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INTENTION TO USE MOBILE WALLET: EXTENSION OF TAM MODEL

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Abstract

Purpose – The purpose of this study is to examine the university students' intention to use mobile wallets (M-Wallet), in this era of rapid technological advancement, using Technology Acceptance Model (TAM) as the basis. In addition, it is also meant to analyse if cash crunch could be considered as an independent factor contributing to the model.

Design/methodology/approach – In total 439 university students from a reputed Indian University. A survey questionnaire was competed reflecting their responses to five constructs viz., their Intention to use mobile wallets, Subjective norms, Awareness, Perceived security and Cash crunch. A structural equation modelling (SEM) method was used for modelling and data analysis.

Findings – The results from the findings led to the revelation that the model employed is a fairly efficient model to study the intention of the Indian university students to use mobile wallets. The proportion of variance explained in University students' intention to use Mobile wallets by its antecedents was 50 percent. In addition, ten out of eleven hypotheses were supported in this study. Further, the data gathered in this study indicate that the model employed has the potential to help in understanding mobile wallet adoption by University students in India, in general.

Originality/value – The model was built with TAM as a base which is a recognised and well-tested model to analyse and grasp the intention to use technology. However, information on its cross-cultural validity is limited. The model employed in this study on a sample of University students validated the

cash crunch as an independent variable and the results indicated that Cash Crunch Technology Acceptance Model (CCTAM) could be an extension of TAM as a model.

Keywords: Technology Acceptance Model, Structural Equation Model, Mobile Wallet, Cash Crunch, Demonetisation

Introduction

Disrupting the traditional payments, mobile payment service is fast becoming important component for financial inclusion in emerging economies. Rapid adoption of smartphones throughout the world has resulted in path breaking integration of innovative payment services. With the increased acceptance at merchant's place, mobile payment services have dislodged the cash from its seat.

From an installed base of about 4 billion in 2016, the global smartphones are expected to grow to about 6 billion by the year 2020. Usage of smartphones for payment services is set to grow above 5 billion in emerging economics in the same period. Globally, Asia continues to account for the majority of the consumer spending in the apps market [1]. Indian smartphones market is growing at a rapid pace with the quicker adoption of technology by the younger generations. It is also estimated that the smartphones users in India would be above 260 million by 2017 which is nearly 20% more than the year 2016 [2]. Mohd Suki (2013) found that there is a strong relationship between students' purchase behaviour and their dependence on smartphones. According to the TCS (2016) survey, students most preferred channel was smartphones ahead of laptops and desktops. Elogie (2015) found that ease of availability and ease of use (used as

variables in its study), have universally ingrained smartphones into everyday activity of the students.

Apart from payments, consumers also store offer coupons, business cards etc., in their smartphones. Usage of smartphones like a leather wallet is called as 'Digital Wallet' or commonly known as 'Mobile Wallet'. More than 50% of the customers prefer Debit/Credit cards, net banking or mobile wallets. Apps are preferred to mobile websites by the customers to shop from their phones [6]. Cole et al (2009) enumerates the opportunities like holding coupons, loyalty cards and electronic receipts, and the challenges like user interfaces, business models, standards, interactions among wallet contents and services, exploiting user context, identifying user intent, lifecycle management etc., in the design of mobile wallet as a substitute for a physical wallet. Patel (2016) found that students' perception about the usefulness of the mobile wallet services could increase the efficiency of buying. Much before demonetisation in India, state private universities like PES University have adopted digital and cashless modes of receipts and payments. Students receive scholarship through RTGS or Cheques. Students charge their identity cards (ID) with digital money and buy foods items and stationery across the stores inside the University campus. Mobile credit card offers alternative ways of payments compared to cash or traditional credit card [9]. The accomplishment of mobile payments and mobile wallets is largely dependent on in view of the mobile industry from an ecosystem perspective, where consumers although crucial represent only as single actor, and mobile payment providers, merchants, financial institutions, technology providers, and the role of government must be taken into account correspondingly. (Amoroso et al, 2012). Post-demonetisation, Indian mobile wallet market has benefited by significant increase in the volume of transactions. The prospects of mobile wallet market in India would be further boosted by promoting cashless payments to fill the gap that exist between the scrapped currency and remonetised currency. M-wallet transactions in India are likely to yield over 160 per cent of compounded annual growth rate (CAGR) rising from over half a billion in FY16 to 260 billion by FY22 driven by rising usage of smartphones, strong mobile internet penetration and

development of e-commerce sector together with increasing disposable incomes [11]. Demonetisation has disrupted the Indian economy by leaving some of the economically weaker sections of society in a significantly grave situation. Hence managing the currency transition becomes important [12]. As a part of financial inclusion mobile payments are accepted in the developing countries to improve the money transfer facility [13]. Users of telecommunication services get benefits from mobile payment such as the saving time, new user experiences and convenience (De, et al 2016).

TAM has been widely put into use by the researchers to predict and foresee the acceptance of technology ever since Davis (1989) introduced it. Individuals behaviour about acceptance of IT has been explained by TAM [16]. TAM has been used by researchers in various studies such as university students [17], administrative staff [18], adoption of 3G phones (Senthil Velmurugan, et al 2014), digital library system (Park, et al, 2009), school teachers (Jen-Hwa Hu, et al 2003) to name a few.

Cash crunch as Independent variable

Immediately after the Indian government announced demonetisation of the old Rs. 1,000 and Rs. 500 notes, people in India formed lengthy queues in front of the banks and ATMs that unleashed bedlam [22]. Cash shortage, post-demonetisation announcement, has disrupted the lives and economic activities of the common man. However, the battle of the government to fight against the black money and corruption has been endorsed by many people in India [23]. Post-Demonetisation, providers of digital payment services came out with ground-breaking ways to appeal to a huge mass. These mobile wallet companies attracted kirana stores, mom-and-pop stores, retail stores etc., to register with them to enable accepting mobile payments from their customers using mobile wallets [24].

Aim of this study

The goal of this study to analyse the university students' intention to use mobile wallets (M-Wallet), in this era of rapid technological advancement, using Technology Acceptance Model (TAM) as the base. Besides, it is also envisaged meant to analyse if cash crunch could be considered as an independent factor and variable influencing the model. With the ever-growing popularity of use of communication

technologies and IT at the individual as well as institutional levels in India, instant changes are taking place in E-commerce. A notion stating effective shaping of the student's intention to use technology could be done at this stage as well. A handful of researchers have studied the TAM model to describe the intention of use technology amongst students. The results from this study will conceivably help us understand the relationships among the TAM constructs when applied to a bigger Indian sample.

The research questions mentioned below are proposed:

- RQ1. Is the TAM an efficient model to explain Indian Students' intention to use mobile wallet?
 RQ2. Which are the significant relationships among the constructs in the TAM in explaining Indian Students' intention to use mobile wallet?
 RQ3. Whether cash crunch can contribute as an Independent variable?

From the TAM, the following hypotheses were formulated.

- H1. Subjective norms (NORMS) will have a significant influence on intention to use (IOU).
 H2. Awareness (AWAR) will have a significant influence on intention to use (IOU).
 H3. Cash Crunch (CASHC) will have a significant influence on intention to use (IOU).
 H4. Perceived Security (SECU) will have a significant influence on intention to use (IOU).
 H5. Subjective norms (NORMS) will have a significant influence on Perceived Security (SECU).
 H6. Awareness (AWAR) will have a significant influence on Perceived Security (SECU).
 H7. Cash Crunch (CASHC) will have a significant influence on Perceived Security (SECU).
 H8: Perceived security mediates the positive effects of Awareness on intention to use
 H9: Perceived security mediates the positive effects of Subjective norm on intention to use
 H10: Perceived security mediates the effects of Cash Crunch (CASHC) on intention to use
 H11: The positive effect of Perceived Security on Intention to use is different for male and female

Research design

Structural equation modelling (SEM) is here used for testing and validating models that contains observed and latent variables. In

addition, SEM model provides exact and reliable measurements at the item and construct levels by measurement of errors. A two-step procedure for SEM was implemented in this study. As such, involvement of testing the measurement model before the structural model [25].

Participants and procedure

Respondents in this study were 439 Students at PES University, South of India. All the respondents registered in the under-graduation programs had access to a Smartphone. All the participants were volunteers without compensation of any kind. Instructions for finishing the task were presented as an introduction in the [Questionpro](#) link and respondents took an average time 8 to 12 minutes to finish the questionnaire. Participants were informed about the purpose of this study through the detailed instructions in the questionnaire, and also their right to pull out from the study at any time during or after the study.

Measures

A questionnaire tool was implemented for this study. It consisted of two sections, of which the first section needed the participants to provide their demographic information and the second contained 15 statements on the five constructs in his study. They are: Subjective norms (NORMS) (three items), Awareness (AWAR) (three items), Cash Crunch (CASHC) (three items), intention to use (ITU) (four items) and Security (SECU) (three items). A 5-point Likert scale with 1 being strongly disagree and 5 being strongly agree was used to measure each item. The Cronbach alphas were: 0.789 for AWAR; 0.825 for NORMS; 0.820 for CASHC, 0.809 for IOU and 0.773 for SECU.

Results

Descriptive statistics

All means were more than the mid-point of 3.00 and the small standard deviation values indicated a narrow spread around the mean. The use of the maximum likelihood estimation (MLE) procedure to assess the measurement model presumed multivariate normality of the observed variables. The skewness and kurtosis indices reflected an acceptable degree of univariate normality for the purposes of structural equation modelling [26].

Test of the measurement model

All items estimated in the measurement model are significant at the p, 0:05 level. Range being from 0.62 to 0.88, signifying convergent validity at the item level. The average variance extracted (AVE) for all constructs were above 0.50 and above, and all Cronbach alphas were 0.70 and above, demonstrating acceptable reliability [27] and convergent validity at the construct level [28].

To avoid erroneous interpretation, researchers recommended using different categories of indices to evaluate for model fitment. These included the χ^2 the ratio of the χ^2 statistic to its degree of freedom, with a value of less than 3 indicating acceptable fit. Other goodness-of-fit indices included the Tucker–Lewis index (TLI), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Hu & Bentler (1999) proposed that TLI and CFI statistics greater than .95 represent a good model fit. As for RMSEA and SRMR, values with less than .06 and .08, respectively, are good. The test of the measurement model revealed that the Extended TAM has a good fit to the sample data [$\chi^2=164.297$; $\chi^2/\text{df}=2.080$; TLI= 0.952; CFI= 0.964; RMSEA=0.050; PCLOSE= 0.506; SRMR=0.0431].

Results of the Confirmatory Factor Analysis.						
	Item	U E	S E	t Val ue	CR	AV E
IOU	1Intention touse	1. 00			0.7 94	0.5 63
	2Intention touse	1. 23	.1 11	11.0 70		
	3Intention touse	1. 31	.1 12	11.7 22		
NOR MS	1Norms	1. 00			0.7 55	0.5 10
	2Norms	.8 95	.0 58	15.5 61		
	3Norms	.7 75	.0 54	14.4 64		
CAS HC	1CashCru nch	1. 00			0.8 28	0.6 17
	2CashCru nch	.9 12	.0 63	14.4 00		
	3CashCru nch	.9 46	.0 66	14.2 79		

AW AR	1Awarene ss	1. 00			0.8 21	0.6 06
	2warenes s	.9 76	.0 72	13.6 13		
	3Awarene ss	.6 80	.0 54	12.6 26		
SEC U	1Security	1. 00			0.7 50	0.5 11
	2Security	1. 32	.1 37	9.60 5		
	3Security	.8 74	.0 77	11.3 41		

Analysis of the Structural Model and Hypothesis Testing

The analysis results are shown in the table below. The path coefficients were examined for their direction, magnitude, and statistical significance. From the mentioned path coefficients, all the hypotheses apiece in this study was either supported or rejected. There was a good fit for the structural model [$\chi^2=164.297$; $\chi^2/\text{df}=2.080$; TLI= 0.952; CFI= 0.964; RMSEA=0.050; PCLOSE= 0.506; SRMR=0.0431] and all, except H7 were supported by the data. From the Extended TAM, two endogenous variables were tested (IOU and SECUC). IOU was directly predicted by NORMS, AWAR, CASHC, and SECUC, resulting in an R^2 of 0.50. In other words, NORMS, AWAR, CASHC, and SECUC had together explained 50% of the variation in IOU. SECUC was directly predicted by NORMS, AWAR and CASHC, resulting in an R^2 of 0.18. In other words, NORMS, AWAR and CASHC had together explained 18% of the variation in SECUC.

Hypothesis testing results				
Hypot hesis	Path	Path Coeffi cient	T valu e	Resul t
H1	NORMS →IOU	.205	3.70 8**	Suppo rted
H2	AWAR →IOU	.308	5.08 5**	Suppo rted
H3	CASHC →IOU	.136	2.69 1**	Suppo rted
H4	SECUC →IOU	.400	6.17 5**	Suppo rted
H5	NORMS → SECUC	.241	3.99 8**	Suppo rted

H6	AWAR → SECU	.297	4.65 1**	Suppo rted
H7	CASHC → SECU	-.035	- .633 NS	Not Suppo rted

**p<0.01

The outcomes of the hypothesis testing showed that out of 7 hypotheses 6 were supported. The relationship between CASHC and SECU (H7) was not supported, and this is because of cash crunch, people had very less alternatives including mobile wallets and hence they did not give much importance to the perceived security of the wallets. In considering the contributions of CASHC as an external variable in the CCTAM, we found that the cash crunch (CASHC) had a significant influence ($\beta=0.136$) on Intention of use. As a variable, CASHC exerted direct and indirect influences on IOU. There was a significant direct effect from CASHC on IOU although it was regarded as small at $\beta=0.136$ (Cohen, 1992). Indirectly, CASHC did not have a significant influence on IOU through SECU and, to compute the indirect effect of CASHC on IOU, the product of the estimate for CASHC → SECU and SECU → IOU was obtained ($-0.021 \times 0.417 = -0.009$) 'My Indirect estimand' for AMOS (Gaskin, J., 2016) was used and it was found that p value was more than 0.05 (0.616) hence, H10 was not supported.

NORMS exerted direct and indirect influences on IOU. There was a significant direct effect from CASHC on IOU although it was regarded as small at $\beta=0.205$ (Cohen, 1992). Indirectly, NORMS had a significant influence on IOU through SECU and, to compute the indirect effect of NORMS on IOU, the product of the estimate for NORMS → SECU and SECU → IOU was obtained ($0.156 \times 0.417 = -0.065$) 'My Indirect estimand' for AMOS (Gaskin, J., 2016) was used and it was found that p value was less than 0.05 (0.001) hence, H9 was supported.

AWAR exerted direct and indirect influences on IOU. There was a significant direct effect from AWAR on IOU although $\beta=0.308$. Indirectly, AWAR had a significant influence on IOU through SECU and, to compute the indirect effect of AWAR on IOU, the product of the estimate for AWAR → SECU and SECU → IOU was obtained ($0.246 \times 0.417 = 0.102$) 'My Indirect estimand' for AMOS (Gaskin, J., 2016) was used

and it was found that p value was less than 0.05 (0.000) hence, H8 was supported.

Multigroup analysis was conducted and it was found that the positive effect of Perceived Security on Intention to use is different for male and female (DF=1; CMIN=60720) p value=0.012 hence, H11 was supported.

Practical implication

From the inclusive perspective, CASHC had contributed to explaining IOU direct and indirect ways. Its direct effect on CASHC was small and there was no evidence of significant indirect influence. Since the study was conducted during the demonetisation period, respondents had less alternatives for making payments, hence the security aspects of wallets were not given much importance. Also, considering the perceived security as mediating variable, we found that all the hypothesis except H10 relating to SECU were supported. On this basis, it was practical to say that the CCTAM model had been enhanced by an extension through the addition of CASHC as an external variable and Perceived Security as a mediating variable. In other words, the use of mobile wallets amongst students in this study could be affected by the extent to which they perceive the security related aspects and the availability of cash in the financial system. A novel technology takes time to be put into motion and become universal. Further, the time to attain acceptability is even longer, for a technology that is related to money. Consumers will be needed to self-assured and secure entrusting their hard-earned money into a mobile wallet. To ensure adoption and acceptance of bank mobile wallets, financial institutions will need to recognize the needs of consumers for security, convenience, and value-added services such as loyalty programs and coupons, and market those features in order to transition customers to a bank-branded mobile wallet especially at the time of cash crunch in the system.

Limitations of the Study and Further Research

a) The data collected for this study is from students of a state private University located in South India. Therefore, there is a limitation to generalise the findings to a larger diverse population.

b) The study was aimed at understanding the influence of awareness, subjective norm,

perceived security and cash crunch on the adoption of mobile wallet by students during demonetisation period. Hence perceived ease of use and perceived usefulness as predictor variables were not considered for the study. Further research can be conducted to include these variables.

Conclusion

Cash crunch as a predictor variable was supported by the results of the study in explaining mobile wallets adoption among university students. Cash crunch had a significant influence on Intention to use the mobile wallet, though it did not significantly influence the perceived security. Under rare and extreme conditions like demonetisation, respondents had less alternatives but to adopt for a new payment technology. With the advancement in technology and governments initiatives to promote digital payments as a part of financial inclusion, adoption of mobile payment services becomes an integral part of the life of mankind.

NORMS=Subjective Norm; AWA=Awareness; CASHC=Cash Crunch; SECU=Perceived Security; IOU=Intention to Use

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