



Students' perceptions towards mobile learning during COVID-19

Kinnari Thaker

Library Assistant,
S. R. Luthra Institute Management
Sarvajanik University
Surat, Gujarat
Email: kinnery.thaker1972@gmail.com

Pratiksinh S. Vaghela

Library In-Charge
Assistant Professor
S. R. Luthra Institute Management
Sarvajanik University
Surat, Gujarat
Email: Pratiksinh.vaghela20@gmail.com

Abstract

Advance information and communication technology have strengthened and opened many opportunities for the education sector. Considering the current COVID 19 situation, online learning has become imperative for teachers and students. Especially learning through mobile phones becomes the most popular and convenient option for online learning. This paper applied Technology Acceptance Model to understand the post-graduate students' perception towards mobile learning during COVID 19 in Surat, Gujarat. The model was extended with the subjective norm as an external variable. A survey method was used to collect data from the students through an online questionnaire. Total 112 responses were collected and were analyzed using IBM SPSS software. The results indicated that perceived usefulness and attitude have a strong and influence on behavioral intention towards mobile learning. While the result of the study also revealed that subjective norm and perceived do not significantly affect behavioral intention towards mobile learning. These may be due to the compulsiveness of mobile learning during COVID 19, which makes others' opinion and ease of use of mobile learning insignificant.

Keywords: TAM, Mobile learning, subjective norm, attitude, behavioral intention, COVID 19



0. Introduction

The penetration of smartphones has emerged as one of the most promising developments in the area of education. The affordability of internet accessibility and cost effect smartphones made it easy to use smartphone technology for education and learning purposes. Especially during the COVID 19 situation when most of the Nations implemented the lockdown, online learning through mobile phones became the most affordable and convenient method for educating students. “Mobile learning focuses on the mobility of the learner, interacting with portable technologies” (Matzavela and Alepism, 2021). It is a distance teaching tactic for teachers and provides a practical learning strategy for students to learn anytime and anywhere (Biswas et al., 2020). After COVID 19 was declared as a pandemic, many educational institutes have stopped their physical teaching modeling. The same is the case with India. The UGC (University Grand Commission) and AICTE (All India Council for Technical Education) instructed the higher educational institutes to continue their teaching through electronic media. Most of the higher education institutions are shifted towards mobile-based learning. Therefore, it becomes crucial for educational institutions to adopt available technology for the continuation of education to the students. Mobile technology is one of the widely accepted online learning modes because of its ubiquitous characters (Sitar-Tăut, 2021). It is the most cost-effective and convenient option for online learning during COVID 19.

During COIVD 19 pandemic lockdown, Universities and Educational institutes worldwide and in India have used internet technology to educate their students, primarily through mobile technology. Educational institutes may consider mobile learning as the futuristic tool for online learning. Many prior studies tried to investigate the behavioral intention of mobile learning with an application of the technology acceptance model. This study extended the TAM model subjective norms (Gan et. al., 2017; Aburub and Alnawas, 2019) to understand its effect on behavioral intention. In TAM, Usefulness and ease of use are the main predictors that affect attitude, and then attitude affects behavioral intention. At the same time, the subjective norm is added as an external antecedent that affects the behavioral intention towards mobile learning (Park et al., 2012). Therefore, the study aims to understand students' perception of mobile learning during COVID 19 in India.



1. Literature Review and Theoretical Background

Literature Review

This section of the paper discusses the primary published prior research in mobile learning and its acceptance.

Matzavela and Alepis (2021) investigated the significant parameters of mobile learning in the last decade based on empirical studies. The revealed that perceived ease of use, perceived usefulness, gender difference, behavior and attitude are the main parameters considered for the evaluation of mobile learning adoption. Further, study supported that TAM is one of the most widely used models to understand mobile learning adoption.

Aburub and Alnawas (2019) Used TAM model to test the acceptance of mobile learning by the students (820) of Higher education institution in Jordan. They found that perceived usefulness and perceived ease of use significantly influence intention towards adoption of mobile learning in higher education.

Tayan (2021) studied 191 students' experience, attitude and perception towards Viability of Mobile Technology Implementation to Support Language Learning in Middle Eastern University. The study found that students have a positive attitude and are ready to accept the mobile learning implementation.

Budianto and Yudhi (2021) investigated 198 students and 199 teacher's perceptions towards Whatsapp-based learning during COVID 19 outbreak. They found discrepancies in teachers' and students' perception, ease of use, and usefulness. The study supports Whatsapp as a primary tool for study compared to its current use, and this possibility can be explored further.

Lismardayani and Oktavia (2021) investigated the perception of students' English learning material through E-learning UNP during COVID 19 at Negeri Padang University. The study concluded that the overall students' perception towards E-learning UNP is positive. Easiness of Mobile learning and positive perception contribute more towards the effectiveness of the mobile learning.



Chaka and Govender (2017) conducted a study perception and readiness towards mobile learning in Nigeria on college students. The study adopted qualitative research with a sample of 320 students for the study. The study revealed that effort expectancy, performance expectancy, and social influence are positively related to behavioral intention towards acceptance of mobile learning.

Ganet. al., (2017) investigated the mobile learning library adoption by college students in china. The structural equation model was tested on data collected from 192 students. The study found that attitude is the most significant factor that influences the behavioral adoption of mobile learning.

Al-Adwanet. al. (2018) investigated the students' reediness and factors that affect mobile learning adoption in Jordan's higher education. Based on the quantitative research design, the study found that relative advantages of mobile learning, perceived enjoyment, social influence, self-management, and complexity are the main factors influencing mobile learning adoption in Jordan.

Saroia and Gao (2019) and Asher IrfanSaroia& Shang (2019) understand the intention of student to adopt MLMS(mobile learning management systems) in Sweden. Data have been collected from 130 students and TAM model was applied to test adoption of MLMS. The study found that easiness to use MLMS, usefulness, and attitude are the important contributors that positively contribute to the adoption of mobile learning in the case of Sweden.

Alshurideh et. al., (2019) examined the mobile learning system driver's effect by applying the TAM and Expectation-Confirmation models. The structural equation model was run and tested on data collected from 448 students. The student revealed that social influence, perceived ease of use, perceived usefulness positively influence students' intention towards mobile learning.

Al-Emranet. al. (2018) carried out a systematic literature review on applying the TAM model to understand mobile learning acceptance. Based on the 87 published articles during 2006 to 2018 study found that majority of the studies were conducted in Taiwan and mainly in the context of higher education. It also found that TAM was extended by adding external and constructs from



other theories and models. Most of the studies were based on the survey method, and the subjective norm is the significant construct that has been added to the TAM.

Fagan (2019) investigated factors affecting acceptance of mobile learning by students in higher education and applied the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Data were collected from 171 students in the USA and were analyzed using PLS-SEM software. The study found that perceived usefulness (performance expectancy) and enjoyment were the important factors significant for the acceptance of mobile learning.

Sitar-Tăut (2021) investigated mobile acceptance learning during COVID 19 time by applying the UTAUT model on a sample of 311 higher education students in Romania. The study found that others opinion, performance and effort expectancy influence intention towards mobile learning acceptance.

Biswaset. al., (2020) examined the students' perception towards mobile learning during COVID 19 in Bangladesh. The survey method was employed, and data were collected from 416 students in Bangladesh Universities. The study findings revealed that most of the student has positive perception towards mobile learning. The study suggested that mobile learning technology can be incorporated into the teaching system through social media.

2.1 Technology acceptance model

The TAM model is the most robust and extensively applied theoretical framework in previous studies to predict the user's technology acceptance behavioral intention (Sana'a, 2016; Driediger and Bhatiasevi, 2019). The TAM was developed by Davis (Davis, 1989) and is considered as one of the effective models to understand information system / Information Technology acceptance. The TAM model is a validated, robust model for understanding an individual's acceptance of technology (Venkantesh and Davis, 2000). As per the TAM, Perceived ease of use and Perceived usefulness are the main predictors influencing an individual's attitude and the behavioral intention to use a system.

According to Davis (1989), "Perceived usefulness (PU) is defined as the degree to which a person believes that using a particular system would enhance his or her job performance". Therefore, acceptance of technology depends on an individual's belief that underline technology



will help them complete the job effectively. Further, "Perceived ease of use (PEOU) refers to the degree to which a person believes that the use of a system will be effortless" (Davis, 1989). Individuals will use the technology if its use is effortless. Further, the perceived usefulness is the main predictor intention to use technology compared to perceived ease of use. The TAM model proposed that PEOU is positively associated with PU because the convenience of system use increases system usefulness. Therefore, perceived usefulness is considered the main predictor, while PEOU is a supplementary antecedent to predicting technology usage (Davis, 1989).

2.2 Subjective norm

As Fishbein and Ajzen (1975) proposed in TRA theory, attitude towards a particular behavior and subjective norms will determine the overall behavioral intention (Khalifa and Shen, 2008). "Subjective norms are the rules by which operates the subjective motivation of individuals to act consistently with the views of the individuals' peers and social group" (Bonera, 2011). According to Ajzen (1985), "subjective norms refer to the person's perception of the social pressures put on him or her to perform the behavior in question". According to the prior research subjective norm have direct effect on behavioral intentions (Ha and Nguyen, 2019; Ha, 2020), while as per the study of Çelik, (2011); Yang, (2012) subjective norm have indirectly influence behavioral intentions. Prior study also found that Indian consumers depend on their social groups' opinions for using a shopping website (Srinivasan, 2015). Fishbein and Ajzen (1975) define attitude as "an individual's positive or negative feelings (evaluative effect) about performing the target behavior". Individuals give weight to a particular behavior to frame attitude based on an individual's belief and his or her evaluation of the expected outcome of that behavior.

3 Objectives of the study

Based on the theoretical framework and the literature review, the aims to achieve the following objective,

1. To understand the students' perception towards mobile learning
2. To investigate the influence of perceived usefulness on intention to use mobile learning
3. To investigate the influence of perceived ease of use on intention to use mobile learning



4. To investigate the influence of attitude on intention to use mobile learning
5. To investigate the influence of subjective norm on intention to use mobile learning

Based on the objectives the study hypothesized as,

- H₁: There is a positive influence of perceived usefulness on behavioral intention towards mobile learning
- H₂: Perceived ease of use is positively influencing behavioral intention towards mobile learning
- H₃: Attitude toward mobile learning is positively influencing behavioral intention towards mobile learning
- H₄: Subjective norm is positively influencing behavioral intention towards mobile learning

4. Methodology

The study applied Technology Acceptance Model by extending in with subjective norm as variables. The study is based on causal research design as it established causal relationship to understand behavioral intention towards mobile learning. The survey method was used to collect data from post-graduate students of MBA College in Surat city of Gujarat state. TAM variables were measured on a five-point scale where one strongly disagrees and five strongly agree. 200 students were approached for the responses, and 112 responses were recorded during the data collection period. The data were collected through online mode with the help of Google Form and were coded with MS excel software. IBM SPSS 21 software was used to analyze the data, and tests like reliability, correlation, regression are applied to conclude on study objectives.

5. Results

5.1 Descriptive analysis

The following section of the paper discusses the significant findings of the study.

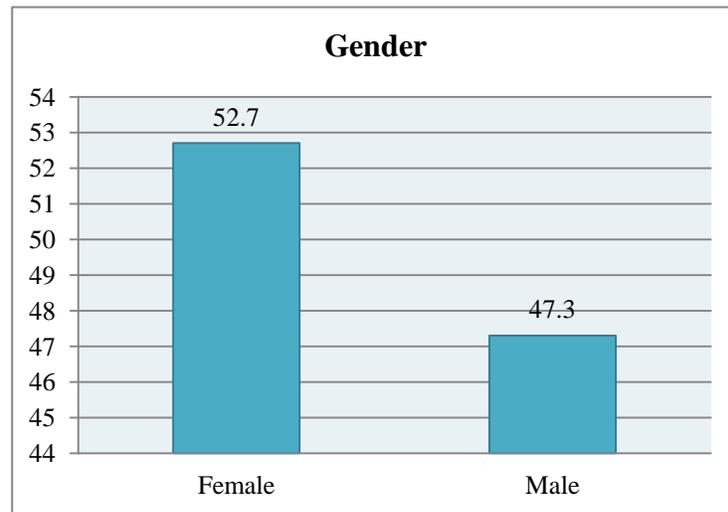


Figure 1: Gender of Students

Figure 1 indicates the out of 112 student respondents, 52.7 percent were female students and 47.3 percent were male students in the study.

5.2 Reliability test

A reliability test is used to accuracy and consistency of the constructs used in the study (Cooper et. al., 2006). Table I indicate the reliability test statistic of reliability test of the constructs used in the study. In table 1, all alpha's values are more than the thumb rule value 0.7 and all values are greater than 0.9, which is considered excellent reliability of the instrument.



Table 1
Reliability Test

Reliability Statistics		
Construct	Cronbach's Alpha	No. of Items
PU	0.911	5
PEOU	0.956	6
A	0.928	5
SN	0.926	4
BI	0.943	7
Overall	0.981	27
Note: PU: perceived usefulness, PEOU: perceived ease of use, A: attitude, SN: subjective norms, BI: behavior intention		

5.3 Correlation

A correlation test is carried out to understand the relationship between constructs of the study. The purpose of the correlation test is to understand the relationship of behavioral intention with other independent variables Subjective norms (SN), Perceived usefulness (PU), Perceived ease of use (PEOU), and Attitude (A). Table 2 indicate that all significant p values are greater than 0.05, which means there is a strong and positive relationship between behavioral intention and Subjective norms (SN), Perceived usefulness (PU), Perceived ease of use (PEOU), and Attitude (A). This indicates that the regression analysis can be performed to identify the impact of these independent variables on behavioral intention to use mobile learning in the situation of COVID 19.



Table 2
Correlation test statistics

Correlations						
		SN	PU	PEOU	A	BI
SN	Pearson Correlation					
	Sig. (2-tailed)					
PU	Pearson Correlation	.818**				
	Sig. (2-tailed)	.000				
PEOU	Pearson Correlation	.745**	.871**			
	Sig. (2-tailed)	.000	.000			
A	Pearson Correlation	.817**	.834**	.833**		
	Sig. (2-tailed)	.000	.000	.000		
BI	Pearson Correlation	.794**	.851**	.809**	.878**	
	Sig. (2-tailed)	.000	.000	.000	.000	
**. Correlation is significant at the 0.01 level (2-tailed).						
Note: PU: perceived usefulness, PEOU: perceived ease of use, A: attitude, SN: subjective norms, BI: behavior intention						

5.4 Regression

“A regression analysis is a method of investigating functional relationship between independent and dependents variables of the study” (Chatterjee and Hadi, 2013). In this study, behavioral intention is a dependent variable with Subjective norms (SN), Perceived usefulness (PU), Perceived ease of use (PEOU), and Attitude (A) as independent variables. The following hypothesizes are tested to study the effect of the independent variables.

- Ho₁: There is no effect on subjective norms on intention to use mobile learning
- Ho₂: There is no effect on perceived usefulness on intention to use mobile learning
- Ho₃: There is no effect on perceived ease of use on intention to use mobile learning
- Ho₄: There is no effect on attitude on intention to use mobile learning



These hypotheses were tested at a 95 % of confidence level with the help of SPSS software. Tables 3, 4 and 5 provide a detailed description of the test results.

Table 3
Regression model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.905 ^a	.819	.813	.48075
a. Predictors: (Constant), A, SN, PEOU, PU				
Note: PU: perceived usefulness, PEOU: perceived ease of use, A: attitude, SN: subjective norms, BI: behavior intention				

Table 3 show that R value is 0.905 and Adjusted R square value is 0.813. This values indicated that the variation in behavioral intention can 81.9 percent explain by the predictor variables, perceived usefulness, subjective norms, perceived ease of use and attitude.

Table 4
ANOVA model fit statistics

ANOVA					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	112.180	4	28.045	121.344	.000 ^b
Residual	24.730	107	.231		
Total	136.910	111			
a. Dependent Variable: BI					
b. Predictors: (Constant), A, SN, PEOU, PU					
Note: PU: perceived usefulness, PEOU: perceived ease of use, A: attitude, SN: subjective norms, BI: behavior intention					



Table 4 shows the F test value = 121.344 for the predictors variable, perceived usefulness, subjective norms, perceived ease of use and attitude. The significance value is 0.000 which is less than 0.005, indicated that the regression model is good fit for behavioral intention as a dependent variable. It can be said that overall regression model significantly predict the behavioral intention.

Table 5
Regression coefficients statistics

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.183	.153	-	1.196	.234
SN	.090	.082	.087	1.100	.274
PU	.313	.095	.326	3.296	.001
PEOU	.048	.094	.047	.515	.608
A	.509	.092	.495	5.554	.000
a. Dependent Variable: BI (BI: behavior intention)					

Table 5 indicate the regression coefficient β values for all the independent variable. Subjective norm β value is 0.090 ($p=0.274$), which indicate that there is no influence of subjective norm on behavioral intention towards mobile learning. The β value of perceived usefulness is 0.313 ($p=0.001$), which indicate that there is a significant influence of perceived usefulness on behavioral intention towards mobile learning. The β value of perceived ease of use is 0.048 ($p=0.608$), which indicate that there is no significant influence of perceived ease of use on behavioral intention towards mobile learning. The β value of attitude is 0.509 ($p=0.000$), which indicate that there is a significant influence of perceived ease of use on behavioral intention towards mobile learning. This relationship can be represented through following equation,

$$\text{Then: } Y = \alpha + \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4$$



Where Y = Students mobile learning behavioral intention X1 = subjective norms, X2 = perceived usefulness, X3 = perceived ease of use, X4 = attitude; 'Y= 0.183 + 0.090 X1 + 0.313 X2 + 0.048 X3 + 0.509 X4'.

Table 6
Hypothesis test result

Hypothesizes	Result
• Ho ₁ : There is no effect on subjective norms on intention to use mobile learning	Accepted
• Ho ₂ : There is no effect on perceived usefulness on intention to use mobile learning	Rejected
• Ho ₃ : There is no effect on perceived ease of use on intention to use mobile learning	Accepted
• Ho ₄ : There is no effect on attitude on intention to use mobile learning	Rejected

5 Conclusion

The purpose of the study was to investigate the students' perception towards mobile learning during COVID 19. The study developed the theoretical framework based on Technology Acceptance Model and has added subjective norm as an antecedent to the behavioral intention. The study found that perceived usefulness and attitude have a significant positive effect on the intention to use mobile learning. While the study also found that subjective norm and ease of use do not affect behavioral intention towards mobile learning. This may be because mobile learning becomes the only option during COVID 19 pandemic. Therefore, suggestions or another opinion may not have an influence on intention towards mobile learning. The overall study found that students have a positive attitude towards mobile learning and considered it one of the useful learning modes. Universities and Educational institutes should explore this option future to provide an effective teaching experience for students.



6 Limitations and Future Research Scope

The study result should be interpreted with its limitation. This was carried out by considering post-graduate students as a respondent's future research may consider graduate or school students. Further, the study applied a technology acceptance model with the subjective norm as future research may carry out other variables important to the acceptance of mobile learning. The future research may consider the effect of demographic variables on behavioral intention towards mobile learning.

References

- Aburub, F., & Alnawas, I. (2019). A new integrated model to explore factors that influence adoption of mobile learning in higher education: An empirical investigation. *Education and Information Technologies*, 24(3), 2145-2158.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control* (pp. 11-39). Springer, Berlin, Heidelberg
- Al-Adwan, A. S., Al-Madadha, A., & Zvirzdinaite, Z. (2018). Modeling students' readiness to adopt mobile learning in higher education: An empirical study. *International Review of Research in Open and Distributed Learning*, 19(1).
- Al-Emran, M., Mezhujev, V., & Kamaludin, A. (2018). Technology Acceptance Model in M-learning context: A systematic review. *Computers & Education*, 125, 389-412.
- Alshurideh, M., Al Kurdi, B., & Salloum, S. A. (2019, October). Examining the main mobile learning system drivers' effects: A mixed empirical examination of the Expectation-Confirmation Model (ECM) and the Technology Acceptance Model (TAM). In *International Conference on Advanced Intelligent Systems and Informatics* (pp. 406-417). Springer, Cham.
- Asher Irfan Saroia & Shang Gao (2019) Investigating university students' intention to use mobile learning management systems in Sweden, *Innovations in Education and Teaching International*, 56:5, 569-580, DOI: 10.1080/14703297.2018.1557068



- Biswas, B., Roy, S. K., & Roy, F. (2020). Students perception of Mobile learning during Covid-19 in Bangladesh: university student perspective.
- Bonera, M. (2011). The propensity of e-commerce usage: The influencing variables. *Management Research Review*.
- Budianto, L., & Yudhi, A. (2021). Utilizing WhatsApp-driven learning during covid-19 outbreak: Efl users' perceptions and practices. *Computer-Assisted Language Learning Electronic Journal (CALL-EJ)*, 22(1), 264-281.
- Çelik, H. (2011). Influence of social norms, perceived playfulness and online shopping anxiety on customers' adoption of online retail shopping. *International Journal of Retail & Distribution Management*.
- Chaka, J. G., & Govender, I. (2017). Students' perceptions and readiness towards mobile learning in colleges of education: a Nigerian perspective. *South African Journal of Education*, 37(1), 1-12.
- Chatterjee, S., & Hadi, A. S. (2013). *Regression analysis by example*. John Wiley & Sons.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 319-340.
- Driediger, F., & Bhatiasevi, V. (2019). Online grocery shopping in Thailand: Consumer acceptance and usage behavior. *Journal of Retailing and Consumer Services*, 48, 224-237.
- Fagan, M. H. (2019). Factors influencing student acceptance of mobile learning in higher education. *Computers in the Schools*, 36(2), 105-121.
- Fishbein, M., & Ajzen, I. (1977). *Belief, attitude, intention, and behavior: An introduction to theory and research*.
- Gan, C., Li, H., & Liu, Y. (2017). Understanding mobile learning adoption in higher education: An empirical investigation in the context of the mobile library. *The Electronic Library*.



- Ha, N. (2020). The impact of perceived risk on consumers' online shopping intention: An integration of TAM and TPB. *Management Science Letters*, 10(9), 2029-2036.
- Ha, N., & Nguyen, T. (2019). The effect of trust on consumers' online purchase intention: An integration of TAM and TPB. *Management Science Letters*, 9(9), 1451-1460.
- Khalifa, M., & Shen, K. N. (2008). Explaining the adoption of transactional B2C mobile commerce. *Journal of enterprise information management*.
- Lismardayani, R., & Oktavia, W. (2021). Students' Perceptions towards the Use of E-Learning UNP during Covid-19 Pandemic: A Case Study of English Department Students at Universitas Negeri Padang. *Journal of English Language Teaching*, 10(2), 272-284.
- Matzavela, V., & Alepis, E. (2021). M-learning in the COVID-19 era: physical vs digital class. *Education and Information Technologies*, 1-21.
- Park, S.Y., Nam, M.W. and Cha, S.B. (2012), "University students' behavioural intention to use mobile learning: evaluating the technology acceptance model", *British Journal of Educational Technology*, Vol. 43 No. 4, pp. 592-605
- Sana'a, Y. (2016). A critical review of models and theories in the field of individual acceptance of technology. *International journal of hybrid information technology*, 9(6), 143-158.
- Saroia, A. I., & Gao, S. (2019). Investigating university students' intention to use mobile learning management systems in Sweden. *Innovations in Education and Teaching International*, 56(5), 569-580.
- Sitar-Tăut, D. A. (2021). Mobile learning acceptance in social distancing during the COVID-19 outbreak: The mediation effect of hedonic motivation. *Human Behavior and Emerging Technologies*, 3(3), 366-378.
- Srinivasan, R. (2015). Exploring the impact of social norms and online shopping anxiety in the adoption of online apparel shopping by Indian consumers. *Journal of Internet Commerce*, 14(2), 177-199.



Tayan, B. M. (2017). Students and teachers' perceptions into the viability of mobile technology implementation to support language learning for first year business students in a Middle Eastern university. *International Journal of Education and Literacy Studies*, 5(2), 74-83.

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information systems research*, 11(4), 342-365.

Yang, K. (2012). Consumer technology traits in determining mobile shopping adoption: An application of the extended theory of planned behavior. *Journal of Retailing and Consumer Services*, 19(5), 484-491.