

## Factors Influencing the Intention to use Mobile Banking and the Moderating Effects of Subjective Norms and Innovation

Veysel YILMAZ <sup>1\*</sup>, Yasemin KİNAŞ <sup>2</sup>

<sup>1</sup> Eskisehir Osmangazi University, Faculty of Science, Department of Statistics, Meşelik Campus, Eskisehir

<sup>2</sup> General Directorate of Mining and Petroleum Affairs, Ankara

\*Corresponding author: [yc.yasemincan@gmail.com](mailto:yc.yasemincan@gmail.com)

**Received:** 03.03.2024

**Accepted:** 25.04.2024

### Abstract

The aim of this research is to create a conceptual model outlining the factors that impact the decision to use mobile banking services. The study also evaluates the effect of subjective norms and innovation on the proposed model. Data for the study were gathered from a face-to-face survey conducted with 400 employees of a public institution in Ankara, the capital city of Turkey. The study analysed the relationships between latent variables, hypothesis testing, and model fit using Partial Least Squares Structural Equation Modelling (PLS SEM). The research findings indicate that the proposed model demonstrated satisfactory fit according to PLS SEM fit criteria. Additionally, the study found that perceived benefit mediates the relationship between perceived ease of use and attitude.

**Keywords:** Mobil banking, intention, mediating, multi-grup, moderating

## 1. Introduction

Mobile banking (m-banking) is a service that enables bank or financial institution customers to manage their accounts remotely. It offers features such as managing bank accounts, making money transfers, investments, and bill payments without physically visiting the relevant institution. M-banking services empower customers to handle all their financial transactions effortlessly. In addition, mobile banking enables customers to access their accounts conveniently 24/7 and conduct transactions quickly and inexpensively. The increasing use of information and communication technology, such as mobile phones and tablets, has led financial institutions to develop m-banking services, encouraging users to adopt this emerging technology. The globalization of business and systems has highlighted the need for a better understanding of the implications of using m-banking services. This study investigates the willingness to use mobile banking by incorporating variables from the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB). The study investigated the influence of external factors on attitudes towards mobile banking and usage intentions. The research model was analysed using the Partial Least Squares Structural Equation PLS-SEM method via SmartPLS. No changes in content were made as the text already meets the desired characteristics. The variables considered in the study were perceived ease of use, perceived usefulness, compatibility, awareness, attitude, intention, and perceived risk. The research model analysed the causal relationships between the variables. The study also examined the mediating effect of perceived benefit on the relationship between perceived ease of use and attitude, as well as the moderating effect of subjective norm and innovativeness variables.

## 2. Literature Review

The following paragraphs present recent literature on m-banking adoption through

PLS-SEM. Yu (2012) investigated the factors that influence m-banking usage using UTAUT. The analysis showed that perceived reliability and performance expectation significantly affect mobile banking uptake. Additionally, it demonstrated that gender moderates behavioral intention.

Chukwumah (2017) conducted a study on the implementation of mobile banking (m-banking) services in rural regions. The survey was carried out in five villages in Katsina in March 2017, and 196 data points were obtained from four of the villages located in Katsina province. The data was then analyzed using the PLS SEM method with the aid of SmartPLS software. The study model included behavioral intention, perceived compatibility, perceived financial value, perceived trust, and perceived usefulness. The results indicate that perceived trust and perceived compatibility have a significant impact on behavioural intention, while perceived financial value and perceived usefulness have no significant influence.

In their 2019 study, Owusu Kwateng and colleagues examined the factors that affect the adoption and use of mobile banking services in Ghana. They utilized the UTAUT2 model and considered moderating variables such as age, education level, user experience, and gender. The sample consisted of 300 users of mobile banking services in Ghana. The findings suggest that habit, price, and trust are the primary factors that influence the adoption and use of mobile banking services in Ghana. The association between UTAUT2 structures and behavioural patterns of use has been mitigated by individual variances in gender, age, educational attainment, and user familiarity.

In a study conducted by Chaouali and Souiden (2019) on the elderly's resistance to m-banking, the relationship between psychological and functional barriers was investigated. The study used a multi-group analysis with the age variable acting as the

moderator. Data was collected from 425 elderly individuals who did not use mobile banking. The study's findings highlighted that tradition and image influenced the perception of mobile banking use, value, and risk. The factors of utilization, valuation perception, and risk perception were found to be influential in resistance behaviour, with age acting as a mitigating variable in these relationships.

Fernando et al. (2019) developed a conceptual model to investigate the factors that influence consumer behaviour in the adoption and use of m-banking services via mobile phones. The study surveyed 258 individuals, and data from 240 respondents were analysed. The study examined security, privacy, perceived trust, mobile phone usage, m-banking services, and factors affecting m-banking usage.

Foroughi et al. (2019) investigated the determinants of the intention to continue using mobile banking based on self-efficacy and channel preference. The research model's results were critical in clarifying the impact of perceived usefulness, satisfaction, attitude, and intention to continue using mobile banking. It was found that perceived ease of use had no impact on perceived usefulness or attitude.

Usman and Sulistyowati (2019) developed a model to investigate the correlation among service quality, trust, satisfaction, and customer loyalty in mobile banking. The study collected data from 200 participants who used mobile banking services from October to December 2019. The Partial Least Squares Structural Equation Modelling (PLS SEM) method was used for data analysis. The study findings revealed that the variables considered in the model have a significant influence on mobile banking.

Hamidi and Safareeyeh (2019) assessed the employment of a CRM system in the adoption of m-banking as the most influential factor in the banking sector's success. The model they suggested

comprises emotional commitment, faithfulness, loyalty, desire to revisit, number of visits, profitability, and engagement. The study acknowledged that all variables within the model, except for trust, have a favourable impact on customer relationships and contentment.

Widyanti and Usman (2019) aimed to investigate the significance of perceived usefulness, information quality, behavioral intention, perceived value, and perceived ease of use in relation to m-banking utilization. The research collected data from 289 participants who intended to use m-banking in the near future. The study's findings suggest that there is a significant impact of behavioral intention and information quality on the use of mobile banking.

Hassan and Wood (2020) conducted a study on the usage intentions of three consumer segments towards mobile banking, using the Technology Acceptance Model (TAM). The model includes perceived usefulness, perceived risk, perceived ease of use, trust, and social impact. The study found that consumers' perceptions and intentions towards mobile banking are influenced by different country cultures.

Suariedewi and Suprpti (2020) proposed a model that explains the influence of m-banking quality on customers' trust, satisfaction, and loyalty. The study adhered to consistent citation and formatting features, correct spelling, grammar, and punctuation. The study conducted a survey of 120 individuals in Denpasar and found that m-banking quality has a positive impact on trust, which in turn affects satisfaction and loyalty. Technical terms are explained upon first use, and clear, objective language is used throughout the text.

In their 2021 study, Srivastava and Vishnani examined the factors that affect service quality in the banking industry and their impact on m-banking usage intention.

The analysis revealed that trust governs the relationship between service quality and satisfaction, with satisfaction acting as a partial mediator between service quality and user contentment. The study concludes that a user-friendly interface is a crucial feature of an m-banking system.

Kaur and Arora (2022) used UTAUT2 to identify the reasons for using m-banking services. The results of the investigation indicate that perceived risk has a negative impact on behavioural intention. They also found that perceived benefits and performance expectations are influenced by price value.

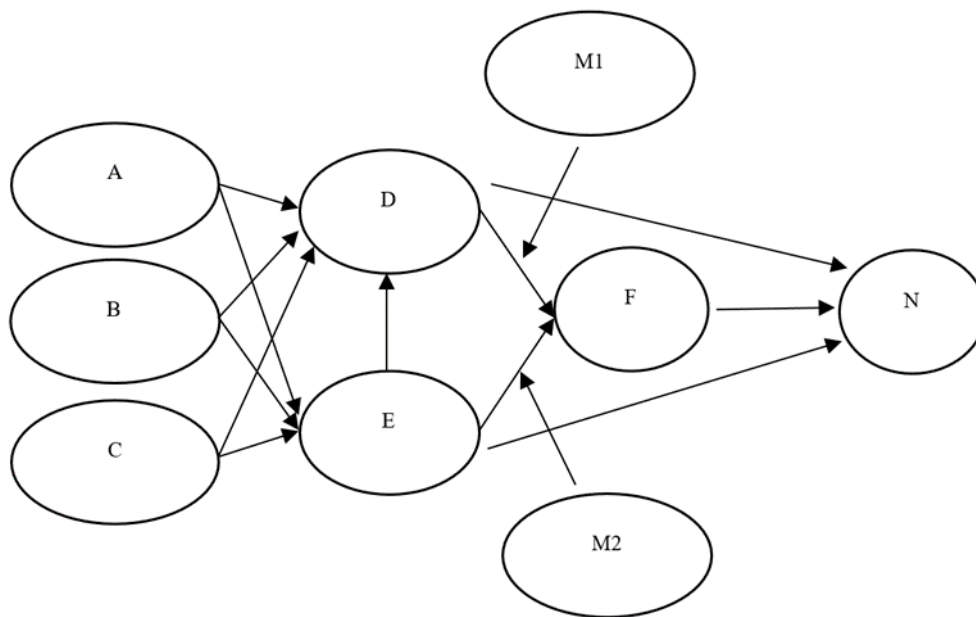
The literature review revealed that the recent approach, PLS SEM, was mainly used in m-banking research to analyse variables related to attitude and intention. This study aims to develop a comprehensive model that illustrates the factors influencing mobile banking intention. Furthermore, the study aims to investigate the moderating

impact of subjective norms and innovativeness in the proposed model.

### 3. Materials and Methods

#### 3.1. Design of the research model and hypotheses

Figure 1 shows the study model illustrating the causal links between the factors that affect m-banking usage intention. The research model includes the factors from the Technology Acceptance (TAM) and Theory of Planned Behavior Models (TPB), as well as the factors that shape the perception of banking usage. Exogenous variables such as compatibility, awareness, perceived risk, subjective norm, and innovativeness are identified in this model. The endogenous variables in our study are perceived usefulness, ease of use, attitude, and intention. We have proposed alternative hypotheses to investigate the effects of these variables.



**Figure 1.** Research model

A: Perceived of risk, B: Compatibility, C: Awareness, D: Perceived of usefulness, E: Perceived ease of use, F: Attitude, N: Intention, M1: Subjective norm, M2: Innovation

The factors in the research model and their definitions are given in Table 1.

**Table 1.** Definition of variables

<b>FACTOR</b>	<b>DEFINITION</b>	<b>SOURCE</b>
Perceived ease of use	A person's belief that using a particular system will not require effort	Davis (1989)
Perceived of usefulness	A person's belief that using a particular system will improve job performance	Davis (1989)
Compatibility	People adapting to something new	Hernandez and Mazzon (2007)
Attitude	An individual's behavior towards the target system	Davis (1989)
Intention	An individual's idea of using a technology	Schierz et al. (2010)
Perceived of risk	All kinds of risks that customers face when trading online (financial, social)	Wu and Wang (2005)
Subjective norm	The perception of whether most people should or should not engage in a behaviour that is important to an individual	Fishbein and Ajzen (1975)
Innovation	An individual's acceptance of new ideas earlier than other individuals	ROGERS (1995)

Zhou (2011) initially explored the impact of trust on mobile banking. Research has shown that consumers' attitudes towards mobile banking are influenced by perceived risk, perceived ease of use, and perceived usefulness (Akturan and Tezcan, 2012; Mohammadi, 2015). Research has shown that a negative attitude towards mobile banking is associated with a higher risk perception (Cheah et al., 2011; Belousova and Chichkanov, 2015; Magdalena and Baridwan, 2015; Mohammadi, 2015; Raza et al., 2017; Abbas et al., 2019; Mulfadina and Sari, 2019; Salsabilla and Zuliestiana, 2019; Rehman and Shaikh, 2020).

H1. A negative relationship exists between the perceived risk associated with mobile banking and its perceived ease of use. As the perceived risk of using mobile banking increases, the perceived benefits decrease.

H2. As the perceived risk of using mobile banking increases, the perceived benefits decrease.

Compatibility refers to an individual's or society's ability to adjust to a given circumstance or situation. To determine the extent to which compliance affects customers' willingness to use mobile

banking services (m-banking), it is crucial to analyse the degree of compliance. Additionally, this variable has a direct impact on the number of customers using m-banking. Shaikh and Karjaluo (2015) and Chen (2013) have established that compliance is positively linked with perceived ease of use and perceived usefulness. Therefore, maintaining compliance enhances positive attitudes towards mobile banking, perceived ease of use, and perceived usefulness. Hypothesis 4 recommends maintaining compliance to positively affect perceived usefulness. Several publications have investigated the relationship between compliance in mobile banking, ease of use, and perceived usefulness. Studies by Belousova and Chichkanov (2015), Mohammadi (2015), Chukwumah (2017), and Raza et al. (2017) have explored this topic.

H3. The more compliant customers are with mobile banking, the easier they perceive it to be to use.

H4. As compliance with mobile banking increases, so does the perceived usefulness.

As mobile banking is focused on customer experience, those who are not well-informed may face challenges when

adopting this service. Chen (2013) highlights that awareness is a critical factor that affects the attitude towards and adoption of mobile banking. Therefore, increasing awareness of mobile banking can improve the perception of ease of use and usefulness, resulting in a more positive attitude (Raza et al., 2017).

H5. As awareness of mobile banking increases, so does the perception of its ease of use.

H6. Furthermore, with the growing awareness of mobile banking, there is a corresponding increase in its perceived usefulness.

Perceived ease of use improves bank patrons' ability to use mobile banking, which in turn increases their positive intentions towards it. Additionally, perceived ease of use is positively related to attitudes and perceived usefulness of mobile banking. Numerous studies in the literature have examined the impact of perceived ease of use on mobile banking. These studies include works by Magdalena and Baridwan (2015), Mohammadi (2015), Raza et al. (2017), Adzima and Aryananti (2018), Hanif (2018), Mulfadina and Sari (2019), Salsabilla and Zuliestiana (2019), Widyanti and Usman (2019), Rehman and Shaikh (2020) and Cheah et al. (2011).

H7. It is evident that attitude is positively affected by the perceived ease of use.

H8. An increase in the perceived ease of use of mobile banking leads to an increase in the perception of its usefulness.

H9. As the ease of use of mobile banking increases, so does the intention to use it.

Research indicates that perceived usefulness has an impact on attitude and intention towards mobile banking (Shaikh and Karjaluo, 2015; Mohammadi, 2015). Mobile banking allows customers to conduct transactions 24/7 without visiting a bank, saving time and reducing transaction costs. Therefore, as perceived usefulness increases, attitude towards mobile banking

and intention to use it will be positively affected, as noted by Elhajjar and Ouaida (2020). Numerous studies have assessed the perceived usefulness of mobile banking applications. Belousova and Chichkanov (2015), Magdalena and Baridwan (2015), Mohammadi (2015), Yagobi and Rad (2015), Chukwumah (2017), Raza et al. (2017), Hanif (2018), Sari et al. (2018), Mulfadina and Sari (2019), Salsabilla and Zuliestiana (2019), Widyanti and Usman (2019), and Rehman and Shaikh (2020) have all conducted research on this topic.

H10. The impact of mobile banking's perceived usefulness on consumer attitude is positive.

H11. An increase in the perceived usefulness of mobile banking leads to a corresponding increase in the intention to use it.

Attitude refers to an individual's behaviour towards a particular event or circumstance based on their own thoughts (Çelik and Yılmaz, 2011).

According to H12, a positive attitude has a significant impact on users' intention to use m-banking services.

Subjective norms are formed by an individual's personal beliefs and can influence their evaluations of another individual's behaviour. The impact of subjective norms on customers' attitudes towards mobile banking usage is significant. Therefore, subjective norms can either increase or decrease the perceived usefulness and ease of use variables' influence on the attitude variable (Magdalena and Baridwan, 2015; Yagobi and Rad, 2015; Cheah et al., 2011).

H13. It is noteworthy that the subjective norm has a moderating effect on the connection between perceived usefulness and attitude.

Specifically, according to H14, there is a positive association between the subjective norm and consumer attitude.

Innovation refers to departing from traditional norms and embracing new trends. Previous studies have shown that innovativeness affects the impact of perceived ease of use on attitude (Cheah et al., 2011; Mohammadi, 2015; Abbas et al., 2019).

H15: Innovation moderates the link between perceived ease of use and attitude.

H16: Innovativeness positively affects perceived ease of use.

Additionally, the study examines both the moderating and mediation effects, leading to the proposal of Hypothesis 17. Perceived usefulness mediates the relationship between perceived ease of use and attitude towards mobile banking.

## 4. Results and Discussion

### 4.1. Demographic findings

Data was collected through a face-to-face survey of personnel employed in a public institution located in Ankara in February 2020. The sample size for the study was n=300. Table 2 presents the gender distribution, education status, monthly income, and age breakdown of the participants. Of the participants, 66% were male and 33% were female. 81% of the sample had obtained a university degree. The age group with the highest representation was 26-35, accounting for 39% of the sample.

**Table 2.** Demographic characteristics of the sample

Variable	Variable levels	F (Frequency)	Percent (%)
Gender	Male	199	66.30
	Female	101	33.70
Educational status	Master degree	47	15.70
	University	243	81.00
	High school	9	3.00
	Primary school	1	0.30
Monthly income	Less than 1500 TL	7	2.30
	1501-2500 TL	5	1.70
	2501-3500 TL	25	8.30
	More than 3501 TL	263	87.70
Age	18-25	14	4.70
	26-35	118	39.30
	36-45	99	33.00
	46-55	51	17.00
	56-65	18	6.00

### 4.2. Validity of the measurement model

The assessment of the PLS model is conducted in two stages: validity and reliability analyses of the measurement model, and analysis of the structural model. These stages are discussed in detail under subheadings (Boonlertvanich, 2019).

Prior to analysis, factor loads were verified. According to Hair et al. (2017), factor loadings should be  $\geq 0.70$ . Table 3 and Figure 2 demonstrate that the relative factor loads were  $\geq 0.62$ . The evaluation considered Cronbach Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE) values. It is

recommended that for each construct, CR and Cronbach Alpha CA values should be equal to or greater than 0.70 (Hair et al., 1998), and AVE value should be equal to or greater than 0.50 (Fornell and Larcker, 1981).

Table 3 shows that Cronbach's Alpha coefficients range from 0.79 to 0.94 and that the CR coefficients are also between 0.81 and 0.94, confirming strong internal consistency reliability. Convergent validity was achieved as indicated by the factor loads ranging from 0.62 to 0.96 and AVE values ranging from 0.58 to 0.87.

**Table 3.** Measurement model results

Factor	Item	Factor loading	CA	CR	AVE
Perceived ease of use (E)	S5	0.871	0.872	0.872	0.694
	S6	0.804			
	S7	0.824			
	S8	0.894			
Perceived usefulness (D)	S9	0.895	0.945	0.945	0.813
	S10	0.911			
	S11	0.906			
Compatibility (B)	S12	0.819	0.898	0.898	0.746
	S13	0.888			
Awareness (C)	S14	0.883	0.829	0.825	0.612
	S15	0.767			
	S16	0.834			
	S17	0.742			
Perceived Risk (A)	S18	0.625	0.791	0.809	0.589
	S19	0.863			
	S20	0.795			
Attitude (F)	S24	0.917	0.933	0.933	0.874
	S25	0.953			
Intention (N)	S26	0.967	0.933	0.934	0.876

According to the Fornell and Larcker (1981) standard, the diagonal elements consist of the square root of AVE. These values must be greater than the correlation values between the variables in the same

row and column. Upon reviewing the data in Table 4, it is clear that the square root of AVE values exceeds the correlation values between the variables in the same row and column.

**Table 4.** Fornell and Larckell criteria

	C	D	E	N	A	F	B
C	(0.782)						
D	0.791	(0.901)					
E	0.764	0.832	(0.833)				
N	0.623	0.562	0.498	(0.936)			
A	0.718	0.487	0.523	0.521	(0.767)		
F	0.776	0.658	0.583	0.757	0.622	(0.935)	
B	0.633	0.614	0.599	0.447	0.519	0.457	(0.864)

Clark and Watson (1995), Gold et al. (2001), and Teo et al. (2008) proposed a threshold value of 0.90 for the HTMT measure. However, this study will use a threshold value of 0.85. Values between 0.85 and 1.00 indicate that the variables

cannot be distinguished, whereas values below 0.85 suggest that the variables are distinguishable. As presented in Table 5, the HTMT values are below the threshold value.

**Table 5.** HTMT criteria

	C	D	E	N	A	F	B
C	-						
D	0.785						
E	0.762	0.836					
N	0.619	0.562	0.499				
A	0.738	0.496	0.526	0.530			
F	0.770	0.657	0.583	0.757	0.632		
B	0.628	0.614	0.600	0.446	0.529	0.457	-



Based on the results presented in Tables 4 and 5, it can be concluded with confidence that discriminant validity has been achieved.

**4.3. Structural model**

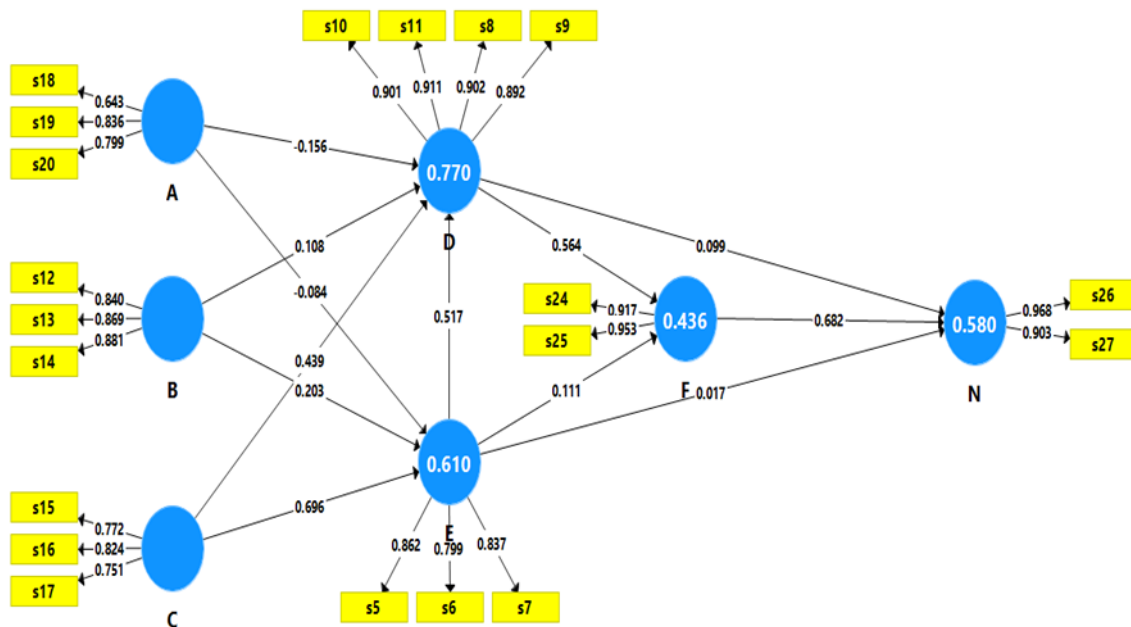
The relationships between the factors were scrutinised using the PLS-SEM technique, and the resulting model is presented in Figure 2.

The data was evaluated using the PLS-SEM method with SmartPLS 3.2.9. The structural model's R<sup>2</sup> and effect size (f<sup>2</sup>) were calculated using the PLS algorithm. Predictive power (Q<sup>2</sup>) was determined through Blindfolding analysis. The model's suitability was evaluated using Chi-Square, Normed Fit Index (Normed), Standardized Root Mean Square Residual-SRMR, Squared Euclidean distance-d\_ULS, and Geodesic Distance-d\_G.

Table 6 presents the results of the structural model, including R<sup>2</sup>, f<sup>2</sup>, Q<sup>2</sup>, and VIF values. The VIF values are below 5

(Hair et al., 2017), indicating no multiple interrelationships among the variables. The D variable is explained by 77%, the E variable by 61%, the N variable by 58%, and the F variable by 44%.

The f<sup>2</sup> effect size coefficient varies between 0.02 and 0.15, 0.15 and 0.35, and 0.35 or greater, as explained by Cohen (1988). Therefore, A and B have a low effect on D; F, D, and E have a low effect on N; and E has a low effect on F. In contrast, C has a moderate effect on D, and D has a moderate effect on F. Additionally, E has a high effect on D, C has a high effect on E, and F has a high effect on N. The Q<sup>2</sup> predictive power coefficients for endogenous variables are greater than zero, indicating that the structural model can predict endogenous variables (Hair et al., 2014). The table shows that the Q<sup>2</sup> values exceed zero, allowing us to conclude that the structural model can predict D, E, F and N.



**Figure 2.** PLS results of the proposed model

A: Perceived risk, B: Compatibility, C: Awareness, D: Perceived usefulness, E: Perceived ease of use, F: Attitude, N: Intention

When assessing the adequacy of the model, another aspect to consider is the Goodness-of-Fit (GoF) index. This index takes on values between 0 and 1, with a

degree of fit ranging from poor (0.00 < GoF < 0.10), fair (0.10 < GoF < 0.25), to excellent (GoF > 0.25) (Wetzels et al., 2009). To calculate the GoF index, simply take the

square root of the AVE and R<sup>2</sup> means resulting from factor analysis.

$$GoF = \sqrt{(mean(R^2) \times mean(AVE))} \quad (1)$$

The model has a strong fit, as evidenced by the average R<sup>2</sup> value of 0.60, the average AVE value of 0.74, and the GoF index of 0.66, which exceeds the threshold of 0.36.

**Table 6.** Structural model results

Relationship		VIF	R <sup>2</sup>	f <sup>2</sup>	Q <sup>2</sup>
C→	D	3.781	0.770	0.223	0.529
E→		2.562		0.455	
A→		2.109		0.049	
B→		1.796		0.02	
C→	E	2.549	0.610	0.483	0.350
A→		2.093		0.008	
B→		1.692		0.062	
D→	N	3.889	0.580	0.006	0.449
E→		3.345		0.001	
F→		1.773		0.625	
D→	F	3.323	0.436	0.170	0.337
E→		3.323		0.007	

**4.4. Hypothesis testing**

After reviewing Table 8, it is evident that hypotheses H2, H3, H5, H6, H8, H10 and H12 are supported, while hypotheses H1, H4, H7, H9 and H11 are not.

C: Awareness→ D: Perceived usefulness: 0.439. This value indicates that as awareness of m-banking increases by one unit, perceived usefulness will increase by 0.439 units.

E: Perceived ease of use→ D: Perceived usefulness: 0.517. As the perceived ease of use of mobile banking increases, so too does the perceived usefulness.

A: Perceived risk→ D: Perceived usefulness:-0.156. When the perceived risk of mobile banking customers increases by one unit, their perceived usefulness decreases by 0.156 units. While this relationship is not very strong, decision makers should still develop promotions and

practices to reduce risk perception, as it can impact customers' attitudes towards banking

C: The relationship between awareness and perceived ease of use is significant with a coefficient of 0.696. Analysis of all path coefficients reveals that the largest is between C and E. Consequently, as customers' awareness of m-banking increases, their perception of the ease of using the application also rises.

F: Attitude→ N: Intention: 0.682. This statement suggests that a positive attitude towards mobile banking will increase the intention to use it. It can be inferred that a one-unit increase in negative attitude towards the application will decrease usage intention by 0.682 units. Therefore, the significance of exogenous variables that affect attitude is highlighted once again. For example D: Perceived usefulness→F: Attitude: 0.564.

**Table 7.** Direct effect coefficients

Relationship		Standardize $\beta$	Standard Error	t value	P value	Result
C→	D	0.439	0.120	3.659	0.001	Supported
E→		0.517	0.099	5.210	0.001	Supported
A→		-0.156	0.078	1.985	0.047	Supported
B→		0.108	0.064	1.659	0.097	Not supported
C→	E	0.696	0.129	5.391	0.001	Supported
A→		-0.084	0.093	0.844	0.399	Not supported
B→		0.203	0.095	2.133	0.033	Supported
D→	N	0.099	0.116	0.853	0.394	Not supported
E→		0.017	0.119	0.145	0.885	Not supported
F→		0.682	0.061	11.12	0.001	Supported
D→	F	0.564	0.173	3.270	0.001	Supported
E→		0.111	0.182	0.607	0.544	Not supported

**4.5. Mediation, moderation, and multi-group analysis**

**4.5.1. Mediating effect**

To investigate the mediating impact of perceived benefit, we proposed and tested the H17 hypothesis. To establish this, the H17 hypothesis was proposed and tested. For a mediating impact to be recognised, exogenous variables must display significant effects on endogenous variables. Furthermore, when mediator variables are incorporated in the model, exogenous variables should have significant effects on mediator variables, and mediator variables should have significant effects on endogenous variables. Although exogenous variables do not have a significant impact on endogenous variables, a mediator effect can be noted if exogenous variables affect mediator variables and mediator variables affect endogenous variables.

Thus, the VAF values of roads that demonstrate significant mediating effects based on the p-values were calculated to provide insight into whether they had a full or partial mediating effect. A complete mediating effect is indicated by  $VAF > 0.80$ , while a partial mediating effect is indicated by a range of  $0.80 \geq VAF \geq 0.20$ . When VAF is less than 0.20, there is no mediating effect. The VAF value for the  $E \rightarrow D \rightarrow F$  path was calculated as 1.07. As the value is greater than 0.80, it can be concluded that there is a complete mediating effect. The H17 hypothesis of this study was fully reinforced due to the complete mediating

effect. The mediating role of perceived usefulness is crucial in the connection between perceived ease of use and attitude towards mobile banking. In other words, perceived ease of use influences attitude through the perceived usefulness factor.

The positive attitude towards mobile banking is boosted by its ease of use only if the application is perceived to be advantageous. However, the attitude is not impacted by the application's ease of use alone. Therefore, when researching the factors that contribute to the attitude of banks and customers towards m-banking, it is important to evaluate the combined effect of its ease of use and benefits. Future studies should focus on this aspect.

**4.5.2. Moderating effect**

The model analyzed the moderating effects of subjective norm (M1) and innovation (M2), which were included as separate variables. The effects of M1 and M2 as moderators are illustrated in Figure 3 and Figure 4. Table 8 shows that the moderating effect ( $D \times M1 \square F$ :  $\beta = -0.085$ ;  $p < 0.10$ ) and  $M1 \square F$  ( $\beta = 0.263$ ;  $p < 0.01$ ) were found to be significant, supporting hypotheses H13 and H14. The influence of the subjective norm on attitudes towards mobile banking is positive and significant. However, research has found that the relationship between perceived usefulness and attitude has a weak negative impact on attitudes. Therefore, the M1 moderating effect can be considered negative, although it is mild.

**Table 8.** Moderating effect of M1 (DxM1→F)

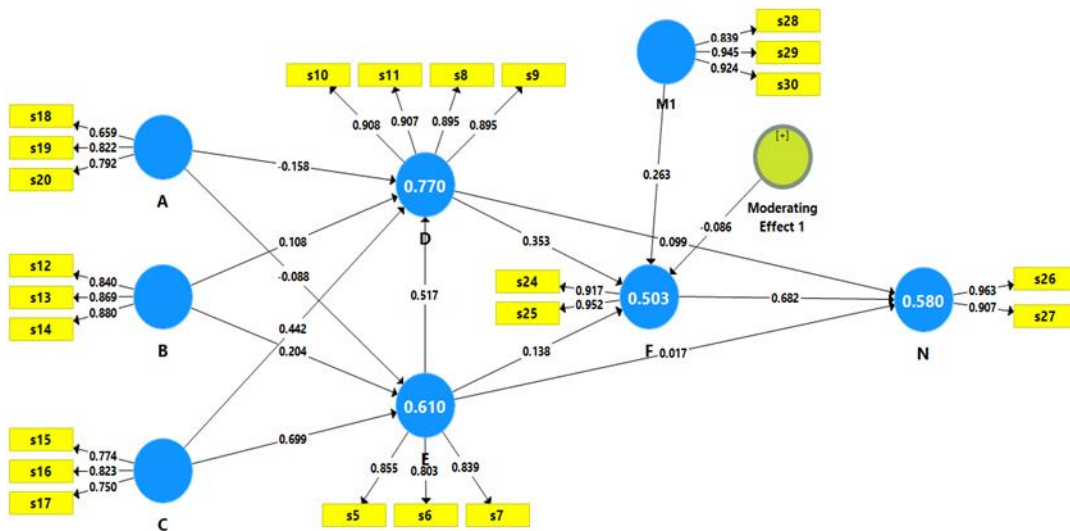
Factors		Standardize $\beta$	p	Result
Moderating effect →	F	-0.085	0.081	Supported
M1 →		0.263	0.001	Supported

Table 9 shows that M2 to F ( $\beta=0.414$ ;  $p<0.01$ ) has a positive and significant effect, while the regulatory effect (ExM2 to F:  $\beta=-0.069$ ;  $p>0.10$ ) is not significant. Hypothesis H16 is supported, but hypothesis H15 is not. The perceived level

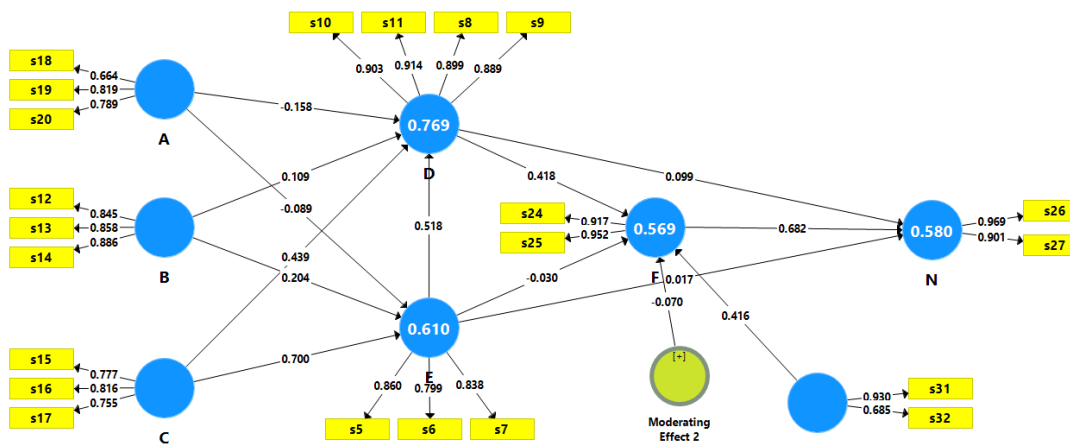
of innovation towards mobile banking has a substantial and favourable impact on the attitude towards its utilisation. This finding emphasises the importance of decision-makers creating original applications for mobile banking.

**Table 9.** Moderating effect of M2 (ExM2→F)

Factors		Standardize $\beta$	p	Result
Moderating effect →	F	-0.069	0.151	Not supported
M2 →		0.414	0.001	Supported



**Figure 3.** Moderating effect of M1



**Figure 4.** Moderating Effect of M2

As mobile phone technology develops, the perception of mobile banking applications also changes. Therefore, it is crucial to investigate the factors that influence attitudes and intentions, enabling banks to develop customer-centric applications. This investigation analysed the correlations within the research model, which consists of Attitude and Intention variables. The model incorporated the Subjective Norm and Innovativeness variables as moderator variables, and evaluated their impact on the effects of Usefulness and Ease of Use on Attitude.

Customers who are innovative-minded do not perceive mobile banking as a risky prospect and are therefore more receptive to technological advancements. However, the perceived ease of use of mobile banking did not affect customer attitudes, while innovativeness did not have any impact on either enhancing or diminishing the aforementioned effect. The ease of use of mobile banking had no bearing on the attitudes of the surveyed customers.

#### 4.5.3. Multi-Group analysis

The study investigated whether gender influences the transformation of attitudes towards mobile banking into intention to use. To test the moderator effect of gender, multiple group analysis was conducted since gender is a categorical variable. The results of the analysis showed a significant difference between Group 1 (female) and Group 2 (male) in the relationship between Attitude→Intention ( $\beta=0.213$ ;  $p<0.05$ ) regarding mobile banking use. It has been found that women have a stronger relationship with mobile banking than men, and therefore find it more beneficial.

The gender variable moderates the conversion of positive attitudes towards m-banking into usage intention, with this transformation being more potent for women than men. Women tend to develop more positive attitudes towards and show greater appreciation for mobile banking than men. There is evidence to suggest that

women tend to have more positive attitudes towards and show greater appreciation for mobile banking than men. Although men generally possess greater technological proficiency, their usage of mobile banking differs from that of women.

## 5. Conclusions

In the service-oriented banking industry, competition is fierce and growth is a top priority. To gain a competitive edge, banks focus on providing high-quality services that meet customer expectations (Yılmaz et al., 2018).

The prevalence of information and communication technology, such as mobile phones and tablets, has led financial institutions to offer m-banking services to their customers. Therefore, a comprehensive comprehension of mobile banking has become crucial.

This study presents a structural model to clarify the attitude and intention towards mobile banking within the framework of Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB). The model tests 17 hypotheses, and their outcomes are evaluated. In this study, 12 hypotheses investigate the connections between factors in the proposed model, while 4 hypotheses analyse both mediation and moderating effects.

The researchers have discovered that the risk factor has a significant negative impact on the variables being considered (Belousova and Chichkanov, 2015; Magdalena and Baridwan, 2015; Mohammadi, 2015; Raza et al., 2017; Abbas et al., 2019; Mulfadina and Sari, 2019; Salsabilla and Zuliestiana, 2019; Rehman and Shaikh, 2020). After analysis, it was discovered that there is a negative and significant correlation between Perceived Risk and Perceived Usefulness (A: Perceived risk → D: Perceived usefulness: -0.156), while no significant correlation was found between Perceived Usefulness and Attitude (D → F: Attitude: -0.084).

The literature review revealed that only a limited number of studies have investigated the effects of subjective norms and innovation as moderator variables in the model. The study examined the moderator effects of certain variables. The results indicate that subjective norm acts as a moderator and enhances the impact of benefit on attitude.

Customers who perceive innovation positively do not consider m-banking a risky concept, which makes them more receptive to technological advancements. The study found a significant and positive correlation between innovation and attitude, with a coefficient of 0.416. For each one-unit increase in customers' perception of innovation, their positive attitudes towards mobile banking increase by 0.416 units.

The study found that perceived usefulness plays a significant mediating role in the relationship between perceived ease of use and attitude towards mobile banking. While perceived ease of use does not directly affect attitude, it is believed that consumers' positive attitudes towards mobile banking services can be improved through the perceived benefits of mobile banking in terms of usefulness. This emphasises the importance of the mediating effect of the ease of use variable. In contrast to prior literature, this study discovered a significant mediating effect of perceived usefulness. However, no significant effect was observed for the perceived ease of use and usefulness of mobile banking on direct intention. As a result, hypotheses H9 and H11 were not supported.

Shaikh and Karjaluoto (2015) and Chen (2013) conducted an in-depth study to identify essential factors that promote or hinder mobile banking adoption. The study found that compliance significantly impacts m-banking adoption. Analysis was conducted for the H3 hypothesis, which revealed that compatibility influences perceived ease of use.

After conducting a literature review, the authors analysed the factors that influence the use of m-banking services, both common and unique. This research identified corresponding outcomes, with the authors investigating similar aspects (Magdalena and Baridwan, 2015; Raza et al., 2017; Hanif, 2018; Salsabilla and Zuliestiana, 2019). Our results align with the findings of Mohammadi's (2015) study. However, resistance was not found to be a significant factor in our study. The study found that there was no significant resistance, based on a face-to-face survey of personnel working for a public institution in Ankara, where the majority of employees actively use mobile banking services.

However, the outcomes of the study may be limited as the data was collected from a small sample of participants, representing only a fraction of m-banking service users in Turkey. Therefore, the results of the study lacked clear decisiveness regarding m-banking practice. The outcomes of the study may be limited as the data was collected from a small number of participants who represent only a fraction of m-banking service users in Turkey. Additionally, since 90% of the participants hold university degrees, they may have a higher level of technological proficiency than other social groups. Therefore, the sample should only be evaluated within the context of university graduates, and it should be noted that the results may only be applicable to this specific group.

Conducting SEM studies on the use of mobile banking services in Turkey can offer valuable guidance to banks on the specific issues that users face. This, in turn, can create a more competitive environment for banks operating in Turkey.

In essence, banks should aim to simplify and increase the accessibility of their mobile banking systems. This study emphasizes the importance of reinforcing the perceived ease of use in this regard. Conducting research into people's attitudes and usage behaviours towards e-banking

during the pandemic could prove beneficial. Despite owning Android or iOS enabled mobile phones, certain segments of society remain apprehensive of the perceived risks associated with mobile banking. To improve public perception of mobile banking, it is recommended to provide comprehensive information about its advantages and potential hazards through audio and visual means. These measures are deemed crucial to enhance awareness and foster a favourable attitude towards m-banking. The public perception of m-banking should be augmented by elucidating the service through audio and visual means, and by providing comprehensive information about its advantages and potential hazards.

#### **Declaration of Author Contributions**

The authors declare that they have contributed equally to the article. All authors declare that they have seen/read and approved the final version of the article ready for publication.

#### **Declaration of Conflicts of Interest**

All authors declare that there is no conflict of interest related to this article.

#### **Ethical Committee Approval**

The subject of the study and the data collection tool were found to comply with the ethical rules with the decision of the ESOGU Social and Human Sciences Human Research Ethics Committee numbered 64075176-299-E.12224

#### **Kaynaklar**

Abbas, M., Zaman, U., Ahmad, J., Nawaz, M. S., Ahraf, M., 2019. Diffusion of mobile banking in Pakistan. *Smart Journal of Business Management Studies*, 15(1): 10-19.

Adzima, F., Ariyanti, M., 2018. Analysis of factors influencing interest in using mobile banking application on the customer bank BRI Purwakarta. *E-Proceeding of Management*, 5(2): 1584-1592.

Akturan, U., Tezcan, N., 2012. Mobile banking adoption of the youth market: Perceptions and intentions. *Marketing Intelligence and Planning*, 30(4): 4.

Belousova, V., Chichkanov, N., 2015. Mobile banking adoption in Russia: What incentives matter? National Research University Higher School of Economics, 1-24.

Boonlertvanich, K., 2019. Service quality, satisfaction, trust, and loyalty: The moderating role of main-bank and wealth status. *International Journal of Bank Marketing*, 37: 278-302.

Chukwumah, S., 2017. Adoption of mobile banking service in rural Nigeria. Master's Thesis, Turun Yliopisto University of Turku, Turku.

Chaouali, W., Souiden, N., 2019. The role of cognitive age in explaining mobile banking resistance among elderly people. *Journal of Retailing and Consumer Services*, 50: 342-350.

Clark, L., Watson, D., 1995. Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7: 309-319.

Chen, C., 2013. Perceived risk, usage frequency of mobile banking services. *Managing Service Quality: An International Journal*, 23(5): 410-436.

Cohen, J., 1988. Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale: Lawrence Erlbaum Associates.

Cheah, C.M., Teo, A.C., Sim, J.J., Oon, K.H., Tan, B.I., 2011. Factors affecting Malaysian mobile banking adoption: An empirical analysis. *International Journal of Network and Mobile Technologies*, 2(3): 149-160.

Çelik, H.E., Yılmaz, V., 2013. LISREL 9.1 ile yapısal eşitlik modellemesi. Anı Yayıncılık, Eskişehir.

Davis, F., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3): 319-340.

- Davis, F., 1993. User acceptance of computer technology: System characteristics, user perceptions. *International Journal of Man-Machine Studies*, 38(3): 475-487.
- Elhajjar, S., Ouaida, F., 2020. An analysis of factors affecting mobile banking adoption. *International Journal of Bank Marketing*, 38(2): 352-367.
- Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1): 39-50.
- Fernando, E., Surjandy, Meyliana, Murad, D.F., 2019. Development conceptual model smartphone adoption for use mobile banking. *6th International Conference on Information Technology, Computer and Electrical Engineering (ICITACEE)*, Semarang, Indonesia, pp. 1-5.
- Foroughi, B., Mohammad I., Sunghyup S.H., 2019. Understanding the determinants of mobile banking continuance usage intention. *Journal of Enterprise Information Management*, 32(6): 1015-1033.
- Fishbein, M., Ajzen, I., 1975. Attitude-behaviour relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, 84(5): 888-918.
- Gold, A., Malhotra, A., Segars, A., 2001. Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18: 185-214.
- Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2014. *A primer on partial least squares structural equation modeling* (1st ed.). Thousand Oaks: Sage.
- Hair, J.F., 1998. *Multivariate Data Analysis with Readings*. Englewood Cliffs, NJ: Prentice-Hall.
- Hamidi, H., Safareeyeh, M., 2019. A model to analyze the effect of mobile banking adoption on customer interaction and satisfaction: A case study of m-banking in Iran. *Telematics and Informatics*, 38: 166-181.
- Hanif, M., 2018. *Analysis Technology Acceptance Model (TAM) pada aplikasi mobil banking jenius Di Kota Jakarta*. Undergraduate thesis. Universitas Katolik Parahyangan Fakultas Ekonomi Program Sarjana Manajemen.
- Hassan, H.E., Van R.W., 2020. Does country culture influence consumers' perceptions toward mobile banking? A comparison between Egypt and The United States. *Telematics and Informatics*, 46: 101312.
- Hernandez, J., Mazzon, J., 2007. Adoption of internet banking. Proposition and implementation of an integrated methodology approach. *International Journal of Bank Marketing*, 25: 72-88.
- Kaur, S., Sangeeta A., 2023. Understanding customers' usage behavior towards online banking services: An integrated risk-benefit framework. *Journal of Financial Services Marketing*, 28(1): 74-98.
- Mohammadi, H., 2015. A study of mobile banking loyalty in Iran. *Computers in Human Behavior*, 44: 35-47.
- Magdalena, R., Baridwan, Z., 2015. The analysis of individuals' behavioral intention in using mobile banking based on TPB, TAM and perceived risk. *International Undergraduate Program in Accounting Faculty of Economics and Business*, University of Brawijaya, 4(1): 1-13.
- Mulfadina, T., Sari, D.K., 2019. Effects of perceived ease of use, perceived usefulness, and perceived risk on customer interests of using mobile banking services with gender as moderating variables (Study on BRI Customers in Dharmasraya Branch). *International Journal of Innovative Science and Research Technology*, 4(4): 466-474.



- Püschel, J., Mazzon, J.A., Hernandez, J.M.C., 2010. Mobile banking: proposition of an integrated adoption intention framework. *International Journal of Bank Marketing*, 28(5): 389-409.
- Rogers, E., 1995. Diffusion of innovation. New York: Free Press.
- Rehman, Z.U., Shaikh, F.A., 2020. Critical factors influencing the behavioral intention of consumers towards mobile banking in Malaysia. *Engineering, Technology and Applied Science Research*, 10(1): 5265-5269.
- Raza, S.A., Umer, A., Shah, N., 2017. New determinants of ease of use and perceived usefulness for mobile banking adoption. *International Journal Electronic Customer Relationship Management*, 11(1): 44-65.
- Salsabilla, S., Zuliestiana, D.A., 2019. Analysis of intention use BRI mobile banking in Indonesia, from perceived usefulness, perceived ease of use and perceived risk. *E-Proceeding of Management*, 6(2): 1-8.

---

**To Cite:** Yılmaz, V., Kinaş, Y., 2024. Factors Influencing the Intention to use Mobile Banking and the Moderating Effects of Subjective Norms and Innovation. *MAS Journal of Applied Sciences*, 9(2): 383–399.  
DOI: <http://dx.doi.org/10.5281/zenodo.11844158>

---