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Determinants of Customers' Behavioral Intention to Use Mobile Banking in Debre Markos, Ethiopia

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Abstract

The main objective of this study is to investigate the determinants of customers' behavioral intention to use mobile banking in Debre Markos, Ethiopia. The study employed both descriptive and explanatory research approaches. The survey sample consisted with 320 bank customers from all commercial banks in Debre Markos, Ethiopia. Data were collected through a well-structured questionnaire, using a combination of convenience and simple random sampling techniques. The analysis was conducted using descriptive statistics and multiple linear regression model, with STATA version 15. The regression results revealed that perceived usefulness, attitude towards use, and perceived behavioral control significantly and positively influence customers' behavioral intentions to use mobile banking. However, perceived risk was found to have a significant negative effect. Based on these findings, the study suggests that commercial banks in the study area should enhance customer awareness regarding the usage, benefits, and security of mobile banking services to encourage a greater usage among customers.

Keywords*: Mobile Banking, Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB) and Financial Inclusion.*

1. Introduction

Mobile banking refers to the use of a mobile devices, such as a smartphone or tablet, to conduct banking transactions and access financial services remotely. In recent years, mobile banking has become a driving force in transforming the global banking industry (Chibueze, Maxwell, & Osondu, 2013; Yıldırım, & Ayar, 2024).) Customers can manage their accounts, transfer funds, pay bills, deposit checks, and perform other banking activities through the mobile app. Mobile banking offers significant convenience and flexibility, allowing users to handle their finances on the go without being tied to a physical location (Sathye, 1999 and Pakpahan & Legowo, 2021). Nowadays, due to the accessibility of smartphones and advancements in digital banking, coupled with the growing demand for more convenient banking services, mobile banking has become increasingly popular.

Ethiopia, a country characterized by mainly rural population and limited digital banking infrastructure, confronts significant challenges in providing accessible financial services to its citizens. Despite government initiatives to enhance financial inclusion, traditional banks face constraints in reaching

rural areas (Entele, 2019; Alemayehu and Kassa, 2020; Amena & Likeneh, 2021). For instance, while the percentage of Ethiopia's adult population with an account at a formal financial institution has gradually increased from 22% in 2014 to over 46% in 2022, formal financial inclusion lags significantly behind other East African countries, such as Kenya (82%) and Rwanda (77%). There remains a substantial gap in financial inclusion between urban and rural areas, where the majority of the population resides. Many of poor and less literate Ethiopians in rural areas remain unbanked (GSMA, 2023).

The Ethiopia Living Standards Measurement Survey (LSMS 2018–2019) conducted by the World Bank also found a rural-urban gap, with 59% of urban versus 18% of rural adults having a bank account (World Bank, 2020). In this context, mobile banking presents a potential promising solution to bridge the gap and enhance financial inclusion in Ethiopia. The evolution of mobile banking in the country has been gradual but promising. With the introduction of mobile money platforms and partnerships between Ethio Telecom and financial institutions, along with increased accessibility to smart phones, there has been a rising interest in mobile-based financial transactions (Matiwos, 2018; Assegid, 2019). In Ethiopia, due to the newness of the service to the banking industry and among consumers, there are limited empirical studies available (Matiwos, 2018; Entele, 2019; Amena & Likeneh, 2021; Kejela & Porath, 2022 and Bayiley, 2022).

These studies indicate that despite the potential benefits of mobile banking, such as enhanced convenience, cost-effectiveness, and improved access to financial services, its adoption and utilization among bank customers remain relatively low. Most bank customers in Ethiopia continue to prefer traditional methods for conducting their banking transactions, primarily through branch-based retail banking services. This trend is prevalent across the country, including the study area. This situation creates a significant challenge to government efforts to enhance financial inclusion, particularly in remote rural areas, and to leverage digital technology for promoting economic development. Socio-economic constraints, technological barriers, and concerns related to trust and security are key factors contributing to the low level of digital banking usage in Ethiopia (Birru, 2019). As Ethiopia strives to enhance financial inclusion and promote economic development, understanding the factors influencing bank customers' behavioral intention to use mobile banking is crucial for stakeholders aiming to encourage its widespread adoption and usage (Birru, 2019; Lemma and Gebre, 2017; Matiwos, 2018; and Tibebe, 2019).

Therefore, the main objective of this study is to investigate the determinants of customers' behavioral intention to use mobile banking in Debre Markos town, with a view to inform strategies and interventions that can promote mobile banking usage and enhance financial inclusion in the local community.

2. Literature Review

2.1. Technology Acceptance Theories and Models along with Empirical Literatures

User acceptance of technology has been an important area of research for over 20 years. Various competing theoretical models have been used to investigate the determinants of acceptance and use of information technology in the past. While many researchers have developed and proposed theories and models that can be used to explain and predict individuals' behavioral intention to use a particular technology or system, the Theory of Planned Behavior (TPB) proposed by Ajzen (1988), Technology Acceptance Model (TAM) proposed by Davis (1989) and Perceived Risk Theory proposed by Featherman and

Pavlou (2003) have been the major ones in the literature.

Technology Acceptance Model (TAM): TAM suggests that perceived usefulness and perceived ease of use are key determinants of individuals' behavioral intention to use a particular technology. According to the model, perceived usefulness (PU) is defined as "the extent to which an individual believes that using a particular system will improve his or her job performance (Davis, 1989), while perceived ease of use (PEU) is the degree to which an individual believes that using a particular information technology would be free of effort (Davis, 1989) and hence if an application is perceived to be easier to use than another, it is more likely to be accepted by potential users. Behavioral intention refers to the cognitive expression of an individual's readiness to perform a specific behavior, and it is considered to be the immediate predecessor of actual usage behavior (Fishbein and Ajzen, 1975 and Ajzen, 1991). In the context of mobile banking, studies have consistently found support for Technology Acceptance Model (TAM), implying that customers are more likely to adopt mobile banking if they perceive it as useful and user friendly (Davis, 1989; Munoz-Leiva et al., 2017; Lemma and Gebre, 2017; Matiwos, 2018; Tibebe, 2019; Assegid, 2019; De Leon, 2019; Alemayehu and Kassa, 2020; Pakpahan & Legowo, 2021; Bayiley, 2022; and Yıldırım, & Ayar, 2024).

Theory of Planned Behavior (TPB): The Theory of Planned Behavior (TPB) extends technology acceptance model by incorporating additional constructs such as subjective norms and perceived behavioral control as additional determinants of behavioral intention. Subjective norm is defined as "person's perception of social pressure to perform or not to perform a given behavior" (Ajzen, 1988, p.132) whereas perceived behavioral control is defined as the individual's perception towards the presence or absence of the required resources to perform a particular behavior (Ajzen, 1985). Studies conducted using Theory of Planned Behavior constructs to examine users' mobile banking usage behavior have shown that subjective norms and perceived behavioral control significantly influence the behavioral intention to use mobile banking (Ajzen, 1991; Tesfaye and Debebe, 2018; De Leon, 2019; Alemayehu and Kassa, 2020; Sureya & De Rose, 2020; Bayiley, 2022 and Yıldırım, & Ayar, 2024).

Perceived Risk Theory: Perceived risk theory suggests that individuals' perceptions of risk such as concerns about security, privacy, and financial loss, influence their willingness to adopt and use new technologies. Especially in developing countries, where concerns about mobile banking security are more prevalent, perceived risk has been identified as a significant barrier to adoption and usage of the service (Featherman and Pavlou, 2003; Munoz-Leiva et al., 2017; Tibebe, 2019; Gebre and Demissie, 2019; Assegid, 2019; Alemayehu and Kassa, 2020; Sureya & De Rose, 2020 and Pakpahan & Legowo, 2021).

Attitude toward use (ATU): Attitude is defined as "a person's positive or negative feeling associated with performing a given behavior. An individual will develop a positive attitude towards a specific behavior if he/she believes that it will lead to positive results (Ajzen and Fishbein, 1980). The effect of attitude on customers' behavioral intention to use mobile banking has been validated in the findings of many previous studies. The implication of these findings is that individuals who believe that the usage of mobile banking would bring positive consequences are more likely to hold a favorable attitude towards their intention to use (Munoz-Leiva et al., 2017; Lemma and Gebre, 2017; Assegid, 2019; Pakpahan & Legowo, 2021; Kejela & Porath, 2022; Bayiley, 2022; and Yıldırım & Ayar, 2024).

Availability and Quality of internet / network connection: The availability and quality of network or internet connection is a prerequisite for the use of mobile banking services. Several prior studies have confirmed the effect of availability and quality of internet or network connection on customers behavioral intention to use mobile banking (Pikkarainen et al., 2004; Lemma and Gebre, 2017; and Birru, 2019). Their findings imply that the availability and quality of internet or network connection would enhance their intention to use mobile banking.

2.2. Conceptual Framework and Hypotheses Formulation

From the above theoretical and empirical literature review, the researcher developed the following conceptual framework and research hypotheses. The conceptual framework integrates constructs from Technology Acceptance Model and Theory of Planned Behavior along with perceived risk, and availability and quality of internet or network connection (Figure 1).

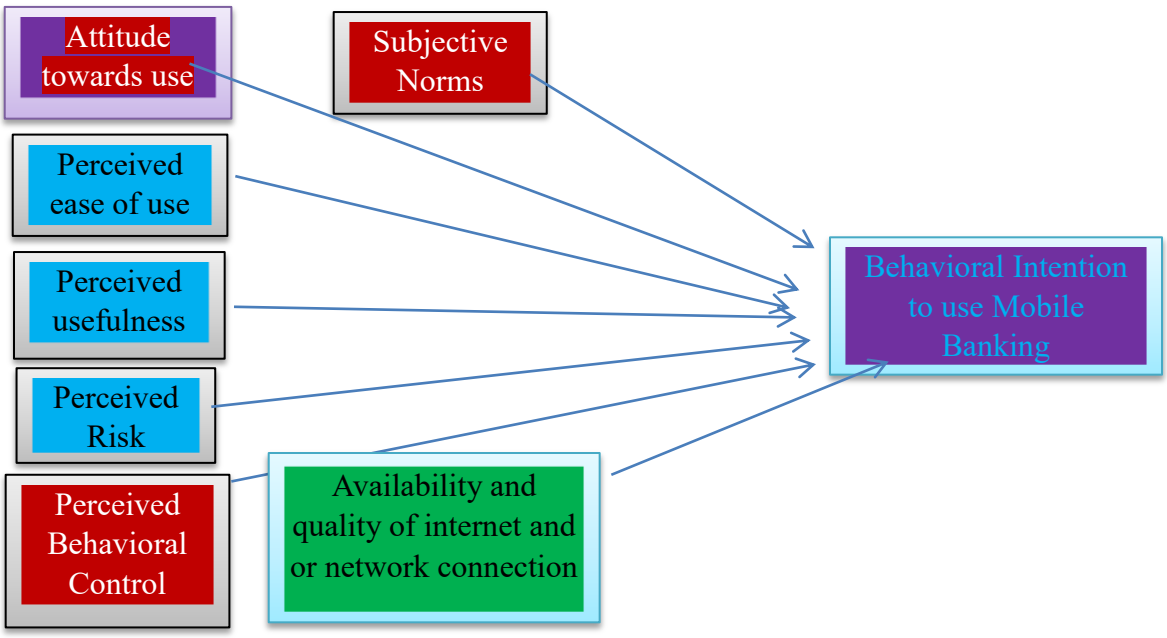


Figure 1. Conceptual Framework

Source: (Davis, 1989; Ajzen, 1988, p.132; Ajzen, 1985 and Ajzen and Fishbein, 1980)

Research Hypotheses

From the above literature review and conceptual frame work (figure 1), the following research hypotheses were formulated.

H1: Bank customers' behavioral intention to use mobile banking is positively influenced by perceived usefulness.

H2: Bank customers' behavioral intention to use mobile banking is positively influenced by perceived ease of use.

H3: Bank customers' behavioral intention to use mobile banking is positively influenced by subjective norms.

H4: Bank customers' behavioral intention to use mobile banking is positively influenced by perceived behavioral control.

H5: Bank customers' behavioral intention to use mobile banking is negatively influenced by perceived risk.

H6: Bank customers' behavioral intention to use mobile banking is positively influenced by their attitude toward use.

H7: Bank customers' behavioral intention to use mobile banking is positively influenced by the availability and quality of internet and or network connection.

3. Materials and Methods

3.1.**Research Design**

To investigate the determinants of customers behavioral intention to use mobile banking, the study employed a combination of descriptive and explanatory research design.

3.2.**Population and Sampling**

The target population of the study includes all commercial bank customers in Debre Markos town who have access to mobile banking services. Considering factors such as accessibility and participants willingness to participate while maintaining research ethics, a combination of convenient and simple random sampling techniques was used to select respondents.

3.3.**Sample Size:**

The required sample size of the study was determined based on the number of predictor or independent variables. Based on the recommendations of Hair et al. (2010), the sample size should be 15-20 observations per variable for generalization purposes. Tabachnick and Fidell (2007, p. 123) also give a formula for calculating sample size requirements (for regression analysis), considering the number of independent variables that you wish to use: $N > 50 + 8m$ (where m = number of independent variables). Based on these justifications, and accounting for potential errors and non-response rates, a total of 320 respondents (8*20*2) were deemed an acceptable sample size for the current study. However, the actual collected sample size of the study was 270 resulting in a response rate of 84.4%. The remaining 50 respondents did not return their questionnaires.

3.4.**Method of Data Collection**

The data was collected using structured surveys or questionnaires administered to the selected bank customers. It was designed to collect data on both dependent and independent research variables. Additionally, demographic information such as age, gender, education level, occupation and income were collected for descriptive analysis. The data collection took place from February to April, 2023.

3.5.**Development of Measurement Instrument**

The study variables were derived from classical theories that explore the acceptance of new technology, including Theory of Planned Behavior, Technology Acceptance Model and Perceived Risk Theory. Five-point likert-type scales were used to measure participants' perceptions and attitudes towards the research variables. Participants were asked to rate their agreement or disagreement with statements related to each variable and the mean value of the indicators was used for regression analysis (Hair et al, 2010).

3.6.**Method of Data Analysis**

The data collected was analyzed using both descriptive and inferential analysis methods. Descriptive statistics were used to summarize the demographic information of the sample. Due to the cross-sectional nature of the data, ordinary least square regression analysis was used to examine the relationships between the independent variables and the dependent variables. Multiple linear Regression analysis using ordinary least square (OLS) estimation

method was conducted to identify significant predictors of behavioral intention to use mobile banking (Hair et al., 2010 and Pallant, 2011). The data was analyzed by using STATA version 15.

3.7.**Model Specification**

The OLS Multiple linear regression model is stated below

$$BI=\beta 0+\beta 1PU+\beta 2PEU+\beta 3ATU+\beta 4PR+\beta 5PBC+\beta 6SN+\beta 7AQINC+\varepsilon i,:$$

Where, BI=Behavioral intention to use mobile banking
PU=Perceived usefulness
PEU=Perceived ease of use
ATU=Attitude towards use
PR=Perceived risk
PBC=Perceived behavioral control
SN=Subjective norms

AQINC=Availability of quality internet and or network connection

4. Results and Discussion

In this section, the data collected related to demographic profile of respondents as well as the determinants of their behavioral intention to use mobile banking is presented, analyzed and discussed.

4.1.Demographic Profile of Respondents

Table 1. Demographic Profile of Respondents

Variables	**Category**	**Frequency**	**Percent**
Gender	Male	179	66.3
	Female	91	33.7
Age	18-25	69	26.34
	26-32	109	41.6
	33-40	69	26.33
	>40	15	4.70
Education	Elementary school complete	7	2.59
	High school complete	18	6.67
	College diploma	28	10.37
	First degree	180	66.67
	Second degree and above	37	13.70
Income	Less than 2000	14	6.86
	2000-3999	60	29.41
	4000-5999	68	33.33
	6000-10,000	38	18.63
	>10,000	24	11.76
Occupation	Government employee	110	40.74
	Private employee	92	34.07
	Self-employed	40	14.81
	Student	18	6.67

	Unemployed	10	3.70

Source: STATA output, 2024

The demographic profile of respondents indicates that more than half of the respondents are males (66.3%). In terms of age category, the majority of the respondents are young, falling within the 18-32 age category (67.9%). Regarding educational level, the majority of the respondents hold a first degree or higher (80.37%). The data also reveals the average monthly income of respondents, with most reporting a net income of greater than 4,000 Ethiopian Birr (63.72%). Finally, the occupational status of respondents shows that a significant number (40.74%) are government employees (Table 1).

Table 2. Descriptive Statistics of Variables Included in the Research Model

Variable name	**Mean**	**Std. dev.**
Perceived Behavioral Control (PBC)	3.71	.8772
Behavioral Intention (BI)	4.16	.7717
Subjective Norms (SN)	2.27	1.0486
Attitude Towards Use (ATU)	4.08	.8198
Perceived Usefulness (PU)	4.11	.7720
Perceived Ease of Use (PEU)	3.97	.8884
Perceived Risk (PR)	2.89	1.1911
Availability of Internet/Network Connection (AQIC)	2.45	.9850

Source: STATA output, 2024

The descriptive statistics result of the variables indicated that bank customers' have a positive attitude towards mobile banking service (mean=4.08). They perceive mobile banking as useful (mean=4.11) and user friendly or easy to use (mean=3.97). They also show a positive behavioral intention to use mobile banking (mean=4.16) and possesses the necessary resources such as mobile phones and computer knowledge as well as skills to use the service (mean=3.71). However, their intention to use mobile banking is not influenced by their friends, colleagues, families and other service user community (mean=2.27). The table also indicates that there is a problem of accessing quality internet or network connection (mean=2.45). The standard deviations for most of the variables were less than one, indicating that the item scores for each construct were distributed around the mean score (Table 2).

Table 3. Cronbach's Alpha Reliability Result of Research Variables

Variable name	**No. of items**	**Cronbach Alpha**
Perceived Behavioral Control (PBC)	3	0.793
Behavioral Intention (BI)	6	0.917
Subjective Norms (SN)	4	0.879
Attitude Towards Use (ATU)	4	0.947
Perceived Usefulness (PU)	5	0.870
Perceived Ease of Use (PEU)	4	0.927
Perceived Risk (PR)	5	0.871
Availability of Internet/Network Connection (AQIC)	4	0.839

Source: STATA output, 2024

The Cronbach's alpha reliability test of all the constructs is above the cutoff value of 0.7 or higher (Hair et al., 2010), indicating high internal consistency among the items measuring each variable or construct (Table 3)

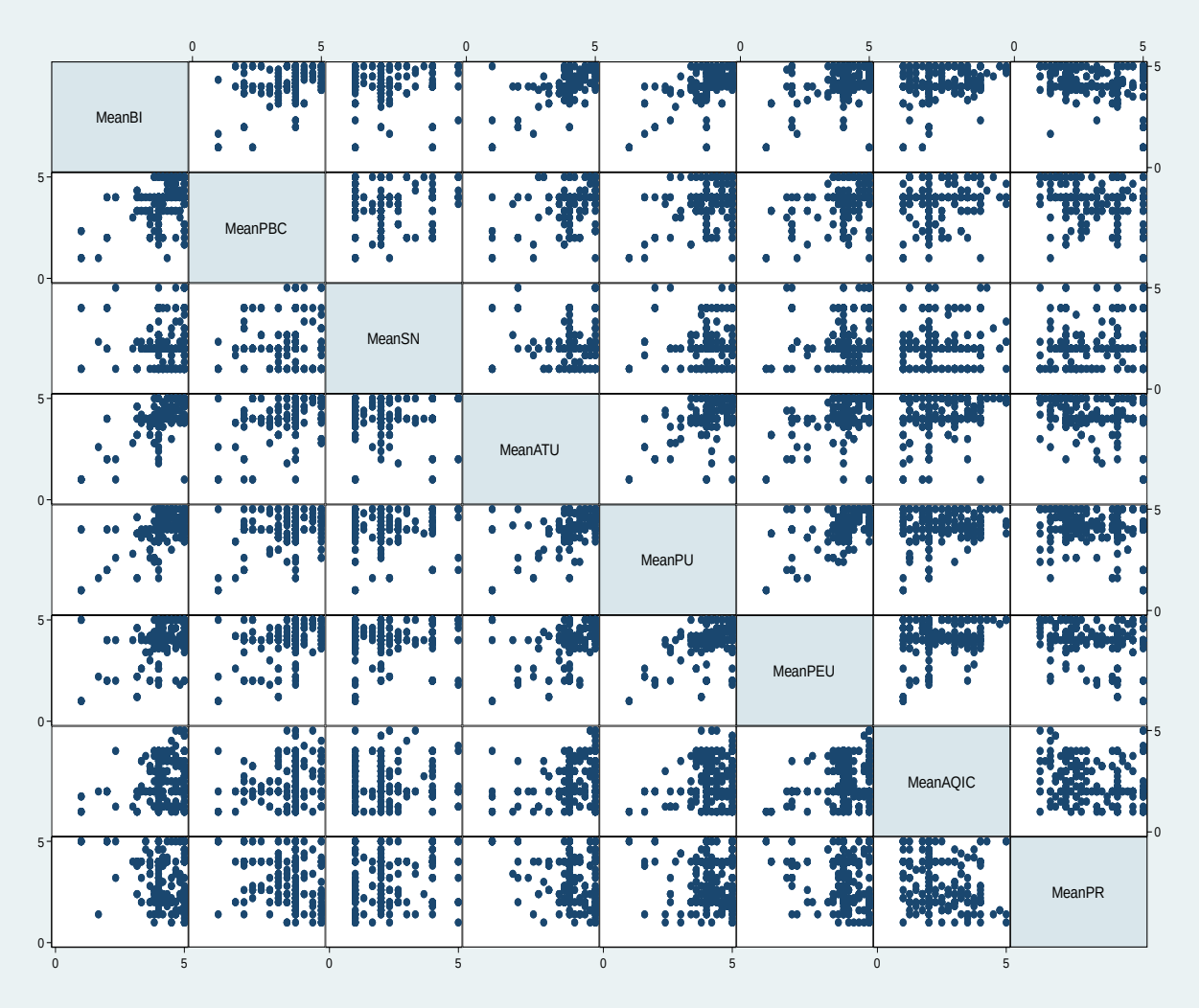
4.2. Diagnostic Test

Linearity, homoscedasticity, normality of errors, and no perfect multicollinearity are the key assumptions for Ordinary Least Square regression. Conducting diagnostic tests to verify these assumptions is crucial for ensuring the reliability and validity of OLS regression results. However, the issue of autocorrelation is not a series concern in cross-sectional data.

Linearity: This assumption states that the relationship between independent and the dependent variables is linear (Gujarati, 2004). Scatter plots of the dependent variable against the independent variables is used to check this assumption (Brooks, 2008 and Hair et al., 2010). If the relationship between these variables is normally distributed and linearly related, the shape of the scatterplot becomes oval. If one of the variables is non-normal, then the scatterplot between this variable and the other is not oval. In this study, the assumption of linearity was assessed using scatterplots and the results indicate no severe departure from the linearity assumption (Table 4). However, slight departure from linearity is expected in social science researches (Pllant, 2011).

Homoscedasticity: The test of homoscedasticity for two metric variables is best examined graphically using scatterplots. Departures from equal dispersion are indicated by such shapes such as cones or diamonds (Hair et al., 2010). In this study, the assumption of homogeneity of variance was assessed using scatterplot, which showed no serious departure from equal dispersion (Table 4). However, slight departure from homoscedasticity is expected in social science researches (Pllant, 2011).

Table 4. Scatter plot (Test of linearity and Homoscedasticity)



Normality: Another assumption of the CLRM assumption is that the residuals should be normality distributed (Gujarati, 2004). One of the most commonly applied tests for normality is the histogram (Brooks, 2008). If the residuals are normally distributed, the histogram should have a bell-shape. As indicated below (Figure 2), the histogram is approximately bell-shaped, suggesting that the residuals are normally distributed or close to normality.

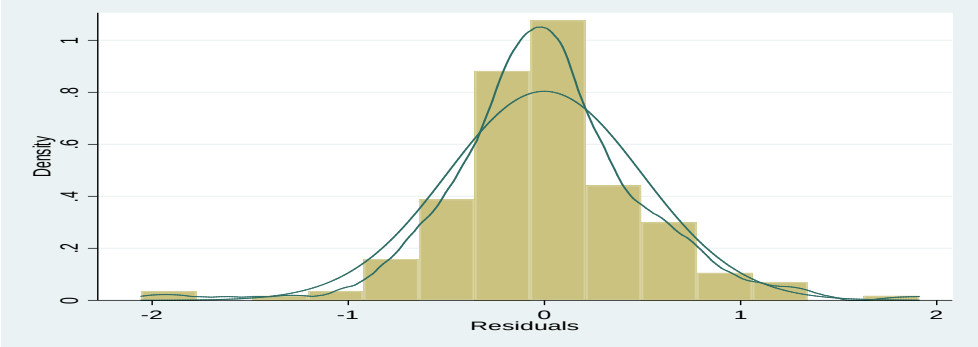


Figure 2. Test of Normality using Histogram

Source: STATA output, 2024

Multicollinearity

An implicit assumption made when using OLS estimation method is that the explanatory variables are not highly correlated with one another (Brooks, 2008). To check the presence of collinearity or multicollinearity, the variance inflation factor (VIF) test was employed. Hair et al. (2010) recommends a common cutoff threshold with a tolerance value of 0.1, which corresponds to a VIF value of 10. In this study, the tolerance and VIF values indicate the absence of multicollinearity problem. The tolerance values for all the variables are above 0.5, and the VIF values are below 1.81 (Table 5), both of which are below the cutoff threshold values mentioned above.

Table 5. VIF Result for Test of Multicollinearity

Variable name	VIF	Tolerance
Perceived Behavioral Control (PBC)	1.39	0.7214
Subjective Norms (SN)	1.06	0.9454
Attitude Towards Use (ATU)	1.77	0.5644
Perceived Usefulness (PU)	1.81	0.5523
Perceived Ease of Use (PEU)	1.67	0.5999
Perceived Risk (PR)	1.24	0.8093
Availability of Internet and /Network Connection (AQIC)	1.14	0.8792

Source: STATA output, 2024

4.3.Regression Output

Table 6. Multiple Regression OLS Estimation Result

```
. reg MeanBI MeanPBC MeanSN MeanATU MeanPU MeanPEU MeanAQIC MeanPR
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Source	SS	df	MS		
				Number of obs	= 270
				F(7, 262)	= 47.61
Model	89.6918814	7	12.8131259	Prob > F	= 0.0000
Residual	70.5101762	262	.26912281	R-squared	= 0.5599
				Adj R-squared	= 0.5481
Total	160.202058	269	.595546683	Root MSE	= .51877

MeanBI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
MeanPBC	.0911392	.0424492	2.15	0.033	.0075541	.1747242
MeanSN	.0122892	.0310217	0.40	0.692	-.0487945	.0733728
MeanATU	.4286524	.0513532	8.35	0.000	.3275349	.5297699
MeanPU	.261749	.055124	4.75	0.000	.1532066	.3702915
MeanPEU	.0108671	.0459631	0.24	0.813	-.079637	.1013711
MeanAQIC	.0003594	.0350849	0.01	0.992	-.0687248	.0694436
MeanPR	-.0849916	.0295176	-2.88	0.004	-.1431135	-.0268697
_cons	1.184863	.2520935	4.70	0.000	.6884761	1.68125

Source: STATA output, 2024

4.4.Discussion

The estimation results based on OLS estimation technique indicate that the R-squared and the adjusted-R squared statistics of the model are 55.9 % and 54.8%, respectively. The adjusted R-squared value of 54.8% suggests that 54.8% of the variation of in the dependent variable (behavioral intention to use mobile banking) is explained by the changes in the independent variables. This implies that the conceptual model (an integration of TAM and TPB with two additional variables) partially explains the dependent variable which will be used as a research gap for future studies (Table 6).

As shown in the regression output (Table 6), behavioral intention (β=0.0911, t=2.15 and p=0.033) is positively influenced by customers perceived behavioral control, supporting hypothesis H4. This implies that the more customers' have the required knowledge, skill and resources such as mobile phone, the stronger becomes their behavioral intention to use mobile banking. This finding is consistent with previous studies (Ajzen, 1991; Tesfaye and Debebe, 2018; Alemayehu and Kassa, 2020; Bayiley, 2022 and Yıldırım, & Ayar, 2024). This is because most users believe that having the necessary skills, resources and knowledge is essential for using mobile banking services.

Perceived usefulness has a positive effect on bank customers behavioral intention to use mobile banking (β=0.2617, t=4.75 and p=0.000), indicating that hypothesis H1 is supported. This implies that consumers find mobile banking very useful, as it improves the execution of their daily banking transactions and helps them save cost and time. This finding is consistent with previous studies (Davis, 1989; Matiwos, 2018; Tibebe, 2019; Assegid, 2019; Alemayehu and Kassa, 2020; Bayiley, 2022; and Yıldırım, & Ayar, 2024), which imply that the more useful the technology is perceived to be (such as being time saving, convenient and effective in managing banking transactions); the stronger the behavioral intention to use it becomes.

The behavioral intention of bank customers to use mobile banking services is positively influenced by their attitude towards its use (β=0.4286, t=8.35 and p=0.000), indicating that hypothesis H6 is supported. This finding implies that a more positive attitude towards mobile banking leads to a greater behavioral intention or readiness to use the service. Consistent with previous studies (Lemma and Gebre, 2017; Assegid, 2019; Pakpahan & Legowo, 2021; and Kejela & Porath, 2022), this result suggests that the more favorable a customer's attitude towards mobile banking, the stronger becomes their behavioral intention / readiness to use the service (Table 6).

The study finding regarding the effect of perceived risk indicates that bank customers' behavioral intention to use mobile banking is negatively influenced by their risk perception (β=-0.0849, t=-2.88 and p=0.004), supporting hypotheses H5. This suggests that higher risk associated with mobile banking leads to lower intention to use the service. Previous studies and theories have consistently supported this, highlighting perceived risk as a significant barrier to adoption, especially in developing countries where concerns about security and fraud are prevalent (Featherman and Pavlou, 2003; Munoz-Leiva et al., 2017; Tibebe, 2019; Gebre and Demissie, 2019; Assegid, 2019; Alemayehu and Kassa, 2020; Sureya & De Rose, 2020 and Pakpahan & Legowo, 2021). Furthermore, this finding implies that, due to their risk perception, mobile banking users lack confident in mobile banking services. As a result, they are unwilling to take any risks and prefer to use traditional banking services.

However, subjective norms (SN), perceived ease of use (PEU) and availability and quality of internet and or network connection (AQIC) had statistically insignificant effect (Table 6).

5. Conclusion and Recommendation

Based on the findings of the study, it can be concluded that customers behavioral intention to use mobile banking is positively influenced by their perceived behavioral control, perceived usefulness and attitude towards use, while it is negatively influenced by their risk perception. The result also indicated that as compared to other variables, attitude towards use is the most important predictor of the dependent variable. The implication is that the better the customer's attitude towards mobile banking, the more becomes their behavioral intention/readiness to use the service. However, subjective norms, perceived ease of use and availability and quality of internet and or network connection have no statistically significant effect on bank customer behavioral intention to use mobile banking. As a recommendation, these conclusions suggest that commercial banks in the study area should focus on increasing customer awareness regarding the usage, benefits, and security of mobile banking services to enhance customers' mobile banking usage behavior.

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