Acta Commercii - Independent Research Journal in the Management Sciences
ISSN: (Online) 1684-1999, (Print) 2413-1903

Diffusion of innovation and financial technology adoption among small and medium enterprises in South Africa

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Dates:
Received: 07 Apr. 2026
Accepted: 15 July 2026
Published: 11 Sept. 2026

How to cite this article:
Nyanga, T. & Eresia-Eke, C., 2026, 'Diffusion of innovation and financial technology adoption among small and medium enterprises in South Africa', *Acta Commercii* 26(1), a1637. https://doi.org/10.4102/ac.v26i1.1637

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Orientation: The adoption of financial technology (FinTech) among small and medium-sized enterprises (SMEs) has garnered significant attention because of its potential to improve business performance. However, adoption rates remain slow, particularly in emerging markets.

Research purpose: This study aimed to investigate the determinants of FinTech adoption by SMEs in South Africa using the diffusion of innovation theory as the theoretical framework.

Motivation for the study: Despite the growing availability of FinTech solutions, limited empirical evidence exists on the factors influencing their adoption by SMEs in emerging economies such as South Africa. Understanding these determinants is essential to inform policy, guide FinTech providers and support SMEs in leveraging digital financial innovations to enhance competitiveness and sustainability.

Research design, approach and method: A quantitative research approach was employed, and structural equation modelling was used to analyse the relationships between relative advantage, trialability, observability, compatibility, complexity and financial technology (FinTech) adoption.

Main findings: The findings revealed that trialability, compatibility and complexity significantly and positively influence adoption of FinTech. Relative advantage demonstrated a statistically significant but negative relationship with adoption of FinTech, while the relationship between observability and adoption of FinTech was statistically insignificant.

Practical/managerial implications: Practical implications include the need for FinTech providers to offer pilot programmes and design tailored solutions for SMEs.

Contribution/value-add: Ultimately, this study's findings contribute to the diffusion of innovation theory by highlighting the nuanced role of adoption factors in an emerging market context.

Keywords: diffusion of innovation; financial technology; small and medium enterprises; relative advantage; trialability; observability; compatibility; complexity.

Introduction

In a systematic literature review of studies about financial technology (FinTech) adoption, Firmansyah et al. (2023) considered adoption intention and actual usage of FinTech as having similar meanings in the studies that were reviewed because both imply exposure to adoption. The current study aligns with this position and therefore FinTech adoption reflects a tacit intention to adopt or indeed the actual usage of FinTech by an organisation. The use of FinTech has garnered attention in recent years because of its potential to transform global financial services. Despite its swift expansion (Lou & Li 2017), the uptake of FinTech has progressed sluggishly, especially in emerging nations (Lin, Lin & Ding 2020b). The sluggish adoption is extensively recorded, with research highlighting that the rate of adoption is generally limited and particularly accentuated in emerging nations (Elmustapha, Hoppe & Bressers 2018; Rafique et al. 2020). Though Yeh (2020) contended that innovations generally experience gradual global acceptance, the adoption of FinTech has been especially languid.

Adoption trends are inconsistent and shaped by both push and pull factors, with emerging markets primarily propelled by demand-side dynamics (Frost 2020). The variation in adoption rates can be ascribed to multiple contextual factors. For instance, Skare and Soriano (2021) asserted that globalisation, by reducing obstacles to technology transfer, acts as an accelerator

for technology adoption, resulting in higher adoption rates in more globalised economies. This indicates that economic development and integration are crucial factors in promoting FinTech acceptance, as Tidd (2010) discovered that innovations typically disseminate more rapidly in emerging nations. Similarly, Huarng and Yu (2022) highlighted elevated levels of entrepreneurship, economic development and technology as facilitators of FinTech adoption in industrialised nations. Notably, this tendency is not ubiquitous; even advanced economies such as Germany have been shown to fall behind certain developing nations in FinTech adoption (Daragmeh, Sági & Zéman 2021).

Curiously, the integration of FinTech by small and medium-sized enterprises (SMEs), despite its prospective advantages (Bofondi & Gobbi 2017), has been markedly sluggish (Senarathna et al. 2018). This is unexpected, considering SMEs are frequently regarded as more nimble than larger firms in the adoption of new technology (Prause 2019). It is noteworthy, however, that family-owned SMEs, for example, favour internal financing to prevent share dilution, hence constraining their utilisation of FinTech services (Xiang, Zhang & Worthington 2018). Organisational issues, including insufficient expertise, restricted size and hierarchical structures, further impede FinTech adoption (Prause 2019; Uvarova & Vitola 2019).

Moreover, deficiencies in trust and education have been recognised as obstacles to FinTech adoption among SMEs (Utami & Sitanggang 2021). Although SMEs recognise FinTech services, apprehension regarding potential financial losses from erroneous transactions may hinder their adoption (Dinh, Nguyen & Nguyen 2018). Additionally, research indicates that insufficient awareness and exposure to FinTech among SMEs constitutes a significant challenge (Masood & Sonntag 2020). The distinct characteristics of each SME hinder the implementation of standardised FinTech solutions, potentially impeding adoption rates (Masood & Sonntag 2020). From an emerging market context, there is justification for the study of FinTech adoption in South Africa as the country is characterised by a well-developed banking sector, high smartphone and internet penetration, financial exclusion and a relatively large informal economy. Relative to other countries on the African continent, the combination of these characteristics amplifies the attractiveness of FinTech at a macro-level and makes the South African context unique for a FinTech adoption study.

Against this backdrop, the study's primary objective is to examine the factors of FinTech adoption among SMEs in South Africa, utilising the diffusion of innovation theory as a theoretical framework. In pursuit of this overarching objective, the study would explore how the factors of relative advantage, trialability, complexity, compatibility and observability influence FinTech adoption.

Literature review

The diffusion of innovation theory offers a comprehensive framework for analysing the acceptance and dissemination of innovations across various contexts, rendering it appropriate for investigating the intricate aspects affecting FinTech adoption by SMEs in an emerging market setting. Rogers (2010) characterised diffusion of innovation as a process by which an innovation is conveyed through designated channels, gradually, among individuals in a social system. Vargo, Akaka and Wieland (2020) characterised the diffusion of innovation as the dissemination or adoption of technology within a social framework. More generically, Dearing and Cox (2018) asserted that diffusion is a social process that transpires among individuals as a reaction to acquiring knowledge about an innovation. The transmission of innovation, as a social process, is facilitated by peer networks, where the adoption of technology by opinion leaders often catalyses widespread adoption (Kaminski 2011).

The diffusion of innovation (DOI) theory is widely employed to model the diffusion and acceptance of technology (Mitra et al. 2020) and is recognised as a prominent framework utilised to analyse and comprehend technology adoption (Rani 2021). The efficacy of the DOI theory in forecasting technology adoption arises from its interdisciplinary nature as it incorporates insights from Economics, Sociology and Communication (Elmustapha et al. 2018). It is characterised as a recognised paradigm for delineating the elements influencing technology adoption by users (Riahi & Garrouch 2023). The DOI theory is based on comprehending the elements that motivate and affect an individual's adoption of a specific technology (Ho et al. 2020). The DOI theory comprises five characteristics related to innovation: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability and (5) observability (Rogers 1995), which are utilised as independent variables in this study. According to Kaminski (2011), these innovation-related characteristics can elucidate the reasons for the successful adoption, sluggish adoption or failed adoption of certain technologies.

Relative advantage and adoption of financial technology

Relative advantage, as articulated by Rogers (1995), denotes the extent to which an invention is regarded as superior to the concept it supplants, rendering it a pivotal element in technology adoption. Some studies have emphasised the beneficial impact of relative advantage on the adoption of FinTech and associated technologies. Marei et al. (2023) and Owusu et al. (2021) asserted that it is improbable for prospective adopters to accept new technology before a conviction that its advantages surpass those crystallising from current options. Almashhadani et al. (2023) reinforce this assertion, revealing that consumers are more predisposed to embrace technologies that offer improved productivity, less effort and time efficiency. Iluba and Phiri (2021) and Moghavvemi et al. (2021) similarly identified a significant association between relative advantage and FinTech adoption, confirming its status as a crucial predictor.

Further research, including that of Qalati et al. (2021) and Mehra, Rajput and Paul (2022), similarly determined that

perceived advantages, such as enhancements in efficiency and productivity, incentivise SMEs and individuals to embrace technology. Nevertheless, divergent results are present in extant literature, as Pan et al. (2022) and Sukumaran, Bee and Wasiuzzaman (2022) observed no substantial impact of relative advantage on the adoption of artificial intelligence and other technologies, respectively. Rani and Kumar (2023) as well as Mangula, Van de Weerd and Brinkkemper (2014) similarly found that relative advantage did not significantly affect behavioural intentions to use technology.

These divergent findings emphasise that although relative advantage frequently serves as a crucial factor in adoption decisions, its relevance may differ across contexts, technologies and sectors. Consequently, results from prior studies cannot be relied upon to accurately predict what the exact situation would be among SMEs in South Africa as it specifically concerns the nexus of relative advantage and FinTech adoption. This study remains duly cognisant of the different positions in the literature but is also mindful of the highly competitive nature of the South African SME sector that heightens the quest of a business to seek advantage over others in order to remain in business. It is against this background that this study elects to hypothesise (H) that in the context of South Africa as a developing economy:

> **H_1:** There is a positive relationship between relative advantage and adoption of FinTech by SMEs.

Trialability and adoption of financial technology

Trialability denotes the degree to which prospective adopters can test an innovation on a restricted scale, as articulated by Ho et al. (2020) and Ullah et al. (2021). The capacity to trial a product or service is generally regarded as a characteristic that enables adoption, though research evidence about its role in technology adoption is inconsistent. Results stemming from studies conducted by Iluba and Phiri (2021) as well as Sun and Chi (2018) indicate that trialability is crucial for fostering adoption, as it enables prospective adopters to gain direct experience, establish confidence and evaluate the functioning and compatibility of an innovation.

Kaur et al. (2023) as well as Johnson et al. (2018) also emphasise that trialability instils confidence in users regarding the validity and security of products, hence facilitating adoption. More specifically, Tiwari et al. (2023) observed that trialability facilitates user acclimatisation to FinTech goods, hence promoting their utilisation. Conversely, some other studies, including those by Bureshaid (2021), Anh (2023), as well as Rani and Kumar (2023), revealed no significant effect of trialability on the adoption of technologies like mobile banking, suggesting that its effects may differ across settings. The divergent findings indicate that although trialability may influence technology adoption, the nature of its role may vary as it is contingent on the characteristics of the innovation, the user demographic and contextual elements such as perceived risk and technological familiarity.

In the quest to hypothesise the nature of the relationship between trialability and adoption of FinTech, this study is mindful of the different positions advanced by scholars but is swayed by the reality that SMEs are wary of the high failure rates that plague the sector and can ill-afford to institutionalise business practices that they have not tested. It is on this basis that it is hypothesised that in the South African context, that:

> **H_2:** There is a positive relationship between trialability and adoption of FinTech by SMEs.

Observability and adoption of financial technology

As articulated by Dearing and Cox (2018), observability denotes the extent to which the results and advantages of employing a technology are apparent to others. Minishi-Majanja and Kiplang'at (2005) contended that observable outcomes of FinTech generate social discourse that promotes adoption, whereas Mehra et al. (2022) observed that younger demographics frequently display their utilisation of new technology to their friends, resulting in increased adoption rates. Indeed, observability is regarded as a significant factor influencing acceptance (Hsu & Lin 2016; Kolodinsky, Hogarth & Hilgert 2004). Corroborating this position, Badi et al. (2021) emphasised the significance of observability in the process of the adoption of smart contracts within the United kingdom (UK) construction sector. Observability diminishes uncertainty by demonstrating beneficial outcomes, hence facilitating the dissemination of technology (Elmustapha et al. 2018; Sun & Chi 2018).

A slightly different opinion was canvassed by Ahmad et al. (2023), whose study revealed that observability, albeit influential, was the least important determinant of home technology adoption in Pakistan. Contrarily, reliant on findings from different studies, Kapoor, Dwivedi and Williams (2013) as well as Iluba and Phiri (2021) concluded that observability did not significantly affect the adoption of mobile payments and technologies in India and Zambia, respectively. Similarly, in a study undertaken by Lin et al. (2020a), it was determined that observability did not demonstrate a statistically significant relationship with technology adoption by SMEs. The conflicting findings indicate that although observability might facilitate adoption by demonstrating advantages and diminishing ambiguity, the definitive role that it plays may differ based on different contexts. Some of the positions advocated in prior research, the fact that positive social perceptions often dictate business behaviour of SMEs and the reality that observable benefits would encourage particular business practices, influence the study to hypothesise that:

> **H_3:** There is a positive relationship between observability and adoption of FinTech by SMEs.

Compatibility and adoption of financial technology

Compatibility, characterised as the congruence of a technology with the end-user's beliefs, expectations and

needs (Ullah et al. 2021), may be pivotal in the adoption of technologies. This notwithstanding, some studies, such as that conducted by AlBar and Hoque (2019) found no significant correlation between compatibility and technology adoption in rural Saudi Arabia. Similarly, the results of the study undertaken by Maroufkhani et al. (2020) revealed that compatibility did not influence the adoption of big data analytics by SMEs.

In contrast, Okoli and Tewari (2021) contend that technologies that align with established standards and previous experiences are more likely to be embraced. Wang, Zhao and Cheng (2022) emphasised that compatibility affects technology adoption. Compatibility is recognised as a significant factor in FinTech acceptance in Tanzania (Iluba & Phiri 2021; Koloseni & Mandari 2024). This position is given credence by the finding that compatibility has been demonstrated to facilitate the adoption of mobile banking (Ho et al. 2020) and digital banking (Tiong 2020).

In addition to its direct effects, compatibility indirectly facilitates FinTech adoption by improving perceived usefulness and perceived ease of use (Purwantini, Athief & Waharini 2020; Sunardi et al. 2022). Also, compatibility promotes financial inclusion, as emphasised by Hayat and Ul Hameed (2024), by facilitating the use of FinTech services. Though there are contrasting thoughts as it concerns how compatibility – a complex and context-sensitive phenomenon – relates to FinTech adoption, a recurrent opinion in the literature seems to be that they have a positive association. Additionally, from a business practice perspective, it would seem plausible that SMEs would be driven to employ systems that are compatible with their businesses. It is in light of these that the current study projects that:

> **H_4:** There is a positive relationship between compatibility and adoption of FinTech by SMEs.

Complexity and adoption of financial technology

Complexity, defined as the level of difficulty consumers encounter in comprehending or utilising a technology (Ching, Teoh & Amran 2020), is commonly regarded as an impediment to the adoption of FinTech. Technologies regarded as intricate or challenging to utilise often dissuade prospective adopters, as consumers exhibit reluctance to dedicate time and effort to mastering their use (Shanmugam & Shanmugam 2021; Tiwari et al. 2023). Research indicates that reduced complexity facilitates the acceptance of technology solutions, since customers are more inclined to accept simpler systems (Riahi & Garrouch 2023). In studies conducted by Matsepe and Van der Lingen (2022) as well as Moghavvemi et al. (2021), it was revealed that users promptly discarded technology perceived as complex. The notion of complexity deters adoption by inducing user reluctance to engage with the technology (Nasution et al. 2023).

Nonetheless, studies by AlBar and Hoque (2019) as well as Bureshaid (2021) identified no substantial correlation between complexity and technology adoption. Research on mobile banking by Anh (2023) also revealed that complexity did not significantly influence its adoption. The varied findings indicate that although complexity is typically viewed as an obstacle, its effect on adoption may differ from context to context. Though there is some extent of discordance in various scholarly perspectives presented in existing literature, rational thinking suggests that complex systems may not necessarily hold sufficient appeal to SMEs that would lead to their adoption, as they may complicate business processes. Based on this conviction, the current study posits that:

> **H_5:** There is a negative relationship between complexity and adoption of FinTech by SMEs.

Leveraging the hypothesised relationships deductively derived by considering different positions in extant literature concerning DOI components and technology adoption, a research model was developed for the study, and it is presented in Figure 1.

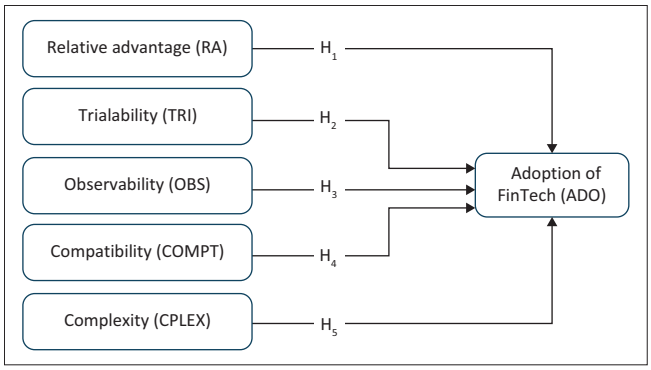
Research methods and design

This study employs a quantitative research design consistent with the positivism paradigm. Moreover, the quantitative technique enables hypothesis formulation and the systematic collection of data for hypothesis testing (Ahmad et al. 2019), as is applicable in the current study.

Sampling and data

The purposive non-probability sampling technique was employed to determine the pool of respondents for the study. Purposive sampling was considered suitable for this investigation primarily because of the absence of a comprehensive sampling frame. Additionally, randomisation was deemed largely impractical, given the extensive and heterogeneous population of SMEs in South Africa (Small Enterprise Development Agency [SEDA] 2022), which complicates the establishment of a reliable sampling frame (Etikan, Musa & Alkassim 2016). The study is cross-sectional and utilised an online survey methodology.

Online surveys offer researchers several benefits, such as cost-effectiveness, the ability to pause and continue the



FinTech, financial technology.

FIGURE 1: Research model.

survey, and the swift completion of the research instrument by participants (Nayak & Narayan 2019). Of the 1533 online responses gathered, 1065 were classified as valid, while 468 were regarded as invalid as a result of incompleteness, resulting in a usable rate of 69.47%. Based on prior research regarding the determinants of FinTech adoption, which utilised approximately 362 responses (Sharma et al. 2024), 386 responses (Wu & Peng 2024) and 399 responses (Amnas et al. 2023), the 1065 responses employed in this study are deemed sufficient.

Measurement scales

A structured questionnaire was employed to acquire data for the study. The constructs relative advantage (RA), trialability (TRI), observability (OBS), compatibility (COMPT) and complexity (CPLEX) were regarded as singular constructs and assessed with measurement instruments adapted from the studies of Moore and Benbasat (1991), Al-Jabri and Sohail (2012), as well as Gholami, Abdekhoda and Gavgani (2018). The adaptation mainly involved minor word changes from 'mobile banking' to 'FinTech adoption' and the integration of scale items drawn from the studies of the identified authors. This culminated in having five items for the measurement of each of the DOI component constructs. Additionally, adoption of FinTech (ADO) was assessed using an instrument derived from the study of Dulcic, Pavlic and Silic (2012) along with that of Shahbaz et al. (2020). The RA, TRI, OBS, COMPT, CPLEX and ADO measuring scales were evaluated on a five-point Likert scale with answer options ranging from strongly disagree (1) to strongly agree (5).

A pilot study involving 30 respondents (comprising owners and managers) was conducted prior to the main study, primarily to help determine if any questions were ambiguous or lacked clarity in a bid to determine the content validity of the instrument. This act aligns with the thoughts of Creswell and Creswell (2017), who contend that a pilot study enables the researcher to establish content validity. The results of the pilot study in relation to content validity and internal consistency of scale items were deemed satisfactory.

Instructively, the study recognised that utilising the same questionnaire to gather data for both independent and dependent variables can lead to common method bias (CMB). Consequently, the Harman single-factor test was employed to analyse CMB, to establish the existence a single-factor variance percentage below 50%, as per the precedence of Abbasi et al. (2021). The Harman single-factor test results indicated that one factor accounted for 35.51% of the total variance, suggesting that CMB is not an issue in this study.

Data analysis

The hypothesised relationships were examined using Covariance-based Structural Equation Modelling (CB-SEM). AMOS version 29 (IBM Corp., Armonk, NY, US) was used to perform the CB-SEM analysis in this study. Covariance-based structural equation modelling is a statistical analysis method designed to investigate the interrelationships among many variables within a model (Mia, Majri & Rahman 2019). Covariance-based structural equation modelling is suitable for validating theoretically hypothesised relationships (Reinartz, Haenlein & Henseler 2009), as demonstrated in this study. The CB-SEM consists of two main phases: (1) it evaluates the measurement model (i.e. reliability and validity) and (2) it analyses the structural model by investigating the linear correlations between the suggested latent variables (De Carvalho & Chima 2014). The measuring model was evaluated by assessing the reliability of the scales using Cronbach's alpha, while convergent validity was examined through the average variance extracted (AVE), and discriminant validity was investigated through the heterotrait-monotrait ratio of correlations (HTMT). The second stage in CB-SEM concentrates on calibrating the structural model by evaluating the significance of the interactions among latent variables (Iacobucci 2010).

Ethical considerations

Ethical clearance to conduct this study was obtained from the University of Pretoria, Faculty of Economic and Management Sciences Research Ethics Committee (No. EMS129/23).

Results

The demographic data indicated that the majority of the respondents possessed tertiary education (67%), and while a notable percentage (33.3%) owned the sampled SMEs, the others were top managers. The fact that the targeted respondents were owners and top management staff mostly responsible for information technology (IT) issues, qualified them to report on FinTech adoption decisions on behalf of their respective SMEs. Also, 47.8% of the respondents highlighted that their SMEs had a workforce of 10 people and below. Further, the majority (65.6%) of respondents asserted that their SMEs had been operational for 10 years or fewer, with elevated response rates observed in finance and business services (13.2%); retail, automobile trade and repair services (11.3%); as well as catering, accommodation, and other industries (11%). In the sample, 51.6% of SMEs reported an annual turnover of less than R3 million.

Assessment of measurement model

The study employed Confirmatory Factor Analysis (CFA) to assess the measurement model utilised in the study. Table 1 presents the results for internal consistency reliability, convergent validity and discriminant validity for RA, TRI, OBS, COMPT, CPLEX and ADO.

The factor loadings were assessed using a cut-off point of 0.600, following Palmieri et al. (2023:5), where indicators below this threshold are considered to demonstrate weaker item reliability. Following the identification of lower-loading indicators, a conservative approach was adopted in line with Howard (2020:916). Items below the threshold were

TABLE 1: Reliability, convergent and discriminant validity.

Test	RA	TRI	OBS	COMPT	CPLEX	ADO
α	0.860	0.744	0.750	0.786	0.833	0.799
Rho_c	0.862	0.745	0.751	0.804	0.835	0.827
AVE	0.556	0.494	0.501	0.579	0.564	0.506
HTMT						
RA	-	-	-	-	-	-
TRI	0.514	-	-	-	-	-
OBS	0.537	0.648	-	-	-	-
COMPT	0.624	0.511	0.579	-	-	-
CPLEX	0.003	0.145	0.133	0.006	-	-
ADO	0.477	0.649	0.633	0.557	0.206	-

RA, relative advantage; TRI, trialability; OBS, observability; COMPT, compatibility; CPLEX, complexity; ADO, adoption of FinTech; AVE, average variance extracted; HTMT, heterotrait-monotrait ratio of correlations.

carefully reviewed, and indicators including TRI1 (0.551), TRI5 (0.448), OBS1 (0.504), OBS5 (0.101), COMPT1 (0.506), COMPT5 (0.536) and CPLEX2 (0.476) were removed. However, CPLEX1 (0.585) and ADO1 (0.335) were retained because removing these indicators negatively affected construct reliability, convergent validity and overall model fit. Their retention was also supported by theoretical relevance, ensuring that the conceptual meaning of the constructs was preserved. Therefore, a conservative decision was made to retain these items rather than rely solely on statistical thresholds.

The retained indicators demonstrated acceptable measurement quality, with Cronbach's alpha values ranging from 0.744 to 0.860 and composite reliability values ranging from 0.745 to 0.862, exceeding the recommended threshold of 0.700. Convergent validity was supported for most constructs; however, the AVE values for TRI (AVE = 0.494), OBS (AVE = 0.501), and ADO (AVE = 0.610) indicate marginal convergence for some constructs. In particular, TRI recorded an AVE slightly below the recommended 0.500 threshold. Following Fornell and Larcker (1981) as well as Wach, Stephan and Gorgievski (2016), TRI was retained because AVE values between 0.400 and 0.500 may be acceptable when composite reliability is satisfactory and theoretical validity is established. Nevertheless, the marginal AVE value of TRI, alongside the relatively modest AVE values of OBS and ADO, is acknowledged as a limitation, and the findings involving these constructs should be interpreted with appropriate caution.

An HTMT criterion of 0.850 was adopted to assess discriminant validity, following Henseler, Ringle and Sarstedt (2015) and Rashid, Noranee and Bahtar (2023). Although HTMT was initially developed within the partial least square-structural equation modelling (PLS-SEM) context, Voorhees et al. (2016) extended its application to CB-SEM and provided empirical evidence supporting its effectiveness as a reliable assessment of discriminant validity. Therefore, HTMT was adopted in this study as a complementary and more sensitive measure compared with traditional approaches such as the Fornell–Larcker criterion, which may fail to identify discriminant validity issues in certain circumstances. The HTMT ratios for the study constructs ranged from 0.003 to 0.649, which are below the recommended threshold of 0.850. These findings confirm adequate discriminant validity, indicating that the constructs are empirically distinct and that the measurement items capture different theoretical concepts. Consequently, the measurement model demonstrates satisfactory construct differentiation and provides support for subsequent structural model assessment.

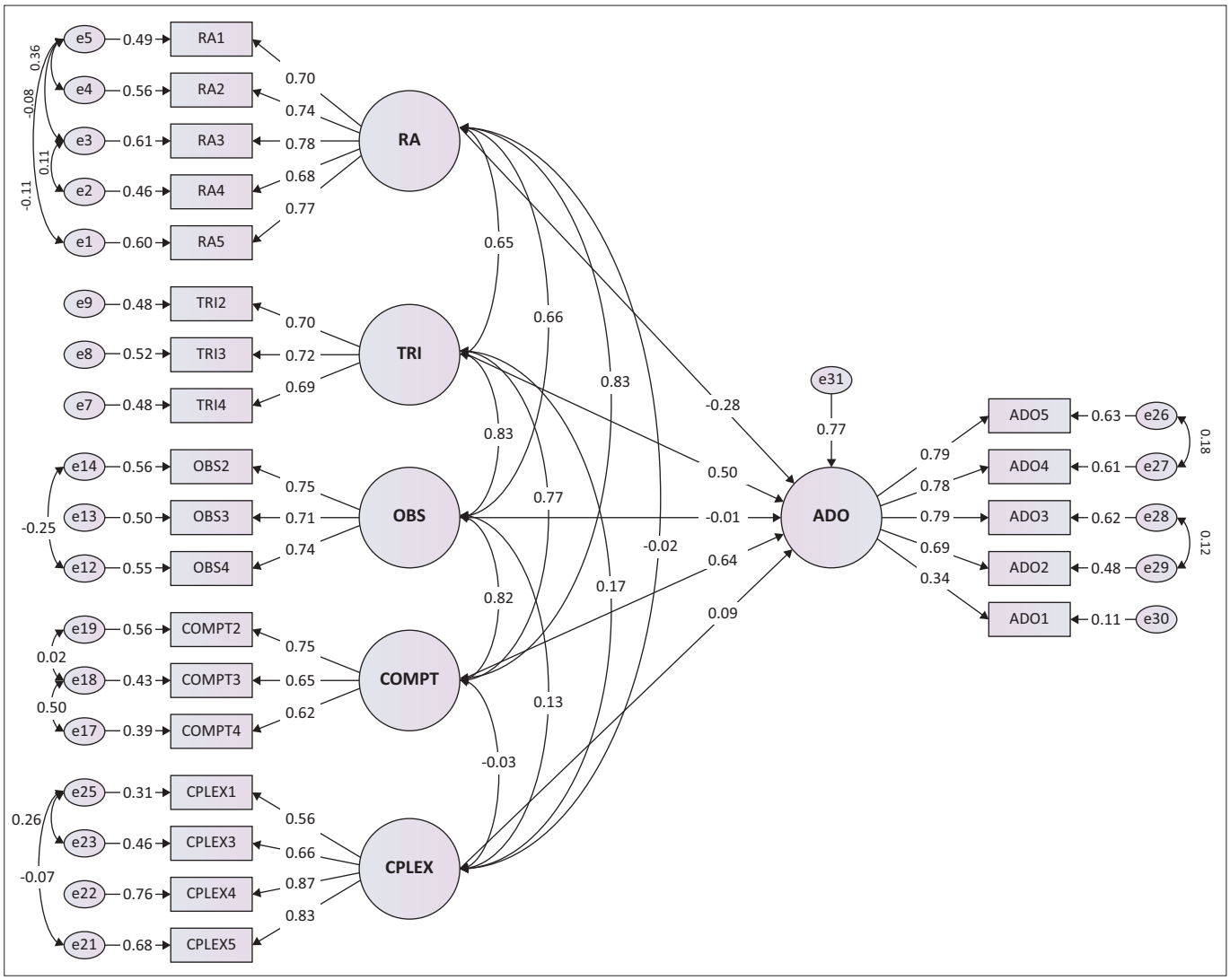
Structural model and hypothesis testing

A structural model was developed to examine the proposed interactions, as illustrated in Figure 2. The model analysed the correlation among RA, TRI, OBS, COMPT, CPLEX and ADO. The outcomes of the model fit for the path analysis model depicted in Figure 2 indicate that the model achieved a satisfactory fit, as evidenced by Chi-square (minimum discrepancy) divided by degrees of freedom (CMIN/DF) = 2.864; comparative fit index (CFI) = 0.967; Tucker-Lewis index (TLI) = 0.960; normed fit index (NFI) = 0.951; goodness of fit index (GFI) = 0.953; adjusted goodness of fit index (AGFI) = 0.936; root mean square error of approximation (RMSEA) = 0.042; and standardised root mean square residual (SRMR) = 0.050.

The structural path analysis model results show that the path coefficient for the association between RA and ADO is –0.28, whereas the path coefficients for the independent variables TRI, OBS, COMPT, CPLEX and the dependent variable ADO are 0.50, –0.01, 0.64 and 0.09, respectively.

Table 2a and Table 2b presents the coefficients, *t*-values, *p*-values and statistical findings about the direct relationships between the independent variables RA, TRI, OBS, COMPT, CPLEX and the dependent variable ADO.

The structural equation modelling (SEM) results indicated a significant negative correlation between RA and ADO ($\beta = -0.277$, $t = -2.750$, $p = 0.006$); thus, H_1 was not supported because of the inverse direction of the relationship as demonstrated by the results. Additionally, a statistically significant positive correlation was shown between TRI and ADO ($\beta = 0.504$, $t = 5.187$, $p = 0.000$), indicating that H_2 is supported. The study revealed that OBS and ADO exhibited a negative and statistically insignificant correlation



RA, relative advantage; TRI, trialability; OBS, observability; COMPT, compatibility; CPLEX, complexity; ADO, adoption of FinTech.

FIGURE 2: Structural path model results.

TABLE 2a: Structural model results for the hypothesised relationships.

Hypothesised relationship†		Estimate		*t*-stat	*p*-value	Decision
		Std	Unstd			
H_1	RA → ADO	-0.277	-0.185	-2.750	0.006*	Not Supported
H_2	TRI → ADO	0.504	0.273	5.187	0.000*	Supported
H_3	OBS → ADO	-0.014	-0.007	-0.123	0.902	Not Supported
H_4	COMPT → ADO	0.644	0.397	3.390	0.000*	Supported
H_5	CPLEX → ADO	0.091	0.050	2.560	0.010*	Not Supported
R^2	-	0.766		-	-	-

RA, relative advantage; TRI, trialability; OBS, observability; COMPT, compatibility; CPLEX, complexity; ADO, adoption of FinTech; SME, small and medium-sized enterprises; Std, standardised estimates; Unstd, unstandardised estimates.

*, Hypothesised relationship is statistically significant at 0.05.

†, Predictive model for adoption of FinTech by SMEs.

TABLE 2b: Structural model results for the hypothesised relationships.

Test	CMIN/DF	CFI	TLI	NFI	RMSEA	SRMR	GFI	AGFI
Direct relationship structural path model fit indices	2.864	0.967	0.960	0.951	0.042	0.050	0.953	0.936

CMIN/DF, Chi-square (Minimum Discrepancy) divided by degrees of freedom; CFI, comparative fit index; TLI, Tucker-Lewis index; NFI, normed fit index; RMSEA, root mean square error of approximation; SRMR, standardised root mean square residual; GFI, goodness of fit index; AGFI, adjusted goodness of fit index.

(β = –0.014, t = –0.123, p = 0.902), which implies that H_3 was not supported. The findings of the study also indicate that the correlation between COMPT and ADO was positive and statistically significant (β = 0.644, t = 3.390, p = 0.000), which means that H_4 is supported by the study's results. The research findings reveal a positive and statistically significant association between CPLEX and ADO (β = 0.091, t = 2.560, p = 0.010). This is contrary to the hypothesised negative relationship between the two constructs, and therefore the results signal that H_5 is not supported.

In summary, the study findings indicate that TRI and COMPT promote ADO, while RA, OBS and CPLEX exhibit no statistically significant correlation with ADO among the cohort of studied SMEs in South Africa. Notably, the results of the study also show that the predictive model for RA, TRI, OBS, COMPT, CPLEX and ADO has a coefficient of determination of 0.766 (R^2 = 0.766). This means that 76.6% of the variance in ADO is explained by RA, TRI, OBS, COMPT and CPLEX.

Discussion

This study's findings offer compelling insights into the factors influencing FinTech adoption by the cohort of studied SMEs in South Africa, revealing both congruence and discrepancies with existing research and theoretical frameworks. The inverse relationship between RA and ADO indicates that although SMEs acknowledge the prospective benefits of FinTech, the perceived costs, such as financial investment, implementation duration and effort, may suppress any perceived benefits. Additionally, the prevalence of cybercrime and online fraud may have created enough distrust among SMEs to erode the perceived advantage that FinTech adoption might embody. Similarly, infrastructural issues in South Africa such as electricity disruptions, unstable internet connectivity and high data costs might dissuade FinTech adoption even in the face of positive perceptions about the relative advantage for the SME that may sprout from such a decision. This conclusion, arguably shaped by unique contextual issues in South Africa, challenges a proposition of the DOI theory, which asserts that a greater relative advantage should result in increased adoption. The finding also contradicts research findings of scholars such as Al Nawayseh (2020), who concluded that perceived benefits facilitate adoption. However, the study's result with respect to RA and ADO corresponds with the idea that risk aversion and adherence to conventional methods may inhibit the studied SMEs from embracing new technologies.

The positive and statistically significant correlation between TRI and ADO underscores the necessity for SMEs that participated in the study to evaluate and investigate FinTech options prior to making a commitment. This is consistent with the findings of Sun and Chi (2018) as well as Kaur et al. (2023), who assert that trialability diminishes uncertainty and enhances trust, in contrast to Anh (2023), who reported no significant effect of trialability on adoption in a specific study conducted in Vietnam. Given the profound effect that FinTech adoption may have on the business operations of the studied SMEs, it is understandable that opportunities to try out different FinTech products to determine their suitability for the businesses might engender high levels of adoption. Additionally, this study revealed that OBS had no statistically significant correlation with ADO, a result which is consistent with the findings of Kapoor et al. (2013) as well as Iluba and Phiri (2021). This suggests that the cohort of studied SMEs may favour direct experience over the observation of others' adoption of FinTech in their decision-making, highlighting the importance of practical trials over indirect influence.

The DOI attribute of COMPT was highlighted as a statistically significant factor that positively influences ADO. This suggests that SMEs that were in the study's sample favoured FinTech solutions that correspond with their current processes, objectives and frameworks, hence reducing disruption. In the specific South African context, the highly competitive nature of the SME sector and the resource-constrained environment in which they operate heighten the importance of ensuring that whatever technological solutions are adopted seamlessly befit their businesses.

This, amongst others, may be because it would guarantee minimal disruptions to current business processes and reduce the trepidation associated with the adoption of FinTech. The study's result of a positive and significant relationship between COMPT and ADO is consistent with the findings of Iluba and Phiri (2021) and the results reported by Koloseni and Mandari (2024) in studies conducted in Zambia and Tanzania, respectively. However, the finding contradicts the results of the study undertaken by AlBar and Hoque (2019), where it was reported that compatibility had no significant influence on technology adoption among rural-based SMEs in Saudi Arabia.

The current study found that CPLEX had a positive and statistically significant correlation with ADO, indicating that the studied SMEs may regard specific FinTech solutions as complicated yet useful enough to warrant the effort required for comprehension and implementation. Additionally, the perception of complexity by the studied SMEs may be that such FinTech solutions embody more functionality while providing higher levels of security during usage. Such solutions, if mastered by the adopting SME, could set the business apart from competition, and this conviction therefore could encourage the SME to adopt more complex FinTech solutions that ordinarily appeal less to the greater majority of SMEs. This discovery contradicts traditional perspectives, such as those advanced in studies by Matsepe and Van der Lingen (2022) as well as Moghavvemi et al. (2021), both of which propose that perceived complexity hinders adoption. Interestingly, it substantiates the findings of Bureshaid (2021) and Anh (2023), which indicated that complexity did not substantially impede adoption. These findings together emphasise the intricate and context-dependent characteristics of FinTech adoption among SMEs, highlighting the necessity of resolving perceived obstacles while utilising enablers like trialability and compatibility to promote adoption.

Contribution of the study

This research provides theoretical and practical insights on FinTech adoption by SMEs, especially within the South African setting. The study theoretically enhances understanding of the diffusion of innovation theory by offering empirical evidence regarding the varying effects of determinants, including relative advantage, trialability, observability, compatibility and complexity, on FinTech adoption among a sample of SMEs. The theory suggests that these factors often promote technology adoption; however, the study indicates that not all factors exert equal influence in the context of the SMEs in South Africa that participated in this study, as only trialability and compatibility emerged as key drivers relative to others.

These findings enhance the theoretical framework by illustrating the intricate effect of these factors in influencing FinTech adoption in an emerging market context. The study's emphasis on SMEs, a vital yet frequently overlooked sector, addresses a substantial gap in the literature and enhances the theoretical comprehension of technology adoption in smaller firms. The study elucidates the distinctive elements affecting FinTech adoption among the examined cohort of SMEs, offering critical insights that can enhance theoretical models and frameworks specific to this sector.

This emphasis on SMEs enhances the overall discussion on technology adoption by integrating the viewpoints and experiences of smaller enterprises. The study provides practical insights for FinTech providers and governments seeking to enhance adoption rates among SMEs. By highlighting trialability and compatibility as crucial antecedents of FinTech adoption, the study emphasises the need for creating tech-solutions that are readily testable and can effortlessly integrate with current SME operations. The findings also challenge the premise that perceptions of relative advantage, observability and reduced complexity always enhance adoption, amplifying the need for customised approaches that cater to the specific concerns and operational constraints of SMEs.

Limitations and considerations for future studies

This study employed a quantitative technique reliant on self-reported data from participants, potentially introducing biases and inaccuracies in the gathered replies. Future research should implement a mixed-methods approach, as this would engender the generation of more profound insights as it pertains to the antecedents of FinTech adoption in SMEs. The present study is a cross-sectional analysis that does not account for potential changes in SME behaviour over time concerning the adoption of FinTech specifically, and technology broadly. Subsequent studies could utilise a longitudinal methodology to elucidate the fluctuations in SMEs' behaviour regarding technology adoption. Future researchers should also consider undertaking a comparative analysis of the determinants influencing FinTech adoption by SMEs by using the technology acceptance model (TAM) and the technology-organisation-environment (TOE) as theoretical prisms to elucidate the dynamics associated with the geographical advantages and economies of scale of SMEs. Finally, the findings of this study are ultimately constrained by reliance on a non-random sample for responses, which invariably limits the generalisability of the findings. Consequently, it is recommended that future studies rely on random sampling techniques to create a pool of respondents for their studies.

Conclusion

The research examined the factors influencing FinTech adoption among a sample of SMEs in South Africa, employing a quantitative methodology executed from a positivist philosophical perspective. The results indicated varied outcomes concerning the correlations between different components of the DOI theory and FinTech adoption. Relative advantage exhibited a statistically significant inverse connection with ADO, suggesting that the perceived advantages of FinTech did not result in heightened adoption in the cohort of studied SMEs. Notably, TRI demonstrated a statistically significant positive effect on ADO, underscoring the importance of trials to FinTech adoption. Observability exhibited a negative, albeit statistically insignificant correlation with ADO. This suggests that the studied SMEs are not necessarily influenced to adopt FinTech simply because they observe that it may be beneficial to those who adopted it.

The study's findings also showed that COMPT surfaced as a significant catalyst for adoption as it displayed a positive correlation with ADO. The implication of this may be that SMEs that seek to encourage the adoption of FinTech solutions by their businesses must ensure that such solutions are compatible with established business processes. Complexity exhibited a statistically significant and positive correlation with ADO. The deduction from this is that the studied SMEs are not dissuaded by the level of complexity that attends the adoption of a FinTech solution arguably because complexity may be a function of increased functionality and security that the SME may consider beneficial. In sum, these findings highlight the essential roles of TRI and COMPT in promoting FinTech adoption among the studied SMEs while downplaying the roles of RA, OBS and CPLEX.

While noting the importance of restraint from generalisations because of the use of a non-probability sampling technique in the study, the study nonetheless recommends that the issues of trialability and compatibility of FinTech solutions should be prioritised in the operational settings of the studied SMEs. Providing pilot programmes or complimentary trials may enable SMEs to realise the advantages of FinTech without significant upfront expenditures, thereby enhancing adoption rates. Furthermore, FinTech providers ought to devise solutions that interface effortlessly with current SME processes to enhance compatibility, as this would foster adoption.

Acknowledgements

This article is based on research originally conducted as part of Taguma Nyanga's doctoral thesis titled 'Determinants and outcomes of financial technology adoption by small and medium enterprises', submitted to the Faculty of Economic and Management Sciences, the University of Pretoria in 2025. The thesis is currently unpublished and not publicly available. The thesis was supervised by Chukuakadibia Eresia-Eke. The manuscript has been revised and adapted for journal publication. The author confirms that the content has not been previously published or disseminated and complies with ethical standards for original publication.

This article is based on data from a larger study. A related article focusing on technology acceptance model and related antecedents explored the nexus of the constructs of perceived usefulness, perceived ease of use, FinTech adoption and organisational performance of SMEs has been published in *The Southern African Journal of Entrepreneurship and Small Business Management*, 17(1), 1428. The present article addresses a distinct research question, focusing on determinants of FinTech adoption by SMEs in South Africa using the diffusion of innovation theory as the theoretical framework.

Competing interests

The authors, Taguma Nyanga and Chukuakadibia Eresia-Eke, declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

CRediT authorship contribution

Taguma Nyanga: Conceptualisation, Data curation, Formal analysis, Methodology, Writing – original draft. Chukuakadibia Eresia-Eke: Project administration, Supervision, Writing – review & editing. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication, and take responsibility for the integrity of its findings.

Funding information

The authors received no financial support for the research, authorship and/or publication of this article.

Data availability

The data set for this research is filed on: https://figshare.com/articles/dataset/PhD_data_Taguma_Nyanga/29445035?file=55881035

The following tables and/or figures are informed by the data set aforementioned: Table 1; Table 2a, Table 2b and Figure 2. There are no restrictions on the data.

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