

An Empirical Analysis of Consumer Intention towards M-commerce

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[Abstract] The exponential growth of wireless communications in India has given rise to a promising market for mobile commerce. The surge in online searches and mobile-based shopping has prompted the necessity to identify the elements that impact the adoption of mobile commerce in India. The intent of this study is to ascertain and construct a comprehensive model that elucidates the various elements influencing the adoption of mobile commerce. A conceptual model was created based on previous research. The constructs utilized in this study have been derived from the Technology Acceptance Model as well as other pertinent literature. The survey method was adopted for this research, and a total of 309 data points were collected from New Delhi.

Data were analyzed using confirmatory factor analysis, and Covariance-Based Structural Equation Modeling (CB-SEM) was employed to assess the direct and indirect effects of the variables. The findings of this study will provide valuable insights for m-commerce enterprises in devising effective marketing strategies and creating suitable applications that boost consumer engagement.

[Keywords] mobile commerce, adoption, online shopping

Introduction

The online population of India is growing at a faster pace than many other countries, driven by the widespread availability of affordable smartphones, cost-effective mobile data plans, and extensive network coverage. This has significantly contributed to the rapid development of the mobile commerce (M-commerce) sector in India, with an expected crossing of 500 million mobile internet users in the South Asian country (Sanika Diwanji, statista.com, 2020). In 2019, more than 81% of individuals used smartphones, and this percentage is projected to increase to 97.1% by 2025 (A. Puri Mirza, 2020). The increasing adoption of smartphones and the use of mobile applications are reshaping the dynamics of the market (Fang, 2019).

The introduction of Reliance Jio has played a pivotal role in enhancing the accessibility and affordability of mobile services. This development facilitates businesses in implementing and managing digital strategies for their brands. In line with the objective of creating a digital India, the Indian government has initiated collaborations with mobile internet ecosystem players and service providers. With a growing trend of people engaging in various online activities exclusively through mobile devices, online portals and businesses are compelled to shift their focus toward M-commerce. The rapid evolution of the technological landscape over time underscores the need to identify the variables influencing the adoption of M-commerce within the Indian context.

The primary objective of this study is to determine the factors that affect the adoption of M-commerce in India. The identification of these factors is crucial and will be guided by prior research to ensure a comprehensive understanding of M-commerce.

Review of Literature

The Technology Acceptance Model (TAM) serves as a valuable framework for understanding the adoption of m-commerce by elucidating the underlying factors that influence users' intentions and

behaviors. The renowned "Technology Acceptance Model" (Davis, 1989) asserts that perceived ease of use and perceived utility are crucial factors shaping attitudes toward the use of new technologies. TAM has been widely employed in studies related to M-commerce (Ooi & Tan, 2016), with some investigations focusing on mobile banking adoption in India (Thakur & Srivastava, 2014) and in investigation of adoption of zoom platforms (Bhatt, S., & Shiva, A., 2020). Further modifications were made to TAM, leading to TAM2, an extension proposed by Venkatesh & Davis (2000).

The adoption of m-commerce is influenced by a multitude of factors that collectively shape consumer behavior. It is essential to determine factors affecting adoption of m-commerce for multiple online activities. In this study, perceived usefulness, perceived ease of use and subjective norms constructs are taken from TAM and rest of the constructs are taken from other studies. Following are the constructs affecting attitude of the users for adopting m-commerce.

Perceived usefulness holds utmost importance in influencing individuals' attitudes toward the adoption of new technology (Davis, 1989). Prior studies have highlighted the presence of the perceived utility element in multiple models related to M-commerce adoption. Users perceive accessing the internet or engaging in online activities via mobile devices as convenient. M-commerce provides time savings, adaptability, and customisation, all of which contribute to improved work efficiency. People are more likely to place their trust in a range of mobile services when they believe the advantages provided by m-commerce (Kumar, Israel et al., 2018). Prior research suggests that trust in a mobile information system is positively impacted by users' perception of its utility (Afshan & Sharif, 2016; Kumar et al., 2018). Perceived usefulness has consistently emerged as a significant predictor of M-commerce adoption in various studies (Abu-Shanab & Haider, 2015; Faqih & Jaradat, 2015; Ozturk, Bilgihan, Nusair, & Okumus, 2017). There is a positive influence of perceived usefulness on the attitude of the user.

Trust is widely acknowledged as a critical factor influencing individuals' inclination to adopt specific behaviors in the context of M-commerce (Wang et al., 2013; Y. Cui et al., 2019). The consumer's level of trust plays a determining role in whether they will opt for online product purchases or not (Pandey & Chawla, 2019; Liu & Li, 2019). People are utilizing M-commerce for doing online transactions. In the case of M-commerce, transactions are processed digitally, this generates risk in the users (Heinze et al., 2017). This creates uncertainty in people's reaction towards M-commerce (Omonedo & Bocij, 2017). When users trust M-commerce platforms, they are more inclined to perceive them as safe and dependable channels, resulting in positive attitudes characterized by comfort, satisfaction, and loyalty. Conversely, distrust or concerns regarding security issues can lead to skepticism and diminished engagement with M-commerce services. Therefore, it is imperative for M-commerce providers to prioritize the establishment and maintenance of trust to foster positive attitudes among users, thereby driving sustained adoption and usage of M-commerce platforms. Numerous prior studies have underscored trust as a crucial determinant of consumer online behavior (Hashim & Tan, 2015; Madden et al., 2017). Trust establishes a robust relationship between the buyer and seller, representing the prospective buyers' perception of credibility in the target of trust. There is a positive influence of trust on the attitude of the user.

Security: Consumers are consistently concerned about their personal information, with transaction security and personal information security being paramount issues for users. Security during storing and transferring financial information throughout the purchasing process is one of the major concerns of online shoppers (Agag, et al., 2016). Reckless management of the financial information of customers would result in adverse ethical perceptions. Security plays a critical role in shaping the adoption of mobile commerce (M-commerce), exerting a significant influence on consumer trust and their willingness to engage in transactions through mobile devices. In today's landscape, where cyber threats and privacy concerns abound, consumers are increasingly cautious about divulging sensitive information, such as credit card details, on mobile platforms. The security factor serves as a significant barrier to M-commerce adoption (Garg & Choou, 2015). There is a positive influence of security on the attitude of the user.

Perceived ease of use is defined as "the degree to which a person believes that a given technology is easy to use" (Davis, 1989, p. 320). It encompasses the mental strain associated with processing the system. Perceived ease of use (PEOU) is considered a predominant determinant of the intention to adopt. Many researchers have examined these factors as essential influences of users' adoption of mobile services

via mobile internet (Muñoz-Leiva, 2017). The increasing convenience and user-friendliness of mobile apps have resulted in a surge in consumer adoption (Kang et al., 2015). The underlying rationale is that when a technology is perceived as easy to use, users can accomplish a greater volume of work within a given time frame. Consequently, users are more likely to perceive the technology as beneficial (Sun & Chi, 2018). There is a positive influence of perceived ease of use on the attitude of the user.

Perceived value added described the value provided by M-commerce to users. These are the various advantages that consumers gain from the adoption of new technology (Duan et al., 2019). When consumers believe that M-commerce offers distinct advantages over traditional methods, such as convenience, accessibility, personalized experiences, and time-saving features, they are more inclined to embrace it. This perceived value extends beyond the transaction itself to encompass the entire shopping journey, including browsing, product selection, payment options, and post-purchase support. Businesses that effectively communicate and deliver on these value propositions not only attract more users to their M-commerce platforms but also foster loyalty and repeat purchases. Thus, the perceived value added emerges as a crucial factor in driving the widespread adoption of M-commerce as a preferred channel for conducting transactions in the digital era. Perceived benefits are considered a key component influencing M-commerce adoption in various sectors (Otieno & Kahonge, 2014; Picoto et al., 2013). There is a positive influence of perceived value added on attitude of the user.

Perceived Privacy: Consumers need to provide personal details and confidential information from debit/credit cards for online transactions, leading to a sense of insecurity among consumers. As individuals increasingly turn to mobile devices for various transactions, concerns regarding the privacy and security of their personal data become paramount. When users perceive that their privacy is safeguarded through robust security measures, transparent data practices, and explicit privacy policies, they are more inclined to engage in M-commerce activities. Conversely, apprehensions about potential data breaches, unauthorized access, or misuse of personal information can dissuade consumers from embracing M-commerce solutions. Hence, it is imperative for businesses to prioritize the establishment and maintenance of trust by implementing stringent privacy measures, thereby reassuring consumers about the confidentiality and integrity of their data. Prior research has identified customers' trust and propensity to utilize the technology for consumption or purchase purposes as being influenced by their perception of privacy (Ozturk et al., 2017; Zhang, et al., 2018). All user information is stored on the cloud, creating privacy concerns (Chung, H. and Lee, S., 2018; Dorai, G., et al., 2018), with privacy having an impact on user behavior. There is a positive influence of perceived privacy on the attitude of the user.

Subjective norms refer to an individual's perception of the impact exerted by significant individuals in their social circle, such as family, friends, and colleagues. These subjective norms play a crucial role in shaping an individual's intentions to adopt and utilize innovative technologies (Venkatesh & Davis, 2000; Dwivedi et al., 2018, p. 307). Social influence has been shown to positively affect internet usage (Osama Isaac et al., 2019). Subjective norms exert a considerable influence on the adoption of M-commerce, reflecting the perceived social pressure and expectations surrounding mobile shopping behavior. Individuals often weigh the attitudes, beliefs, and actions of their peers, family, and social circles when deciding to embrace new technologies like M-commerce. Positive subjective norms, wherein individuals believe that those significant to them endorse and support M-commerce usage, can drive adoption by fostering a sense of social approval and acceptance.

Conversely, negative subjective norms, where individuals perceive disapproval or lack of engagement with M-commerce among their peers, can impede adoption. By nurturing a supportive social environment and addressing perceived social pressures, businesses can enhance the prospects of successful M-commerce platform adoption and usage. If influential contacts such as friends and family engage in M-commerce, the rate of M-commerce adoption is likely to be high. Users also utilize M-commerce for sharing purchase details and comparing products with their friends and family (Shankar et al., 2016). There is a positive influence of subjective norms on the attitude of the user.

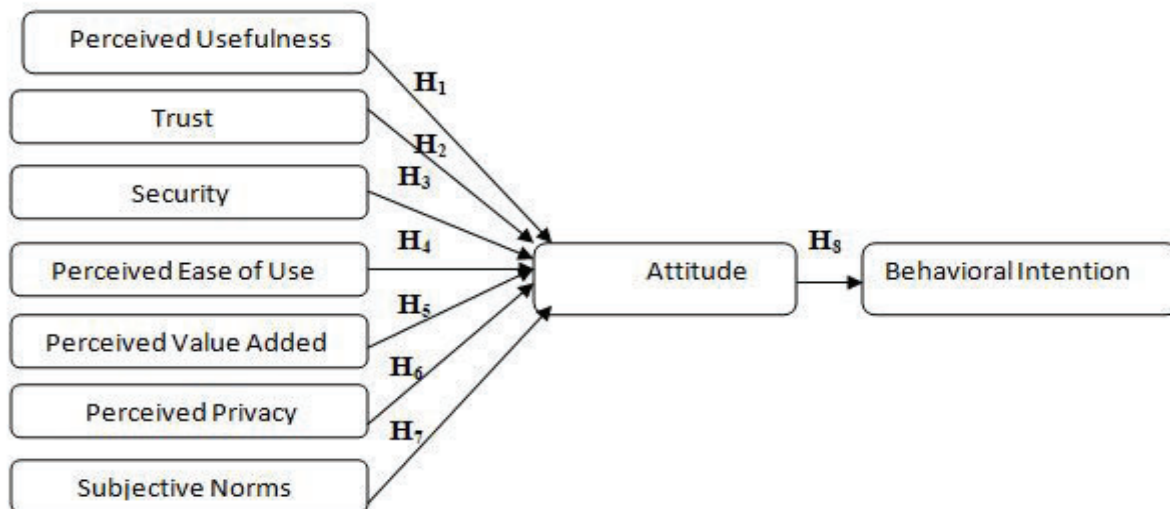
Attitude: A positive attitude enables individuals to take action for desired outcomes (Chi, 2018). Attitudes serve as predictors of behavioral intentions (Chi, 2018; Souiden, Chaouali & Bacouche, 2019). Positive attitudes, which encompass favorable views of the benefits, convenience, and reliability of M-

commerce, are instrumental in driving adoption by inspiring individuals to embrace and utilize mobile commerce platforms. Negative attitudes, arising from apprehensions about security, usability, or trustworthiness, can impede adoption, leading individuals to resist or avoid engaging in M-commerce activities. By fostering positive attitudes among consumers, businesses can foster greater acceptance and adoption of M-commerce as a preferred channel for conducting transactions in today's digital landscape. Ideal behavioral intentions are generated by users when they hold a positive attitude towards a system, specifically regarding technology acceptability and continuance (Zhang, Lu et al., 2018). A positive attitude is positively correlated with a higher degree of trust in mobile applications (Hajiheydari & Ashkani, 2018). There is a positive influence of attitude to the intention.

An integrated research framework was created for the study as per the literature review (Figure 1).

Figure 1

Integrated Research Framework



Methodology

Survey method is used for this study. Data was collected via google forms. A total of 309 responses received by mails, resulting in a sample size of 309. The data were gathered from the city of New Delhi. Prior to the commencement of data collection, a preliminary assessment was undertaken using a pretest administered to a sample of 15 respondents. The purpose of this pretest was to evaluate the suitability and relevance of the content, as well as the appropriateness of the questions, scales, and instructions utilized in the study. As per the feedback of pretest, certain measuring items were modified to align with the specific context of the study. A pilot test was done with a sample size of 32 respondents to assess the statistical and methodological accuracy of the measures, including their reliability and validity. The ultimate revised questionnaire was disseminated to the participants. The data collected was subsequently analyzed using SPSS version 21.0 and AMOS version 19.0.

The constructs are taken from existing relevant previous studies with changes in sentence formation so the content will become as per the study only (refer Table 1). The items were extracted from multiple standardized scales. The statements were derived from prior research and were subsequently modified to ensure their relevance to the current investigation. Nine Constructs were judged using a five-point Likert scale that varied from 1 “Strongly disagree” to 5 “Strongly Agree”.

Table 1
Measurement Scale

Factor	Items	Adaption from
Perceived Ease of Use (PEOU)	PEOU1: Learning to operate internet through mobile would be easy for me. PEOU2: I would find it easy to get access to the internet through mobile. PEOU3: My interaction with the internet through mobile would be clear and understandable. PEOU4: It would be easy for me to become skillful at using internet through mobile. PEOU5: I would find mobile internet easy to use.	Davis (1989)
Perceived Usefulness (PU)	PU1: I think using m-commerce would make it easier for me to conduct transactions. PU2: I think using m-commerce would make it easier for me to follow up my transactions. PU3: I think using m-commerce would increase my productivity. PU4: I think using m-commerce would increase my effectiveness. PU5: I think using m-commerce would increase my efficiency.	Davis (1989)
Trust (T)	T1: I feel using internet through mobile in monetary transactions is safe. T2: I feel my personal data is in confidence while using internet through mobile. T3: I feel the terms of use are strictly followed while using internet through mobile. T4: I feel using m-commerce for my transactions is trustworthy.	Zarpau et, al. (2012)
Subjective Norms (SN)	SN1: People who are important to me think that I should use M-commerce to purchase goods and/or services. SN2: People whose opinion I value prefer me to use M-commerce to purchase goods and/or services. SN3: People who influence my behavior would think that I should use M-commerce to purchase goods and/or services. SN4: People who are important to me would think that I should use M-commerce to purchase goods and/or services.	Taylor and Todd (1995)
Perceived Privacy	P1: I am concerned that the information I submit on the mobile internet could be misused. P2: I am concerned that a person can find private information about me on the internet. P3: I am concerned about submitting information on the mobile internet, because of what others might do with it.	Dinev and Hart (2006)
Security	S1: I feel secure sending personal information through mobile internet across web. S2: I feel safe providing personal information about me to web retailers through mobile internet. S3: The Web is a safe environment to provide personal information through mobile internet. D1: Redeeming discount makes me feel good.	O'Cass& Fenech (2003)

Perceived Value Added	D2: I enjoy buying on discount regardless of the amount I save by doing so. D3: I enjoy looking for discounts on the Internet. D4: When I use discount, I feel that I am getting a good deal.	Lichtenstein, D.R., Netemeyer, R.G. and Burton, S. (1990)
Attitude	A1: Using a mobile internet for online activities saves me time. A2: I think using M-commerce is beneficial to me. A3: Using a Mobile internet for online activities saves me money.	
Behavioral Intention	BI1: I intend to use M-commerce as soon as possible. BI2: I intend to continue using mobile internet for online activities in the future. BI3: I will regularly use M-commerce in the future.	Sapna Rakesh & Arpita Khare (2012) [Crespo and del Bosque, 2008]

Data Analysis

Respondent demographics are presented in terms of gender, age group, education, occupation, and monthly income. Total 54% are male and 46 % are female. A total of 43.7% belong to the 30–45 age group, total 34% belong to 18–30 age group, 17% belong to above 45 age group and 5 % are below 18 years. A total of 41 % are postgraduate, 37% are graduated, 16% belongs to others and 7% are higher secondary. A total of 67% are married and the rest are un-married. The Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy and the Barlett’s test of sphericity utilized for checking adequacy of the sample size. KMO value indicated the adequacy of the sample size (KMO value > 0.60) (Tabachnick & Fidell, 2001).

Table 2
KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.706
Bartlett's Test of Sphericity	Approx. Chi-Square	4888.414
	Df	496
	Sig.	.000

Confirmatory Factor Analysis

Confirmatory factor analysis [CFA] increased the control for assessing unidimensionality than exploratory factor analysis [EFA]. It is more as per the overall process of construct validation (Ahire, Golhar, & Waller, 1996). In this study CFA ran through AMOS19.0. The initial CFA, with all latent factors modeled simultaneously as correlated first-order factors, after deletion of one item D2 because of low value of standardized regression weight, indicated a reasonable fit. All indicators are given in table 3. With chi square = 662.277, df = 395, cmin/df = 1.795, p < .05, comparative fit index (CFI) = .931, Tucker–Lewis index (TLI) = .919, root mean square error of approximation (RMSEA) = .051 Table 3 presents the results.

Table 3
Model Fit Indices of the Measurement Model

CMIN/df	1.795	CFI	0.931	RMSEA	0.051
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Construct Validity & Reliability

All Average Variances Extracted (AVEs) exceeded 0.50, ensuring robust discriminant validity. Consistency in discriminant validity was maintained, as evidenced by the square root of the AVE for each factor being greater than its correlations with other factors, and each factor's Average Variances Extracted surpassing the maximum shared variance (Fornell & Larcker, 1981). The statistical tools package developed by Professor Gaskin was employed for analysis (refer to Table 4: Construct Validity). All factors demonstrated construct reliability exceeding 0.70. Based on these rigorous statistical tests, it can be inferred that the scales utilized in this study were valid and reliable indicators of the latent constructs.

Table 4*Construct Validity of Measures*

	CR	AVE	MSV	ASV	A	S	T	SN	PU	PP	PVA	PEOU	I
A	0.756	0.511	0.029	0.010	0.715								
S	0.788	0.566	0.027	0.008	0.023	0.752							
T	0.925	0.754	0.020	0.005	0.007	0.049	0.869						
SN	0.785	0.549	0.072	0.023	0.021	0.053	0.039	0.741					
PU						0.035							
	0.803	0.514	0.047	0.011	0.004		- 0.021	0.117	0.717				
PP					-								
	0.775	0.541	0.047	0.014	0.133	0.050	0.036	0.205	0.216	0.736			
PV					-								
A	0.845	0.578	0.072	0.020	0.116	0.124	0.096	0.269	0.153	0.004	0.736		
PE					-								
OU					-							0.162	
	0.744	0.501	0.051	0.020	0.139	0.164	0.140	0.225	0.035	0.064	0.035		
I					-								
	0.935	0.829	0.029	0.008	0.169	0.116	0.026	0.055	0.016	0.039	0.098	0.095	0.91

(CR= Construct reliability, AVE= Average variance explained, MSV = Maximum shared variance, ASV= Average shared variance; A= Attitude, S= Security, T= Trust, SN= Subjective norms, PU= Perceived Usefulness, PVA= Perceived value added, PP = Privacy; PEOU=Perceived ease of use; I=Intention)

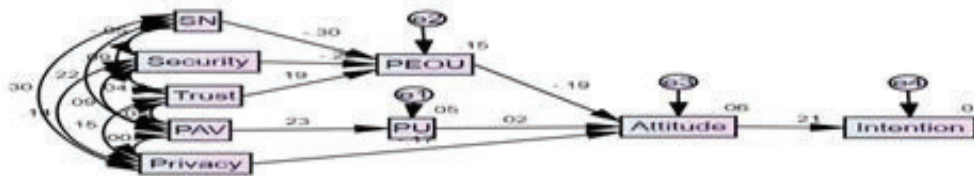
Results

This study found that all the constructs have significant impact on adoption of M-commerce except PU and Privacy. PU and Privacy have insignificant impact on adoption of M-commerce (see Table 5).

Table 5
Hypotheses Testing Result

	Estimate	S.E.	C.R.	P Label	Decision
PEOU<---Security	-.176	.047	-3.733	***	Supported
PEOU<---SN	-.127	.028	-4.478	***	Supported
PEOU<---Trust	.067	.025	2.663	.008	Supported
Attitude<---PU	.034	.038	.905	.365	Not supported
Attitude<---PEOU	-.208	.057	-3.641	***	Supported
Attitude<---Privacy	-.069	.022	-3.214	.001	Not supported
Attitude<---PAV	-.096	.029	-3.306	***	Supported
Intention<---Attitude	.433	.123	3.513	***	Supported

Figure 2
Integrated TAM Model of Adoption of M-Commerce



Conclusion

The significant advancements and developments in technology-driven systems, particularly those related to the internet, are catalyzing transformations in the interacting dynamics between corporations and their interactions with consumers. The rapid increase in the number of mobile internet users, the prevalence of affordable smartphones, and increased internet availability are major contributors to the widespread use of mobile devices for various online activities. Consequently, it is essential to adopt an approach that enhances the comprehensiveness of customers' and marketers' perspectives on online shopping from mobile devices.

The preceding investigations laid the foundation for the development of a conceptual model, and empirical data were gathered to provide robust support for the suggested model of M-commerce adoption in this study. The findings suggest that the mentioned factors have a notable impact on the adoption of mobile devices for various online activities, particularly in the context of purchasing. All variables exhibit statistical significance, aligning with previous research conducted by Kenneth C.C. Yang (2005), Ayman Bassam Nassuora (2013), and Wei et al. (2009).

In this study, trust emerges as a prominent and influential component in the adoption of M-commerce, surpassing other aspects. Consequently, online players and e-tailers should develop tactics that effectively enhance the trust of online consumers or users. Online consumers exhibit a heightened level of apprehension regarding the safeguarding of their personal information, particularly their payment card details, during the course of engaging in online transactions. When formulating plans for the advancement of internet portals, it is vital to take into account this particular issue. The present situation necessitates the identification of the key factors that significantly contribute to the increase in adoption rates. There exists

ample opportunity for further investigation to ascertain the remaining components that contribute to the process of adoption.

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