

Factors influencing customers' intention to adopt e-banking: a TAM and cybercrime perspective using structural equation modelling

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Abstract

Purpose – This study assesses the factors influencing customers' intention to adopt e-banking in the context of the technology acceptance model and the moderation role of cybercrime.

Design/methodology/approach – The variables in the study are measured using a five-point Likert scale with measures adopted from existing literature. The independent variables are perceived ease of use, perceived usefulness and security and privacy. These are postulated to be moderated by the perceived risk of cybercrime and to influence e-banking adoption intentions. A quantitative approach is used. Primary data are collected from a sample of 209 randomly selected bank customers. The study uses a two-step (measurement model and structural model) approach to data analysis.

Findings – The key findings in this study are that perceived risk of cybercrime strengthens the positive relationship between perceived ease of use and e-banking adoption intentions but dampens or weakens the positive relationship between perceived usefulness and customers' e-banking adoption intentions. The study makes several recommendations to inform scholarship, policy and practice.

Originality/value – Unlike existing literature, the study makes a unique contribution by including perceived risk of cybercrime as a moderating variable of theoretical significance in the relationship between adoption of e-banking and its determinants.

Keywords E-banking, Adoption intentions, Technology acceptance model, Structural equation modelling, Cybercrime, Perceived usefulness

Paper type Research paper

1. Introduction

Electronic banking (also called online banking or Internet banking in some literature (Khattoon *et al.*, 2020), has gained popularity as a banking solution in recent years due to the increase in Internet access (Bons *et al.*, 2012) among people globally. It was made even more popular when COVID-19-related safety restrictions made it difficult for human interaction and hence more feasible to conduct banking online (Yildirim and Erdil, 2023). However, the



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rise of e-banking has also resulted in an increase in cybercrime as criminals look to exploit the vulnerabilities of online banking systems (Chevers, 2019). Cybercrime can impact e-banking adoption by making bank customers feel unsafe and insecure when using online banking services (Akinbowale *et al.*, 2023). This can lead to users avoiding e-banking altogether or only using it for less sensitive transactions.

Several studies have been conducted on e-banking adoption (examples include, among others, (Carranza *et al.*, 2021; Chauhan *et al.*, 2019; Kesharwani and Tripathy, 2012; Perkins and Annan, 2013; Shaikh and Karjaluto, 2015). The technology acceptance model (TAM) by Davis (1980, 1989) is a well-established theory that has been used by various studies (Ahmad *et al.*, 2020; Kaulu *et al.*, 2018; Tiwari, 2021) to explain the factors that influence the adoption and use of new technologies.

The TAM suggests that the perceived usefulness and perceived ease of use of a new technology are the two main factors that influence people's intention to adopt technology (Davis, 1980). However, the TAM does not take into account the impact of cybercrime on e-banking adoption intentions, and the earlier mentioned studies largely ignore the potential mediation role of cybercrime in the relationship between e-banking adoption intentions and its determinants. This study will examine the moderation role of cybercrime in the relationship between e-banking adoption intentions and its determinants. The study therefore contributes more to the original TAM. It also provides useful insights into the intricate relationships amongst e-banking and its antecedents (including cybercrime). This is useful for scholarship, policy and practice.

The study will address questions such as: What is the influence of cybercrime on e-banking adoption intentions? Does perceived cybercrime moderate the relationship between perceived usefulness and e-banking adoption intentions? Does perceived cybercrime moderate the relationship between perceived ease of use and e-banking adoption intentions? What is the moderating role of perceived cybercrime in the relationship between safety, privacy and e-banking adoption?

According to Hayes (2018), moderation (also called interaction) occurs when a third variable (say W) influences the magnitude of the causal effect of the independent variable (X) on the dependent variable (Y). For example, moderation could be said to occur if cybercrime affects the magnitude of the effect between ease of use of e-banking and adoption of e-banking. In the context of this study, perceived ease of use is the extent to which a user of an e-banking service finds the process of using the service free from effort (Davis, 1980; He *et al.*, 2018). Perceived usefulness is the extent to which the user finds the service fit for purpose. Perceived cybercrime in this context is the extent to which a user feels that thefts or fraud are likely to happen through the adoption of online banking services (Phillips *et al.*, 2022).

Overall, this study is necessary because it makes a significant contribution to the body of knowledge on e-banking adoption and cybercrime. It uniquely adds the potential moderation role of cybercrime in the relationship between e-banking adoption and its determinants, as explained by the TAM. The study informs banks and nonbank financial institutions about which factors affect e-banking adoption and how to address cybercrime and promote e-banking adoption.

2. Literature review

2.1 Theoretical review

The TAM by Davis (1980, 1989) underpins this study. It suggests that the perceived usefulness and perceived ease of use of a technology influence users' adoption intentions (AIs). In the context of e-banking or online banking, this would imply that the ease of use of e-banking and its usefulness determine customers' intentions to adopt e-banking. In this context, perceived usefulness is the belief that using e-banking will improve one's

performance or life (Tiwari, 2021). Perceived ease of use is the belief that using e-banking will be easy to do (Tiwari, 2021). While the TAM model explains how ease of use and usefulness of an information technology (IT) lead to the adoption of such technology, it leaves out several key variables, including cybercrime. Hence, the current study assesses the factors that influence e-banking AI, including the moderating role of perceived cybercrime.

2.2 Empirical review

There are several studies that have been conducted on the adoption of e-banking. This section reviews some of these.

Chauhan *et al.* (2019) use the TAM to assess internet banking AI among 487 bank customers in India. They modify the TAM by including perceived security risk (PSR), consumer innate innovativeness (II) and domain-specific innovativeness (DSI) in the questionnaire. The data were analysed using a two-step (measurement model and structural model) approach. The study finds that perceived usefulness, perceived ease of use, attitude, II and DSI are positive influencers of customers' intention to adopt internet banking. The PSR had a negative influence on internet banking AI. The study makes important contributions to the body of knowledge by including the variables they used. However, the potential moderation role of perceived cybercrime was not considered.

Chama *et al.* (2021) study the factors influencing the adoption of electronic banking services among bank customers. The study confirms that trust, perceived usefulness and social influence affect the adoption of e-banking. This study makes useful contributions by clearly identifying the factors that affect e-banking adoption. One of these is the usefulness of e-banking. Hence, it is hypothesized that:

H1. Perceived usefulness of e-banking has a positive influence on e-banking AI.

Montazemi and Saremi (2015) investigate the factors influencing the adoption of online banking by using meta-analysis to synthesize the findings of 52 studies on online banking adoption. The key factors identified are perceived usefulness, perceived ease of use and security. The study therefore highlights the importance of safety and privacy on online banking platforms.

Alkhowaiter (2020) conducted a literature review and performed a weighted and meta-analysis of 46 papers on internet banking adoption in Gulf countries. They find that the best predictors of internet banking adoption are perceived usefulness, trust and perceived security. This highlights the significance of considering not only the usefulness of e-banking services but also their security. Hence, it is hypothesized as follows:

H2. Perceived security of e-banking has a positive influence on e-banking AI

Tiwari (2021) analyses the variables that influence e-banking adoption in Ethiopia's commercial banking sector. The key determinants were perceived ease of use, infrastructure, security and trust. The study collected data from 179 responses and utilized structural equation modelling. Trust was found to mediate the relationship between the determinants and e-banking adoption.

Alnemer (2022) investigates the factors that determine the adoption of digital banking in the Kingdom of Saudi Arabia. A sample of 1,009 from the Global Financial Inclusion Survey of 2017 was analysed using chi-square and logistics regression with the TAM as the underpinning theory. Among the results, perceived ease of use (PEOU) and perceived usefulness (PU), were found to have positive marginal effects on the adoption of digital banking in the Kingdom. This study provides insights into the PU, PEOU and e-banking AI nexus.

Santouridis and Kyritsi (2014) investigate the determinants of internet banking adoption in Greece. A questionnaire based on the TAM was administered to 266 respondents after pilot-testing it with the directors of 3 banks and 11 bank customers. The study used linear

regression to investigate the determinants of internet banking adoption. Perceived credibility, usefulness and ease of use of internet banking were found to be determinants of internet banking adoption. This suggests that the ease of use of e-banking services has a positive influence on adoption intentions. It is therefore hypothesized that:

H3. Perceived ease of use of e-banking has a positive influence on e-banking AI

[Kassim and Ramayah \(2015\)](#) identify the factors influencing the intention to continue using Internet banking among users in Malaysia. The study uses a self-administered questionnaire using drop-off and pick-up (DOPU) to collect data. The sample consisted of 413 bank customers. Data analysis was done using the SPSS statistical analysis package and partial least squares. The study found various risks (social, time loss and opportunity cost) to be significant influencers of internet banking adoption in addition to perceived usefulness. This study therefore highlights the importance of considering risk in the relationship between e-banking and its determinants.

[Sharma et al. \(2020\)](#) investigate the factors that influence internet banking AI in Fiji. The study uses a unified theory of acceptance and use of technology (UTAUT) to develop a model of internet banking adoption from data collected from 503 respondents. One of the findings is that perceived risk negatively affects internet banking AI. It is therefore hypothesized as follows:

H4. Perceived risk of cybercrime has a negative influence on e-banking AI

[Martins and Oliveira \(2014\)](#) develop a conceptual model that amalgamates the UTAUT model with perceived risk to explain e-banking AI and usage behaviour. The model was tested on 249 responses from Portugal. The results support some of the UTAUT variables. However, most importantly, the results also support the role of risk as a stronger predictor of e-banking AI. Hence, it is hypothesized that:

[Chaimaa et al. \(2021\)](#) provide an overview of electronic banking services. The study highlights challenges and risks and proposes solutions to various aspects of e-banking. Ease of use is one of the benefits discussed, while security concerns are one of the challenges. While the study brought awareness to the key factors affecting e-banking, it did not test hypotheses such as the hypotheses in the current study.

[Banu et al. \(2019\)](#) use the TAM and decomposed theory of planned behaviour to assess customer satisfaction in online banking. The study collects data from 750 respondents from India. Using hierarchical regression, the study finds that perceived usefulness partially mediates the relationships between the various variables (awareness of online banking services, security, knowledge of the Internet, self-efficacy, intention to adopt, trust and ease of use) and customer satisfaction. This study raises awareness of the possibility that security concerns may influence the intricate relationships between e-banking adoption intentions and their determinants.

H5. Perceived risk of cybercrime moderates the relationship between perceived usefulness and e-banking AI

H6. Perceived risk of cybercrime moderates the relationship between perceived security and privacy and e-banking AI

H7. Perceived risk of cybercrime moderates the relationship between perceived ease of use and e-banking AI

3. Methods

A quantitative approach ([Creswell, 2012](#)) is used in this study. Primary data was collected from commercial bank customers through a self-completed online questionnaire. The link was randomly sent to individuals above the age of 15 in Zambia. The [World Bank \(2022\)](#)

estimates this population to be 10,709,967. This population was chosen because of its feasibility and accessibility to the researchers as well as its potential for generalizability to most parts of the world because of the large mix of social classes in the population.

The questionnaire questions were adapted from previous studies (Chiou and Shen, 2012; De Kimpe *et al.*, 2020; Pikkarainen *et al.*, 2004; Suh and Han, 2003). This was in order to safeguard the validity of the instrument as well as the comparability of the results. All variables were measured on a five-point Likert scale. Appendix 1 shows the breakdown of the respective observed variables used. A total of 209 commercial bank customers filled out and submitted the questionnaire. This sample size is considered sufficient for structural equation modelling (SEM) in accordance with various literature (Hadi and Abdullah, 2016; Kyriazos, 2018; Tabachnick and Fidell, 2013).

Within the scope of the study and in relation to e-banking, the variables of Perceived Usefulness (PU), perceived ease of use (PEOU), security and privacy (SP) of e-banking, perceived risk of cybercrime (PROC) and intention to adopt e-banking or AI were examined. The independent variables are PU, PEOU and SP of e-banking. The PROC is the moderating variable while e-banking AI is the dependent variable.

Although it was measured on a Likert scale, the moderator (PROC) is presumed to be a continuous variable because the five-point Likert scale was used. Five-point Likert scales can be taken as continuous in line with various literature (Bernstein, 2004; Robitzsch, 2020; Sullivan and Artino, 2013). Figure 1 shows the variables in this study and the hypothesized relationships.

Data analysis was conducted in SPSS version 23 and SmartPLS4. Data analysis began with data cleaning, which involved a check for descriptive statistics such as maximum and minimum values, dealing with missing data, a check for and removal of outliers using SPSS and a check for respondent misconduct using standard deviations. Afterwards, measurement model assessment was conducted in SmartPLS4. This involved the determination of factor loadings, reliability analysis and validity analysis. The factor loadings were used to determine how well particular questionnaire items represented their respective underlying constructs. Alpha and composite reliability were used to assess internal consistency in this

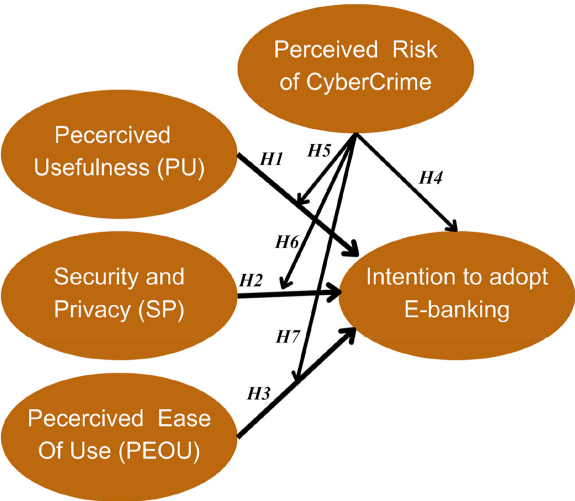


Figure 1.
Hypothesized
relationships in
the study

Source(s): Figure by authors

regard. Construct validity was used to determine whether measures that are theoretically not highly related to each other are in fact not related (Hubley, 2014). Specifically, convergent construct validity was measured using the average variance extracted (AVE). Discriminant construct validity was measured using Fornell & Larcker criterion, HTMT and cross factor loadings. The measurement model assessment was followed by the structural model assessment. It is at this stage of the data analysis that the hypotheses are tested. The structural model assessment began with collinearity tests. This was followed by the assessment of significant relationships through bootstrapping. Finally, the explanatory power (r-squared) was assessed. These were done in line with the model in Figure 1.

4. Results

The section presents the results.

4.1 Sample profile

The sample of bank customers consisted of 47.8% female and 52.2% male respondents ($N = 209$). The age range of 21–30 represented 54.1%, which was the largest age group of the respondents, while the age range above 50 years of age had the lowest number of respondents (3.8%). In terms of their main occupation, 53.1% of the respondents were employed, 34.4% were students and the rest of the percentage was composed of unemployed adults and business owners. Table 1 shows these results.

4.2 Measurement model assessment

The quality of the constructs or measurement model in the study is analysed using factor loadings, validity and reliability. The measurement model was tested for factor loadings, validity and reliability using various measures presented in this section.

4.2.1 Factor loadings and deletion of items. The factor loadings were initially all above 0.7 except that of PROC5, which had a factor loading of 0.465. It was therefore deleted. Later, PROC 3 was also deleted in order to improve on the average variance extracted (AVE) for PROC, which was initially below 0.5. Due to poor VIF, SP2 was deleted as well. Table 2 shows the factor loadings for the final model selected. A more detailed presentation of the factor loadings is shown in Appendix 2.

Variable	Measurement	Frequency	Percent
Gender	Female	100	47.8
	Male	109	52.2
	Total	209	100.0
Age	20 and below	13	6.2
	21–30	113	54.1
	31–40	29	13.9
	41–50	46	22.0
	51 and above	8	3.8
	Total	209	100.0
Occupation	Business owner	10	4.8
	Employed	111	53.1
	Student	72	34.4
	Unemployed adult	16	7.7
	Total	209	100.0

Source(s): Table by authors

Table 1.
Sample profile

Variable	AI	PROC	PEOU	PU	SP	VIF
AI2	0.888					3.135
AI1	0.870					3.43
AI4	0.835					2.095
AI3	0.817					2.311
AI5	0.747					1.626
PROC6		0.846				2.84
PROC7		0.832				2.957
PROC8		0.752				2.782
PROC11		0.738				2.493
PROC9		0.738				2.362
PROC1		0.668				1.551
PROC2		0.612				2.738
PROC10		0.596				3.336
PROC4		0.577				2.012
PEOU2			0.875			2.807
PEOU1			0.862			1.623
PEOU3			0.858			3.774
PEOU4			0.843			3.265
PEOU5			0.818			2.518
PEOU6			0.686			3.181
PU1				0.802		2.107
PU2				0.664		1.594
PU3				0.751		2.01
PU4				0.761		2.643
PU5				0.657		2.127
PU6				0.858		2.729
PU7				0.849		3.644
PU8				0.832		3.285
SP1					0.866	2.491
SP3					0.865	1.811
SP4					0.864	2.843
SP5					0.724	1.891
Average variance extracted	0.693	0.508	0.682	0.601	0.707	
Cronbach's alpha	0.888	0.879	0.906	0.904	0.862	
Composite reliability (rho_c)	0.918	0.901	0.928	0.923	0.906	

Table 2.
Reliability and validity
test results

Source(s): Table by authors

4.2.2 Indicator multicollinearity. The variance inflation factor (VIF) is used to check for multicollinearity or collinearity among the indicators (Kim, 2019). According to Hair et al. (2020), multicollinearity is considered low and hence not a problem when VIF values are 3–5 or below. Using the variables from Table 2, the VIF for SP2 was the highest and above 5. Hence, SP2 was deleted. This left items with a VIF below , ensuring reduced multicollinearity problems.

4.2.3 Construct reliability. The model was tested for reliability using both Cronbach's alpha and composite reliability. For the measures to be reliable, they need to be 0.7 and above (Hair et al., 2020). As per Table 2, all the variables were found to have Cronbach's alpha and composite reliabilities above 0.7.

4.2.4 Construct validity. The convergent validity (the extent to which multiple attempts to measure the same concept are in agreement) was determined through average variance extracted (AVE). As shown in Table 2, all the AVE values were greater than the benchmark of 50% or 0.5 (Hair et al., 2020), hence confirming convergent construct validity.

Discriminant validity; which is the extent to which the measures of different constructs are distinct or not too highly correlated (Henseler *et al.*, 2015) was tested using various criteria. The Fornell and Larcker (1981) criteria involves comparison of the square root of the AVE for each construct with the correlations between that construct and other constructs. As per criteria, the square roots of the AVE for each of the constructs (Shown in italic in Table 3) were greater than the correlations between that particular construct and other constructs in the model. Hence discriminant validity was established. The heterotrait-monotrait (HTMT) criteria requires that all HTMT ratios be below 0.85 for discriminant validity to be established (Hair *et al.*, 2020). All the HTMT ratios in this study (figures above the italic diagonal in Table 3) were below 0.85. Therefore, discriminant validity existed.

4.3 Structural model assessment

Table 4 shows the path coefficient results. The results show that PROC positively moderates the relationship between PEOU and e-banking AI ($\beta = 0.14$, $p = 0.016$). There was also a negative moderating influence of PROC in the relationship between PU and e-banking AI, but this was only statistically significant at the 10% significance level ($\beta = -0.115$, $p = 0.051$). The PROC, however, did not have a significant moderating influence in the relationship between SP and AI ($\beta = 0.001$, $p = 0.983$). The variables PEOU, PROC and PU had statistically significant relationships with AI. The r-squared value of AI was 0.679, while the adjusted r-squared was 0.668. A summary of the moderation analysis results is presented in Table 4.

Based on the findings, H1, H3, H4 and H7 are the hypotheses that were supported. There was only support for H5 at the 0.1 significance level. The hypotheses H2 and H6 were not supported. Table 5 shows the results of hypothesis testing.

A slope analysis was also conducted in order to assess the nature of the moderating effects. This analysis shows that PROC strengthens the positive relationship between PEOU and e-banking AI. It also shows that PROC dampens or weakens the positive relationship between PU and the customer's e-banking AI. These results are shown in Figure 2.

	AI	PEOU	PROC	PU	SP
AI	<i>0.833</i>	0.703	0.307	0.732	0.403
PEOU	0.636	<i>0.826</i>	0.158	0.544	0.416
PROC	-0.292	-0.080	<i>0.713</i>	0.179	0.236
PU	0.665	0.492	-0.008	<i>0.775</i>	0.385
SP	0.362	0.376	0.010	0.333	<i>0.841</i>

Note(s): NB: Italic diagonal figures are square roots of AVE. Below the diagonal are correlations between the constructs. Above the diagonal are HTMT values

Source(s): Table by authors

Table 3.
Fornell–Larcker and heterotrait-monotrait (HTMT) criteria

Variable	β	Standard deviation	<i>t</i> -statistic	<i>p</i> -value
PEOU $\rightarrow$ AI	0.383	0.080	4.776	0.000
PROC $\rightarrow$ AI	-0.224	0.060	3.704	0.000
PU $\rightarrow$ AI	0.437	0.079	5.533	0.000
SP $\rightarrow$ AI	0.064	0.056	1.143	0.253
PROC x PU $\rightarrow$ AI	-0.115	0.059	1.951	0.051
PROC x PEOU $\rightarrow$ AI	0.140	0.058	2.404	0.016
PROC x SP $\rightarrow$ AI	0.001	0.051	0.022	0.983

Source(s): Table by authors

Table 4.
Path coefficients results

Table 5.
Hypothesis test results

Hypothesis	Result
H1: Perceived usefulness of e-banking has a positive influence on e-banking adoption intentions (AI)	Supported
H2: Perceived security and privacy of E-banking has a positive influence on E-banking AI	Not supported
H3: Perceived ease of use of e-banking has a positive influence on e-banking AI	Supported
H4: Perceived risk of cybercrime (PROC) has a negative relationship with e-banking AI	Supported
H5: Perceived risk of cybercrime moderates the relationship between perceived usefulness and E-banking AI	Weak support
H6: Perceived risk of cybercrime moderates the relationship between perceived security and privacy and e-banking AI	Not supported
H7: Perceived risk of cybercrime moderates the relationship between perceived ease of use and e-banking AI	Supported

Source(s): Table by authors

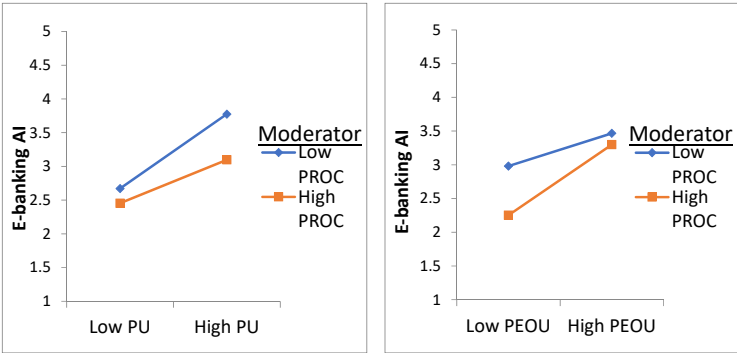


Figure 2.
Slope analysis

Slope analysis of PU, PROC and e-banking AI

Slope analysis of PEOU, PROC and e-banking AI

Source(s): Figures by authors

5. Discussion

The key unique results in this study are that (1) perceived risk of cybercrime (PROC) strengthens the positive relationship between perceived ease of use (PEOU) and e-banking AI and (2) PROC dampens or weakens the positive relationship between perceived usefulness (PU) and customers' e-banking AI. As expected, the study also found that PEOU and PU have a significant positive influence on e-banking AI. These results therefore provide support for four hypotheses: H1, H3, H4 and H7. Two hypotheses, H2 and H6, were not supported. These are multifaceted results with various discussion points.

Firstly, the results show that PEOU has a positive influence on e-banking AI. This is in line with the TAM and confirms the findings of studies such as Santouridis and Kyritsi (2014) and Montazemi and Saremi (2015), among others. Secondly, in line with the TAM, the study also found that perceived usefulness (PU) has a positive influence on e-banking AI. This means that the higher the PU of e-banking, the more likely customers are to adopt it. This underscores the importance of creating useful e-banking features. It also echoes or reaffirms some of the findings in existing literature, such as Chauhan *et al.* (2019), Montazemi and Saremi (2015) and Santouridis and Kyritsi (2014).

There was also a negative influence of PROC on AI. This is similar to and supports the finding of Sharma *et al.* (2020) and provides support for H4. This support also highlights the

negative role that perceived cybercrime plays in e-banking AI. Hence, financial institutions need to control not only cybercrime itself but also the perceptions of customers of it. This is particularly important as the results show that perceived cybercrime weakens the positive relationship between perceived usefulness of e-banking and e-banking adoption. This means that even if e-banking is useful, at higher levels of cybercrime, customers are unlikely to use e-banking.

The r-squared value of AI was 0.679, while the adjusted r-squared was 0.668, suggesting that the variables considered for this study were able to explain between 66.8% and 67.9% of the changes in e-banking AI. This is expected as this parsimonious model captures as many variables as possible, but not all the variables possible.

6. Conclusions

This study has assessed the factors influencing customers' intention to adopt e-banking in the context of the TAM and the moderation role of cybercrime. Unlike existing literature, the study makes a unique contribution by including perceived risk of cybercrime as a moderating variable of theoretical significance in the relationship between adoption of e-banking and its determinants. The variables in the study are measured using a five-point Likert scale with measures adopted from existing literature. The independent variables are perceived ease of use, perceived usefulness and security and privacy. These are postulated to be moderated by the perceived risk of cybercrime and postulated to influence e-banking AI. A quantitative approach is used. Primary data is collected from a sample of 209 randomly selected bank customers. A two-step (measurement model and structural model) approach is used. The key unique findings in this study are that perceived risk of cybercrime strengthens the positive relationship between perceived ease of use and e-banking adoption intentions but dampens or weakens the positive relationship between perceived usefulness and customers' e-banking adoption intentions. The study makes several recommendations to inform scholarship, policy and practice.

7. Recommendations

The study highlights the importance of accounting for the moderation role of cybercrime when studying e-banking adoption or indeed, adoption of any information technology solution. Future studies must control for this moderating role. The current study used cross-sectional data, as with many studies in e-banking. However, future studies should consider using time series data in order to factor in time-varying effects. In line with the findings, it is recommended that banks and financial institutions implement simple and intuitive user interfaces that are easy for people to understand and use. Security features need to be in the background so that this does not interfere with the smooth usage of e-banking. The banks must also do their best to control perceptions of cybercrime in the industry. This could be done in conjunction with IT and banking regulators. The banks and regulators as well as policymakers, should also educate customers about cybercrime and how to protect themselves.

List of abbreviations

AI	Adoption intentions
AVE	Average variance extracted
DSI	Domain-specific innovativeness
HTMT	The heterotrait-monotrait
II	Consumer innate innovativeness
IT	Information technology

PEOU	Perceived ease of use
PROC	Perceived risk of cybercrime
PSR	Perceived security risk
PU	Perceived usefulness
SP	Security and privacy
TAM	Technology acceptance model
UTAUT	Unified theory of acceptance and use of technology
VIF	Variance inflation factor

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Appendix 1

Customers' e-banking adoption intentions

Variable	Description	Adopted from	N	Min	Max	Mean	SD
<i>Dependent variable – intention to adopt e-banking</i>		Suh and Han (2003)					
AI1	I intend to continue using this internet banking site in the future		209	2	5	3.99	0.55
AI2	I expect my use of this internet banking site to continue in the future		209	2	5	4.00	0.51
AI3	I will frequently use this Internet banking site in the future		209	1	5	3.96	0.58
AI4	I will strongly recommend others to use this Internet banking site		209	1	5	3.94	0.61
AI5	I am willing to spend more time to understand how to efficiently use Internet banking		209	2	5	4.07	0.50
<i>Moderating variable – perceived risk of cybercrime</i>		Chiou and Shen (2012), De Kimpe et al. (2020)					
PROC1	I am afraid that my data will be embezzled (misappropriated)		209	1	5	3.06	1.10
PROC2	I am afraid that my password will be divulged (disclosed)		209	1	5	3.00	1.01
PROC3	I do not believe that my personal account can be securely protected through the online transaction process		209	1	5	3.43	0.80
PROC4	I feel using internet banking still has the risk of incomplete transaction		209	1	5	3.44	0.98
PROC5	It is hard to discern the service quality of internet banking		209	1	5	2.48	0.93
PROC6	I am afraid to become a victim of malware (malicious software)		209	1	5	3.81	0.75
PROC7	I am afraid to become a victim of ransomware (access blocking malicious software)		209	1	5	3.73	0.78
PROC8	I am afraid to become a victim of hacking		209	1	5	3.88	0.77
PROC9	I am afraid to become a victim of phishing (electronic means of confidential data theft)		209	1	5	3.89	0.69
PROC10	I am afraid to become a victim of identity theft (obtaining financial or personal information of another)		209	1	5	3.89	0.75
PROC11	I am afraid to become a victim of consumer fraud (deceptive business practices causing customers financial losses)		209	1	5	3.85	0.76

(continued)

Table A1.
Questionnaire measures and descriptive statistics

Variable	Description	Adopted from	N	Min	Max	Mean	SD
<i>Independent variable – perceived usefulness of e-banking</i>		Chiou and Shen (2012), Suh and Han (2003)					
PU1	Using Internet bank improves my financial transactions performance		209	2	5	4.03	0.54
PU2	Using Internet bank enhances my effectiveness on the financial transactions		209	1	5	3.99	0.60
PU3	Overall, I find the Internet bank useful in my financial transactions		209	2	5	4.01	0.55
PU4	Using Internet bank makes it easier to do my financial transactions		209	1	5	3.92	0.70
PU5	Using the Internet banking site has a critical role in supporting my banking activities		209	2	5	3.84	0.65
PU6	Using this internet banking site enables me to accomplish banking activities more quickly		209	1	5	4.09	0.52
PU7	Using this internet banking site makes it easier to do my banking activities		209	2	5	4.05	0.59
PU8	I find this internet banking site useful for my banking activities		209	2	5	4.00	0.55
<i>Independent variable – perceived security and privacy of e-banking</i>		Pikkarainen <i>et al.</i> (2004), Chiou and Shen (2012), Pikkarainen <i>et al.</i> (2004)					
SP1	I trust in the technology an online bank is using		209	1	5	3.60	0.74
SP2	I trust in the ability of an online bank to protect my privacy		209	1	5	3.20	1.02
SP3	I trust in an online bank as a bank		209	1	5	3.20	1.06
SP4	Using an online bank is financially secure		209	1	5	3.36	0.87
SP5	I am not worried about the security of an online bank		209	1	5	3.02	1.04
<i>Independent variable – perceived ease of use of e-banking</i>		Chiou and Shen (2012)					
PEOU1	It is easy for me to learn how to use Internet banking site		209	2	5	3.96	0.53
PEOU2	I find it easy to get the Internet banking site to do what I want it to do		209	2	5	3.94	0.54
PEOU3	35. My interaction with the Internet bank is clear and understandable		209	1	5	3.90	0.62
PEOU4	Overall, I find the Internet bank easy to use		209	2	5	3.98	0.60
PEOU5	It is easy to remember how to use this internet banking site		209	1	5	3.97	0.62
PEOU6	It is easy for me to become skilful at using an online bank		209	1	5	3.79	0.70

Table A1. Source(s): Table by authors

Variable	AI	PEOU	PROC	PU	SP
AI1	<i>0.870</i>	0.600	−0.168	0.616	0.288
AI2	<i>0.887</i>	0.564	−0.214	0.649	0.280
AI3	<i>0.817</i>	0.539	−0.326	0.481	0.346
AI4	<i>0.835</i>	0.476	−0.259	0.482	0.328
AI5	<i>0.747</i>	0.455	−0.258	0.523	0.269
PROC11	−0.169	−0.024	<i>0.738</i>	0.034	−0.070
PROC1	−0.229	−0.096	<i>0.668</i>	0.035	0.204
PROC10	−0.057	−0.039	<i>0.596</i>	0.065	−0.030
PROC2	−0.207	−0.151	<i>0.612</i>	−0.017	0.162
PROC4	−0.177	−0.054	<i>0.577</i>	0.095	0.270
PROC6	−0.286	−0.034	<i>0.846</i>	−0.131	−0.109
PROC7	−0.265	−0.110	<i>0.832</i>	−0.057	−0.166
PROC8	−0.182	0.005	<i>0.752</i>	−0.022	−0.140
PROC9	−0.128	0.067	<i>0.738</i>	0.118	−0.014
PEOU1	0.540	<i>0.862</i>	−0.063	0.421	0.190
PEOU2	0.566	<i>0.875</i>	−0.108	0.427	0.330
PEOU3	0.516	<i>0.858</i>	0.004	0.397	0.319
PEOU4	0.581	<i>0.843</i>	−0.025	0.474	0.272
PEOU5	0.518	<i>0.818</i>	−0.157	0.337	0.293
PEOU6	0.410	<i>0.686</i>	−0.045	0.380	0.521
PU1	0.576	0.434	−0.033	<i>0.802</i>	0.221
PU2	0.457	0.319	−0.029	<i>0.664</i>	0.339
PU3	0.511	0.335	−0.087	<i>0.751</i>	0.183
PU4	0.441	0.341	0.031	<i>0.761</i>	0.380
PU5	0.388	0.338	0.061	<i>0.657</i>	0.435
PU6	0.600	0.394	−0.014	<i>0.858</i>	0.242
PU7	0.576	0.449	−0.002	<i>0.849</i>	0.156
PU8	0.526	0.426	0.042	<i>0.832</i>	0.215
SP1	0.347	0.410	−0.032	0.324	<i>0.888</i>
SP3	0.311	0.310	0.095	0.329	<i>0.818</i>
SP4	0.327	0.361	−0.043	0.287	<i>0.892</i>
SP5	0.196	0.103	0.028	0.131	<i>0.757</i>

Source(s): Table by authors

Table A2.
Factor loadings**Corresponding author**Byrne Kaulu can be contacted at: byrne4b@gmail.com

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