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INVESTIGATING CONSUMERS' ADOPTION OF M-COMMERCE IN EMERGING ECONOMIES

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Abstract

Covid-19 pandemic and Internet penetration propelled an unprecedented spike in the adoption of mobile commerce (m-commerce) amongst consumers across the world including emerging economies like India. This paper investigates the antecedents (six observed variables and four moderating factors) of the adoption of m-commerce in India with the help of an extended TAM (Technology Acceptance Model) by making use of primary data collected from 288 consumers residing in different rural and urban areas of Delhi NCR, India. Multiple regression and ANOVA tests were applied on collected data which revealed perceived benefits to be the strongest independent variable having a significant bearing on the adoption of m-commerce along with the consumers' area of residence. The study results have peculiar implications for consumers, producers, marketers, policy-makers, and the state and central governments.

Keywords: *TAM, perceived usefulness, perceived safety, m-commerce*

I. Introduction

Coined by Kevin Duffey in 1997 the term mobile-commerce or precisely m-commerce, is "the delivery of electronic commerce capabilities directly into the consumer's hand, anywhere, via wireless technology" (Duffey, 1997). It means doing commercial transactions such as banking, booking, paying bills, and selling/purchasing goods and services online with the help of mobile/wireless/handheld devices like smartphones, palmtops, personal

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digital assistants, and tablets. M-commerce is a subdivision of e-commerce. E-commerce stands for electronic commerce, wherein the shopping is done over the internet through a laptop or PC while in m-commerce the transactions are done through mobile/wireless devices so that people can do their transactions anywhere at any time as long as they can access the internet on their smartphones.

The strength of m-commerce in India lies in the availability of various online digital platforms that offer a large variety of goods under most of the possible categories in one place on 24*7 basis with a facility to compare the price of competitive brands, refund and replacement facilities, flexi-time delivery, several payment options, and payment on installments. India's digital journey augmented by the sudden outbreak of the Covid-19 pandemic in the field of m-commerce is duly supported by the availability of cheap smartphones and mobile data with over 483 million users in 2018 and estimated to reach over 500 million by 2023 (Keelery, 2021). With the kind of advantages and facilities it provides, the future growth prospects of m-commerce in India are very bright. Some of the top m-commerce platforms/websites/applications in India are Flipkart.com, Infibeam.com, Amazon.com, eBay.in, Shopping.indiatimes.com, Shopping.rediff.com, Futurebazaar.com, Homeshop18.com, Yebhi.com, Univercell.in, Techshop.in/store/main.php, Smartshoppers.in, Lynx-india.com, Mediahome.in, and Themobilestore.in.

Researchers have used various models and theories to examine, investigate, and predict the adoption behavior of users in respect of information systems, e.g., UTAUT, TAM, TRA, TPB, IDT, MM, SCT, and MPCU. These models have been modified and extended to include new variables as per the investigation objectives and settings. The technology acceptance model (TAM), considered to be an influential extension of TRA (Fishbein and Ajzen, 1975), is originally developed by Fred Davis in 1989 (Davis, 1989), gradually modified and extended as TAM2 (Venkatesh and Davis, 2000), and TAM3 (Venkatesh and Bala, 2008). It is considered to be

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one of the most widely applied models to study users' acceptance and usage of a technology system (Kasirye and Masum, 2021; Ting, 2018), e.g., Chhonker et al. (2017) reviewed 201 articles to examine the usage of various technology adoption models/theories in m-commerce during 2008-2016 and found TAM to be the most popular model amongst researchers to study the behavior intention of m-commerce users. Although many researchers have examined the issues relating to m-commerce, however, very few have included the impact of the Covid-19 pandemic, users' employment, and area of residence on the adoption of m-commerce in India. Being an emerging economy with second largest population in the world, India provides an apt base for this study to investigate the antecedents (six observed variables and four moderating factors) of the adoption of m-commerce in India with the help of an extended TAM.

Literature Review

TAM has been extensively used in past to study users' intention to adopt various emerging technologies including m-commerce in different countries, e.g., Kasirye and Masum (2021) examined the effects of e-Wallet usage in Malaysia by applying TAM on data gathered from 381 students. From the retailers' perspective, Chopdar and Balakrishnan (2020) have examined the determinants of repurchase intention and satisfying experience in m-commerce by applying the stimulus-organism-response approach on data from 420 regular users of m-commerce, and found perceived ubiquity and m-commerce app incentives as the strongest predictors of impulsiveness and perceived value respectively. Sujatha and Sekkizhar (2019) surveyed 832 Indians to study the factors predicting adoption and usage of m-commerce in India by applying a revised TAM with IDT by involving variables like perceived risk, cost, compatibility, perceived ease of use, and perceived usefulness. Asastani et al., 2018 surveyed 156 people to determine the factors affecting users to adopt m-commerce by using the integrating UTAUT and TAM.

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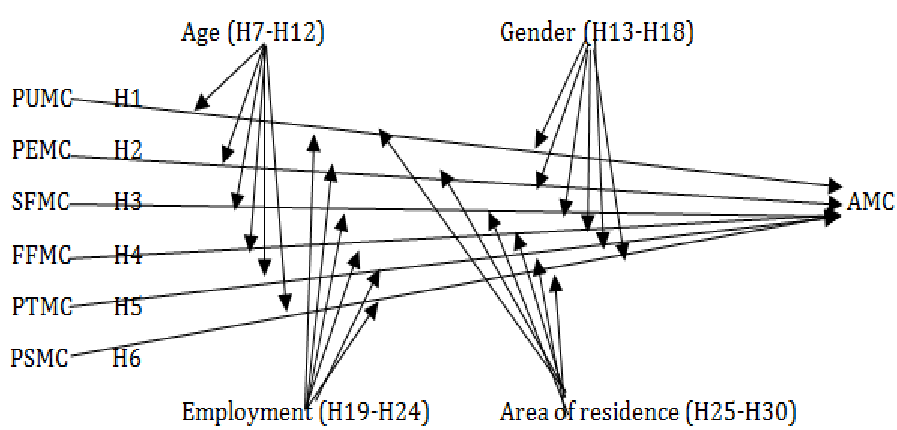
Singh et al (2018) also supported the use of TAM to examine the adoption of m-commerce via mobile applications. Ting (2018) incorporated brand equity and website quality in the TAM to predict Chinese consumers' intention to use m-commerce for apparel from the 786 eligible responses obtained via an online survey. Roy and Moorthi (2017) developed a conceptual model of technology readiness by examining the impact of perceived ubiquity of smartphones, perceived usefulness, privacy concerns, and perceived ease of use on m-commerce adoption in India with responses from 803 respondents. Chang et al. (2015) explored the antecedents of users' behavioural intention to adopt m-commerce by proposing a research framework that integrates four variables, i.e., personal innovativeness, cost, perceived risk, and enjoyment in TAM. The most common conclusion derived in past studies based on TAM is that the users will accept and use any system/technology only when they will find it user-friendly and useful. Based on the reviewed literature, the proposed TAM for this study, visualized in Figure 1 in terms of m-commerce adoption includes a total of seven observed variables, i.e., perceived usefulness, perceived ease of use, social factors, facilitating factors, perceived trust, perceived safety, and actual use (conceptualized in the succeeding paragraphs),and four moderating variables (age, gender, employment, and area of residence).

Figure 1: Proposed TAM Model



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Perceived Usefulness for using M-Commerce (PUMC) - Davis (1989) has defined perceived usefulness as, "the degree to which a person believes that using a particular system would enhance his/her job performance". It is consumers' perception about the outcome of technology usage experience. Researchers have found perceived usefulness to be the most influential determinant for the adoption of m-commerce by customers (Kasirye and Mausum, 2021; Sarkar et al., 2020; Asastani et al., 2018; Ting, 2018). Thus, it is proposed that:

H1: PU will significantly affect the adoption of m-commerce.

Perceived Ease to use M-Commerce (PEMC) – This variable is defined by Davis (1989) as, "the degree to which a person believes that using a particular system would be free of effort". It explains the user-friendliness of a system so that minimum efforts can lead to maximum satisfaction. Past researchers have observed a significant relationship between the adoption of m-commerce and user-friendliness interface of the related platforms and services (Singh 2020; Singh et al., 2018; Ting, 2018; Chhonker et al., 2017), hence, it is suggested that:

H2: PE will significantly affect the adoption of m-commerce.

Subjective Norms to use M-Commerce (SNMC) - Fishbien and Ajzen (1975) defined subjective norms as, "the person's perceptions that most people who are important to him think he should or should not perform the behavior in question". Subjective norms prescribe the social influence on the users to decide about the adoption/use of a system (Asastain et al., 2018; Ting, 2018; Venkatesh et al., 2003). Quite a good number of past studies have found this variable to be significant in predicting the use of m-commerce, e.g., Asastani et al. (2018) surveyed 156 people in Indonesia to determine the factors affecting users to adopt m-commerce and found

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social influence to significantly influence the use of m-commerce, thus, it is proposed:

H3: SF will significantly affect the adoption of m-commerce.

Facilitating Factors to use M-Commerce (FFMC) - Venkatesh et al. (2003) defined this variable as, “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system”, i.e., this variable includes all the necessary technical and instrumental support to eliminate/minimize the difficulties to use m-commerce, i.e., smartphone, Internet connectivity/mobile data, debit/credit card for m-payments (Chhonker et al., 2017; Roy and Moorthi, 2017). In a developing country like India, this variable is even more significant due to the digital divide that persists in access and affordability across income groups (Khasru, 2021). Past studies also made similar observations regarding this variable (Singh, 2020; Sujatha and Sekkizhar, 2019; Ting, 2018), hence, it is hypothesized that:

H4: FF will significantly affect the adoption of m-commerce.

Perceived Safety to use M-Commerce (PSMC) – Safety and security play an important role in new technology adoption, particularly in developing countries (Garg and Choeu, 2015). It includes security for transactions, personal information, and facility. Amongst these, the most important being the financial (credit/debit card) information as online transactions provide scope for cyber-crimes (Sujatha and Sekkizhar, 2019; Chang et al., 2015; Mittal and Mohan, 2013). Past studies found a negative relationship between this variable and adoption of m-commerce (Sujatha and Sekkizhar, 2019), leading to suggest that:

H5: PS will significantly affect the adoption of m-commerce.

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Covid-19 Pandemic and M-Commerce (CPMC) - Covid-19 pandemic suspended the brick-and-mortar commerce activities and forced people across the world to embrace work and education (Mittal and Raghuvaran, 2021) from physical to virtual mode (Khasru, 2021), i.e., from offline to online resulting in an unprecedented spike in Internet and smartphone penetration even in remote rural areas, boosted by a trusted digital payment system. Due to Covid-19, people have also changed their shopping frequency and mode by shifting from physical commerce to e-commerce/m-commerce (Khasru, 2021). Hence, it seemed logical to assume that:

H6: Covid-19 Pandemic will significantly affect the adoption of m-commerce.

Moderating Factors: Past researchers have also examined and observed a significant impact of some of the moderating variables on users' adoption of m-commerce. Some of these variables are technology users' age, gender, experience, enjoyment, voluntariness of use. This study makes use of two of these variables, i.e., users' age and gender, and makes use of two more variables, i.e., employment (employed/unemployed) and area of residence (rural/urban). Users' age and gender were found to have a significant impact on perceived benefits, perceived efforts, social factors, facilitating factors, and perceived safety (Sarkar et al., 2020; Ting, 2018; Roy and Moorthi, 2017; Vekatesh et al., 2003), the similar impact can also be expected from the newly added variables as both of them will provide a favorable position to the user to go for m-commerce, thus, it is proposed that:

H7-H12: Age will significantly affect the PB, PE, SF, FF, PC, and PS to adopt m-commerce.

H13-H18: Gender will significantly affect the PB, PE, SF, FF, PC, and PS to adopt m-commerce.

H19-H24: Employment will significantly affect the PB, PE, SF, FF,

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PC, and PS to adopt m-commerce.

H25-H30: Area of residence will significantly affect the PB, PE, SF, FF, PC, and PS to adopt m-commerce.

2. Methodology

This is an exploratory study. The primary data was obtained from the m-consumers, who frequently (at least four times a month) shop online through their mobile phones and residing in different rural and urban areas of Delhi NCR, India. Convenience and snowball sampling techniques were adopted for sample selection. The survey was designed on Google Forms. The respective respondents were approached through various virtual means such as whatsapp groups, e-mails, Facebook accounts, and Instagram. The response rate was confined to one response per person, and the response window was open for one month, i.e., July 2021. A total of 495 people in the age group 15 to 54 years responded, out of which responses from 288 people were found to be complete and usable. The sample profile is provided in Table 1. A structured non-disguised questionnaire was designed, developed, and used for data collection. Reviewed literature guided the preparation of the research instrument which was divided into three parts. Part I introduced the study with the objectives, nature, and scope along with the respondents' rights. Part II covered demographics of the respondents, and Part III consists of seven scales (45 statements) in terms of respondents' indentations to adopt m-commerce in India. The questionnaire was pre-tested on a sample of 18 respondents for internal consistency, flow of language, and ease of understanding.

171 males (59 percent) and 117 females (41 percent) constituted the surveyed sample of 288 respondents, which were distributed across five age categories, i.e., below 20 years (18 percent), 21-29 years (22 percent), 30-39 years (25 percent), 40-49 years (20 percent), and 50 years and above (15 percent). The majority of the respondents were from rural areas

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(56 percent). All the respondents were educated, and except 31 percent rest of them were either graduates or post-graduates and above. The majority of the respondents (57 percent) were not employed.

Table 1: Respondents' Demographic Profile

Characteristic	N= 288	(%) Share*	Characteristic	N= 288	(%) Share*
Gender			Residential Area		
Male	171	59	Rural	162	56
Female	117	41	Urban	126	44
Age (years)			Educational Qualification		
below 20	52	18	Upto Class 12	90	31
21-29	63	22	Graduation	110	38
30-39	71	25	Post-graduation and above	88	31
40-49	57	20	Employment Status		
50 and above	45	15	Employed	124	43
			Not-employed	164	57

* Round off to two digits.

3. Results and Analysis

A review of the literature leads to the identification of seven multi-item scales consisting of a total of 45 statements. These scales were restructured keeping in view the study requirements. After screening the collected data for outliers, missing values, and normality (P-P Plots and scatterplots), several rounds of exploratory factor analysis (EFA), and reliability coefficient (Cronbach alpha) were conducted to weed out the non-relevant and multidimensional scale items resulting in the final selection of 35 items across seven-scales. Further, to warrant the internal consistency, the coefficients of composite reliability (CR) and average variance extract (AVE). All the coefficient values cleared the minimum eligible criterion, i.e., 0.70 for Cronbach Alpha, Factor loadings, CR, and 0.50 for AVE (Gerbing and Anderson, 1988). The reliability analysis results are summarized in Table 2.

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Convergent validity of the applied scales was ensured by calculating the average variance extracted values. All the AVEs are found to be higher than minimum suggested thresh hold value of 0.50 (Gerbing and Anderson, 1988). Finally, the discriminant validity of the adopted scales was examined according to the Fornell-Larker criterion (1981) whereby the coefficients of correlations (cross-loadings) are different and higher than the square root of AVEs (shown as the bold values in Table 2).

Table 2: Reliability Analysis

Construct Name	Items[1]	α[2]	CR	AVE	Convergent and Discriminant Validity[3]						
					1	2	3	4	5	6	7
1. PBMC	6	.874	.905	.614	**.783**						
2. PEMC	5	.813	.872	.576	.745**	**.759**					
3. SFMC	3	.795	.880	.709	.453**	.551**	**.852**				
4. FFMC	4	.742	.839	.566	.593**	.642**	.601**	**.752**			
5. PSMC	6	.906	.889	.640	.421**	.547**	.403**	.471**	**.800**		
6. CPMC	5	.848	.892	.624	.483**	.518**	.419**	.561**	.639**	**.790**	
7. AMC	5	.871	.907	.662	.705**	.684**	.452**	.664**	.400**	.560**	**.814**

Notes: 1. Scale used: 5(Strongly Agree) to 1(strongly Disagree); 2. Cronbach alpha coefficient; 3.Bold diagonal values = square root of AVE; ** $p < .01$

Regression analysis was conducted (Table-3) to test the statistical significance of the study hypotheses. The analysis started with the fulfilment of three basic assumptions regarding (i) multicollinearity checked through variance inflation factor (VIF), (ii) autocorrelation checked through the Durbin-Watson statistic, and (iii) quality of fit measured through the R^2 value. The calculated statistical values were found to be within the acceptable limits, e.g., each of the VIF values is less than 5, the Durbin-Watson statistic is in the range of 1.50 - 2.50, and R^2 is significant [R^2 (6, 279) = .632 is significant (F = 79.974) at p < .001] (Table 3A). The value of R^2 signifies that the independent variables are collectively capable of explaining 63 percent of the variation in Indian consumers' adoption of m-commerce, which, in research, is considered to be a good fit (Ting, 2018).

Regression analysis results (Table 3B) indicate that a significant relationship (significant t-values) exists between the dependent and

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independent variable except for SFMC (non-significant t-value) resulting in the acceptance of H1, H2, H4, H5, H6 and rejection of H3. The results also revealed that the variable perceived benefits is the strongest variable (β = .329) to predict the adoption behaviour of consumers for m-commerce, followed by facilitating factors (β = .272), perceived efforts (β = .232), perceived safety (β = .218), perceived convenience (β = .118), and social factors (β = .032).

Table 3: Regression Analysis Results

Independent variables	(A) Model Summary				(B) Dependent Variable (AMC)	
	VIF	Durbin-Watson statistic	R^2	F	β	*t-value*
1. PBMC	2.412	1.853	.632	79.974***	0.329	5.836***
2. PEMC	3.062				0.232	3.648***
3. SFMC	1.697				0.032	0.685
4. FFMC	2.276				0.272	4.974***
5. PSMC	1.912				0.118	2.342*
6. CPMC	2.017				0.218	4.227*

* $p < .05$; ** $p < .01$; *** $p < .001$

One-way ANOVA was applied to examine the impact of moderating variables, i.e., consumers' age (H7 - H12), gender (H13 - H18), employments status (H19 - H24), and area of residence (H25 – H30) on the independent variables. Table 4 depicts the corresponding analysis results. The result reveals that out of the four moderating variables, consumers' area of residence is the most significant variable having an impact on each of the independent variable, thus resulting in the acceptance of H25 to H30. Respondents' employment status turned out to be the next most significant variable impacting five out of six independent variables, hence, H19, H20, H21, H23, H24 are accepted but H22 is rejected. The age of the respondents significantly impacted four variables, i.e., social factors, facilitating factors, perceived convenience, and perceived safety leading to the acceptance of H9, H10, H11, and H12. Similarly, the impact of gender

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was limited to all except two of the independent variables, i.e., facilitating factors and perceived safety, hence, H13, H14, H15, and H17 are accepted, and H16 and H19 are rejected.

Table 4: ANOVA Results

Independent Variables	Moderating Variables							
	Age		*Gender*		*Employment*		*Area of Residence*	
	***F*-value**	**Result**	***F*-value**	**Result**	***F*-value**	**Result**	***F*-value**	**Result**
1. PBMC	1.776	Reject	7.130*	Accept	2.935**	Accept	4.788**	Accept
2. PEMC	1.162	Reject	8.780*	Accept	5.840**	Accept	12.638***	Accept
3. SFMC	2.707**	Accept	10.279*	Accept	3.400**	Accept	12.582***	Accept
4. FFMC	2.999**	Accept	1.574	Reject	1.491	Reject	12.707***	Accept
5. PSMC	3.522**	Accept	4.116*	Accept	7.073***	Accept	16.062***	Accept
6. CPMC	2.964**	Accept	0.215	Reject	7.926***	Accept	10.921**	Accept

p < .05; ** p < .01; *** p < .001

4. Conclusions

The results of this study are parallel to the literature (Asastain et al., 2018; Ting, 2018: Davis et al., 2003) and a clear indication that the future of commerce lies in m-commerce even in emerging economies like India. The results revealed that the customers adopted m-commerce because of their positive perceptions about benefits, facilitating factors, ease of use, and safety but not due to social norms. The impact of Covid-19 on the adoption of m-commerce is found to be positive and significant. The moderating impact of variable, area of residence was strongest followed by the variable employment, age, and gender. M-commerce also has the potential to reduce poverty, create new employment opportunities, and drive post-pandemic growth in all the concerned sectors.

These results indicate that to reap the dividends of digital transformation, the policy-makers and marketers need to address the legal, regulatory, and policy gaps as well as boost digital skills of consumers and upgrade the necessary facilities in terms of Internet connectivity, price of smartphones,

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electricity, faster and safer payment gateways, fast track licensing, and cyber-security. As per an estimate, in India, $35billion investment is needed on annual basis to make it in the top-five global digital economies (Khasru, 2021). Apart from this, for this sector to grow, the regulatory roadblocks need to be strengthened to make them consumer-oriented, transparent, and easy to understand and follow. Digital revolution is a global imperative and a key to success across all the sectors including manufacturing and retails, and cannot be overlooked. This study has the potential to be replicated with a broader, probabilistic sample with more variables. A mix of various other technology adoption models, e.g., UTAUT, IDF, TRA, TPB, MM, may also be applied to get more comprehensive results.

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