

Consumer adoption of Mobile Wallets under the new normal: An empirical study in India based on Technology Acceptance Model (TAM)

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Abstract

Since the emergence of Covid-19 Novel Coronavirus, the world has been reeling to unshackle itself from the devastating effects of the menacing pandemic. The outbreak of Coronavirus has blighted the economy of all nations and thus halted the growth trajectory of all the countries. The lockdowns imposed as a precautionary measure to blunt the blood thirsty pandemic has changed the modus vivendi of the common man. One of the striking revelations in these times has been an astounding upsurge in the use of cashless payment systems like Paytm, Phone Pe, Google Pay and others. In this light, there has been wholesome changes witnessed among the people of India talking in the light of the use of mobile wallets. The present research paper intends to examine and analyze the perception of Indian customers by probing into their motivations, attitudes and behavioural intentions towards the adoption and usage of mobile wallets in the era of Covid-19.

Keywords: Covid-19 pandemic; Mobile Commerce; Mobile Wallets; Attitudinal and Behavioural Dimensions; Customer Adoption; Technology Acceptance Model (TAM)

1. Background of the study

In the backdrop of this fast paced world, where rapid technological advancements are exhibiting myriad uncanny pyrotechnics it has been witnessed that there has been a bewildering intensification in the use of cashless payment systems largely triggered by the dramatic rise in the usage of internet, smartphones and relentless percolation of technologies in the ambit of E-commerce. Truth to be told, the head turning amelioration of technologies coupled with the consumers' proclivity towards a more luxurious modus operandi has been a nifty driving force for the emergence of such eye-twitching transitions in the Indian bourgeoisie. In the past few years in a developing country like India, the spontaneous proliferation in the domain of e-commerce and mobile commerce has facilitated a plethora of hassle free online services like online shopping, online payment, online booking and reservation, etc. which has been embraced by a huge proportion of Indian customers especially those belonging to segment of middle class and upper middle class of the Indian society bringing prodigious metamorphosis in the consumption pattern among such people. The Indian consumers are fast relinquishing the offline activities for the innovative comfy online services.

In this context, the emergence and growth of mobile wallets in India and their acceptance by Indian consumers has been of the striking revelations of the 21st century world. The gradual increase in the disposable income of Indian consumers, the juggernaut of technological innovations, the splendid metamorphosis in the features of latest smartphones, the havoc-free online services blended with penchant of Indian consumers for more convenient modus vivendi has propelled the demand in the usage of mobile wallets like Paytm, Phone Pe, Google Pay, Amazon Pay, Pay Pal and many such mobile payment applications. The usage of these mobile wallets has made life easy for the Indian consumers who were otherwise subjected to travails in making payments where the malaise lay more often than not standing in a queue to make a payment or sometimes relatively late payments. With the advent of mobile wallets a major clod of Indian consumers are instantaneously willing to use such expedient services. The present research study purports to investigate the intrinsic motivations, perceptions and adoption mechanisms of users of mobile wallets in the testing times of Covid-19. The current research study has been undertaken in the metropolitan setting of Kolkata. According to Kagan's India online consumer survey of 1000 adult respondents conducted in 2019, Paytm was dominating the global market share of mobile wallets in India with 81%.

Sr. No.	Type of digital payment system	Description
1.	Unstructured supplementary service data (USSD) *99#	The service works across all GSM service providers and handsets
2.	Immediate payment system (IMPS)	It is available on basic mobile phones, smart phones, via internet and at ATMs
3.	National electronic fund transfer (NEFT)	Individuals, corporates or organizations keeping accounts with a bank branch can transfer funds electronically to any account
4.	Real-time gross settlement (RTGS)	The RTGS system is primarily meant for large value transactions
5.	Prepaid payment instrument (PPI)	Individuals/Organizations are permitted to hold pre-paid payment mechanisms to pay for purchase of services, goods and financial services
6.	Unified payment interface (UPI)	Interconnect banks to help fund transfers
7.	Mobile banking	Access to bank account via browser or App
8.	Mobile wallets	Popular digital payment system via smart phone apps. Examples – HDFC payZ app, ICICI Pocket and Paytm
9.	Aadhar-enabled payment system (AEPS)	Complete payment system using biometric authentication
10.	BHIM	UPI-based system to enable money transfer just using mobile number
11.	Credit card/debit card	Card-enabled fund transfer

Exhibit 1: Digital payment systems in India
 (Source of Image: Adopted from Singh, 2016)

Mobile payment usage, India
 (% of all surveyed adult internet users)



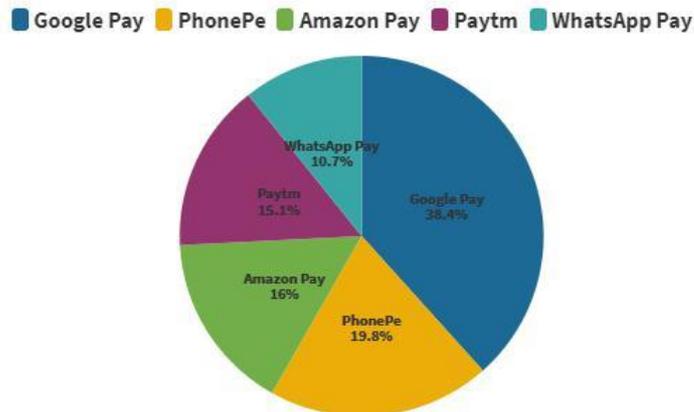
Exhibit 2: Source of image – Kagan China adult consumer survey, July 2019
 (Retrieved from S&P Global Market Intelligence)

2. Introduction to the study

The emergence of Covid-19 has been a death-knell to the nations worldwide. The potential outbreak of the pandemic and increase in the number of death tolls forced government of all countries to enforce lockdowns as a precautionary measure to curtail the deadly disease. The Prime Minister of India, Shri Narendra Modi, announced nationwide lockdown from the middle of March, 2020 and since then the economy of India has been reeling. The lockdown dismantled all major sectors of the economy like manufacturing, retailing, transportation, tourism, hospitality, etc. and with business operations completely closed, managing transactions like cash payments became a major conundrum. In this context, the Indian consumers had shown a strong penchant towards the adoption of mobile wallets with the sole intention of managing cashless transactions. The lockdowns and restrictions in movement of people fuelled massive adoptions and usage of mobile wallets across the whole of India which was also witnessed among many people belonging to the lower middle class segment of the Indian society. The Indian consumers by capitalizing on these agile cashless digital mobile applications were able to make and receive payments by just a mere click on their smartphones, which fulfilled their motives of making and receiving payments at a time when access to liquid money was difficult simultaneously staying at home adhering to the quarantine protocols, thus, fostering a win-win situation.

The concept of mobile wallets in an endeavour of the “Digital India Initiative” introduced by the Government of India. The mobile wallets fall under the category of cashless mode of transactions along with debit cards and credit cards, NEFT/RTGS, Mobile Banking and many such digital payment systems available within the country. These mobile payment applications facilitate online payments to mobile recharges, electricity bill payments, bookings and reservations of flights, trains, buses and cabs, online shopping, payment related to educational purposes and many more such things. Since the inception of these mobile wallets, a major chunk of the Indian population have shown a spectacular interest in the usage of these mobile services which has led to a gargantuan growth of registered users of these mobile wallets. As per the data collected from Business Insider according to Bernstein’s Report in May, 2020, during the lockdowns in India, Google Pay was perched at 38.4% of the total market share of mobile wallets in India with 75 million users and Phone Pe at 19.8% with 60 million users while Amazon Pay, Paytm and WhatsApp Pay follow the bandwagon with 16.1%, 15.1% and 10.7% of market share if mobile wallets in India.

Google Pay had the highest market share in May 2020



*Exhibit 3: Source of Image - Bernsteins
(Retrieved from [businessinsider.in](https://www.businessinsider.in))*

One of the arduous challenges for any academic researcher lies in augmenting the current level of consciousness of multiple factors which trigger the mobile wallets to be accepted and adopted especially in times of Covid-19 when talking in the context of Technology Acceptance Model (TAM), where the crux objective is to probe into the underlying perceptions, motivations, attitudes and behavioural intentions of Indian consumers towards these mobile wallets. TAM is an information system model describing a number of decisions which influence how consumers would accept and use a new technology when presented with it. In the current research study, we have rejigged the model of TAM to include concepts of 'Subjective Norm' and 'Exigencies.' Albeit, few researchers in the past have blended the various components of 'Attitude-Intention-Behaviour', in this particular research study we intend to emphasize on conventional TAM with certain minor modifications.

3. Objectives of the study

1. To find out the perception of Indian customers towards Mobile Wallets.
2. To examine and analyze the motivations, attitudes and behavioural intentions of the Indian customers towards Mobile Wallets.

4. Literature Review

Studies conducted by Shankar, A & Kumari, P. (2016) and Singh, S & Rana, R (2017) revealed that Indian consumers are highly allured by the characteristics of money transfer provided by system of cashless payment services in India. Over the years, there have been massive pioneering and development of myriad theories and models for the purpose of explaining and prognosticating consumer behaviour towards a technological innovation. TAM is considered to be amongst the most influential models of technological acceptance, an extension of the Theory of Reasoned Action (TRA). TAM is an amelioration over TRA as it was built on certain independent variables like Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as well as dependent variables like Attitude towards Usage (ATU). Fred Davis had coined the term PU as the degree or extent to which a person believes that using a particular system would lead to enhancement of his or her job performance. Davis (1989) defined PEOU as the degree or extent to which a person believes using a particular system would be free from effort. Further adding to the theory, Davis (1993) said that the usage of actual information system was determined by a concept called Behavioural Intention (BI), which was determined jointly by the users' attitude towards the use of the system and perceived usefulness. He defined it as "the subjective probability that an individual will perform a specified behaviour." Attitude towards Usage (ATU) is a crux dependent variable in the TAM and in the words of Ajzen & Fishbein (2000), "it is the evaluative effect of positive or negative feeling of individuals in the usage of a particular system."

With the passage of time, the concept of TAM began bolstering from the dynamics of retrospective information technology to integrate novel concepts like e-commerce and m-commerce. Lin et al. (2008), in their study focused on the application of TAM, in that they endeavoured to corroborate the influence of crux elements like mobile trust, perceived usefulness, perceived ease of use and service fee on wireless mobile data service categorizing them as independent variables having an inexorable impact on the customer adoption of SMS technology. It is noteworthy that the traditional model of TAM has also proven to be quite flexible to include independent constructs most notably 'Subjective Norm', as first introduced by Taylor & Todd (1995), who defined it as "the influence gained from social circle on whether or not to use a particular."

TAM is still being relentlessly studied and expanded. "The two major upgrades under the umbrella of TAM are TAM 2 (Venkatesh & Davis 2000 and Venkatesh 2000) and Unified Theory of Acceptance and Use of Technology (UTUAT, Venkatesh et al. 2003)." As per

Venkatesh & Bala, 2008, “TAM 3 has also been proposed in the context of e-commerce which would include the effects of trust and perceived risk on system use.”

Though very few researches has been conducted in the past taking into consideration the concept of Subjective Norm in the context of TAM, we find it extremely grueling to come across the domain of Exigencies used as a construct in TAM. This in fact is the essence of our present research study.

5. Conceptual Framework of TAM

The Technology Acceptance Model (TAM) is a theory of information system (IS) explaining the way users embrace and use a new technology. The suggestion of the model lies in the users’ decision about the usage of a new technology which is actually influenced by various factors when the users interact with a new technology. The most predominant factors in the TAM are Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Attitude towards Usage and Behavioural Intention are also crux variables that make up for TAM. The TAM is a brainchild of Fred Davis which was introduced in the year 1986. TAM is being relentlessly expanded with two new innovative models, TAM2 and UTUAT which were introduced in the year 2000 and 2003 respectively.

6. Research Model and Hypothesis Formulation

The below model is a re-modified TAM. The constructs namely ‘Subjective Norm’ and ‘Exigencies (Covid-19)’ has been incorporated to cater to the influence of peer groups and urgent unforeseen needs respectively. Therefore, our research model comprises of 6 constructs, which has been developed and presented below.

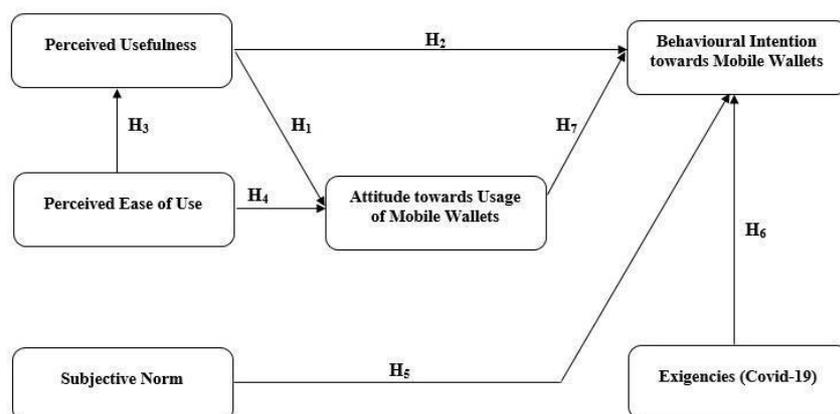


Exhibit 4: Research Model of the present research study
(Self-developed by authors)

The current research study purports to develop a research framework for the user acceptance and intention of mobile wallets, pillared on a re-modified Technology Acceptance Model (TAM). For this purpose, the following hypotheses have been developed and substantiated through the above research model represented above.

H1: Perceived Usefulness has a positive influence on Attitude towards Usage of Mobile Wallets among consumers

H2: Perceived Usefulness has a positive influence on Behavioural Intention of consumers towards Mobile Wallets

H3: Perceived Ease of Use has a positive influence on Perceived Usefulness towards Mobile Wallets among consumers

H4: Perceived Ease of Use has a positive influence on Attitude towards Usage of Mobile Wallets among consumers

H5: Subjective Norm has a positive influence on Behavioural Intention of consumers towards Mobile Wallets

H6: Exigencies (Covid-19) has a positive influence on Behavioural Intention of consumers towards Mobile Wallets

H7: Attitude towards Usage of Mobile Wallets has a positive influence on Behavioural Intention of consumers

7. Data and Methodology

A rigorous research was conducted including both primary and secondary data. Secondary data was used to create a robust foundation of conceptual framework of the present research study. For this purpose, several research papers has been acquired from various authentic and reliable e-resource sites like Sage, JStor, BASE, Google Scholar, etc. For the purpose of primary data collection, a survey has been conducted on a total sample size of 250 respondents, in the age group of 18-45 years, engaged in various occupations, all of them using mobile wallets. For the purpose of data collection a close-ended questionnaire was developed. Most of the questionnaire were mailed while others were randomly doled out to the respondents. The questions in the questionnaire were mostly self-developed albeit few questions have been adopted from previous researches. The questionnaire contained 22 questions under 6 segments, namely, Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Subjective Norm (SN), Exigencies (Covid-19), Attitude towards Usage (ATU) and

Behavioural Intention (BI). A five-point Likert scale (5=Completely Agree and 1=Completely Disagree) has been used to measure the concepts. There were few responses which were erroneous and some were not returned, hence, those responses had to be rejected. After the rejection of such responses, the final valid responses stood at 234.

8. Analysis and Presentation of Data

The data obtained has been processed by using IBM SPSS version 23.0.

- *Demographic Profiling*

Table 1: Representation of Demographics

Demographic Construct	Classification	Population Statistics	Percentage
Gender	Male	124	0.53
	Female	110	0.47
	TOTAL	234	1.00
Age	18-24 years	38	0.16
	25-35 years	108	0.46
	36-45 years	88	0.38
	TOTAL	234	1.00
Occupation	Student	22	0.10
	Service	92	0.39
	Business	81	0.35
	Others	39	0.16
	TOTAL	234	1.00
Income	Below 10000 INR	29	0.12
	10001 INR-25000 INR	55	0.24
	25001 INR-50000 INR	75	0.32
	50001 INR – 100000 INR	42	0.18
	Above 100000 INR	33	0.14
	TOTAL	234	1.00

Thus, we can see that the ratio of male and female is moderately balanced in the proportion 124:110 where the total respondents are 234. The age group of 25-35 years and 36-45 years constitute major chunks of the population with 108 respondents (46%) and 88 respondents (38%) respectively. Major proportion of the respondents are engaged in service and business as evidenced by the above table. Respondents with income level between 25001 INR-50000 INR and 10001 INR-25000 INR are massive users of mobile wallets. One of the stunning results of the above demographics is the number of respondents having income level below 10000, using mobile wallets which is actually very close when compared to the respondents having 10 times more income than them. We see that respondents falling below income level of 10000 INR comprise 12% of the total population juxtaposed to the respondents with

income level above 100000 INR, perched at 14% of the total population according to our survey. This is an evidence of the spectacular turnaround in the behaviour of people of such income level, predominantly falling under the category of lower class segment of the Indian society who have adopted and used mobile wallets in times of exigencies like the ongoing Covid-19.

- *Instrument Reliability*

A reliability analysis has been conducted to check the internal validity and consistency of the items used for each factors. For conducting, reliability statistics, IBM SPSS version 23 has been used. As per Nunnally (1978), “questionnaire for various factors are judged to well reliable measurement instrument, with Cronbach’s Alpha scores being all above 0.6.” Thus, we can conclude from the above statement that the Cronbach’s Alpha score falling below 0.6 will not fit perfectly in the questionnaire. By running the reliability statistics, we have found that the Cronbach’s Alpha score were above the standard value of 0.6 for every item of which is robust enough thus, validating that all the 14 items fit perfectly in our questionnaire and support our proposed research model.

Table 2: Reliability Statistics for all variables (n=22)

Cronbach’s Alpha	Cronbach’s Alpha based on Standardized Items	N of items
0.869	0.869	22

- *Correlation Analysis*

After conducting the reliability analysis, it is vital to find out the relationship between the 6 factors as well as to examine the hypotheses of our proposed research model. To serve this purpose, we have conducted a correlation test by using SPSS version 23. The below table shows that the correlation between PEOU, PU, ATU, SN, EX (Covid-19) and BI are positive and significant, thereby, confirming, our original hypotheses made in the literature related to TAM. The correlation statistics has been presented below.

Table 3: Representation of Correlation Statistics

Factor		PEOU	PU	ATU	SN	EX (Covid-19)	BI
PEOU	Pearson Correlation	1	0.749**	0.773**	0.598**	0.764**	0.692**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	234	234	234	234	234	234
PU	Pearson Correlation	0.749**	1	0.788**	0.665**	0.712**	0.728**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	234		234	234	234	234
ATU	Pearson Correlation	0.773**	0.788**	1	0.603**	0.616**	0.705**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	234	234		234	234	234
SN	Pearson Correlation	0.598**	0.665**	0.603**	1	0.547**	0.584**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	234	234	234		234	234
EX (Covid-19)	Pearson Correlation	0.764**	0.712**	0.616**	0.547**	1	0.789**

- *Regression Analysis*

To further bolster our research findings, we have also conducted a regression statistics to test the different proposed hypothesis.

First, we examine the relationship between H1 and H4.

Table 4: Representation of Regression Statistics

Table: Predictors: PU & PEOU → Dependent Variable: ATU

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.876 ^a	.717	.713	.60436

a. Predictors: (Constant), PEOU, PU

Coefficients ^a					
Model	Unstandardized Coefficients		Standard Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	.378	.193		1.534	.143
PEOU	.363	.050	.381	6.826	.000
PU	.587	.057	.553	10.342	.000

a. Dependent Variable: ATU

As we can see from the above table, the value of R square indicates that the two predictors (PU, PEOU) explains 71.7% variations in ATU. It explains the rationality of this model, albeit there might be other oblivious factors having an impact on the respondents' ATU. The standardized coefficients (β) shows that PU ($\beta=0.553$) have a larger impact than PEOU ($\beta=0.381$). Also, the Sig. indicates that both of the predictors have a significant and positive impact on ATU scores being less than 0.001 level.

Table 5: Representation of Regression Statistics

Table: Predictors: PU, SN, EX (Covid-19) & ATU → Dependent Variable: BI

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.895 ^a	.724	.707	.57964

a. Predictors: (Constant), PU, SN, EX (Covid-19), ATU

Coefficients ^a					
Model	Unstandardized Coefficients		Standard Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	.319	.186		1.770	.093

From the above table it is confirmed that all the four predictors namely PU, SN, EX (Covid-19) and ATU had a significant and positive influence on BI, with ($\beta=0.558$), ($\beta=0.287$), ($\beta=0.315$) and ($\beta=0.394$) respectively for each predictor. Each of the four predictors have Sig=0

Finally, we conduct a regression analysis to examine H3.

Table 6: Representation of Regression Statistics

Table: Predictors: PEOU → Dependent Variable: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.809 ^a	.687	.690	.56438

a. Predictors: (Constant), PEOU

Coefficients^a

Model	Unstandardized Coefficients		Standard Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.378	.193		1.534	.143
PEOU	.363	.050	.381	6.826	.000

a. Dependent Variable: PU

Finally, one more determination of a regression model was done to test our fourth hypothesis, i.e. influence of PEOU on PU. As evidenced from the above table, the value of R Square is 0.687 which represents that PEOU explains 68.7% variations in PU. We also notice that Standard Coefficient value is ($\beta=0.381$), PEOU had a significant and positive impact on PU.

Hence, our proposed research model along with the hypotheses are rightly proven correct as evidenced by the robust examination and analysis.

9. Findings and Deliberations

This study was a pioneering effort in applying Mobile Wallets into a TAM model which was re-modified especially by including the novel construct of ‘Exigencies (Covid-19).’ On the basis of our proposed research model and hypotheses development, we have probed into the liaisons among the traditional components of TAM like PU, PEOU, ATU and BI and Subjective Norm and Exigencies (Covid-19). Utopian as it might appear, the study is imperative when talking in the light of the recent proliferation of smartphone features and multi-functionality when dealing with various applications like mobile wallets. According to

our research findings, Perceived Usefulness (PU) had a significant impact on Attitude towards Usage (ATU) of mobile wallets. It was also observed that PU was significantly related to Behavioural Intention (BI). The reason behind this could be that consumers are willing to adopt a beneficial mobile application that could make their life more convenient. Perceived Ease of Use (PEOU) was significantly related to ATU of mobile wallets. Furthermore, the domain of 'Subjective Norm' which deals with the influence of social circle had a significant impact on the Behavioural Intention (BI) of the consumers towards mobile wallets. Social interactions in today's world plays a pivotal role in shaping the perception and attitude of people, in this case, the perception and attitude of respondents towards mobile wallets. We also notice that Exigencies (Covid-19 in our present research study) also influence the attitude of people as evidenced by our research findings. In fact, the spectacular adoption and usage of mobile wallets in the era of Covid-19 is a fact well-documented. This shows, that customer's perception will be quite different in case of urgent need or emergency situation or any other kind of exigencies. The findings of the present research study also proved that PEOU had a strong influence on PU, suggesting that providing adequate user training is vital for fine-tuning the consumers' perception about the usefulness of a technology which is quite new. Ultimately, we comprehend that consumers' Attitude towards Usage of mobile wallets has been prodigious in shaping up the Behavioural Intention of consumers as both psychological and physiological faculties are a nifty driving force in the development of perceived likelihood of customers.

10. Conclusion

The astounding amelioration of technology is relentlessly fostering a head-turning growth in the landscape of e-commerce and m-commerce. The face of technology has witnessed a seismic shift, particularly in the recent years because of a plethora of instauration thereby boosting a bewildering proliferation in mobile internet and smartphone features. The smartphones possess uncanny qualities supporting myriad technological applications which has proven to be extremely useful for the customers. Amidst this pandemic, where survival of mankind has been challenged, let alone commercial transaction and other activities, many agile mobile applications like mobile wallets have served the purpose of consumers by absorbing their despondency in these times of exigencies. We have been able to bring out the effectiveness of mobile wallets when talking in the context of customers' perception towards it especially in the Covid era. The present research study has highlighted certain crux

components under the TAM constructs, which will be quite useful to guide future researches. People in Kolkata highly value mobile wallets such as Paytm, Phone Pe, Google Pay and others. A reason for this lies in the confidence and the eagerness among the erudite consumers of Kolkata who are always ready to embrace new-fangled technology. Granted the fact that the framework of TAM has garnered widespread criticisms due to its arguable heuristic value, restricted explanatory and predictive power and triviality. Nevertheless, it is still the most popular theoretical model used in academia. The present research study is robust enough to provide valuable conclusions related to the display of consumer behaviour towards mobile wallets in time of Covid-19.

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