

# Understanding the Factors Influencing Adoption of Digital Banking in Emerging Markets: The Role of Perception and Personality Antecedents

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## ABSTRACT

The emergence of digital banking has presented the banking industry with benefits and challenges. Although digital banking services provide customers with increased convenience and accessibility around the clock, many still struggle to grasp their ever-changing nature. To address this, a study was conducted to identify the main factors influencing the adoption of digital banking in South Africa. The study used an e-readiness framework that combined the innovation diffusion theory and trust in technology with the technology readiness index to measure consumers' adoption of digital banking channels. The researcher applied quantitative methodology to answer the research question. The snowball sample required respondents to answer the questionnaire and pass it on to others in the network with bank accounts and mobile phones; 338 responses were accepted. Structural equation modelling was employed to test the proposed hypotheses. This study discovered that the adoption of digital banking services is influenced positively by relative advantage, observability, optimism towards technology, innovativeness and insecurity. Therefore, banks should develop user-friendly platforms with online support to encourage the adoption of digital banking. Future research can use qualitative or mixed method approaches to investigate how customers' perceptions and personalities influence the adoption of digital in emerging markets.

**JEL classification:** G21,M31

**Keywords:** Digital Banking, Customer Behaviour, Innovation, Adoption, Emerging Markets.

## 1. INTRODUCTION

In recent decades, the world has undergone significant changes due to technology. The personal computer, increased processing power, global connectivity, trade migration, and an expanded workforce have forced businesses to re-evaluate their models (Louw & Nieuwenhuizen, 2019). With the rise of the internet and increased adoption, businesses have been presented with new opportunities for digitalisation and developing digital business models (Louw & Nieuwenhuizen, 2020; Sibanda et al., 2020). As a result, banks have transitioned to the Fourth Industrial Revolution (4IR) by integrating digital banking into their operations. The demand for simple and convenient

customer transactions has led to the evolution of digital banking, which involves computerised processes and web-based services (Kiliari & Koesrindartoto, 2019).

Technology has transformed and continues to transform banking (Lee & Chen, 2022). With online deposits, mobile apps, and electronic bill payments, digital banking disrupts traditional banking (Ragnvald, 2001; Omoge et al., 2022). The most change significantly shifts from physical branch bank visits to electronic delivery channels such as withdrawals, deposits and virtual cards at ATMs (Gomber et al., 2018). Numerous studies have explored digital banking adoption in South Africa, with most conceptualising it as a single technology, such as mobile banking (Thusi & Maduku, 2020), internet banking (Aguidissou et al., 2017), cell phone banking (Bankole et al., 2017; Shambare, 2011), and ATMs (Mtwecu, 2019). However, there is a deficiency of research focusing on digital banking channels holistically (Matlala, 2022).

Digital banking has great potential among South Africans, especially millennials, who are expected to be tech-savvy due to their upbringing in the digital age. Financial institutions can tap into this market by offering digital banking services (Awada, 2023). Digital banking plays a crucial role in South Africa by bridging the gap between banks and the informal entrepreneurs (de Jager, Wulandari & Pham, 2023), lower-income or grant recipient population and subsequently provides valuable transfer, saving, and investment options to consumers (de Jager et al., 2023). However, despite financial institutions' efforts to cater to customer preferences, issues and concerns still prevent consumers from fully embracing digital banking services. These include concerns about the safety of personal data and cybersecurity (Hensen & Kötting, 2022). To address these concerns, digital banking platforms should offer user-friendly features, add-on services and online support tools (Melnychenko et al., 2020).

Previous studies attempted to integrate models in exploring the adoption of digital banking, Technology Acceptance Model (TAM) and Technology Readiness Index (TRI) (Musyaffi et al., 2022), Task-Technology Fit (FFT) and Trust in Technology (Lee & Chen, 2022). Innovation diffusion theory (IDT) and TRI (Matlala, 2022) to better understand the factors influencing behavioural intention to adopt the new technology. This study adopted the integration of IDT, TT and TRI theories to answer the research question: *How do customers' perceptions and personalities influence the adoption of digital banking in South Africa?* Therefore, this research aims to close the gap by exploring the predictive power of perceptions (relative advantage, observability and structured assurance) and personality (optimism towards technology, innovativeness, insecurity and discomfort) in promoting digital banking channel adoption in South Africa.

Essentially, this paper is structured as follows: The literature review section on theoretical context and hypotheses introduces the personality and perception antecedents constructs and develops the hypotheses. The methodology section describes the data collection procedures and validation of measurement properties of the constructs. In addition, the results and discussion section presents the empirical investigation's findings. Also, it includes an analysis of the results, limitations of the work, and suggestions for future research. Finally, the conclusion follows the discussion section.

## 2. LITERATURE REVIEW

### 2.1. Digital banking

Digital banking is a broad term that describes the various banking products and services requiring internet connectivity, such as wireless or wired technology (Sardana & Singhanian, 2018). Digital banking is a process that allows a consumer to perform banking functions online. Digital banking provides consumers access to transact banking services via ATMs, cell phones and smart devices (Alkhowaiter, 2020; Kitsios et al., 2020; Kouladoum et al., 2022). Digital banking

technology denotes services ranging from automatic teller machines (ATMs), cell phone banking, Internet banking, and, more recently, mobile banking (Merhi et al., 2020). Digital banking is a modern way of accessing various financial services such as cash withdrawal, funds transfer, cash deposit, bill payments, and other financial queries (Hakimi et al., 2023; Magotra et al., 2019). This innovative service delivery mode is gaining popularity among customers (Shahid et al., 2022).

## 2.2. Theoretical framework

This research delves into the concepts of behavioural intention in the context of digital banking consumers' adoption. The researcher employed three theory-driven models, namely the Innovation Diffusion Model (IDT) by Roger (1995), Trust in Technology (TT) by (McKnight et al., 2011), and the Technology Readiness Index (TRI) by Parasuraman (2000). Perception comprehends two IDT traits – relative advantage and observability; structural assurance was added as (McKnight et al., 2011) believe that structural conditions like guarantees, contracts, support, or other safeguards exist in the general type of technology that make success likely. While personality comprehends four constructs- optimism towards technology, innovativeness, discomfort and insecurity.

## 2.3. Hypotheses formulation

### Perception and behavioural intention

The willingness to use banking technology largely depends on a person's intention to embrace digital banking. The study aims to gain a deeper understanding of the factors that facilitate or impede the adoption of digital banking among consumers in South Africa. Furthermore, the study suggests that individuals at ease with technology are more inclined to embrace specific technologies, as there is a favourable correlation between these independent variables and technology adoption.

#### *Relative advantage and behavioural intention*

The concept of relative advantage (RA) refers to how much better innovation is perceived to be compared to its predecessor (Moore & Benbasat, 1991; Rogers, 2003). Research by Moore & Benbasat (1991) and Brown et al. (2003) found that people are more likely to adopt an innovation when perceiving a more significant relative advantage. This advantage can also increase efficiency, economic benefits, and improved status, as Mombeuil & Uhde (2021) and Shambare (2012) noted.

*H1: A perceived relative advantage of digital banking will positively influence consumers' behavioural intention to adopt digital banking.*

#### *Observability and behavioural intention*

According to Rogers (2003), observation refers to the degree to which innovation outcomes are visible to others. Research has shown that prominently displayed products are more likely to gain attention and be embraced by the general public (Shua et al., 2018; Rahmi et al., 2019).

*H2: A perceived observability of digital banking will positively influence consumers' behavioural intention to adopt digital banking.*

### ***Structural assurance and behavioural intention***

To ensure security, technological and legal structures are put in place to provide structural assurance (Hanif et al., 2022). Financial institutions are responsible for ensuring users feel secure using digital banking platforms. As per trust conveyance (Wingreen et al., 2019), users may place their trust in third parties for transacting on digital banking channels.

*H3: A perceived structural assurance of digital banking will positively influence consumers' behavioural intention to adopt digital banking.*

### **Personality and behavioural intention**

Individuals' fundamental beliefs about themselves are reflected in their personality traits. This study identifies four constructs – optimism towards technology, innovativeness, discomfort, and insecurity – as factors expected to impact behavioral intention.

### ***Optimism towards technology and behavioural intention***

Optimism is a common belief among individuals that positive outcomes are more likely to occur than negative ones (Omotayo & Adekunle, 2021). Optimism is defined as a positive attitude towards technology (Saxena et al., 2022) and subsequent beliefs that it offers consumers greater autonomy, flexibility (Windasari et al., 2022), and efficiency (Lai & Lee, 2020) in their daily activities. According to Patansheti et al. (2016), those who are optimistic about using new technology are more likely to have positive intentions regarding its use.

*H4: A personality optimism towards technology will positively influence consumers' behavioural intention to adopt digital banking.*

### ***Innovativeness and behavioural intention***

Innovativeness is defined as the degree of newness of innovation related to, but not limited to, marketing services, brand building and software development (Decyk, 2023; Ho et al., 2020; Sohaib et al., 2020). Consequently, consumers are more open to new ideas and are more likely to embrace technological advances (Kumar et al., 2022).

*H5: A personality innovativeness of digital banking will positively influence consumers' behavioural intention to adopt digital banking.*

### ***Discomfort and behavioural intention***

According to Parasuraman (2000) and Jarrar, Awobamise, and Sellos (2020), discomfort (DIS) attributes refer to the feeling of being overwhelmed and lacking control over technology. Jarrar et al. (2020) suggest that complex features of tech products can negatively affect user evaluation due to the learning cost. Accordingly, if consumers are uncomfortable with the digital banking channels, their behavioural intention to adopt the technology will be influenced (Nassr et al., 2021).

*H6: A personality discomfort of digital banking will positively influence consumers' behavioural intention to adopt digital banking.*

### ***Insecurity and behavioural intention***

*Insecurity* is mistrust of technology and scepticism regarding its effectiveness (Humbani & Wiese, 2018). Insecure individuals typically need more self-assurance regarding the safety of new technologies. They may believe there are risks associated with using new technologies.

Previous research (Humbani & Wiese, 2018; Nassr et al., 2021) indicates that insecurity negatively influences the behavioural intention to adopt new technology. Nonetheless, when consumers ultimately believe they will gain substantial benefits from utilising new technologies and be willing to assume the associated risks (Kuo et al., 2013).

*H7: A personality insecurity of digital banking will positively influence consumers' behavioural intention to adopt digital banking.*

### 3. METHODOLOGY

The author utilised a quantitative approach to analyse the relationship between independent and dependent variables. A descriptive survey design was employed, which guided our research questions, purpose, and data collection methods. According to Saunders et al. (2019), the population is the entire set of cases from which a sample is selected. The population and target sample used for data collection were South African retail banking consumers above 18 years old with a mobile phone. In line with another study (Fariz, 2022), non-probability sampling was applied as a snowball sampling technique. The survey link was then distributed to colleagues and friends. Another participant also sent it to family and friends across nine provinces of South Africa. These referrals reached digital banking users and non-users since people who know each other trigger the population (Cooper & Schindler, 2018).

After collecting data, 362 questionnaires were received, but 24 were unusable due to not passing the pre-screening process. Therefore, the researcher analysed data from 338 questionnaires. Table 1 exhibits the demographic profile sample of the study. Bentler and Chou (1987) have suggested that a sample size of 250–500 is adequate for SEM analysis as the likelihood of unexpected issues during data analysis is low. The study utilised a Structural Equation Model (SEM) to investigate the relationship between constructs. Tests were performed with SPSS plus AMOS version 28 statistical software to test hypotheses and estimate path models involving latent variables observed through multiple indicators.

**Table 1**  
Demographic profile sample

	Demographic characteristics	Percentage (%)
Gender	Male	45,3
	Female	55,7
Age	< 35	32.2
	36–45	37.3
	55+	30.5
Marital Status	Single	43.5
	Married	51.5
	Separated/Divorced	5.0
Cross Income	< R20 000	33.1
	R20 0001.00 – R40 000	34.0
	> R40 001.00	32.8
Employment	Employed	71.6
	Self Employed	10.1
	Unemployed	18.3



## 4. RESULTS AND DISCUSSION

### Assessment of the suitability of the data.

After testing the model fit using various indicators, it was deemed satisfactory and fell within the recommended acceptable limit (Hair, Black, Babin, & Andersen, 2014). The measurement model revealed the following results Chi-square value ( $\chi^2$ ) = 571.736 ( $p < 0.001$ ,  $df = 271$ ,  $\chi^2/df = 2.110$ , CFI = 0.978, TLI = 0.974, RMSEA = 0.057 and, SRMR = 0.0286, PClose = 0.003, which is above the recommended cut-off (Hu & Bentler, 1999). The point of noting was the value of RMSEA of 0.057, which is higher than the recommended cut-off of  $\leq 0.08$  and SRMR of 0.0238 below the recommended value of 0.06 (Hu & Bentler, 1999). All the values are above the recommended cut-off, as illustrated in Table 2.

**Table 2**

Depict structural model of fit summary

Model Fit Summary			
Model Goodness-Fit Indexes	Recommended cut-off	Result Model	Comment
Chi-square		571,736	Acceptable
Chi-square/DF	$\leq 5.00$	2.110	Acceptable
NFI	$\geq 0.90$	0.960	Acceptable
CFI	$\geq 0.90$	0.978	Acceptable
IFI	$\geq 0.90$	0.979	Acceptable
TLI	$\geq 0.90$	0.974	Acceptable
PNFI	$> 0.60$	0.800	Acceptable
RMSEA	$\leq 0.08$	0.057	Acceptable

Note: N = 338, \*p < 0.05

### Validity and reliability

The seven (7) constructs were tested for reliability and validity (see Table 3). In general, the reliability of the latent construct was tested using Cronbach's alpha ( $\alpha$ ) and composite reliability. Table 3 depicts Cronbach's alpha ( $\alpha$ ) value of all the constructs ranging from 0.966 to 0.994, which exceeds the 0.70 thresholds (Taber, 2018). To assess the convergent validity of the constructs, individual item loading and average variance extracted (AVE) are used (Fornell & Larcker, 1981). All loading factors were significant and exceeded 0.5 thresholds (Shrestha, 2021). In addition, the Average variance extracted (AVE) exceeds the 0.5 threshold, as depicted in Table 4. For Composite Reliability (CR), values range from 0 to 1; However, the values of CR between 0.6 to 0.7 are acceptable (Shrestha, 2021). The result shown in Table 4 meets the requirements reflecting that an internal consistency exists; these results strongly support composite reliability, unidimensionality and convergent validity.

**Table 3**  
Depict construct reliability and convergent validity

Construct	Items	FL > 0.5	$\alpha > 0,7$	CR > 0.7	AVE = $\sum \lambda^2/n$ (> 0.5)
Relative advantage (RA)	RA1: Digital banking offers better capabilities than other conventional banking.	.823	.943	.943	.806
	RA2: Embracing digital banking can significantly improve the efficiency of my banking transactions.	.842			
	RA3: Digital banking saves time when performing banking transactions.	.893			
	RA4: Managing my finances becomes easier with digital banking.	.867			
Observability (OB)	OB1: Other banking customers seemed interested in digital banking when they saw me using it.	.938	.971	.971	.918
	OB2: Digital banking has no queue	.934			
	OB3: As soon as a transaction is made, I can see it immediately.	.910			
Structural Assurance (SLA)	SLA1: I feel safe conducting digital banking transactions because of its cyber security mechanism	.874	.966	.966	.906
	SLA2: I feel safe conducting digital banking transactions because of its data protection policy	.900			
	SLA3: I feel safe conducting digital banking transactions because of its customer privacy policy	.839			
Optimism towards technology (OPT)	OPT1: Technology gives me more freedom of mobility	.909	.994	.994	.983
	OPT2: I prefer utilising the latest and most advanced available technology.	.910			
	OPT3: I find new technologies to be mentally stimulating.	.909			
Innovativeness (INN)	INN1: I can keep up with the latest banking innovations.	.851	.979	.979	.940
	INN2: I have the necessary resources to use digital banking.	.867			
	INN3: I have the necessary knowledge to use digital banking.	.857			
Insecurity (INS)	INS1: I need training or guidance on the use of digital banking functions	.958	.984	.984	.954
	INS2: I have received training or guidance on using digital banking functions.	.969			
	INS3: I understand the security and privacy use of digital banking.	.973			
Discomfort (DIS)	DIS1: Digital banking is complex to use	.943	.0949	.949	.861
	DIS2: Digital banking requires a lot of effort	.929			
	DIS3: Digital banking requires a complex setup process.	.960			
Behavioural Intention (BI)	BI1: I intend to use digital banking continuously in the future.	.898	.983	.983	.934
	BI2: I will always try to use digital banking in my daily life.	.910			
	BI3: I am planning to use digital banking in the future.	.893			
	BI4: I predict I will use digital banking in the future	.895			

Furthermore, the discriminant validity of the constructs was tested (see Table 4). According to Henseler et al. (2015), the relationships between shared variances among constructs and AVE

values are compared. Table 4 depicts that all construct supports the discriminant validity, and the constructs are less than the square roots of AVE values.

**Table 4**

Depict discriminant validity by the Fornel-Lacker criterion

Construct	RA	OB	SLA	OPT	INN	DIS	BI	INS
Relative advantage	.898							
Observability	.390***	.958						
Structural assurance	.435***	.384***	.952					
Optimism towards technology	.317***	.277***	.512***	.991				
Innovativeness	.462***	.307***	.505***	.610***	.969			
Discomfort	−.0050	−.0065*	.144*	.049	.080	.928		
Behavioural intention	.536***	.366***	.414***	.420***	.480***	−.0017	.967	
Insecurity	−.0204**	−.0122*	−.168	−.158**	−.200***	.182**	−.240***	.977

Additionally, the results of the heterotrait-monotrait (HTMT) analyses (see Table 5) showed values ranging from 0.088 to 0.503, which was below the recommended thresholds of 0.90 and 0.85 (van der Vaart, 2021). As such discriminant validity was supported between all constructs reliability, convergent and discriminant validity were acceptable.

**Table 5**

Heterotrait-Monotrait (HTMT) analyses

Construct	RA	OB	SLA	OPT	INN	DIS	BI	INS
Relative advantage								
Observability	.0377							
Structural assurance	0.447	0.379						
Optimism towards technology	.0320	0.274	0.503					
Innovativeness	0.465	0.306	0.501	0.604				
Discomfort	0.0005	0.069	0.151	0.054	0.088			
Behavioural intention	0.531	0.363	0.405	.0414	0.471	0.013		
Insecurity	0.201	0.122	0.171	0.156	0.199	0.176	0.241	

### Assessing of Structural Fit of the Model

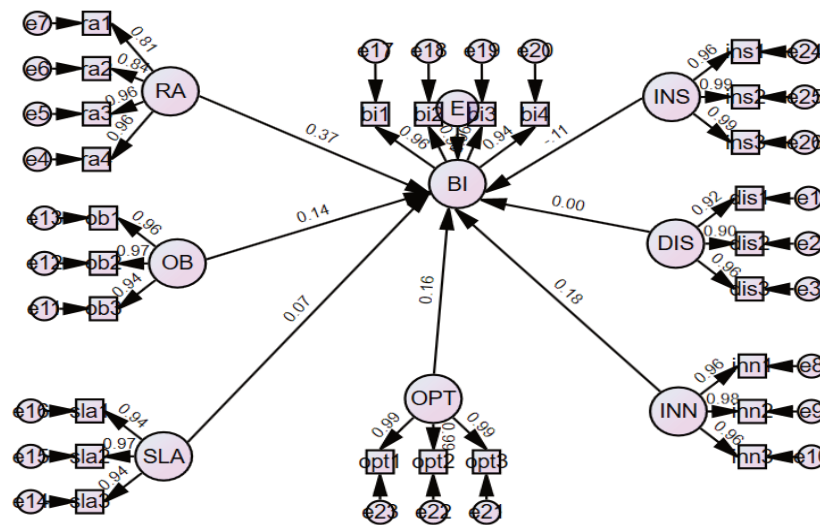
Based on the values of the model fit indices and residual value shown in Table 2, the results of the structural model (as displayed in Figure 1) indicate that our model is an acceptable fit. The main factor to consider when evaluating a structural model is the variance explained by Boomsma (2000).

The model has a coefficient of determination or variance extracted ( $R^2$ ) of 0.41. This means that the selected exogenous variables can account for 41.1% of the changes in the dependent variable (BI).



**Figure 1**

Final structural model developed for the study



The study found that adopting digital banking as a preferred mode over physical banks is positively influenced by relative advantage ( $\beta = ,328$ ;  $t = 6,080$ ;  $p$ -value = 0,0001), observability ( $\beta = 0,117$ ;  $t = 2,366$ ;  $p$ -value = 0,019), optimism towards technology ( $\beta = 0,143$ ;  $t = 2,482$ ;  $p$ -value = 0,013), and innovativeness ( $\beta = 0,158$ ;  $t = 2,593$ ;  $p$ -value = 0,010). However, structural assurance ( $\beta = 0,058$ ;  $t = 1,003$ ;  $p$ -value = 0,316) and discomfort ( $\beta = -0,04$ ;  $t = -0,085$ ;  $p$ -value = 0,931) do not significantly impact this behavioural intention. Additionally, insecurity ( $\beta = -0,94$ ;  $t = -2,064$ ;  $p$ -value = 0,039) hurts the intention to adopt digital banking. These findings are based on standardised estimates, t-statistics, and P-values shown in Table 6.

**Table 6**

Structural path analysis result

Hypothesis	Relationship	Estimate	SE	CR	$p$ -value	Findings
H1	Behavioural intention<--Relative advantage	0.328	.050	6.080	***	Supported
H2	Behavioural intention<--Observability	0.117	0.047	2.346	0.019	Supported
H3	Behavioural intention<--Structural assurance	0.058	0.046	1.003	0.316	Not Supported
H4	Behavioural intention<--Optimism towards technology	0.143	0.050	2.482	0.013	Supported
H5	Behavioural intention<-- Innovativeness	0.158	0.066	2.593	***	Supported
H6	Behavioural intention<--Insecurity	-0.094	0.039	-2.064	0.039	Supported
H7	Behavioural intention<--Discomfort	-0.004	0.026	-0.085	0.932	Not Supported

Notes: \*\*\*  $p$ -value < 0.01; \*\*  $p$ -value < 0.05; \*  $p$ -value < 0.10

## 5. DISCUSSION

The study reveals that consumers exhibiting insecure behaviours are less likely to use digital banking. The research indicates that when digital banking and online transactions compromise their safety, consumers perceive a higher risk, increasing discomfort. As per the study's findings, insecurity can negatively impact the adoption of innovative technologies, consistent with previous research (Adiyarta et al., 2018; Sarkar et al., 2020).

According to a recent study, more innovative people tend to have a greater interest in using digital banking services. This finding aligns with previous research on adopting innovative technologies (Wiese & Humbani, 2020; Simarmata & Hia, 2020). Among the factors considered in the study, innovativeness was the most vital driver of digital banking adoption. This suggests that a person's level of innovativeness significantly impacts their willingness to use digital banking. Essentially, more innovative people feel more comfortable using self-service technologies without apprehension. Similarly, optimism towards technology significantly influences one's intention to use digital banking. This is consistent with previous research conducted by Shim et al. (2020), and Chan & Petrikat (2022) claim that optimistic individuals perceive digital banking as a positive solution to banking challenges. In addition, it affects their intention to use or continue use.

Bank consumers generally have a positive outlook toward new technology, seeing it as a convenient (Martínez-Navalón et al., 2023), flexible (Windasari et al., 2022), and efficient (Lai & Lee, 2020) way to access banking products and services anywhere, anytime (OECD, 2020). South African banks must understand the importance of adopting digital banking technology for various reasons. Relative advantage has higher predicted power as compared to other variables. The findings of this study align with those of previous research conducted by (AbuAkel & Brahim, 2023). Both studies demonstrate that having a relative advantage influences the consumer's intention to use digital banking and impacts their tendency to utilise digital banking channels. Additionally, digital banking assists consumers in managing their finances by enabling them to regulate the inflow and outflow of funds effectively and efficiently (Magotra et al., 2019 & Hakimi et al., 2023).

Furthermore, Studies show that observability plays a significant role in determining whether people are likely to adopt digital banking. This result aligned with previous researchers (Anh, 2023; Bakr et al., 2017). Observability refers to the ability to see the benefits of digital banking, such as accessing transactions quickly and easily from anywhere (Magotra et al., 2019). Consumers find digital banking a convenient and effective way to manage their finances, as it is available around the clock (24/7). Additionally, consumers are more likely to adopt digital banking when they see their friends, family, and peers using it safely and securely without worrying about bank closure time.

## 6. CONCLUSION AND CONTRIBUTION

The World Bank research indicates that digital banking is becoming increasingly popular in emerging countries (Jeník et al., 2020). For this reason, this study investigates how customers' perceptions and personalities influence the adoption of digital banking in South Africa. The results suggest that relative advantage, observability, structural assurance, optimism towards technology towards technology, innovativeness, discomfort, and insecurity can elucidate 41.1% of the variation in customer behavioural intention to use digital banking services. By understanding the personality traits influencing digital banking services adoption, banks can take appropriate measures to enhance its acceptance and ensure widespread adoption. Additionally, digital banking providers should consider facilitating the development of strategies to promote self-service technology and encourage non-users to embrace digital services.

This study applied a quantitative methodology. Future research can employ other methodologies, e.g., qualitative or mixed-method approaches, to illustrate the consumer behavioural intention to adopt digital banking. The participant's responses were through a snowball sample from the South African population. Therefore, it would be imprudent to generalise the findings to the entire emerging countries. Future research should focus on other emerging African countries to highlight the dissimilarities and similarities in how customers' perceptions and personalities influence the adoption of digital banking. The researcher acknowledges the limitations of the

study. The researcher selectively employed specific antecedents (IDT, TT, and TRI) to predict customer behaviour pertaining to the adoption or continued usage of digital banking services. Therefore, while the study provides valuable insights, its results should be interpreted cautiously and not broadly generalised.

## References

- AbuAkel, S.A., & Ibrahim, M. (2023). The Effect of Relative Advantage, Top Management Support and IT Infrastructure on E-Filing Adoption. *Journal of Risk and Financial Management*, 16(6), 295.  
<https://doi.org/10.3390/jrfm16060295>
- Adiyarta, K., Napitupulu, D., Rahim, R., Abdullah, D., & Setiawan, M.I. (2018). Analysis of e-learning implementation readiness based on integrated our model. In *Journal of Physics: Conference Series*, vol. 1007, p. 012041. IOP Publishing.  
<https://doi.org/10.1088/1742-6596/1007/1/012041>
- Aguidissou, O.C., Shambare, R., & Rugimbana, R. (2017). Internet banking adoption in South Africa: The mediating role of consumer readiness. *Journal of Economics and Behavioral Studies*, 9(5), 6–17.  
[https://doi.org/10.22610/jeb.v9i5\(J\).1905](https://doi.org/10.22610/jeb.v9i5(J).1905)
- Alkhowaiter, W.A. (2020). Digital payment and banking adoption research in Gulf countries: A systematic literature review. *International Journal of Information Management*, 53(1), 102102.  
<https://doi.org/10.1016/j.ijinfomgt.2020.102102>
- Al-Rahmi, W.M., Yahaya, N., Aldraiweesh, A.A., Alamri, M.M., Aljarboa, N.A., Alturki, U., & Aljeraiwi, A.A. (2019). Integrating technology acceptance model with innovation diffusion theory: An empirical investigation on students' intention to use E-learning systems. *Ieee Access*, 7, pp. 26797–26809.  
<https://doi.org/10.1109/ACCESS.2019.2899368>
- Anh, V.T. (2023). Mobile banking adoption in Vietnam: an empirical study. *Economics, Finance and Management Review*, (1), 60–67.  
<https://doi.org/10.36690/2674-5208-2023-1-60>
- Awada, A. (2023, June 6). *How banks can tap into an \$860 billion Metaverse market*. EY.  
[https://www.ey.com/en\\_gl/financial-services-emeia/the-metaverse-revolution-how-banks-can-tap-into-a-860-billion-dollar-market](https://www.ey.com/en_gl/financial-services-emeia/the-metaverse-revolution-how-banks-can-tap-into-a-860-billion-dollar-market)
- Bakr, A., Salahuddin, E., Chowdhury, I.A., Mahtab, H., & Khabir, L. (2017). Factors influencing the mobile banking adoption in the banking sector of Bangladesh. *Australasian Journal of Business, Social Science and Information Technology*, 3(3), 142–154.
- Bankole, F.O., Bankole, O.O., & Brown, I. (2017). Influences on cell phone banking adoption in South Africa: An updated perspective. *Journal of Internet Banking and Commerce*, 22(3), 1–16.
- Bentler, P.M., and Chih-Ping Chou. (1987). Practical Issues in Structural Modeling. *Sociological Methods & Research* 16: pp. 78–117.  
<https://doi.org/10.1177/0049124187016001004>
- Boomsma, A. (2000). Reporting analyses of covariance structures. *Structural equation modeling*, 7(3), 461–483.  
[https://doi.org/10.1207/S15328007SEM0703\\_6](https://doi.org/10.1207/S15328007SEM0703_6)
- Brown, I., Cajee, Z., Davies, D., & Stroebel, S. (2003). Cell phone banking: predictors of adoption in South Africa – an exploratory study. *International Journal of Information Management*, 23(2003), 381–394.  
[https://doi.org/10.1016/S0268-4012\(03\)00065-3](https://doi.org/10.1016/S0268-4012(03)00065-3)
- Chan, C.Y.T., & Petrikat, D. (2022). Self-Service Technology: Benefits and Challenges. *Journal of Computer Science and Technology Studies*, 4(2), pp. 118–127.  
<https://doi.org/10.32996/jcsts.2022.4.2.14>
- Cooper, D.R., & Schindler, P.S. (2018). *Business research methods (13th ed.)*. McGraw-Hill/ Irwin.
- Decyk, K. (2023). Innovative Activity of the Service Sector of the EU Member States. *Journal of the Knowledge Economy*, 1–26.  
<https://doi.org/10.1007/s13132-023-01143-w>
- De Jager, J.W., Wulandari, N., & Pham, Q.T. (2023). Digital Channel Distribution in Banking Services: A Customer Perspective from Three Developing Countries. Presented at: *SIBR-Thammasat: Conference on Interdisciplinary Business and Economics Research*, Bangkok, 1–20.
- Fariz, F. (2022). Strategies to increase user satisfaction in online shopping applications. *Journal of Applied Management (JAM)*, 20(2), 438–444.  
<https://doi.org/10.21776/ub.jam.2022.020.02.19>

- Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* 18 (1), 39–50.  
<https://doi.org/10.1177/002224378101800104>
- Ghani, E.K., Ali, M.M., Musa, M.N.R., & Omonov, A.A. (2022). The Effect of Perceived Usefulness, Reliability, and COVID-19 Pandemic on Digital Banking Effectiveness: Analysis Using Technology Acceptance Model. *Sustainability*, 14(18), 11248.  
<https://doi.org/10.3390/su141811248>
- Gomber, P., Kauffman, R.J., Parker, C., & Weber, B.W. (2018). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. *Journal of Management Information Systems*, 35, 220–265.  
<https://doi.org/10.1080/07421222.2018.1440766>
- Hanif, M.S., Yunfei, S., Hanif, M.I., & Afzal, F. (2022). Mobile shopping continuance intentions of expats in China: influence of structural assurance and the stay duration. *International Journal of Mobile Communications*, 20(5), 541–567.  
<https://doi.org/10.1504/IJMC.2022.125421>
- Hair, J.F., Black, W.C., Babin, B.J., & Andersen, R.E. (2014). *Multivariate data analysis*, Pearson, Essex.
- Hakimi, T.I., Jaafar, J.A., and Aziz, N.A.A. (2023). What factors influence the usage of mobile banking among digital natives? *Journal of Financial Services Marketing*, 1–16.  
<https://doi.org/10.1057/s41264-023-00212-0>
- Henseler, J., Ringle, C.M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science* 43, 115–135.  
<https://doi.org/10.1007/s11747-014-0403-8>
- Hensen, J., & Kötting, B. (2022). From open banking to embedded finance: The essential factors for a successful digital transformation. *Journal of Digital Banking*, 6(4), 308–318.
- Ho, J.C., Wu, C.G., Lee, C.S., & Pham, T.T.T. (2020). Factors affecting the behavioural intention to adopt mobile banking: An international comparison. *Technology in Society*, 63, p.101360.  
<https://doi.org/10.1016/j.techsoc.2020.101360>
- Hu, L.T., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, 6(1), 1–55.
- Humbani, M., & Wiese, M. (2018). A cashless society for all: Determining consumers' readiness to adopt mobile payment services. *Journal of African Business*, 19(3), 409–429.  
<https://doi.org/10.1080/15228916.2017.1396792>
- Jarrar, Y., Awobamise, A., & Sellos, P. (2020). Technological Readiness Index (TRI) and the intention to use smartphone apps for tourism: A focus on in Dubai mobile tourism app. *International Journal of Data and Network Science*, 4(3), 297–304.  
<https://doi.org/10.5267/j.ijdns.2020.6.003>
- Jeník, I., Flaming, M., & Salman, A. (2020). Inclusive digital banking: Emerging markets case studies. *Consultative Group to Assist the Poor Working Paper*. Washington, DC.
- Jin, C.H. (2016). The effects of mental simulations, innovativeness on intention to adopt brand application. *Computers in Human Behavior*, 54, 682–690.  
<https://doi.org/10.1016/j.chb.2015.08.013>
- Kitsios, F., Giatsidis, I., & Kamariotou, M. (2021). Digital transformation and strategy in the banking sector: Evaluating the acceptance rate of e-services. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(3), 204.  
<https://doi.org/10.3390/joitmc7030204>
- Kiliari, G., & Koesrindartoto, D.P. (2019). Proceeding Book of the 4th ICMEM 2019 and the 11th IICIES.
- Kumar, A., Dhingra, S., Batra, V., and Purohit, H. (2020). A framework of mobile banking adoption in India. *Journal of Open Innovation: Technology, Market, and Complexity*, 6(2), 40.  
<https://doi.org/10.3390/joitmc6020040>
- Kuo, K.M., Liu, C.F., & Ma, C.C., (2013). An investigation of the effect of nurses' technology readiness on the acceptance of mobile electronic medical record systems. *BMC medical informatics and decision making*, 13, 1–14.  
<https://doi.org/10.1186/1472-6947-13-88>
- Kouladoum, J.C., Wirajing, M.A.K., & Nchofoung, T.N. (2022). Digital technologies and financial inclusion in Sub-Saharan Africa. *Telecommunications Policy*, 102387.  
<https://doi.org/10.1016/j.telpol.2022.102387>
- Lai, Y.L., & Lee, J. (2020). Integration of Technology Readiness Index (TRI) Into the Technology Acceptance Model (TAM) for Explaining Behavior in Adoption of BIM. *Asian Education Studies*, 5(2), 10.  
<https://doi.org/10.20849/aes.v5i2.816>



- Lee, J.C., & Chen, X. (2022). Exploring users' & adoption intentions in the evolution of artificial. Intelligence mobile banking applications: the intelligent and anthropomorphic perspectives. *International Journal of Bank Marketing*, 40(4), 631–658.
- Louw, C., & Nieuwenhuizen, C. (2019). Online, community-driven E-commerce platforms and the rise of lifestyle commerce: A conceptual study. In *Seventh annual winter global business conference*, 12(4), 1–8.
- Louw, C., & Nieuwenhuizen, C. (2020). Digitalisation strategies in a South African banking context: A consumer services analysis. *South African Journal of Information Management*, 22(1), 1–8.  
<https://doi.org/10.4102/sajim.v22i1.1153>
- Magotra, I., Sharma, J., & Sharma, S.K. (2019). Adoption of self-service technologies among banking customers: a revisit. *International Journal of Applied Management and Technology*, 18(1), 67–72.  
<https://doi.org/10.5590/IJAMT.2019.18.1.05>
- Martínez-Navalón, J.G., Fernández-Fernández, M., & Alberto, F.P. (2023). Does privacy and ease of use influence user trust in digital banking applications in Spain and Portugal? *International Entrepreneurship and Management Journal*, 19(2), 781–803.  
<https://doi.org/10.1007/s11365-023-00839-4>
- Matlala, N.P. (2022, June 28). *Digital readiness and the adoption of self-service banking technologies in South Africa*. University of the Western Cape.  
<https://etd.uwc.ac.za/handle/11394/9842>
- McKnight, D.H., Carter, M., Thatcher, J.B., & Clay, P.F. (2011). Trust in a specific technology: an investigation of its components and measures. *Transactions on Management Information Systems*, Vol. 2, No. 2, pp. 1–15.  
<https://doi.org/10.1145/1985347.1985353>
- Melnychenko, S., Volosovych, S., & Baraniuk, Y. (2020). Dominant ideas of financial technologies in digital banking. *Baltic Journal of Economic Studies*, 6(1), 92–99.  
<https://doi.org/10.30525/2256-0742/2020-6-1-92-99>
- Merhi, M., Hone, K., Tarhini, A., & Ameen, N. (2020). An empirical examination of the moderating role of age and gender in consumer mobile banking use: a cross-national, quantitative study. *Journal of Enterprise Information Management*.  
<https://doi.org/10.1108/JEIM-03-2020-0092>
- Moore, G.C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research*, 2(3), 192–222.  
<https://doi.org/10.1287/isre.2.3.192>
- Mtwecu, K. (2019, June 30). *Consumer Adoption of ATM Banking* (master's Dissertation). University of Johannesburg.  
<https://hdl.handle.net/10210/452103>
- Mombeuil, C., & Uhde, H. (2021). Relative convenience, relative advantage, perceived security, perceived privacy, and continuous use intention of China's WeChat Pay: A mixed-method two-phase design study. *Journal of Retailing and Consumer Services*, 59, 102384.  
<https://doi.org/10.1016/j.jretconser.2020.102384>
- Musyaffi, A.M., Sari, D.A.P., Amal, M.I., Deswanto, V., Nuryati, T., & Rismawati. (2021). Attitude Toward of Public Hospital Information System: The Role of Technology Readiness. *Quality – Access to Success*, 22(185), 136–141.  
<https://doi.org/10.47750/QAS/22.185.18>
- Nassr, R.M., Aldossary, A.A., & Nasir, H. (2021). Students' Intention to Use Emotion-Aware Virtual Learning Environment: Does a Lecturer's Interaction Make a Difference? *Malaysian Journal of Learning and Instruction*, 18(1), 183–218.  
<https://doi.org/10.32890/mjli2021.18.1.8>
- Omoge, A.P., Gala, P., & Horkey, A. (2022). Disruptive technology and AI in the banking industry of an emerging market. *International Journal of Bank Marketing*, 40(6), 1217–1247.  
<https://doi.org/10.1108/IJBM-09-2021-0403>
- Omotayo, F.O., & Adekunle, O.A. (2021). Adoption and use of electronic voting system as an option towards credible elections in Nigeria. *International Journal of Development Issues*, 20(1), 38–61.  
<https://doi.org/10.1108/IJDI-03-2020-0035>
- OECD. (2021, June 30). *Artificial Intelligence, Machine Learning and Big Data in Finance: Opportunities, Challenges, and Implications for Policy Makers*. OECD.  
<https://www.oecd.org/finance/artificial-intelligence-machine-learning-big-data-in-finance.htm>
- Parasuraman, A. (2000). Technology Readiness Index (TRI) is a multiple-item scale to measure readiness to embrace new technologies. *Journal of service research*, 2(4), 307–320.  
<https://doi.org/10.1177/109467050024001>
- Ragnvald, S. (2001). Self-Service Banking: Value Creation Models and Information Exchange. *Informing Science: The International Journal of an Emerging Trans discipline*, 4(4), 139–148.  
<https://doi.org/10.28945/568>



- Rogers, E.M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.
- Sardana, V., & Singhania, S. (2018). Digital technology in the realm of banking: A review of the literature. *International Journal of Research in Finance and Management*, 1(2), 28–32. <https://doi.org/10.33545/26175754.2018.v1.i2a.12>
- Sarkar, S., Chauhan, S., & Khare, A. (2020). A meta-analysis of antecedents and consequences of trust in mobile commerce. *International Journal of Information Management*, 50, 286–301. <https://doi.org/10.1016/j.ijinfomgt.2019.08.008>
- Saunders, M.N.K., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students*. 8th Edition, Pearson, New York.
- Saxena, N., Gera, N., & Taneja, M. (2022). An empirical study on facilitators and inhibitors of adoption of mobile banking in India. *Electronic Commerce Research*, 1–32. <https://doi.org/10.1007/s10660-022-09556-6>
- Shahid, S., Jamid, U.I., Islam, J., Malik S., & Hasan U. (2022). Examining consumer experience in using m-banking apps: A study of its antecedents and outcomes. *Journal of Retailing and Consumer Services*, 65(102870). <https://doi.org/10.1016/j.jretconser.2021.102870>
- Shambare, R. (2012). *Predicting consumer preference for Remote Banking Services in South Africa and Zimbabwe: The role of consumer perspectives versus personality variables (D.Tech Thesis)*. Tshwane University of Technology. SA.
- Shambare, R. (2011) Cell phone banking adoption in South Africa. *Business and economic research*, 1(1). <https://doi.org/10.5296/ber.v1i1.1144>
- Shi, X., Liu, J., & Sirkeci, I. (2016). *Psychological Determinants of Brand Loyalty: The case of Apple and Samsung*. 1–19.
- Shrestha, N. (2021). Factor Analysis as a Tool for Survey Analysis. *American Journal of Applied Mathematics and Statistics*, 9(1), 4–11. <https://doi.org/10.12691/ajams-9-1-2>
- Shim, H.S., Han, S.L., & Ha, J. (2020). The effects of consumer readiness on the adoption of self-service technology: Moderating effects of consumer traits and situational factors. *Sustainability*, 13(1), 95. <https://doi.org/10.3390/su13010095>
- Shua, T.M., Siangb, P.Y., & Chuanc, T.C. (2018). Confirmatory Factor Analysis on Factors Influencing M-commerce Adoption among Generation Y in East Malaysia. *Proceedings of the International Social Science Conference Challenge on Law and Business*, Melaka, Malaysia.
- Sibanda, W., Ndiweni, E., Boulkeroua, M., Echchabi, A., and Ndlovu, T. (2020). Digital technology disruption on bank business models. *International Journal of Business Performance Management*, 21(1–2), 184–213. <https://doi.org/10.1504/IJBPM.2020.106121>
- Simarmata, M.T., and Hia, I.J. (2020). The role of personal innovativeness on behavioral intention of Information Technology. *Journal of Economics and Business*, 1(2), 18–29. <https://doi.org/10.36655/jeb.v1i2.169>
- Sohaib, O., Hussain, W., Asif, M., Ahmad, M., & Mazzara, M. (2019). A PLS-SEM neural network approach for understanding cryptocurrency adoption. *Ieee Access*, 8, 13138–13150. <https://doi.org/10.1109/ACCESS.2019.2960083>
- Taber, K.S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in science education*, 48(1), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Thusi, P., & Maduku, D.K. (2020). South African millennials' acceptance and use of retail mobile banking apps: An integrated perspective. *Computers in Human Behavior*, 111, p. 106405. <https://doi.org/10.1016/j.chb.2020.106405>
- van der Vaart, L. (2021). The performance measurement conundrum: Construct validity of the individual work performance questionnaire in South Africa. *South African Journal of Economic and Management Sciences*, 24(1), 3581. <https://doi.org/10.4102/sajems.v24i1.3581>
- Wiese, M., & Humbani, M. (2020). Exploring technology readiness for mobile payment app users. *The International Review of Retail, Distribution and Consumer Research*, 30(2), 23–142. <https://doi.org/10.1080/09593969.2019.1626260>
- Windasari, N.A., Kusumawati, N., Larasati, N., & Amelia, R.P. (2022). Digital-only banking experience: Insights from gen Y and gen Z. *Journal of Innovation & Knowledge*, 7(2), p. 100170. <https://doi.org/10.1016/j.jik.2022.100170>
- Wingreen, S.C., Mazey, N.C., Baglione, S.L., & Storholm, G.R. (2019). Transfer of electronic commerce trust between physical and virtual environments: experimental effects of structural assurance and situational normality. *Electronic Commerce Research*, 19, 339–371. <https://doi.org/10.1007/s10660-018-9305-z>