Original Research Article

A conceptual model to determine factors influencing mobile money banking adoption in Ghana

Abstract
The growth of mobile money service in Ghana has been attributed to many other factors outside the spectrum of technology. The research focus was to determine the factors influencing mobile money service from the point of technology. The study analysis was based on Structural Equation Modelling of Partial Least Squares using SmartPLS. It was determined that, the following construct, perceived risk, perceived cost, perceived usefulness, perceived ease of use, compatibility, relative advantage, observability, trialability, social influence with ($p < 0.001$) influenced user in adopting mobile money banking in Ghana. The research finding will enable stakeholders related to the mobile money industry to strengthen it gains and sustain it growths toward the mobile money services. The research present the information technology factors that influence the adoption of mobile money and how factors should be factored in the development of the mobile money industry. The research also give industry players the systematic factors they could relied on when making any decision toward user acceptance.

Keywords: Adoption, Mobile money,Diffusion Theory, Technology Acceptable Model, Structure Equation Model

Comment [DM1]: Spacing

1. Introduction

Mobile money is a widely used application, mainly in mobile finance. It involves the integration of digital payments and mobile telecommunication networks via cross-industry and cross-platform collaboration among both mobile network operators (MNOs) and financial institutions (Baolin et al., 2017).

Mobile money financial system provides a wide range of financial services (Luna, Liébana-Cabanillas, Sánchez-Fernández, & Munoz-Leiva, 2019), such as merchant micropayments, person-to-person financial transfers between individuals, utility bill payments, checking bank accounts, and long-distance remittances (Baabdullah, Alalwan, Rana, Kizgin, & Patil, 2019 ; Phuong, Luan, Dong, & Khanh, 2020). Currently, a mobile money system is provided through various organisations and business strategies.

Mobile money banking solutions in Ghana has been around since 2009 and can be considered vital in the FinTech sector (PWC, 2016). From a modest beginning in 2009, mobile payment solutions today contribute significantly to the level of cash flows that exceed the country's total traditional banks transactions. The number of registered mobile money customers as of the end of 2021 stood at 48.3 million, with 17.9 million active mobile money accounts and 442 thousand active agents of the four mobile money operators (Vodaphone Cash, Airtel/Tigo and MTN momo) (BOG, 2021). The total mobile money transaction flow stood at 164.80 billion for 2021(BOG, 2021).

Although mobile money banking provides clear advantages and conveniences, its limited use, acceptability and lack of broad adoption have resulted in a range of empirical investigations. Most academics concentrated on industrialized nations in this context, such as the USA (Johnson, Woolridge & Bell, 2019) Germany (Wirth, 2017), the United Kingdom (Koenig□Lewis, Palmer, & Moll, 2010) Japan (Maurer and Mainwaring, 2021). There have been just a modest number of research about mobile money on developing and emerging markets (India, Emirate, Malaysia); the inadequacy of research in emerging and developing geographies has produced a knowledge vacuum that has to be filled.

The research focus was to determine the factors influencing mobile money service in Ghana using TAM/DT.

1.1 Purpose of the study

The purpose wasto determine using TAM/DT what factors contribute to the growth of mobile money banking in Ghana.

Comment [DM2]: Of what?

1.2 Research Questions

To this, the following study questions were set:

What factors influence the acceptance of mobile money banking in Ghana?

Comment [DM3]: Spacing

a. Is there a significant positive relationship between users' behavioural intentions and actual use of mobile money banking services?
b. Is there a significant positive relationship between user attitudes and behavioural intentions to use mobile banking services?
c. Is there a significant positive relationship between user attitudes toward mobile money services and perceived risk about mobile money ecology?
d. Is there a significant positive relationship between the perceived costs of mobile money and the attitudes of users toward the use of mobile money banking services?
e. Is there a significant positive relationship between perceived trust and user attitudes toward mobile money banking services?
f. Is there a significant positive relationship between perceived usefulness and user attitude toward mobile money banking?
g. Is there a significant positive relationship between perceived usefulness and actual use of mobile money services?
h. Is there a significant positive relationship between user attitudes toward mobile money banking and perceived ease of use?
i. Is there a significant relationship between users' perceived ease of use of mobile money services and user attituded to use mobile money applications?

j. Is there a significant positive relationship between mobile money service perceived ease of use and perceived usefulness?
k. Is there a statistically significant relationship between compatibility and user attitude to use mobile money banking services?
l. Is there a relation between relative advantage and user attitude toward mobile money services?
m. Is there a statistically significant positive relationship between observability and user attitude towards mobile money services?
n. Is there any significant positive relationship between, trialability and user attitudes toward mobile money banking services?
o. Is there a statistically significant positive relationship between users' attitudes and social influence towards mobile money?

1.3 Research Hypothesis

Table 1 detailed the hypothesis set for the research

Table 1: Research hypothesis

H01:The Behavioural Intentions significantly influence Actual use of mobile money banking services.
H02: Users' Attitudes toward positively impact Behavioural Intention toward mobile money services.
H03: Perceived Risk about mobile money ecology impact user Attitude towards mobile money services.
H04: Perceived Cost of mobile money positively impacts users' Attitudes towards using mobile money
H05: Perceived Trust significantly impact User Attitude towards mobile money services.
H06: Perceived Usefulness of mobile money service positively impact User's Attitude towards mobile money.
H07: Perceived Usefulness of mobile money positively impact Actual Use of mobile money services.
H08: User Attitude towards mobile money services significantly influenced Perceived Ease of Use .
H09: Perceived Ease of Use positively impact on Perceived Usefulness towards mobile money.
H010: Perceived Ease of Use significantly impact on Actual Use of mobile money
H011: Compatibility positively impact users Attitude to use mobile money services.
H012: There is significant impact of Relative Advantage on Users' Attitude towards mobile money service.
H013: Observability of user's mobile money positively impact User's Attitude toward mobile money services.
H014: Trialability of mobile money banking ecology influences User Attitudes toward mobile money services.
H015: Social Influence significantly impact Users' attitudes towards mobile money.

2 Research Model in Literature

The literature review considers the factors in both TAM and DT that were taken into account for the conceptual framework development of the study, which can be seen in Figure 1.

a. The behavioural intentions of users influence on their actual use of service.
As said by Davis's TAM theory (Davis,Bagozzi & Warshaw,1989).), one's attitude has a greater influence on their behavioural intention to use a particular service or technology. When a user has a positive attitude toward a service or product, the user is more likely to have to use that particular service (Chao, 2019).

b. The attitude of users impacts on their behavioural intention.
In most studies in the fields of information science, e-commerce, and many other studies relating to those intending to use technology, user attitude has become a pivotal variable (Chawla & Joshi, 2020; Prabhakaran, Vasantha, & Sarika, 2020; Gupta & Duggal, 2020; Flavián, Guinaliu, & Lu, 2020).

c. The perceptions of perceived risk impact on user attitude to adopt.
A user's risk of a subject matter, in this case, a mobile payment system, will influence the individual's attitude toward using the service (Chauhan, Yadav, & Choudhary, 2019 ; Shaikh, Glavee-Geo & Karjaluoto, 2021 ; Zhang, Tao, Qu, Zhang, Lin & Zhang, 2019).

d. The perceived cost impact on users' attitude towards.
According to Luarn and Lin (2005), in their study, mobile banking adoption has been mostly associated with comparative cheaper cost of transaction charges and maintenance costs by users; this has been collaborated by Tobbin (2012) research suggests that cheaper cost of transaction associated with mobile banking has influenced users rate of acceptance, the cost here is

in comparison to other charges associated with bank charges compare to all cost relatable to mobile money charges (Lee, Ryu & Lee, 2019; Jin, Seong & Khin, 2019; Singh & Sinha, 2020).

e. The perceived trust impact on their attitude
It has been demonstrated that trust reduces the customers' need to understand, control, and facilitate transaction time to complete the task to be carried out by the user (Bhatt, 2021 ; Obaid, 2021; Jouda, Jarad, Obaid, Mdallalah, & Awaja, 2020).

f. The perceived usefulness impact on a user's attitude
There is a strong belief that the perceived usefulness of innovation, particularly on the part of users, will influence their willingness to use the service and technology provided (Islami et al., 2020; Tubaishat, 2018; Moslehpour et al., 2018; Chen and Aklikokou, 2020; Caffaro et al., 2020).

g. A users' compatibility impact on their attitude
The willingness of an individual to easily initiate and integrate mobile banking services into their existing technology will eventually sway the user to be associated with such technology. The user is always looking for ways to use and be associated with technology in order to make their lives easier and not become subjugated by it.(Chawla & Joshi, 2020; Elhajjar,& Ouaida, 2019 ; Min, So & Jeong, 2019).

h. Relative advantage of mobile money service impact users attitude to user mobile money
When a user perceives a positive impact on their regular financial service, they are more likely to adopt that application into their regular application usage (Park, Ahn, Thavisay, & Ren, 2019; Chawla & Joshi, 2019).

i. A users' observability impact on user attitude
Prior to using the technology, the user observability has to do with asking questions and inquiring about the technology. These are done in order to comprehend and appreciate the system and the value such technology could add to their existing and normal routine daily financial transactions without any hassle (Mi et al., 2019; Al-Rahmi, Yahaya, Aldraiweesh, Alamri, Aljarboa,Alturki & Aljeraiwi, 2019).

j. The trialability influence on attitude of user
The trial period is critical; it is the time when the user appreciates, understands, and participates in the communication channel to ensure the system's successful completion. This lesson is available to users during the registration process for any mobile banking service at any accredited agent (Yuen, Cai, Qi, & Wang, 2021; Teo, Zhou, Fan & Huang, 2019; Ho, Wu, Lee, & Pham, 2020).

k. Social influence impact on users' attitude toward
Social influence is also influenced by perceived risk, perceived cost, and trialability (Ventre and Kolbe, 2020; Liang et al., 2018; Park et al., 2019; Zhao, 2018; Ariffin, 2018; Mohseni et al., 2018), each of which has shown to positively influence a user's behavioural intentions to use or adopt to technology or new services.

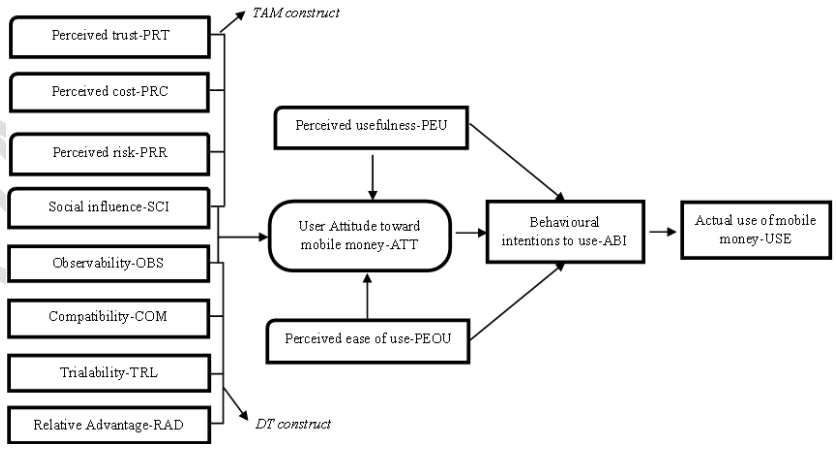

Figure 1: Research model for study

3 Methodology

Comment [DM4]: Good

The primary data collection method is used in conjunction with the quantitative research method (Kothari and Gaurav, 2018; Saunders et al., 2017). The target audience consists of mobile money users in Ghana who use Vodaphone cash, AirtelTigo wallet, and MTN momo and are over the age of eighteen (18).

According to Fowler (2009), determining sample size precludes three factors: margin of error, confidence level, and response rate. The sample size for the study was determined using the margin of error, confidence level, and the response rate of 2%, 98 %, and 50%, respectively. As of 2021, Ghana has 17.9 million active mobile money users (BOG, 2021).

Using Uttley(2019) sample size regime, which followsTaherdoost (2017)equation $n = \frac{p\,(100-p)z^2}{E^2}$ where n (sample size), p (percentage of population), E (maximum percentage error to tolerate), Z (confidence level). The sample size determine from the equation is 2298.

The data collected were analyzed using structural equation model (SEM) (Dijkstra & Henseler, 2014)with SmartPls.

4 Reliability and Validity

SEM's SmartPLS data analysis tools were employed for the analysis. Endogenous variables and exogenous variables are the two main constructs of variables for the subject test element under consideration (Garson, 2016; Ringle, Sarstedt, Mitchell & Gudergan,2020). TAM and DT variables were used as exogenous construct in the study. Perceived trust, perceived cost, perceived risk, social influence, observability, compatibility, trialability, and relative advantage are exogenous factors considered. User attitude, perceived ease of use, perceived usefulness, behavioural intention to use, and actual use are the endogenous factors.

The SmartPLS data analysis was based on construct reliability and validity. Cronbach's Alpha, AVE, composite reliability, and rho A were used to assess reliability, as well as discriminant validity (R-square(R^2) and Q-square(Q^2), Heterotrait-Monotrait correlation ratio (HTMT), Fornell-Larcker Criterion, and Model Fit).

4.1 Reliability

The consistency of the study outcome is considered when determining the research's reliability. Internal consistency is the level or degree to which the variables set for the study behave the same way when the study is repeated with the same variable in the same given environment when discussing research reliability. The use of SEM via SmartPLS to assess data reliability.

AVE can be used to test both convergent and divergent validity. AVE is the quantification of its squared parameter loadings; it also considers the variance loading of both an attribute and its related measurement outcomes, which should be greater than 0.5. (Cheah et al. 2018; Zhang, Lu & Kizildag, 2018). When the AVE value is less than 0.5, it indicates that the data may contain missing values or errors.

In a reflective model, composite reliability is the best way to determine convergent validity. The composite reliability scale is 0-1, with 1 being the most reliable. Composite reliabilities in framework and exploration studies should be equal to or greater than 0.6. (Chin, 1998). For confirmatory studies, a score of 0.80 or higher is considered a strong simulation conclusion (Henseler, Hubona, Ray 2016).

Cronbach's alpha considers whether latent variable coefficients are convergent or not. When the final result of a Cronbach's alpha test is 0.70 on a scale, it is acceptable for confirmatory research and 0.60 for exploratory research.

4.2 Validity

Validity takes into account how much the constructs absolutely differ from one another or how much the study constructs overlap. Validity is determined using the Heterotrait-Monotrait (HTMT), Fornell-Larcker criterion, R^2 and Q^2. The Heterotrait-Monotrait correlation ratio should not be greater than 0.90. Heseler et al. (2016) and Sarstedt et al. (2019) The Fornell-larcker criterion compares latent construct correlation to the square root of the extracted average variance (AVE).R^2 values of 0.75, 0.50, or 0.25 for endogenous latent variables are significant, moderate, or weak, according to Hair et al. (2020). Greater than zero Q^2 values indicate that the study values were well reconstructed and the model is predictive.

5Analysis

Two items (PRT2 and COM1) were excluded from the analysis as part of the measurement model evaluation due to low factor loadings (<0.600) (Höck and Ringle, 2006; Hair et al., 2020)

Cronbach's alpha and composite reliability (CR) were used in the study to test the reliability of the constraints. All of the CRs exceeded the recommended value of 0.70(Sarstedt et al. 2019; Duarte and Amaro, 2019) Cronbach's alpha for each construct was greater than 0.70

Convergent validity was acceptable since AVE was greater than 0.50. Table 3 shows the reliability and validity results and the factor loadings for the items.

Table 2 illustrates the proportion of mobile money users, with 54 % and 46 % representing both male and female users, respectively. The age group of 29 - 38 years old represented 29.3 % of those who responded to the study, indicating that they are also the most mobile money users. The level of education respondents revealed that those who completed High School dominated, accounting for 29.7 % and 42.4 % are employed.

Table 2: Demographic overview of respondents

Variable		N	%
Gender	Male	1102	54.0
	Female	939	46.0
Age	18 - 28 years	473	23.2
	29 - 38 years	598	29.3
	39 - 48 years	461	22.6
	49 - 58 years	332	16.3
	59 years and above	177	8.7
Occupation	Schooling	403	19.7
	Household work	119	5.8
	Employed	865	42.4
	Unemployed	542	26.6
	Retired	112	5.5
Academic	No formal education	336	16.5
	High school	607	29.7
	Certificate	184	9.0
	Diploma	396	19.4
	Bachelor's degree	350	17.1
	Master's degree	164	8.0
	Doctorate degree	4	0.2

Table 3: Convergent reliability

	Factors Loadings	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Attitude					
Mobile money services have been very useful to me(ATT1).	0.959				
Mobile money services are convenient(ATT2).	0.931	0.921	0.953	0.944	0.810
In all, I have a positive attitude toward using mobile money services(ATT3).	0.936				
I can recommend mobile money service to others(ATT4).	0.760				
Compatibility					
Mobile money service fits in the way I like to my banking payments(COM2).	0.898				
Using mobile money service is compatible with my life style(COM3).	0.825				
Using mobile money services fits the way I would like to manage my finances(COM4).	0.741	0.816	0.821	0.874	0.636
Adopting the new innovation with mobile money is favourable to me(COM5).	0.714				
Observability					
I got to know of the mobile money from the others(OBS1).	0.755				
It is easy for me to observe others using the mobile money service(OBS2).	0.877				
I have seen what others do using their mobile money services(OBS3).	0.898	0.852	0.864	0.900	0.694
Observing other was the best means for me to learn how to use the mobile money services(OBS4).	0.794				
Perceived Ease of Use					
The mobile money usage is understandable(PEOU1).	0.738				
Learning to use the mobile banking service was simple(PEOU2).	0.749				
I am able to use the mobile money to complete my transaction easily(PEOU3).	0.826	0.835	0.867	0.882	0.599
Mobile money usage does not require a lot of thinking(PEOU4).	0.734				
I get the mobile money services to do what I want it to do(PEOU5).	0.817				
Perceived Usefulness					
Operating the mobile money services is easy for me(PEU1).	0.936				
It is easy to get the mobile money services to do what I want it to do(PEU2).	0.952	0.920	0.974	0.948	0.859
Mobile money service is user friendly(PEU3).	0.891				
Perceived Cost					
The Telecoms charges on mobile money services are not reasonable(PRC1)	0.947				
Getting a discount for every purchase I make using my mobile money payment service influence my attitude towards mobile banking(PRC2)	0.838	0.880	1.042	0.920	0.794
Telecoms with less or no charges on their mobile money services influence my attitude to use their services(PRC3).	0.885				

Table 3: Convergent reliability (continue)

	Factors Loadings	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Perceived Risk					
Personal information acquired through mobile money is risky(PRR1).	0.836				
Money lost on my mobile wallet is mostly linked to mobile money usage(PRR2).	0.900	0.780	0.950	0.862	0.677
There is some loss of privacy due to the usage of mobile banking information gathered about you(PRR3).	0.722				
Perceived Trust					
The perceived misuse of my personal information by service providers is a concern to me(PRT1).	0.896				
My mobile money service provider is collecting too much information about me(PRT3).	0.845	0.875	0.878	0.923	0.801
The security of my payment details when using mobile money is a concern(PRT4).	0.940				
Relative Advantage					
Mobile money enhances my financial transactions (RAD1)	0.749				
Using mobile money improves my financial transaction performance(RAD2)	0.768	0.836	0.868	0.883	0.601
Mobile money enables me to accomplish my financial services quickly(RAD3)	0.838				
Mobile money is more helpful to me than actual banking services(RAD4)	0.712				
Using mobile money increases my financial productivity(RAD5)	0.804				
Social Influence					
I use the mobile money service because most of my friends use the mobile money services(SCI1).	0.869	0.872	0.996	0.918	0.789
Using mobile banking services elevate ones social status among relatives and friends(SCI2).	0.850				
My friends and relatives usage experience with mobile money services have influenced me to use mobile banking services(SCI3).	0.943				
Trialability					
Mobile money payment service was available to me to perform any payment applications successfully(TRL1).	0.842				
Using mobile money services, I got enough time to try it out appropriately(TRL2).	0.847	0.845	0.864	0.906	0.763
Trying the mobile banking service long enough enable me to understand how it works(TRL3).	0.929				
Intention to Use					
How strong is your intention to use mobile money services? (USE1)	0.947				
How likely are you recommend mobile money services to others?(USE2)	0.843	0.936	0.974	0.953	0.836

5.1 Discriminant validity analysis

i. R-Square and Q-Square

The total effect magnitude measurement for the conceptual framework is R^2. The normal measure applies R^2 to every variable in the model, allowing integration to be tested for both the measurements for the outer loading and structural models. The incremental R^2 is regarded in the same way as regression. They (Chin, 1998; Höck & Ringle, 2006) classify "cut-offs of 0.67, 0.33, and 0.19 as substantial, moderate, and weak." for the endogenous construct.

It establishes the proportion of variation in the entirely reliant variable. The predictive relevance deduced the most influential interrelationships between a few of the structural model's constructs. The predictive semantic similarity test was used to calculate the Q^2 value for ATT, BIU, PEOU, PEU, and USE. If the value is greater than zero, the model is relevant. The framework was much more relevant when the Q^2 value was close to one (1). Chart1 exemplifies the inferential relevance values for ATT, BIU, PEOU, PEU, and USE. Once ATT was much more relevant, the impacts on BIU, PEOU, and PEU were greater, influencing USE even more, based on the Q^2 values.

Chart1: Using R2 and Q2 to validate the endogenous construct

	R^2	Q^2
ABI	0.030	0.029
ATT	0.725	0.569
USE	0.287	0.210
PEOU	0.314	0.179
PEU	0.072	0.051

The Fornell-larcker criterion was used to assess discriminant validity; the table shows that the square-root of AVE for the construct was greater than the inter-construct correlation. The Heterotrait-Monotrait correlation ratio (Henseler et al., 2016) was also used to assess discriminant validity, with values falling below the 0.90 thresholds. As a result, discriminant validity is established as shown in Table 4

Table 4: Fornell-Larcker Criterion

	ABI	ATT	COM	OBS	PEOU	PEU	PRC	PRR	PRT	RAD	SCI	TLB	USE
ABI	**1.000**												
ATT	0.339	**0.900**											
COM	0.505	0.563	**0.798**										
OBS	0.629	0.668	0.388	**0.833**									
PEOU	0.504	0.562	0.649	0.511	**0.774**								
PEU	0.176	0.272	0.162	0.241	0.198	**0.927**							
PRC	-0.403	-0.241	-0.362	-0.484	-0.465	-0.287	**0.891**						
PRR	0.221	-0.275	-0.251	-0.109	0.188	-0.005	-0.108	**0.823**					
PRT	0.690	0.604	0.784	0.720	0.551	0.191	-0.339	-0.246	**0.895**				
RAD	0.502	0.563	0.644	0.510	0.479	0.186	-0.450	0.184	0.549	**0.776**			
SCI	-0.470	0.197	-0.205	-0.119	0.115	0.036	0.192	0.024	-0.370	0.116	**0.888**		
TLB	0.529	0.625	0.413	0.909	0.619	0.176	-0.465	-0.048	0.643	0.624	0.026	**0.873**	
USE	0.180	-0.248	-0.412	-0.041	0.010	0.090	-0.177	0.589	-0.287	0.012	-0.045	0.082	**0.896**

Note: The bold values are the score root of AVE

The HTMT considers the estimation of the correlation between constructs. The HTMT threshold was achieved as shown in Table5 when all the construct values are below 0.85 (Henseler et al., 2016)

Table 5: HTMT Ratio

	ABI	ATT	COM	OBS	PEOU	PEU	PRC	PRR	PRT	RAD	SCI	TLB	USE
ABI													
ATT	0.351												
COM	0.512	0.555											
OBS	0.695	0.723	0.753										
PEOU	0.521	0.607	0.824	0.583									
PEU	0.190	0.279	0.172	0.261	0.213								
PRC	0.448	0.292	0.402	0.563	0.530	0.290							
PRR	0.199	0.319	0.347	0.245	0.388	0.069	0.173						
PRT	0.738	0.637	0.601	0.430	0.109	0.222	0.380	0.311					
RAD	0.521	0.607	0.823	0.383	0.197	0.213	0.530	0.388	0.599				
SCI	0.513	0.247	0.226	0.196	0.263	0.050	0.254	0.365	0.417	0.263			
TLB	0.544	0.661	0.491	0.564	0.049	0.192	0.555	0.205	0.719	0.749	0.177		
USE	0.194	0.255	0.474	0.281	0.091	0.112	0.271	0.649	0.332	0.092	0.127	0.188	

The rho-A parameter is said to determine whether the model structure construct performances are consistent. A rho-A measurement scale of 0.7 or higher is required to establish composite reliability. Meanwhile, a rho- A value greater than one is out of the ordinary, and thus should be avoided in the model. Table3 expresses the rho-A determined in the research data analysis.

ii. Model Fit

The goodness of fit (GoF) is used to identify whether a theory is well-fitted or poorly fitted and to also identify measurement and structural model measurement error (Dijkstra and Henseler, 2015). According to Henseler et al. (2016), the relatively low the SRMR, the stronger the model's fit. Whenever SRMR is zero, a precise fit is established. A “standardised root mean squared residual (SRMR)” of 0.08 or less is appropriate. A value greater than 0.08 indicates that there is no fit. In this case, the research SRMR is 0.033, which strongly suggests there is a model if fit. Criteria for an exact fit, the comparatively low the “unweighted least squares discrepancy (d_ULS)”, the higher quality fit of the framework, which also applies to the outcome of geodesic discrepancy (dG). Equally vital is the outcome of the Normed fit index (NFI) of the research model determination of best fit; this was achieved as the model outcome showed a determination outcome of 0.893. This is well demonstrated in table 6.

Table 6: Model Fit

	Saturated Model	Estimated Model
SRMR	0.031	0.033
d_ULS	0.122	0.181
d_G	0.893	0.915
Chi-Square	561.247	569.158
NFI	0.881	0.894

5. Structural Model Assessment

The structural approach considers the relationship between the dependent variables and the proposed model's constructs. According to Hair et al. (2020), they showed how to determine “the structural model” through these procedures, the path coefficient, the level of R^2, and the model fit, are used to demonstrate the model's validity (Janadari et al., 2016; Hair et al., 2020).

Another measure of the structured model is path coefficient modelling through the bootstrapping calculation. There is a path coefficient from the algorithm's calculation; however, this method is limited in the output given the true reflection of construct significant to the model. As a result, the bootstrapping calculation is used for the path coefficient for appropriate and a good considerable outcome. Bootstrapping is non-parametric, which randomly does replacement samples from the original sample. The research measure of the model using the coefficient from the bootstrap is exceptionally significant as most of the outcome constructs were between good models fit, as shown in Table 6.

The conceptual framework's total effect magnitude measurement is R^2. The normal measure applies R^2 to every variable in the model, allowing integration to be tested for both outer loading and structural model measurements. The incremental R^2 is treated similarly to regression. The adjusted R^2 is used to assess model complexity. According to these studies (Chin, 1998; Höck and Ringle, 2006), cut-offs of 0.67, 0.33, and 0.19 for the endogenous construct are "substantial," "moderate," and "weak." Table 7 shows that the endogenous construct, user attitude, perceived ease of use, perceived usefulness, behavioural intention to use, and actual use are all significant.

The positive connection discovered between the variables demonstrates the model variable's quality to the model's offered claim. The difference in the R^2 obtained in each measure indicates the variance in the constructed endogenous variables. This model allows the researcher to be flexible in understanding the data and responding to the research measures.

5.2 Hypothesis Assessment

H01: There is a significant impact of behavioural intentions (UBI) on the actual use (ABI) of mobile money banking services.
H01, evaluates whether UBI has impact on individual users in mobile money acceptance. The results shows that UBI has a significant effect on ABI (ß = 0.095, t = 3.435, p < .001), hence H01 was supported.

H02: There is a significant impact of ATT on Behavioural intention (USE).
H02 evaluates whether ATT has significant impact on ABI to use mobile money services. The study outcome shows, ATT has a significant effect on ABI (ß = -0.408, t = 25.540, p < .000), hence H02 was supported.

H03: There is significant impact of perceived risk (PRR) on user attitude (ATT).
H03 evaluates the impact of PRR on ATT. The outcome of the analysis shows that PRR has a significant effect on ATT (ß = -0.116, t = 11.531, p <.000), hence H03 was supported.

H04: There is a significant impact of perceived cost (PRC) on attitude (ATT)
H04 evaluates the impact of PRC on ATT. The outcome of the analysis shows PRC has significant effect on ATT (ß = 0.141, t =8.611, p < .000), hence H04 was supported

H05: There is insignificant impact of perceived trust (PRT) on attitude (ATT).
H03 evaluates the impact of PRT on ATT. The outcome of the analysis shows PRT has no significant effect on ATT (ß = 0.026, t = 0.439, p <.0.661) hence H05 was not supported.

H06: There is a significant impact of perceived usefulness (PEU) on user's attitude (ATT) towards mobile money banking.
H06 evaluates the impact of PEU on ATT. The outcome of the analysis shows that PEU has significant effect on ATT (ß = 0.235, t = 11.446, p < .000), hence H06 was supported

H07: There is a significant impact of Perceived usefulness (PEU) on users' actual use (USE) of mobile money service.
H07: evaluates the impact of PEU on USE. The outcome of the analysis shows PEU has a significant effect on USE (ß = 0.159, t = 7.103, p < .000), hence H07 was supported

H08: There is a significant impact of perceived ease of use (PEOU) on attitude (ATT) towards the use of mobile money services
H08 evaluates the impact of PEOU on ATT. The outcome of the analysis indicates there is a significant effect of PEOU on ATT (ß = 0.562, t = 80.311, p < .000), hence H08 was supported.

H09: There is a significant impact of Perceived ease of use (PEOU) has positive impact on Perceived usefulness (PEU)
H09 evaluate the impact of PEOU on PEU. The outcome of the analysis concludes that there is a significant effect of PEOU on PEU (ß = 0.066, t = 2.642, p < .000), hence H09 was supported.

H010: There is a significant impact of Perceived ease of use (PEOU) has positive impact on users' actual use (USE)
H010 evaluate the impact of PEOU on USE. The outcome of the analysis shows that there is a significant impact of PEOU on USE (ß = 0.208, t = 8.132, p < .000), hence H010 was supported.

H011: There is a significant impact of compatibility (COM) on users' attitude (ATT) to utilise mobile money.
H011 evaluates the impact of COM on ATT. The outcome of the analysis, therefore, shows that there is a significant effect on COM on ATT (ß = 0.443, t = 18.028, p < .000), hence H011 was supported.

H012: There is a significant impact of Relative advantage (RAD) on users attitude (ATT) towards using mobile money services
H012 evaluates the impact of RAD on ATT. The outcome of the analysis from the study shows there is a significant effect of RAD on ATT (ß = 0.158, t = 9.386, p < .001) hence H012 was supported

H013: There is a significant impact of observability (OBS) on the user's attitude (ATT) toward the use of mobile money banking services.H013 evaluates the impact of OBS on ATT. The outcome of the analysis shows that there is effect on OBS on ATT (ß = 0.899, t = 23.268, p < .000), hence H013 was supported

H014: There is a significant impact of trialability (TLB) on user attitudes (ATT) toward mobile money banking services.
H014 evaluates the impact of TLB on ATT. The outcome of the analysis from the study indicate there is effect of TLB on ATT (ß = -0.413, t = 19.446, p < .000), hence H014 was supported.

H015: There is a significant impact of users' attitudes (ATT) on social influence (SCI) toward mobile money banking services
H015 evaluates the impact of ATT on SCI. The outcome of the analysis shown from the study indicate there is significant effect of SCI on ATT (ß = 0.295, t = 21.57, p < .000), hence H015 was supported.

The results of the hypothesis is summarised in Table 5. using the structural model. This equally indicate the supported and not supported hypothesis. In all, there were fifteen (15) hypotheses and only one was not supported. Figure 2 shows the research model represented in SmartPls with plotted independent and dependent variables.

Table 7: Direct Relationship Results and structural model results

Hypothesis Path	B	SE	T	P	Results
H01: USE -> ABI	0.180	0.021	8.476	0.000	Supported
H02: ATT -> USE	-0.408	0.016	25.540	0.000	Supported
H03: PRR -> ATT	-0.116	0.010	11.531	0.000	Supported
H04: PRC -> ATT	0.141	0.016	8.611	0.000	Supported
H05: PRT -> ATT	0.026	0.059	0.439	0.661	Not Supported
H06: ATT -> PEU	0.235	0.021	11.446	0.000	Supported
H07: PEU -> USE	0.159	0.022	7.103	0.000	Supported
H08: ATT -> PEOU	0.562	0.007	80.311	0.000	Supported
H09: PEOU -> PEU	0.066	0.025	2.642	0.008	Supported
H010: PEOU -> USE	0.208	0.026	8.132	0.000	Supported
H011: COM -> ATT	0.443	0.025	18.028	0.000	Supported
H012: RAD -> ATT	0.158	0.017	9.386	0.000	Supported
H013: OBS -> ATT	0.899	0.039	23.268	0.000	Supported
H014: TLB -> ATT	-0.413	0.021	19.446	0.000	Supported
H015: SCI -> ATT	0.295	0.014	21.570	0.000	Supported

Note: *B= Beta Coefficient, SE= Standard Error, T= t-Statistics, P= Probability(P) value.*

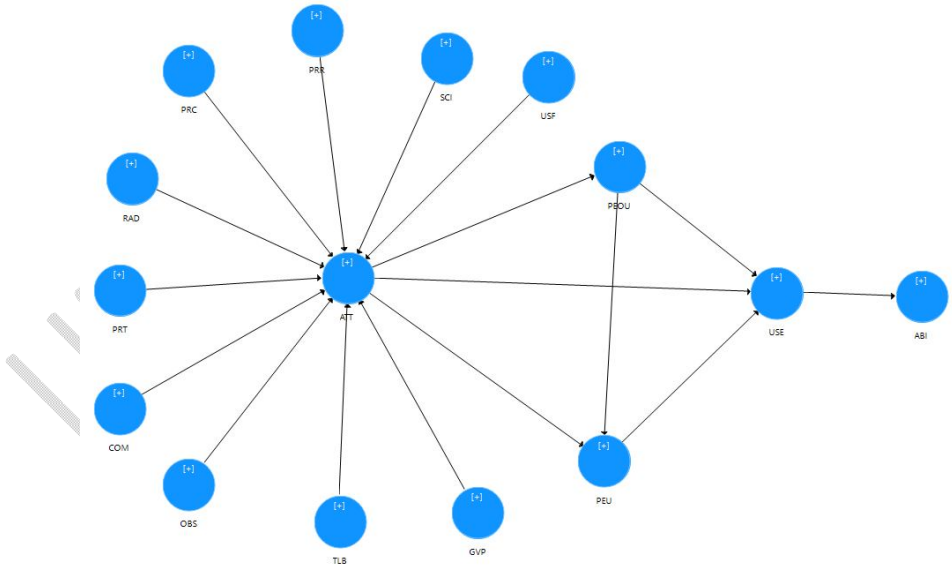

Figure 2: Research model

Figure 2 depicts the flow and plotting of the construct, this was used to analyse the structural model. This equal indicates the independent variables, moderating variables and dependent variables.

5.3 Mediating analysis

Mediating analysis was performed to assess the mediating role of (PEOU, PEU and ATT) on the linkage between Independent Variables (COM, PRR, OBS, PRC, PRT, SIC, RAD, and TLB) and Dependent Variables (USE). The results Table 8 revealed that the total effect of PRR on USE was significant (H03: ß = 0.029, t = 10.134, p <.001). With the inclusion of the mediating variables (PEOU, PEU and ATT), the impact of PRR on USE became significant (ß =0.116, t = 11.844, p <.001,). The indirect effect of PRR on USE through ATT was found significant (ß = .000, t =.013, p < .001). This shows that the relationship between PRR and USE is partial mediated by ATT.

Table 8: Mediating Analysis

Total effects			Direct effects			Indirect effects						
Total effects	Coefficient	p-value	Direct effects	Coefficient	p-value	Indirect effects	coefficient	SD	T-value	P-value	BI [2.5%, 97.5%]	Mediation
COM -> USE	-0.110	0.000	COM -> ATT	0.443	0.000	COM -> ATT -> PEOU -> PEU -> USE	0.001	2.517	0.012	0.001	.001-.005	Partial mediation
OBS -> USE	-0.223	0.000	OBS -> ATT	0.899	0.000	OBS -> ATT -> PEOU -> PEU -> USE	0.002	2.557	0.011	0.002	.002-.010	Partial mediation
PRC -> USE	-0.035	0.000	PRC -> ATT	0.141	0.000	PRC -> ATT -> PEOU -> PEU -> USE	0.000	2.447	0.014	0.000	.000-.002	Partial mediation
PRR -> USE	0.029	0.000	PRR -> ATT	-0.116	0.000	PRR -> ATT -> PEOU -> PEU -> USE	0.000	2.498	0.013	0.000	.001-.000	No mediation
PRT -> USE	-0.006	0.658	PRT -> ATT	0.026	0.658	PRT -> ATT -> PEOU -> PEU -> USE	0.000	0.404	0.686	0.000	.001-.001	Partial mediation
RAD -> USE	-0.039	0.000	RAD -> ATT	0.158	0.000	RAD -> ATT -> PEOU -> PEU -> USE	0.000	2.456	0.014	0.000	.000-.002	Partial mediation
SCI -> USE	-0.073	0.000	SCI -> ATT	0.295	0.000	SCI -> ATT -> PEOU -> PEU -> USE	0.001	2.554	0.011	0.001	.001-.003	Partial mediation
TLB -> USE	0.102	0.000	TLB -> ATT	-0.413	0.000	TLB -> ATT -> PEOU -> PEU -> USE	0.001	2.542	0.011	0.001	.004-.001	Partial mediation

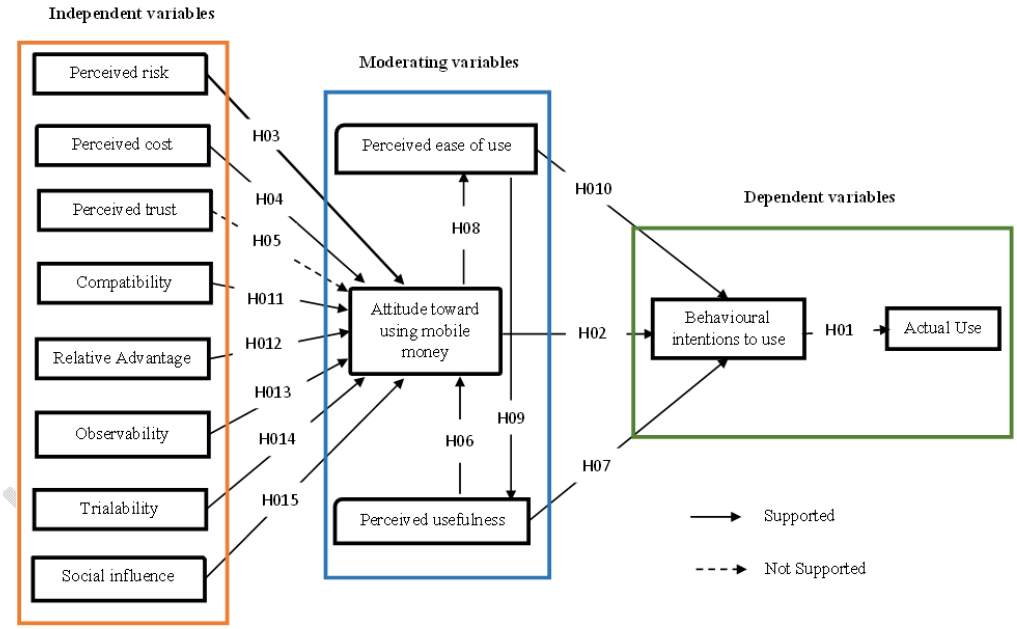

Figure 3: Research model analysis outcome

Figure 3 depicts the research hypothesis outcome as well as the effect of independent variables, moderating variables, and dependent variables. According to the graph, all other factors were supported excerpt perceived trust.

The research therefore conclude that, there is significant effect of the research constructs undertook in the study for both TAM/DT. This then show that, the research model was positively fit for the study. In conclusion the adoption of users behaviour towards technology is done through the TAM/DT.

5.4: Discussion and Conclusion

A number of studies have been conducted to determine which factors influenced mobile users to use mobile money banking. This study concept is unique in comparison to previous research on the subject. The current study is unique in that the constructs under consideration are not the same as those considered by Cudjoe et al (2015). This is also true for Lee et al., (2019), who stated that mobile payment service users should be tested and validated using both TAM and IDT theory. Matitila's (2003) study used constructs that were strikingly similar to those used in this study.

However, the uniqueness was based on the use of government and security constructs in the determination of model usage in assessing the impact of TAM and DT on user adoption of mobile money services. This distinction is also given in terms of the number of participants included in the study's outcome, which was definitive and unanimous, resulting in a far-reaching outcome on the subject. The study included 16 regions with a total population of 2,041 people. Min et al., (2019) on the subject of security adopted for the study support the study's findings.

The research hypothesis set for the study all were met except the fifth hypothesis related to Perceived trust. The factors influencing users adoption of mobile money are compatibility, observability, perceived cost, perceived risk, relative advantage, social influence, and trailability.

A variety of factors influence users' attitudes, which in turn influence their choice and subsequent decisions regarding the adoption of a specific service. It is unclear what causes that choice of judgment. What is clear from the study in terms of what influences users' choices is that those factors that influence their perceived ease of use and lead to perceived usefulness contributed and influenced users to make that final decision of acceptance of technology. Compatibility, observability, perceived cost, perceived risk, relative advantage, social influence, and trailability are the factors that influence user acceptance of technology.

The mediating links associated to the model, thus, the mechanism of impact independent variables on dependent variables are, attitude, perceived ease of use and perceived usefulness.

This distinction is also granted in terms of the number of participants incorporated into the study outcome, which was definitive and unanimous, resulting in a far-reaching outcome on the subject. On this, 16 regions with a total population of 2,041 took part in the study.

Reference:

Al-Rahmi, W. M., Yahaya, N., Aldraiweesh, A. A., Alamri, M. M., Aljarboa, N. A., Alturki, U., & Aljeraiwi, A. A. (2019). Integrating technology acceptance model with innovation diffusion theory: An empirical investigation on students' intention to use E-learning systems. *Ieee Access*, *7*, 26797-26809.

Bhatt, V. (2021). An Empirical Study On Analyzing A User's Intention Towards Using Mobile Wallets; Measuring The Mediating Effect Of Perceived Attitude And Perceived Trust. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, *12*(10), 5332-5353.

Caffaro, F., Cremasco, M. M., Roccato, M., & Cavallo, E. (2020). Drivers of farmers' intention to adopt technological innovations in Italy: The role of information sources, perceived usefulness, and perceived ease of use. *Journal of Rural Studies*, *76*, 264-271.

Chao, C. M. (2019). Factors determining the behavioral intention to use mobile learning: An application and extension of the UTAUT model. *Frontiers in psychology*, *10*, 1652.

Chauhan, V., Yadav, R., & Choudhary, V. (2019). Analyzing the impact of consumer innovativeness and perceived risk in internet banking adoption: A study of Indian consumers. *International Journal of Bank Marketing*. Zhang, T., Tao, D., Qu, X., Zhang, X.,

Chawla, D., & Joshi, H. (2019). Consumer attitude and intention to adopt mobile wallet in India–An empirical study. *International Journal of Bank Marketing*.

Chawla, D., & Joshi, H. (2020). Role of mediator in examining the influence of antecedents of mobile wallet adoption on attitude and intention. *Global Business Review*, 0972150920924506.

Cheah, J.-H., Sarstedt, M., Ringle, C.M., Ramayah, T. and Ting, H. (2018), "Convergent validity assessment of formatively measured constructs in PLS-SEM: On using single-item versus multi-item measures in redundancy analyses", *International Journal of Contemporary Hospitality Management*, Vol. 30 No. 11, pp. 3192-3210. https://doi.org/10.1108/IJCHM-10-2017-0649

Chen, L., & Aklikokou, A. K. (2020). Determinants of E-government adoption: Testing the mediating effects of perceived usefulness and perceived ease of use. *International Journal of Public Administration*, *43*(10), 850-865.

Chin, W. W. (1998). The partial least squares approach for structural equation modelling. Pp. 295– 336 in Macoulides, G. A., ed. Modern methods for business research. Mahwah, NJ: Lawrence Erlbaum Associates

Cudjoe, A.G., Anim, P.A. and Nyanyofio, J.G.N.T. (2015) Determinants of Mobile Banking Adoption in the Ghanaian Banking Industry: A Case of Access Bank Ghana Limited. Journal of Computer and Communications, 3, 1-19. http://dx.doi.org/10.4236/jcc.2015.32001

Davis, F.D. (1989) „Perceived Usefulness, Perceived ease of use, and user acceptance of information technology", MIS Quarterly, 13(3), pp. 319-340.

Dijkstra, T. K., & Henseler, J. (2014). Assessing and testing the goodness-of-fit of PLS path models, 3rd VOC Conference, Leiden, May 9

Elhajjar, S., & Ouaida, F. (2019). An analysis of factors affecting mobile banking adoption. *International Journal of Bank Marketing*.

Flavián, C., Guinaliu, M., & Lu, Y. (2020). Mobile payments adoption–introducing mindfulness to better understand consumer behavior. *International Journal of Bank Marketing*.

Garson, G.D. (2016). Partial Least Squares Regression & Structural Model Statistical , Associates Blue Book Series

Gupta, V., & Duggal, S. (2020). How the consumer's attitude and behavioural intentions are influenced: A case of online food delivery applications in India. *International Journal of Culture, Tourism and Hospitality Research*.

Hair Jr, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. Journal of Business Research, 109, 101–110

Henseler, J., Hubona G.,Ray P.A.(2016)Using PLS path modelling in new technology research:updated guidelines Industrial Management & Data Systems, Vol. 116 Iss 1 pp. 2–20

Ho, J. C., Wu, C. G., Lee, C. S., & Pham, T. T. T. (2020). Factors affecting the behavioral intention to adopt mobile banking: An international comparison. *Technology in Society*, *63*, 101360.

Höck, Michael & Ringle, Christian M. (2006). Strategic networks in the software industry: An empirical analysis of the value continuum. IFSAM VIIIth World Congress, Berlin 2006. Retrieved 2/22/2009 from http://www.ibl-unihh.de/IFSAM06.pdf.

Islami, M. M., Asdar, M., & Baumassepe, A. N. (2021). Analysis of Perceived Usefulness and Perceived Ease of Use to the Actual System Usage through Attitude Using Online Guidance Application. *Hasanuddin Journal of Business Strategy*, *3*(1), 52-64.

Jin, C. C., Seong, L. C., & Khin, A. A. (2019). Factors affecting the consumer acceptance towards fintech products and services in Malaysia. *International Journal of Asian Social Science*, *9*(1), 59-65.

Jouda, H., Abu Jarad, A., Obaid, T., Abu Mdallalah, S., & Awaja, A. (2020, July). Mobile Banking Adoption: Decomposed Theory of Planned Behavior with Perceived Trust. In *The 1st International Conference on Information Technology & Business ICITB2020*.

Kothari C.R and Guarav Garg (2018), Research Methodology Methods and Techniques 4th Edition PDF New Age International Publishers

Lee, J., Ryu, M. H., & Lee, D. (2019). A study on the reciprocal relationship between user perception and retailer perception on platform-based mobile payment service. *Journal of Retailing and Consumer Services*, *48*, 7-15.

Lin, R., & Zhang, W. (2019). The roles of initial trust and perceived risk in public's acceptance of automated vehicles. *Transportation research part C: emerging technologies*, *98*, 207-220.

Min, S., So, K. K. F., & Jeong, M. (2019). Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model. *Journal of Travel & Tourism Marketing*, *36*(7), 770-783.

Moslehpour, M., Pham, V. K., Wong, W. K., & Bilgiçli, İ. (2018). E-purchase intention of Taiwanese consumers: Sustainable mediation of perceived usefulness and perceived ease of use. *Sustainability*, *10*(1), 234.

Obaid, T. (2021). Predicting Mobile Banking Adoption: An Integration of TAM and TPB with Trust and Perceived Risk. *Available at SSRN 3761669*.

Park, J., Ahn, J., Thavisay, T., & Ren, T. (2019). Examining the role of anxiety and social influence in multi-benefits of mobile payment service. *Journal of Retailing and Consumer Services*, *47*, 140-149.

Prabhakaran, S., Vasantha, D. S., & Sarika, P. (2020). Effect of social influence on intention to use mobile wallet with the mediating effect of promotional benefits. *Journal of Xi'an University of Architecture & Technology*, *12*(2), 3003-3019.

Ringle, C. M., Sarstedt, M., Mitchell, R., & Gudergan, S. P. (2020). Partial least squares structural equation modeling in HRM research. The International Journal of Human Resource Management, 31(12), 1617–1643

Sarstedt, M., Hair Jr, J. F., Cheah, J. H., Becker, J. M., & Ringle, C. M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal (AMJ)*, *27*(3), 197-211

Saunders, M., Lewis, Ph. And Thornhill, A. (2017) Research Methods for Business students, 6th edition. Pearson Education Limited, 59.

Shaikh, A. A., Glavee-Geo, R., & Karjaluoto, H. (2021). How relevant are risk perceptions, effort, and performance expectancy in mobile banking adoption?. In *Research Anthology on Securing Mobile Technologies and Applications* (pp. 692-716). IGI Global.

Singh, N., & Sinha, N. (2020). How perceived trust mediates merchant's intention to use a mobile wallet technology. *Journal of Retailing and Consumer Services*, *52*, 101894.

Sobti, N. (2019). Impact of demonetization on diffusion of mobile payment service in India: Antecedents of behavioral intention and adoption using extended UTAUT model. *Journal of Advances in Management Research*.

Taherdoost, H. (2018). A review of technology acceptance and adoption models and theories. Procedia manufacturing, 22, 960–967

Teo, T., Zhou, M., Fan, A. C. W., & Huang, F. (2019). Factors that influence university students' intention to use Moodle: A study in Macau. *Educational Technology Research and Development*, *67*(3), 749-766.

Tubaishat, A. (2018). Perceived usefulness and perceived ease of use of electronic health records among nurses: application of technology acceptance model. *Informatics for Health and Social Care*, *43*(4), 379-389.

Uttley, J. (2019). Power analysis, sample size, and assessment of statistical assumptions—Improving the evidential value of lighting research. Leukos

Yuen, K. F., Cai, L., Qi, G., & Wang, X. (2021). Factors influencing autonomous vehicle adoption: An application of the technology acceptance model and innovation diffusion theory. *Technology Analysis & Strategic Management*, *33*(5), 505-519.

Zhang, T., Lu, C., and Kizildag, M. (2018). Banking "on-the-go": examining consumers' adoption of mobile banking services. *International Journal of Quality and Service Sciences*.

Zhang, T., Tao, D., Qu, X., Zhang, X., Lin, R., & Zhang, W. (2019). The roles of initial trust and perceived risk in public's acceptance of automated vehicles. *Transportation research part C: emerging technologies*, *98*, 207-220.