Digital Payment Systems in Retail Sector: Empirical Exploration of Determining Factors of Actual Use

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ABSTRACT

With the advancement in financial technologies, many digital payment systems have been developed and integrated into e-commerce activities. Their effective adoption by the intended users is the concept of interest to stakeholders. The purpose of this study was to empirically investigate the determining factors of actual use of digital payment systems in the retail sector. This study used primary data collected from digital payment system users in South Africa. A sample size of 417 respondents was used. Guided by the developed hypothesis, structural equation modelling was used in the analysis. The findings indicated that digital payment system use was significantly and positively affected by perceived trust and security, convenience, effort expectancy, and perceived benefits. Social influence was found to have an insignificant effect. Additionally, perceived trust and security significantly mediated the effect of social influence and effort expectancy on actual use of digital payment systems in the retail sector. Perceived benefit mediated the effect of social influence, convenience, and effort expectancy on actual use of digital payment systems in the retail sector. The study highlighted important managerial implications for stakeholders in the retail sector. These include enhancing trust and security of the digital payment systems, marketing the benefits of the payment gateways, and continuous improvement of their technical procedures.

Keywords: Digital payment systems, Retail sector, Financial technologies, Money transfer, Electronic payment systems

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Introduction

Advanced technological innovation in information and financial sector has led to the increased development of e-commerce activities. Among the notable innovations in e-commerce activities include the development and adoption of digital payment systems.[1] Digital payments involve electronic payment systems that facilitate financial transactions between two or more parties. The use of digital payments has increased over the last few decades fuelled by innovations in e-commerce activities, including the rise of the Internet and electronic money transaction systems.[2] For instance, early electronic money transfer systems can be traced to the use of "wire transfer" through electronic funds transfer by Western Union. Over the years, electronic payments evolved to include the facilitation of financial transactions through online electronic payments, including bank transfers, eChecks, and Buy Now, Pay Later solutions, among other electronic payment systems.[3] During the COVID-19 pandemic, digital transactions were accelerated, with competition providing a range of services including payment systems and value-added services. Mobile payment apps such as Cash App and Zelle also played a critical role in the emergence of digital payment systems. Electronic payment systems are linked to digital payment services through digital payment technologies, including machine learning technologies and artificial intelligence (AI).[4] Other technologies used in digital payments include open banking Application Programming Interfaces (APIs) that allow banks to share data with third-party applications, as well as biometric verification, used to verify transactions.

The adoption of digital payment systems in business has been significantly accelerated by the innovation of new technologies in e-commerce activities as well as the benefits accrued from the payment systems.[5] For instance, many business organizations have adopted digital payment systems due to the ease of convenient financial transactions. The key participants in digital payments include the businesses, consumers, and the banks involved. The digital payment systems thus serve as payment gateways responsible for the verification of customer creditworthiness and processing of payment requests. Digital technologies such as near-field communication allow communication between two devices in proximity to facilitate financial transactions. The adoption of digital payment systems in business is also accelerated by the ease of their integration with other business operations, leading to improved business efficiency.[6] For instance, digital payment systems in business can be integrated with other business operation software such as inventory management, which helps streamline business operations and reduce chances of errors. Indeed, machine learning and AI technologies in business play a critical role in allowing businesses to monitor transaction activities within the business and help alleviate potentially fraudulent activities that may lead to losses. Similarly, policies that discouraged the use of cash, especially during the COVID-19 pandemic, played a critical role in the adoption of digital payment systems in businesses globally.

The use of digital payments is widespread globally, with rapid growth in developing nations. For instance, according to Huang,[7] the digital payment industry in Africa generated over $24 billion in revenues in 2020. However, the use of digital payments in Africa's developing countries presents huge growth potential since the revenues represent only 5–7% of all the digital payments made in the continent.[8] Some of the commonly used digital payment systems in Africa's developing nations include mobile money payments,

including M-Pesa, used in Kenya and other East African countries, and MTN mobile money, used in various countries in West Africa. With the rapid growth in the development and use of digital payment systems, in Africa's developing nations, the e-payment systems present various benefits to businesses.[9] For instance, digital payments provide faster payments vital in efficient business operations. Financial transactions through mobile money transfers help reduce waiting time and ensure smooth transactions.[10] The use of digital payment systems also helps businesses in developing nations to reduce transaction costs brought about by the requirement for physical infrastructure, manual handling of transactions, and paperwork.

However, various challenges exist with the adoption of digital payments in developing nations. For instance, many developing countries experience regulatory complexity challenges since every country has their own rules on digital transactions. Similarly, developing nations are faced with the challenges of interoperability, where the transfer of money from one digital system to another becomes problematic. Additionally, the adoption of digital payment systems in Africa has not been well studied. Considering this gap in the literature, the huge potential of digital payment systems, and the inherent challenges, this study is set to explore this area. The objective of this study is to empirically explore the determining factors of digital payment systems, under a case study of Africa, represented by South Africa. This study gives insights into what factors are critical with regard to digital payment system adoption.

Literature Review

Digital Payment Systems in Retail Sector

The convenience of digital payments in business transactions provides various benefits to both business providers and buyers in the retail sector. Various studies on the use of digital payments highlight various benefits to the retail sector. For instance, the study by Mishra et al.[11] articulates that the adoption of digital payment systems in the unorganized retail sector across emerging markets plays a critical role in improving performance. Digital payments ensure fast transactions, leading to the speeding up of checkout processes and real-time cash flows. Inferring from Sivathanu,[12] the adoption of digital payment systems results in a positive impact on retail management. The integration of digital payments with retail management leads to enhanced efficiency and transparency in retail business activities. According to Jenita et al.,[13] the advancement of digital payment systems in the retail sector among developing countries is a way of promoting financial literacy. Indeed, there is a positive relationship between digital payments and e-commerce development as retailers can advance in financial inclusion through increased financial literacy. Business owners can increase their control over their income, leading to increased business productivity. Similarly, Omarini[14] observes that the integration of digital payments into the retail sector results in increased aggregate domestic trade due to increased financial access even in remote cities. Increased financial inclusion contributes to increased retail profitability through increased financial transactions with suppliers, consumers, and the government.

However, various challenges exist in the adoption of digital payments in the retail sector. Trautman[15] highlights the various challenges faced by retail businesses in adopting digital payments. For instance, issues of lack of trust in the regulatory authorities of digital payments by consumers are one of the challenges affecting the increased adoption of digital payments in developing nations. Similarly, Lashitew *et al*.[16] articulate that many developing countries lack a strong financial infrastructure that is vital in supporting digital payment systems. For instance, the lack of strong and stable Internet and access to mobile phones hinders the support of digital payment systems.

Empirical Literature

Various previous empirical research studies highlight the various factors that influence the use of digital payment systems in the retail sector. Based on the unified theory of acceptance and use of technology (UTAUT),[17] the use of digital payments in the retail sector is impacted by factors, including perceived ease of use, complexity of the technology, and benefits and effort expectancy, among other factors. These are explored in the following subsections.

Technical and Transactional Procedures

Technical and transactional procedures in digital payment systems involve the ease of transactional speed in digital payment usage. The study by Shafie *et al*.[18] aimed to determine the influence of transactional procedures in the adoption of digital payments in the retail sector. Transactional speed and accessibility of digital payments are crucial in promoting the increased use of digital payments.[19] The findings indicated that the transactional speed of digital payments characterized by quick processing times plays a critical role in digital payment adoption. This analysis led to the development of the following hypothesis:

H1: *The factor technical and transactional procedures has a significant positive influence on actual use of digital payment systems in the retail sector.*

Perceived Trust and Security

Singh and Sinha[20] analyzed the aspect of perceived trust and security as a factor in the use and adoption of digital payment systems in the retail sector. The study aimed at examining the factors that influence the business and consumer adoption of e-payment systems in the retail sector. The empirical findings in the research indicated that consumers are more likely to adopt technology that they consider secure and they can trust. According to Kim,[21] technology can enhance consumer trust by reducing the possibility of risks and ensuring increased digital safety. Thus, the positive consumer's intention to use digital payment systems is likely to

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be influenced by the positive perception of perceived security as well as increased trust in the technologies. From this analysis, the following hypothesis was developed:

H2: *The factor perceived trust and security has a significant positive influence on actual use of digital payment systems in the retail sector.*

H7a-d: *The factor perceived trust and security mediates the effect of (1) technical and transactional procedures, (2) social influence, (3) convenience, and (4) effort expectancy on actual use of digital payment systems in the retail sector.*

Social Influence

Social influence as a factor influencing technology adoption is characterized by peer recommendations and societal norms towards acceptance of new technology.[22] Chummar *et al*.[23] aimed to determine the influence of societal norms and peer recommendations on the use and adoption of digital payment systems in the retail sector. The outcomes of the study indicated a positive relationship between social influence and the adoption and use of digital payment methods in the retail sector. The analysis led to the development of the following hypothesis:

H3: *Social influence has a significant positive influence on actual use of digital payment systems in the retail sector.*

Convenience

Convenience as a factor in the adoption of new technology involves the ability of the technology to provide immense support in the attainment of expected goals. The study by Chaveesuk *et al*.[24] aimed to determine the influence of convenience as a factor in the adoption of digital technologies in the retail sector. The findings indicated that retailers were likely to use digital payment systems that offered fast and easy-to-use experiences as well as being less costly to businesses. Roselyn and Suharto[25] affirmed that the adoption of digital payments is influenced by their ability to conveniently ensure streamlined financial processes and instant financial transactions even in remote areas. This analysis led to the development of the following hypothesis:

H4: *Convenience has a significant positive influence on actual use of digital payment systems in the retail sector.*

Perceived Benefits

The study by Seethamraju and Diatha[26] aimed to determine the influence of perceived benefits as factors in the adoption of digital payment systems in the retail sector. Perceived benefits in the adoption of innovations involve the perception of the users on how the technologies can improve the performance of their activities.[27] The findings indicated that users in the retail sector were likely to develop positive perceived benefits where the technology had positive effects in increasing the profitability of their businesses. For instance, in developing countries especially in Africa, where the use of digital payment systems including mobile payments is prevalent, positive perceived benefits could be associated with the expected increase in business performance, leading to increased business profitability. This analysis led to the development of the following hypothesis:

H5: *The factor perceived benefits has a significant positive influence on actual use of digital payment systems in the retail sector.*

H8a-d: *The factor perceived benefits mediates the effect of (1) technical and transactional procedures, (2) social influence, (3) convenience, and (4) effort expectancy on actual use of digital payment systems in the retail sector.*

Effort Expectancy

Alhumoudi[28] aimed to determine the influence of effort expectancy in the adoption of digital payments in the retail sector. The aspect of effort expectancy involves the perceived ease of use of a new technology. According to Dong,[29] when a new technology is considered as easy to use and operate, then the consumers are likely to adopt the new technology. The study findings indicated that there is a positive relationship between the perceived effort expectancy and the adoption of digital payment technologies in the retail sector. For instance, the ease of use of mobile payment methods in developing countries plays a positive role in the increased use of mobile payments in the retail sector. This analysis led to the development of the following hypothesis:

H6: *Effort expectancy has a significant positive influence on actual use of digital payment systems in the retail sector.*

Conceptual Framework

Following the evaluation of the literature, a conceptual framework was developed (Figure 1). The framework comprised four independent variables: technical and transactional procedures, social influence, convenience, and effort expectancy. The model had two mediating variables, namely perceived trust and security and perceived benefits, which also functioned as independent variables. The dependent variable of the study was the actual use of digital payment systems (DPS).

Methodology

This section discusses the methods and techniques adopted in this study, which include the research design adopted, the population and sample, the data collection techniques and instruments, as well as the data analysis techniques.

This study began with the evaluation of the literature to identify the prevailing research gap regarding the adoption of digital payment systems. The gap identification was followed by the development of the

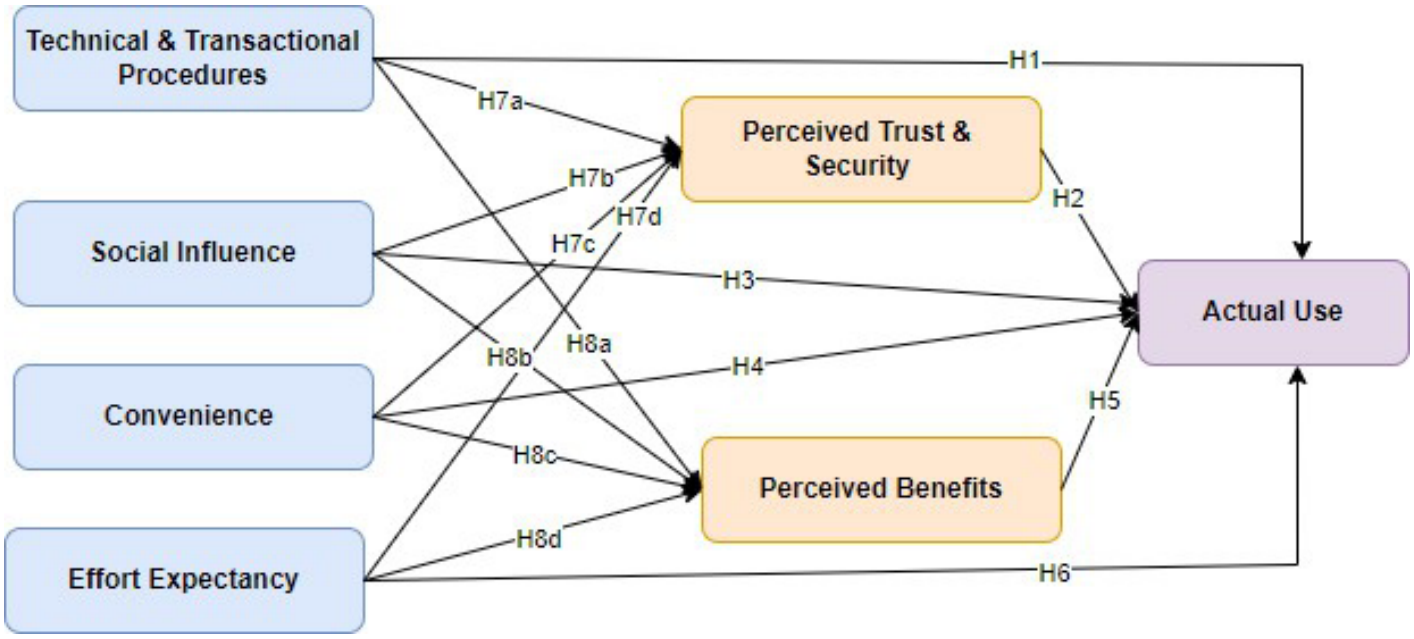

Fig 1 | Conceptual framework

research constructs – both observed and latent variables. The critical review of the literature regarding these constructs led to the study hypothesis and development of the conceptual framework.

The research adopted the quantitative design, where primary data were collected and analysed using statistical techniques. The data were collected from entrepreneurs working in the retail sector in South Africa, who have the experience of using digital payment systems. Examples of digital payments considered for the study include mobile wallets, online payment gateways such as PayPal, peer-to-peer payment apps such as cash apps, and bank transfer apps.

Therefore, the population of the study comprised retail entrepreneurs in South Africa. A target sample of 450 respondents was considered suitable to represent the large population. A convenience sampling technique was adopted to include respondents who met the highlighted inclusion criteria. A total of 439 responses were collected, and upon data cleaning, a sample of 417 was left to be used for the study analysis. The data were collected between June 2024 and July 2024.

The research instrument adopted was a structured questionnaire. The questionnaire was developed to comprise closed-ended questions. The first section captured the demographic data of the respondents. The second section captured the questions regarding the digital payment systems following the hypothesis and study constructs. For the second section, the questions were framed following a 5-point Likert scale (where 1 represents strongly disagree and 5 represents strongly agree).

The data analysis, as mentioned earlier, was conducted in three stages using statistical techniques. The first stage of the analysis was descriptive statistics, where the demographic characteristics of the respondents were evaluated. The second stage of the analysis included model and constructs analysis conducted using model fitness tests and reliability and validity analysis conducted using confirmatory factor analysis (CFA). The third stage of the analysis was the hypothesis evaluation conducted using structural equation modelling (SEM).

Data Analysis and Results

Demographic Analysis

The first stage of the analysis evaluated the demographic characteristics of the study respondents. Considering the gender of the respondents, majority were males (54%) followed by females (42%) and lastly others (4%). An evaluation was made to determine how many respondents have used more than two digital payment systems, where the majority of those who indicated 'Yes' comprised 94%, while those who indicated 'No' were only 6%. The education levels of the respondents were also analysed, of which majority were undergraduate (43%) followed by those who had secondary education level (23%) and those with primary education level (13%). When enquired how long the respondents have been using the digital payment systems, majority opined that they have used it for 3–5 years (42%) followed by >5 years (28%) and 2–3 years (19%) (See Table 1).

Model Evaluation

Before conducting the analysis of the hypothesis, the evaluation of the model was conducted. The first stage of the analysis included the model fitness analysis using CFA. From the analysis presented in Table 2, it shows that all the model fitness values were satisfied.[30–32]

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Table 1 | Demographic analysis results

Variables	Categories	Frequency (n)	Percent (%)
Gender	Male	225	54.0
	Female	176	42.2
	Others	16	3.8
	Total	417	100.0
Used >2 DPS	Yes	391	93.8
	No	26	6.2
	Total	417	100.0
Education levels	Primary	54	12.9
	Secondary	94	22.5
	Undergraduate	181	43.4
	Masters	49	11.8
	PhD	39	9.4
	Total	417	100.0
How long in the use of DPS	1–2 years	47	11.3
	2–3 years	78	18.7
	3–5 years	176	42.2
	>5 years	116	27.8
	Total	417	100.0

Table 2 | Model Fitness Analysis Results

Model fitness	C_{min}/Df	GFI	RMR	NFI	IFI	CFI	TLI
Fitness values	2.175	0.890	0.029	0.904	0.946	0.945	0.937
Required threshold	>5.0	>0.8	<0.080	>0.90	>0.90	>0.90	>0.90
Status	Satisfied	Satisfied	Satisfied	Satisfied	Satisfied	Satisfied	Satisfied

The other analysis that was conducted was the evaluation of the reliability and validity of the study constructs. The standardized beta and average variance extracted (AVE) were used to evaluate the validity of the constructs. According to Kline,[30] the required threshold is >0.50. From the results presented in Table 3, the standardized beta values ranged from 0.524 to 0.824, while the values for AVE ranged from 0.525 to 0.613. These met the required threshold of validity. The reliability of the study constructs was evaluated using Cronbach's alpha and convergent reliability (CR). The required threshold is >0.70. The values for CR ranged from 0.784 to 0.863, while the values for Cronbach's alpha ranged from 0.722 to 0.871. These met the reliability requirement. Overall, these results showed that the reliability and validity of the study constructs were satisfactory.

Hypothesis Evaluation

The hypothesis was evaluated by conducting the SEM. The results for the direct relationship are summarized in Table 4 and Figure 2.

The results indicated that the variable technical and transactional procedures has a positive and significant influence on actual use of digital payment systems in the retail sector ($\beta = 0.175$, $p < 0.01$). Also, the variable perceived trust and security was found to have a positive and significant influence on actual use of digital payment systems in the retail sector ($\beta = 0.359$, $p < 0.05$). Social influence was found to have a negative and insignificant influence on actual use of digital payment systems in the retail sector ($\beta = -0.019$, $p > 0.05$). Convenience was found to have a positive and significant influence on actual use of digital payment systems in the retail sector ($\beta = 0.248$, $p < 0.05$). Similarly, effort expectancy and perceived benefits were found to have a positive and significant influence on actual use of digital payment systems in the retail sector ($\beta = 0.226$, $p < 0.01$ and $\beta = 0.169$, $p < 0.05$, respectively).

In addition to the direct relationship between the study variables, the mediation effect of latent variables of perceived trust and security and perceived benefits was evaluated. The results summarized in Table 5 indicate that the variable perceived trust and security significantly mediated the effect of social influence and effort expectancy on actual use of digital payment systems in the retail sector. The results also indicated that the variable perceived benefits mediated the effect of social influence, convenience, and effort expectancy on actual use of digital payment systems in the retail sector.

Table 3 | Reliability and Validity Analysis

Latent variables	Observed variables	Standardized beta	CR	AVE	Cronbach's alpha
AU	au1	0.761	0.784	0.559	0.722
	au2	0.573			
	au3	0.524			
	au4	0.599			
CV	cv1	0.743	0.816	0.525	0.817
	cv2	0.739			
	cv3	0.724			
	cv4	0.692			
EE	ee1	0.697	0.857	0.601	0.863
	ee2	0.801			
	ee3	0.815			
	ee4	0.783			
PB	pb1	0.758	0.863	0.613	0.871
	pb2	0.834			
	pb3	0.715			
	pb4	0.82			
PTS	pts1	0.787	0.853	0.591	0.854
	pts2	0.781			
	pts3	0.737			
	pts4	0.77			
SI	si1	0.755	0.836	0.560	0.836
	si2	0.739			
	si3	0.77			
	si4	0.728			
TTP	ttp1	0.722	0.853	0.592	0.858
	ttp2	0.824			
	ttp3	0.772			
	ttp4	0.757			

NB: TTP = technical and transactional procedures, PTS = perceived trust and security, SI = social influence, CV = convenience, EE = effort expectancy, PB = perceived benefit, AU = actual use.

Table 4 | Hypothesis Evaluation – Direct Effects

Hypothesis	Path relationship			Beta	S.E	C.R	p-values
H1	TTP	→	AU	0.175	0.040	4.394	***
H2	PTS	→	AU	0.359	0.141	2.536	0.011
H3	SI	→	AU	−0.019	0.048	−0.392	0.695
H4	CV	→	AU	0.248	0.110	2.251	0.024
H5	EE	→	AU	0.226	0.063	3.571	***
H6	PB	→	AU	0.169	0.077	2.187	0.029

NB: TTP = technical and transactional procedures, PTS = perceived trust and security, SI = social influence, CV = convenience, EE = effort expectancy, PB = perceived benefit, AU = actual use.

Discussions of Results

This study explored the aspects which influence the adoption and use of digital payment systems in the retail sector in developing countries, under a case study of South Africa. The study's empirical results presented interesting findings regarding consumer behaviour in adopting digital payments.

Perceived trust and security was found to be the most influential factor as far as the adoption and use of digital payment systems is concerned. These findings emphasize the critical role of trust and security in the adoption of payment technologies. These findings align with Kim *et al.*[33] who indicated that security and trust as a factor of payment systems is very critical to

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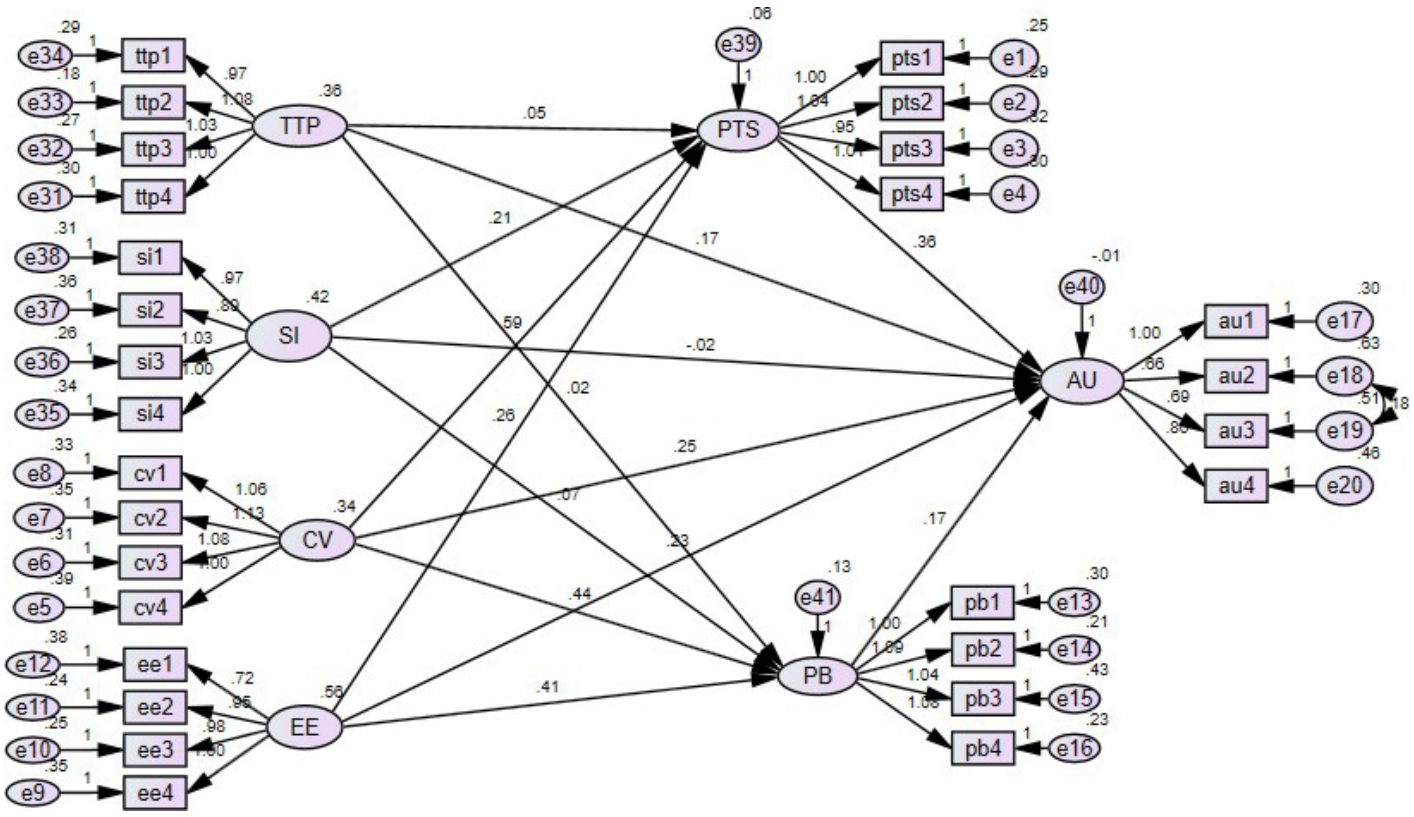

Fig 2 | Hypothesis evaluation – path relationship between study variables

Table 5 | Hypothesis Evaluation – Indirect Effects

Hypothesis	Path relationship	Total effects	Direct effects	Indirect effects	Mediation effect
H7a-d	TTP→PTS→AU	0.052	0.052	0.086	No
	SI→PTS→AU	0.207***	0.207***	0.022**	Yes
	CV→PTS→AU	0.594***	0.594***	0.162	No
	EE→PTS→AU	0.052***	0.256***	0.288**	Yes
	TTP→PB→AU	0.020	0.02	0.124	No
H8a-d	SI→PB→AU	0.069	0.069	0.03**	Yes
	CV→PB→AU	0.443**	0.443**	0.268**	Yes
	EE→PB→AU	0.415***	0.415***	0.374**	Yes

NB: TTP = technical and transactional procedures, PTS = perceived trust and security, SI = social influence, CV = convenience, EE = effort expectancy, PB = perceived benefit, AU = actual use.

users, particularly in situations where cyber security is a concern. In Africa, and South Africa in particular, cyber security and digital fraudulent issues are prevalent. This justified why this study found security and trust to be the most significant factor.[34] These findings also echo the two technology adoption models – the Technology Acceptance Model (TAM) and the UTAUT – which indicates that trust is a key factor in technology adoption.[35]

Convenience was the second most influential factor in the process of adoption and use of digital payment systems in Africa. Convenience implies the level of comfort and ease when using the concerned digital payment technology. Similarly, Dahlberg et al.[36] indicated that the ease of use and the ability to conduct transactions swiftly are critical to the adoption of mobile payment systems. In the retail sector, especially within the African context where time and efficiency are valued due to long queues and crowded markets, the convenience offered by digital payment systems is likely to be a strong motivator for adoption. These findings are also supported by Shankar and Datta[37] for the case of India, and by Oghuma et al.[38] for the case of Nigeria, of which both indicated that convenience has a significant influence on digital payment adoption.

The results found effort expectancy as the third significant influencer of digital payment system adoption. Ease of use implies the ease by which the user could learn to use the digital payment systems. In line with the TAM model, Seethamraju and Diatha[26] indicated that users have a tendency to prefer and use technologies, which require less effort to use. This emphasizes the need for digital payment systems to be free from bugs and errors and offer a seamless transaction experience.

Another important factor highlighted was the perceived benefits. Perceived benefits of digital payment systems from the users' perspective include rewards, discounts, and cashback offers. These aspects are also a consideration to users in the decision-making process. These findings are supported by Rogers' Diffusion of Innovations theory[39] that perceived advantages or benefits over existing methods significantly affect the adoption of new technologies. This study also found that technical and transactional procedures positively influence the use of digital payment systems. The technical and transactional procedures are associated with the perceived ease of use of digital payment systems. As suggested by Zhou,[40] technical reliability is an essential aspect in fostering trust and encouraging the use of digital payment platforms.

Theoretical and Managerial Implications

From the findings of this study, several theoretical and managerial implications and recommendations were developed. Considering theoretical recommendations, this study highlights the importance of expounding the scope of Technology Acceptance Models. These include the TAM and the UTAUT. This study highlights the importance of adding perceived trust and security as a distinct construct to the models. This study insists that as far as technology adoption is concerned, trust and security should not be considered as a supplementary factor but rather as a central concept in the adoption of digital payment systems. The second theoretical implication is the consideration of the contextual factors. Different environments have different effects on digital payment technology adoption. For instance, in the case of South Africa, digital fraud may be prevalent as compared to other cases. This suggests that existing theories should incorporate contextual variables more explicitly, acknowledging that the determinants of technology adoption may vary significantly across different regions and sectors.

This study also provides important actionable insights that could be implemented by the stakeholders in the retail sector interested in digital payment systems. The first managerial implication is that they should focus on enhancing the systems' trust and security. Considering perceived trust and security as the most influential factor in adopting digital payment systems, it is essential for retail managers and payment system providers to prioritize security features. This could include high security and encryption technologies and features, fraud protection, insurance, as well as public awareness on how to apply security measures. The second recommendation is that the proponents should market the benefits of digital payment systems. It is vital to make the tangible benefits of using digital payment systems explicitly known to the potential users. Some of the benefits that could be present include faster checkouts, rewards for digital transactions, and the convenience of cashless transactions. Effective communication of these benefits would attract more users to the payment technologies. Lastly, this study suggests the importance of continuous improvement of the technical procedures. The developers of these systems should work towards the improvement of the system's reliability and performance. Recommendations from the retailers would play a critical role in ensuring that the systems are robust and reliable in handling large numbers of transactions.

Conclusions

This study has conducted a comprehensive empirical analysis of the factors influencing actual use of digital payment systems in the retail sector in South Africa. The study was based on primary data collected from digital payment system users in the retail sector. The findings showed that perceived trust and security, convenience, effort expectancy, and perceived benefits significantly affect the adoption of digital payment systems. However, social influence plays an insignificant role. These findings were in agreement with the existing technology adoption theories such as UTAUT and TAM models, as well as previous research, emphasizing the importance of trust, user experience, and perceived advantages in driving consumer behaviour.

This study highlights recommendations for the retail sector in South Africa, including enhancing trust and security, marketing the digital benefits of the payment gateways, and continuous improvement of technical procedures.

Limitations and Future Research

A few limitations, as well as future research recommendations, are highlighted. The first limitation is the geographical and contextual limitation, where the study focuses exclusively on the retail sector in South Africa, which may limit the generalizability of the findings to other regions or sectors. The second limitation is the cross-sectional design adopted. This design captures data at a single point in time. This approach does not account for potential changes in consumer behaviour or attitudes over time, particularly as digital payment systems evolve and become more widely adopted. Future studies could consider longitudinal designs, which could allow analysis of how consumer behaviour and attitudes towards digital payment systems evolve over time. Additionally, to capture the regional and cultural differences, future studies could consider comparative studies across regions or countries.

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