar *et al.*, 2011). In a typical setting, purchase of the electronic money (e-money) from an agent of a bank or mobile phone operator leads to the creation of a "pseudo account". The user can then send the e-money to another person who can get the money from his or her local agent (Aker and Mbiti, 2010).

Poverty also correlates with the poor education; therefore, Medhi *et al.* (2009) conducted a study to find what kind of usability interface is best suited for the purpose. Their study found that non-text designs (rich multimedia and spoken dialogue systems) are better as compared to the text-based designs. Mas and Morawczynski (2009), in their study, found that the usability of the interface of m-money should be kept very simple so that it is easy to understand and use. They also articulated that m-money is used by the people to store

the money safely; however, the shortcoming is that, unlike banks, it does not earn the users any interest. Pope *et al.* (2011) conducted a study to find m-money's current state in various countries such as India, USA, Hong Kong and Singapore. For India, they found that m-money will be of immense benefits for the poor population. However, India's diverse demographic nature will require individualised market implementation strategies.

If, in a country, more than 70 per cent people pay digitally, there can be above 85 per cent financial inclusion (Bill and Melinda Gates Foundation, 2013). A study by McKinsey that was commissioned by Bill and Melinda Gates Foundation discovered the issues in payment system of the Government of India. The study found that if all the government payments flow electronically in India, the government can save US$22.4 billion every year which is approximately 8 per cent of the total flow of the payment between government and citizens (Lochan *et al.*, 2010).

2.2 Technology acceptance model

TAM is one of the most extensively used models in information systems research, partly because of its simplicity and understandability (King and He, 2006). It examines the impact of technology on human behaviour. The model was originally proposed by Davis (1989) and has its roots in cognitive psychology. It was adapted from a psychological theory, a theory of reasoned action (Fishbein and Ajzen, 1975) that explains human behaviour in accepting an information system (Hu *et al.*, 1999).

Davis (1989) articulated that the intention of using an information system drives the actual use. The perceived ease of use (PEOU), attitude towards use (ATU) and perceived usefulness (PU) explain the intention of a user to use the system. PU and PEOU are defined as "the degree to which a person believes that using a particular system would enhance his or her performance" and "the degree to which a person believes that using a particular system would be free of effort", respectively. ATU is defined as "the degree to which an individual evaluates and associates the target system with his or her job" (Davis, 1993).

The adoption of information systems and services has been extensively explained by using TAM and its new, advanced extensions, such as the TAM2 (Venkatesh and Davis, 2000), TAM3 (Venkatesh and Bala, 2008) and the unified theory of acceptance and use of technology (Venkatesh *et al.*, 2003). TAM and TAM2 have received considerable attention as predictors of the acceptance of information systems (Sun and Zhang, 2006). Comparative studies have also confirmed the supremacy of TAM over other models and theories on behavioural intention (Mathieson, 1991).

The major element affecting the intention to use an information system is the ATU, which is affected by PEOU and PU, which are the major beliefs of a user. Characteristics of the system or external factors affect the cognitive factors PEOU and PU (Davis, 1989). There is evidence in the literature demonstrating a positive impact of PU on ATU (Davis, 1989; Venkatesh and Davis, 2000). There are studies showing a positive impact of ATU on the behavioural intention (BI) to use (Davis, 1989) and PU on BI (Luarn and Lin, 2005). Furthermore, studies also show that PEOU has a direct impact on ATU and PU (Davis, 1989; Chen *et al.*, 2002).

Information technology (IT) has the potential to facilitate the social, political and economic growth in a developing country (Lin *et al.*, 2011). Given the immense potential benefits of a successful m-money system, it is very critical to study the acceptance of m-money among the poor citizenry of the developing countries such as India.

3. Research model and hypotheses

A review of the literature on m-money reveals that it grew in response to the need of providing financial services to the poor population. These services intend to offer various benefits. It is a cheaper alternative for transferring money quickly and safely, e.g. Money transfer by M-Pesa in Kenya costs one-half to one-third of the alternative services of money

transfer (Donovan, 2012). M-money is not only a money transfer system but has emerged as a payment platform where payment can be sent or received by hospitals, schools and firms (Aker and Mbiti, 2010).

Although m-money does not provide all the advantages of banking and financial systems, such as interest on savings, credit and insurance on the value stored in the mobile account, it provides the advantage of money transfer to the far-flung urban or rural areas (Aker and Mbiti, 2010). Liquidity and speed are the key advantages of m-money. Thus, m-money services help in improving the productivity and enhancing the efficiency by avoiding lengthy queue times, reducing the transaction cost, reducing leakage and improving security (Donovan, 2012; Lochan *et al.*, 2010).

Investigation on the M-Pesa users in Kenya found that they are better able to manage financial shocks due to flexibility and ease of access (Stuart and Cohen, 2011). They can receive more remittance in less transaction costs, while eliminating the possibility of theft or leakage (Jack and Suri, 2014). This leads us to believe that m-money is very useful for the poor population. Additionally, PU is established as one of the major factors impacting ATU for an information system (Davis, 1989). Thus, we hypothesise that:

H1. Perceived usefulness of m-money has a positive effect on the user's attitude towards use.

The m-money interface should be simple and easy to understand because the technological sophistication and literacy rate in India are low (Mas and Morawczynski, 2009; Pope *et al.*, 2011; UNICEF, 2006). The ease of use of an information system can impact its usefulness and user's attitude. Therefore, it is highly important to educate the users of m-money at the point of sale. There are a number of studies that demonstrate the positive and direct impact of the PEOU on ATU and PU and ATU on BI to use (Chen *et al.*, 2002; Hung *et al.*, 2005; Davis, 1989; Schierz *et al.*, 2010; Lee and Kim, 2009; Yang and Yoo, 2004). Thus, the following hypotheses are proposed:

H2. Perceived ease of use of m-money has a positive effect on the user's attitude towards usage.

H3. Perceived ease of use of m-money has a positive effect on its perceived usefulness.

H4. User's attitude toward using m-money positively affects behavioural intentions to use.

There are a number of studies employing trust in the TAM (Pavlou, 2003; Gefen *et al.*, 2003; Ha and Stoel, 2009). Trust has been defined differently in various studies. A highly cited study defines trust as a set of expectations shared by all those in an exchange (Zucker, 1986). Trust lets the trusting party believe that the trusted party will not act opportunistically (Teo *et al.*, 2008). The people using m-money represent the trusting party and m-money service provider is the trusted party. If the trusted party breaks or seems to break the trust of m-money users, it can put a negative impact on its acceptance. The lack of trust and uneasiness of parting with own money may prevent someone from accepting such services (Donovan, 2012). Peoples' belief that the use of m-money will keep their hard-earned money safe and help them in using it whenever required will drive their acceptance for the m-money. Hence, the users' perception of trust can impact the adoption of m-money transfer (Tobbin and Kuwornu, 2011).

Further, m-money is a safer alternative than keeping the cash. M-Pesa studies have found reduction in the cases of mugging because of less availability of cash. Thus, m-money helps in maintaining privacy and autonomy because of invisibility of cash (Donovan, 2012). It also enables women to save money from any interference of their male counterparts and vice versa (Morawczynski, 2009). People should be made aware of such benefits, as it can create a trustworthy value proposition for the m-money. Thus, we hypothesise that:

H5. Trust in m-money has a positive effect on its perceived usefulness.

H6. Trust in m-money has a positive effect on the user's attitude.

Figure 1 depicts the proposed research model for this study.

4. Research methodology

4.1 Measurement development

The items for the core constructs of TAM (PU, PEOU, ATU and BI) were adapted from the existing TAM studies (Davis, 1989; Wu, 2011; Igbaria *et al.*, 1997; Venkatesh *et al.*, 2003; Venkatesh and Davis, 2000; López-Nicolás *et al.*, 2008). Items pertaining to trust (TR) were adapted from Fogel and Nehmad (2009). Literature review and interviews with the experts in the field led us to finalise a total of 17 items for this research (Table I). The survey instrument used a seven-point Likert-type scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". A pre-test was performed on 57 prospective and current users of m-money. The reliability of the questionnaire in the pre-test was confirmed as the values of Cronbach's alpha were found higher than 0.7.

Figure 1 Research model

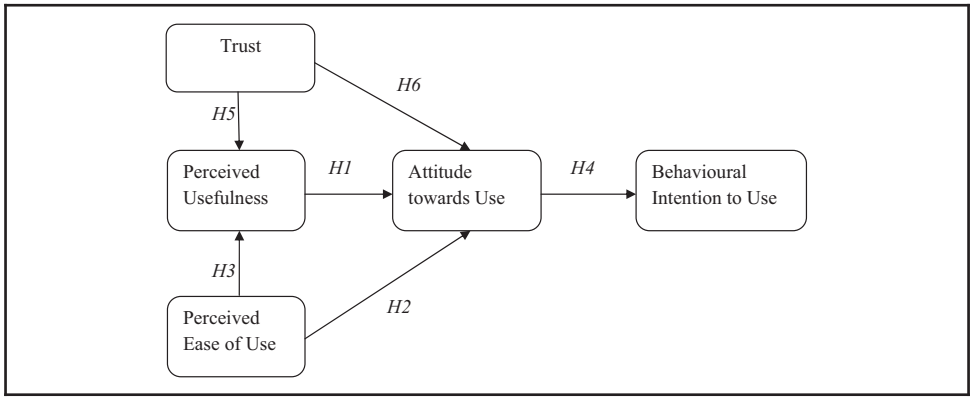

Table I Constructs and measurement items

Construct	*Measurement items*	*Description*
Perceived usefulness (PU)	PU1	I believe m-money reduces turnaround time to transfer money
	PU2	I believe m-money is useful
	PU3	I believe m-money enables the transfer of money at low cost
	PU4	I believe m-money makes money transfer easy
Perceived ease of use (PEOU)	PEOU1	I believe m-money is easy to use
	PEOU2	I believe m-money is simple and understandable for performing transactions
	PEOU3	I believe that the use of m-money is trouble-free
Attitude toward using (ATU)	ATU1	I have a favorable attitude toward using m-money
	ATU2	I believe that the use of m-money is beneficial
	ATU3	I like the idea of transferring money through m-money
Behavioral intention to use (BI)	BI1	I will certainly use m-money to send money
	BI2	If I were asked about my opinion on m-money, I would say something favorable
	BI3	I intend to use m-money as often as possible
Trust (TR)	TR1	M-money is a trustworthy service
	TR2	I can count on m-money to protect my money
	TR3	I can count on m-money to transfer my money safely
	TR4	The m-money can be relied on to keep its promises

4.2 Sampling and data collection

The survey in Hindi language was administered to prospective and current users of m-money who held below-poverty-line (BPL) cards. BPL cards are issued by the Government of India for the poorest of the citizens, the same section that could benefit from the m-money. Literate people filled their survey themselves, while, for illiterates, help was provided. A total of 278 people participated in data collection process, out of which 225 completely answered questionnaires were gathered at the end of the data collection process. Table II lists the sample characteristics.

5. Data analysis and results

Partial least square (PLS) path modelling using SmartPLS 2.0 software was used in this study to test the aforementioned hypotheses. PLS, a structural equation modelling (SEM) approach, aids in analysing the causal research models comprising multiple constructs with multiple items (Lai *et al.*, 2009). PLS tests the measurement and path models simultaneously. The major advantage of PLS is the possibility of testing the model with a minimum sample size of only 30 (Wixom and Watson, 2001). Compared with other SEM approaches, the strength of this approach lies in its flexibility for distributional assumptions and handling complex predictive models (Chin and Newsted, 1999).

5.1 Measurement model

We tested reliability and construct validities (convergent and discriminant validities) in the measurement model. The reliability of the model was confirmed, as the values of Cronbach's alpha were higher than 0.7. For convergent validity, the values of composite reliability and average variance extracted (AVE) should be greater than 0.7 and 0.5, respectively (Bagozzi and Yi, 1988; Fornell and Larcker, 1981; Hair *et al.*, 2010). Table III shows that there is high reliability and convergent validity for each construct. Further, for the discriminant validity, the value of square root of AVE should be higher than the inter-construct correlation values (Chin, 1998). In Table IV, the square roots of AVE are placed as the diagonal values and the inter-construct correlations as the off-diagonal values, indicating the discriminant validity.

Table II Sample characteristics

Variable	*Category*	*No. of respondents*	*(%)*
Age (years)	Under 20	30	13
	20-30	107	48
	30-40	46	20
	40-50	24	11
	Over 50	18	8
Gender	Male	168	75
	Female	57	25

Table III AVE, composite reliability and Cronbach's α

Construct	*AVE*	*Composite reliability*	*Cronbach's* α
ATU	0.76	0.91	0.84
BI	0.77	0.91	0.85
PEOU	0.7	0.87	0.8
PU	0.66	0.89	0.83
TR	0.61	0.86	0.79

Table IV Inter-construct correlations

Construct	*ATU*	*BI*	*PEOU*	*PU*	*TR*
ATU	0.87	0	0	0	0
BI	0.34	0.88	0	0	0
PEOU	−0.12	−0.02	0.84	0	0
PU	0.31	0.21	−0.08	0.81	0
TR	0.28	0.36	−0.08	0.19	0.78

5.2 Path model

The hypotheses (*H1–H6*) were examined using PLS bootstrapping with 1,000 samples of same size ($n = 225$). The path coefficients and *t*-statistics presented in Table V were used to deduce the relationships between constructs.

The statistical results supported *H1*, showing that the PU of m-money had a significant positive influence on ATU ($\beta = 0.26$, $p < 0.001$). *H2* was not supported, demonstrating that PEOU of m-money was not significantly correlated with ATU ($\beta = -0.09$). PEOU of m-money was not shown to have any significant impact on PU ($\beta = -0.07$, $p < 0.001$), not supporting *H3* despite the fact that various studies have empirically verified that PEOU works as an antecedent of PU (King and He, 2006). *H4* was supported, i.e. ATU positively impacts BI ($\beta = 0.34$, $p < 0.001$). *H5* was supported, i.e. TR in m-money was statistically significantly correlated with PU ($\beta = 0.18$, $p < 0.05$). *H6* was also supported, demonstrating that a higher level of TR results in higher ATU ($\beta = 0.22$, $p < 0.001$).

6. Discussion and implications

M-money is being used in developing countries for financial inclusion and improving the ability to transfer money. Literature shows that m-money can be very useful for the poor population due to less transaction costs, speedy process and safety of money (Donovan, 2012; Lochan *et al.*, 2010). However, its success will be truly dictated by its acceptability by the poor population, which is the focus of this research, which examines m-money acceptance by using TAM. The results of this research imply that the core constructs of TAM except PEOU have a strong influence on poor Indians' intention to accept m-money. The analytical results also show that the trust in m-money also impacts its acceptance.

In this research, the perceived usefulness of m-money was found significantly impacting attitude to use it. This finding was in consistency with the existing TAM studies (Hung *et al.*, 2013, 2006; Hamner and Qazi, 2004;). It implies that if poor people are made aware of m-money's usefulness such as transferring money quickly and safely at low cost, it will provide a push for its use as "significance precedes momentum" (Kelly, 1997). For this to happen, the service providers should also strive to incorporate features that users find useful. Further, the service providers have to ensure that there should be conscious and focussed efforts on spreading the message of usefulness of m-money to its potential users through a focussed marketing strategy.

Table V Path coefficients, *t*-statistics and *p*-value

Hypotheses	*Paths*	*Coefficient path*	t-*statistics*	*Results*
H1	PU → ATU	0.26	4.04**	Supported
H2	PEOU → ATU	−0.09	1.17	Not supported
H3	PEOU → PU	−0.07	0.78	Not supported
H4	ATU → BI	0.34	5.86**	Supported
H5	TR → PU	0.18	2.99*	Supported
H6	TR → ATU	0.22	3.87**	Supported

Notes: $^{**}p < 0.001$; $^{*}p < 0.05$

As more and more people start using m-money, they will help in spreading this message by word of mouth. Hence, the focus should be on spreading the significance of m-money, so that m-money gains significant momentum.

According to the results, once the users have attitude towards using m-money, the BIs to use it will follow as per the results of this study. Further, in addition to studying the impact of core constructs of TAM, this study investigates the impact of trust. Trust was found to be significantly impacting attitude towards using m-money and its perceived usefulness. With respect to trust, the findings of this research are compatible with the findings of existing studies (Hung *et al.*, 2013; Robert *et al.*, 2009; Lowry *et al.*, 2008). Poor people may be sceptical about m-money, and, hence, there should be a conscious effort to educate users on m-money's safety feature. A tighter controlled regulatory policy around security of transactions, leading to lack of fraud cases, will contribute to enhanced trust in m-money. Mobile companies should invest in the safety infrastructure to ensure user trust in m-money.

Surprisingly, the PEOU was found to be impacting neither attitude towards using m-money nor its PU. These findings were in line with the existing studies (Hung *et al.*, 2013, 2006; Hamner and Qazi, 2004). This implies that even if sending money via m-money is easy, it does not contribute to its acceptance. Thus, although intuitively ease of use is important for the poor and less literate or illiterate people, only enhancing ease of use would not result into increased acceptance.

7. Conclusion

This research addresses the acceptance of m-money by the poor population in India using TAM. This research has taken a step further by integrating the impact of trust in TAM. The proposed model provides the insights on how different factors affect the acceptance and the use of m-money. The survey data were collected from 225 actual and prospective users of m-money to test the hypotheses empirically. We found strong support for most of the hypotheses in the proposed research model. This information may be used to leverage the promotion of m-money. The study also provides the possible explanations for the significant relationships among constructs, and it explains how this information can be utilised to improve acceptance of this initiative among poor Indians.

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