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NOTE FROM THE EDITORS

As an interdisciplinary indexed journal, *The Journal of Global Business and Technology (JGBAT)* serves academicians and practitioners in the fields of global business and technology management and their related areas. JGBAT is also an appropriate outlet for manuscripts designed to be of interest, concern, and applied value to its audience of professionals and scholars. Readers will note that our attempt to bridge the gap between theory and practice has been successful.

We cannot thank our reviewers enough for having been so professional and effective in reiterating to contributors the need to provide managerial applications of their research. As is now obvious, the majority of the articles include a section on managerial implications of research. We wish to reiterate once again our sincere thanks to JGBAT reviewers for having induced contributors to answer the “so what?” question that every *Journal of Global Business and Technology* article is required to address.

Thank you for your interest in the journal and we are looking forward to receiving your submissions. For submissions guidelines and requirements, please refer to the Manuscript Guidelines at the end of this publication.

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FACTORS INFLUENCING SMES' AND STARTUPS' INTENTION TO ADOPT SMART DIGITAL FINANCIAL SOLUTIONS: APPLYING THE TOE FRAMEWORK

Dr. Vo Phuc Truong Thanh (Corresponding Author)

Faculty of Finance and Banking, School of Economics, Can Tho University, Vietnam
vptthanh@ctu.edu.vn

Huynh Thi Tuyet Suong
Tan Tao University, Vietnam
yen.nguyen@ttu.edu.vn

Truong Thi Xuan Dao
Hung Vuong University of Ho Chi Minh City, Vietnam
daottx@dhv.edu.vn

Nguyen Thi Hong Nhung
Industrial University of Ho Chi Minh City, Vietnam
nguyenthihongnhung@iuh.edu.vn

Nguyen Tan Trung
Van Hien University, Vietnam
trungnt2@vhu.edu.vn

ABSTRACT

This study investigates the factors influencing the intention of SMEs and startups in Vietnam to adopt smart digital financial solutions, addressing the limited empirical evidence in emerging economies. Using the TOE framework, the research applies a mixed-methods design. The qualitative phase includes expert interviews to refine measurement scales for the Vietnamese context, while the quantitative phase is based on a survey of 220 firms analyzed using SEM-PLS with SmartPLS 4.0. Findings show that all three TOE dimensions significantly affect adoption intention, with technological factors, especially cost, complexity, and compatibility, exerting the strongest influence. The study contributes by clarifying the relative importance of TOE components in SMEs and startups and provides practical implications for businesses and policymakers aiming to promote effective and sustainable adoption of digital financial solutions.

Keywords: SMEs, startups, smart digital financial solutions, TOE framework, Vietnam

INTRODUCTION

The rapid advancement of digital technologies over the past decade has been reshaping the global financial ecosystem and transforming the way firms manage their operations. Developments in data analytics, cloud computing, process automation and open banking have accelerated the emergence of smart digital financial solutions. These tools not only help optimize cash flows and strengthen transparency, but also enhance firms' forecasting capabilities and risk management performance (Ozili, 2020). For SMEs and startups, groups that typically face constraints in capital, human resources and financial capacity, such technologies are especially crucial, as they reduce transaction costs, expand access to finance and improve operational efficiency (OECD, 2023).

Despite these benefits, the readiness and intention to adopt smart digital financial tools remain uneven across SMEs and startups. Some firms proactively pursue financial digitalization, while many others remain cautious due to limited technological infrastructure, a shortage of digitally skilled personnel or concerns about operational risks. The 2024 National Digital Transformation Report indicates that only around 35 percent of SMEs and startups in Vietnam have adopted at least some digital financial tools, and fewer than 15 percent use advanced solutions such as automated cash flow systems or predictive analytics. This highlights a clear gap between potential and actual adoption.

From an academic perspective, most studies on financial technology adoption focus on individual consumers or financial institutions, while SMEs and startups, key drivers of innovation, have not received proportional attention (Nguyen et al., 2022). Classical models such as the Technology acceptance model (TAM), the Theory of planned behavior (TPB), and the Unified theory of acceptance and use of technology (UTAUT) primarily explain behavior at the individual level, and therefore do not fully capture organizational decision making, which is shaped simultaneously by technological attributes, internal resources and competitive pressures (Baker, 2012).

In this context, the Technology Organization and Environment (TOE) framework is regarded as a suitable analytical lens for examining technology adoption at the organizational level (Tornatzky and Fleischer, 1990). TOE has been successfully applied in various domains, including e-commerce (Nguyen et al., 2022), cloud computing (Gangwar et al., 2015), blockchain (Clohessy et al., 2019) and artificial intelligence in SMEs (Badghish and Soomro, 2024). These applications demonstrate its ability to capture the full spectrum of technological characteristics, organizational readiness and environmental pressures.

However, the application of the TOE framework to examine SMEs and startups' intention to adopt smart digital financial solutions in Vietnam remains limited. Existing domestic studies mainly focus on consumer-oriented Fintech, digital banking or e-commerce, while systematic investigations of the factors influencing firms' intention to adopt smart digital financial tools are still scarce. This gap is particularly noteworthy given that Vietnam's business landscape consists of 98% SMEs and startups, yet only about 20 percent of them have access to advanced digital financial services (VCCI, 2023).

Addressing these limitations, this study makes three primary contributions. First, at the theoretical level, it extends the TOE framework into the domain of smart digital financial solutions, a context that differs from traditional IT or e-commerce adoption by involving higher financial sensitivity and regulatory exposure. By empirically comparing the relative strength of technological, organizational, and environmental dimensions, the study refines our understanding of how TOE operates under financial innovation conditions in emerging markets. Second, at the contextual level, it provides rare empirical evidence from Vietnam, an emerging fintech ecosystem where SMEs dominate the economic structure but face structural capital constraints. Third, at the practical level, the findings offer actionable insights for policymakers and solution providers aiming to design financially accessible and institutionally supportive digital finance ecosystems for SMEs and startups.

LITERATURE REVIEW AND HYPOTHESIS

Smart digital financial solutions

Smart digital financial solutions refer to a set of tools, platforms and technology applications designed to digitalize, automate and optimize a firm's financial activities (Liu et al., 2024). These solutions typically integrate key technologies such as advanced data analytics, forecasting models, process automation (RPA), cloud computing and open banking connectivity. Together, they help firms strengthen cash flow control, improve transparency, reduce manual errors and enhance the quality of financial decision making (Ozili, 2020).

For SMEs and startups, smart digital financial solutions are particularly valuable, as these firms often face constraints related to resources, financial and accounting capacity and access to capital. The adoption of financial technologies enables them to reduce operating costs, expand access to financial services and improve risk management capabilities, thereby reinforcing their competitiveness in an increasingly digitalized business environment (OECD, 2023).

In this study, smart digital financial solutions are conceptualized as a technological innovation that SMEs and startups consider adopting, and intention to use is viewed as a critical stage preceding actual implementation behavior.

TOE framework

The Technology Organization Environment (TOE) framework proposed by Tornatzky and Fleischer (1990) is a comprehensive theoretical model widely employed to explain how organizations evaluate, adopt and implement technological innovations. The central premise of the framework is that adoption outcomes do not arise solely from the characteristics of the technology but from the combined influence of technological conditions, internal organizational factors and the external environment in which the firm operates. By acknowledging this multi-layered structure, the TOE framework provides a more holistic and realistic explanation of organizational adoption behaviour

The technological context describes the technical attributes of the innovation, including relative advantage, compatibility, complexity and cost. These characteristics shape firms' perceptions of usefulness, practicality and implementation feasibility, thereby influencing whether managers view the innovation as worthwhile. The organizational context reflects the internal conditions that support or constrain adoption, such as leadership commitment, employee capabilities, firm size, resource availability and the overall readiness for transformation. The environmental context encompasses external forces and institutional conditions, including competitive intensity, customer expectations, regulatory requirements and government support policies, all of which create pressures or incentives that influence adoption decisions (Arifia, 2024; Konopik et al., 2021).

One of the strengths of the TOE framework is its ability to integrate these three domains into a unified explanatory model. This makes it particularly suitable for studying technology adoption at the organizational level, especially in contexts where individual perceptions alone cannot fully capture the complexity of decision-making. Unlike individual-based models such as TAM or UTAUT, which focus primarily on psychological determinants, the TOE framework incorporates structural, strategic and environmental dimensions that are essential for understanding how firms approach technological change (Baker, 2012). As a result, the framework has demonstrated strong empirical validity across a diverse range of technological domains, including e-commerce (Nguyen et al., 2022), cloud computing (Gangwar et al., 2015), blockchain (Clohessy et al., 2019) and, more recently, artificial intelligence adoption in SMEs (Badghish and Soomro, 2024).

Given this extensive empirical grounding, applying the TOE framework to examine SMEs' and startups' intention to adopt smart digital financial solutions is well justified. The adoption of such solutions is inherently an organizational decision, shaped simultaneously by the perceived attributes of the technology, the firm's internal capabilities and constraints and the broader business environment in which these enterprises operate. The TOE framework therefore offers an analytically robust foundation for capturing these interrelated influences and for explaining why adoption patterns may differ across firms even within the same industry or market conditions.

Hypothesis

Technological context

Perceived benefits capture the extent to which firms believe that smart digital financial technologies create superior value compared with their existing processes. Contemporary digital transformation theory argues that adoption decisions are largely driven by expected value creation, efficiency improvement and performance enhancement (Konopik et al., 2021). When managers clearly perceive improvements in financial visibility, operational accuracy and processing speed, they are more likely to consider the innovation worthwhile. For SMEs and startups, benefits such as improved cash flow management, reduced errors and shorter processing time represent tangible performance gains that significantly strengthen adoption intention (Konopik et al., 2021).

H1a: *Perceived benefits of smart digital financial solutions have a positive effect on SMEs' and startups' intention to adopt them.*

Compatibility refers to the extent to which digital financial solutions align with a firm's existing processes, strategic objectives, and technological infrastructure. When a new technology integrates smoothly into current workflows and does not require major structural adjustments, firms tend to perceive lower implementation risk and disruption. This perceived fit increases managerial confidence and reduces resistance to change, making firms more inclined to adopt the technology (Arifia, 2024).

H1b: *Compatibility has a positive effect on the intention to adopt smart digital financial solutions.*

Perceived complexity reflects the degree to which a firm views the technology as difficult to understand, implement, or operate. When complexity is perceived to be high, firms often anticipate longer integration timelines, additional training requirements, and a higher likelihood of operational disruption. These concerns increase both switching costs and opportunity costs, thereby diminishing managerial confidence in the technology. Prior innovation-adoption research consistently demonstrates that complexity functions as a major barrier that undermines adoption intention (Zhang et al., 2020). In essence, when a technology is regarded as "unintuitive" or "hard to use," firms tend to postpone or even reject adoption, regardless of the potential strategic benefits it may offer.

H1c: *Complexity has a negative effect on the intention to adopt smart digital financial solutions.*

Cost encompasses not only the initial investment in digital technologies but also the ongoing operating expenses and the resources needed for employee training. For SMEs and startups, which typically operate under tight budget constraints, these financial burdens become particularly salient. High implementation and maintenance costs can easily outweigh the perceived benefits, making cost one of the most critical barriers to digital transformation efforts (Awa et al., 2017). When the required investment is viewed as excessive or risky, firms are more likely to delay adoption or opt for lower-tech alternatives despite their strategic limitations.

H1d: *Cost has a negative effect on the intention to adopt smart digital financial solutions.*

Organizational context

Top management plays a critical role in shaping a firm's strategic direction and ensuring that the necessary resources are allocated for technological initiatives. When senior leaders demonstrate clear commitment through their support, decisions and investment priorities, they help reduce the perceived risks associated with adopting new systems (Kim and Kiymaz, 2024). This commitment also strengthens organizational readiness, creating an environment where innovation is more likely to be accepted and successfully implemented (Clohessy and Acton, 2019).

H2a: *Top management support has a positive effect on the intention to adopt smart digital financial solutions.*

The technological capabilities and digital skills of employees play a central role in determining how effectively a firm can absorb and operate new technologies. When the workforce possesses adequate knowledge and experience with digital tools, firms are better equipped to handle implementation challenges and are more confident in managing potential risks. SMEs and startups with digitally competent employees therefore tend to show a higher willingness to adopt smart digital financial solutions (Aboelmaged and Hashem, 2019).

H2b: *Employee competence has a positive effect on the intention to adopt smart digital financial solutions.*

Environmental context

In the TOE framework, the environmental context reflects the external forces that pressure or motivate firms to adopt innovations, including customers, competitors and the regulatory environment. For SMEs and startups, prior studies show that competitive pressure is often not expressed through market size or the number of rivals, but rather through shifts in customer expectations and behavior (Saadah and Setiawan, 2023). These firms commonly operate in niche markets where customers demand faster, more transparent and more digitalized services. For this reason, customer demand is considered an indirect yet most appropriate indicator for capturing competitive pressure in the SME context. When customers develop higher expectations for digital financial convenience, firms are more inclined to adopt new technologies to maintain competitiveness. Based on this reasoning, the study proposes the following hypothesis:

H3a: *Customer demand has a positive effect on the intention to adopt smart digital financial solutions.*

In addition to competitive forces, regulatory conditions are also a critical part of the environmental context. Numerous TOE studies emphasize that government support, including digital transformation policies, tax incentives, training programs, financial assistance and the clarity of regulatory frameworks, serves as a composite indicator of how supportive the legal environment is toward innovation (Hojnik and Ruzzier, 2016; Susanti et al., 2023). For SMEs and startups that face substantial resource constraints, government initiatives help lower experimentation costs and reduce legal risks, thereby encouraging these firms to adopt digital financial technologies. Accordingly, the following hypothesis is proposed:

H3b: *Government support has a positive effect on the intention to adopt smart digital financial solutions.*

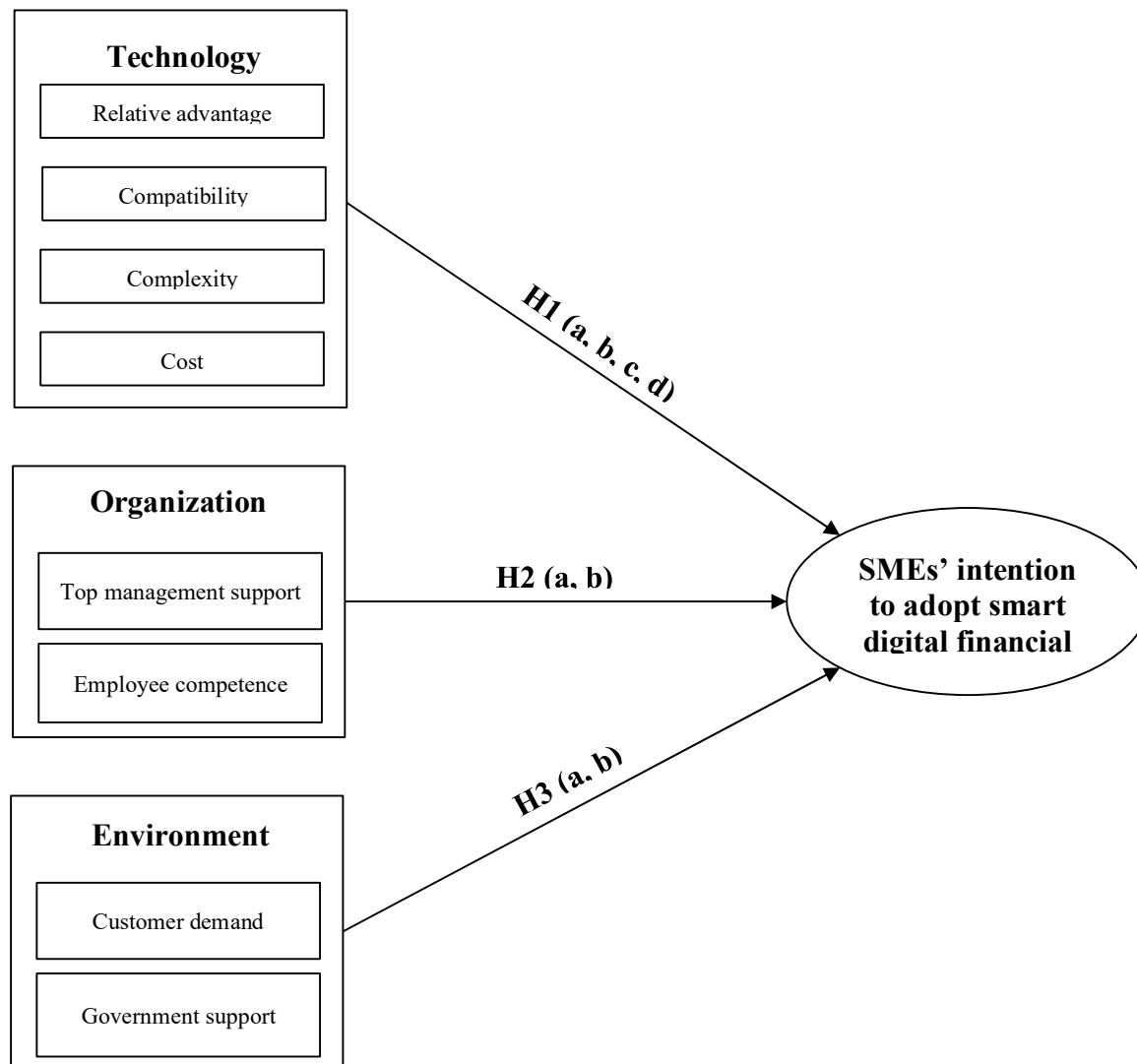


Figure 1. Research Model

Source: Author's proposal (2025)

DATA COLLECTION AND METHODOLOGY

Data collection

The study focuses on SMEs and startups operating in the trade and service sectors, which are widely recognized as among the most dynamic and innovation-driven segments of the economy. These firms face intense competitive pressure and continuous shifts in market conditions, resulting in heightened demand for technological upgrading and financial digitalization. They also encounter persistent challenges related to financial management, capital access and forecasting capability, thereby making the adoption of smart digital financial solutions particularly salient.

Data were collected from 220 firms through a combination of online surveys and in-person distribution at business events, industry networks and startup communities. To enhance coverage and reduce potential perceptual bias, each firm was invited to complete one or two questionnaires. Over a three-month period, from July 2025 to October 2025, the study obtained 357 valid responses that satisfied the

required quality criteria. All constructs were measured using a five-point Likert scale (5 = strongly agree; 4 = agree; 3 = neutral; 2 = disagree; 1 = strongly disagree).

Methodology

The study employs a mixed-methods approach using an explanatory sequential design, in which the qualitative phase is conducted first to ensure that the measurement scales are appropriate for the context of SMEs and startups in Vietnam. In this phase, the research team conducted in-depth interviews with 11 experts and managers selected through purposive sampling to gather practical insights related to technological, organizational and environmental factors. The choice of 11 participants aligns with recommended sample sizes for qualitative research. Hennink and Kaiser (2022) indicate that most studies reach thematic saturation with approximately 9 to 17 interviews, depending on participant homogeneity and topic complexity. Accordingly, the sample size of 11 experts is considered adequate to ensure informational completeness and depth for this study.

The interview data were analyzed using thematic content analysis to identify ambiguities and contextual nuances that required refinement in the measurement items. The results indicate that the core components of the TOE framework remain valid and do not necessitate additional constructs; however, several observed items required linguistic adjustments to enhance clarity and conceptual precision. These refinements were incorporated into the survey instrument prior to the quantitative phase, thereby ensuring methodological coherence and strengthening the reliability of the measurement model.

The quantitative analysis is based on a firm-level sample of 220 SMEs and startups operating in the trade and service sectors. A non-probability convenience sampling approach was adopted, supported by access through professional networks and business associations, as no comprehensive sampling frame exists that identifies firms according to their digital financial adoption practices. The unit of analysis is the firm, and questionnaires were directed specifically to top managers, founders, owners, financial directors, or individuals responsible for digital transformation and financial management, as these respondents possess strategic oversight and sufficient knowledge of the firm's technological capabilities and adoption decisions. In cases where multiple responses were obtained from the same enterprise, answers were reviewed for consistency and aggregated to ensure a single firm-level representation. Sample adequacy was evaluated using established PLS-SEM guidelines: with eight predictors of Behavioral Intention, the "10-times rule" suggests a minimum of 80 observations, while power analysis ($f^2 = 0.15$, $\alpha = 0.05$, power = 0.80) indicates a minimum of approximately 109 observations. The final sample of 220 firms exceeds both thresholds, providing sufficient statistical power for model estimation. Although non-probability sampling limits strict population-level generalization, the targeted key-informant approach strengthens the validity of firm-level inference within a variance-based SEM framework.

The quantitative phase was then carried out using Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the survey data. PLS-SEM is well-suited for studies involving complex models with multiple latent variables and does not require data to follow a normal distribution (Hair et al., 2019). SmartPLS 4.0 was used to estimate both the measurement model and the structural model. In evaluating the measurement model, scale reliability was assessed using Cronbach's alpha and composite reliability, while convergent validity was examined through factor loadings and the Average Variance Extracted (AVE). Discriminant validity was verified using the Fornell–Larcker criterion and the HTMT ratio, ensuring that the latent constructs were conceptually distinct.

For the structural model, multicollinearity was assessed using variance inflation factors (VIF), followed by the estimation of path coefficients and statistical significance testing via bootstrapping with 5,000 resamples. The model's explanatory power, effect sizes and predictive relevance were evaluated using the R^2 , f^2 and Q^2 indices. The PLS-SEM results provide empirical evidence of the extent to which

technological, organizational and environmental factors influence SMEs' and startups' intention to adopt smart digital financial solutions.

RESULTS AND DISCUSSION

Results

Cronbach's Alpha

The reliability assessment results presented in Table 1 indicate that all measurement scales meet the acceptable reliability thresholds established in contemporary international standards. Specifically, the Cronbach's alpha coefficients of the constructs range from 0.766 to 0.925, exceeding the minimum threshold of 0.70 recommended by Hair et al. (2017). This confirms the reliability of each observed variable and demonstrates that the overall measurement scale is appropriate. In addition, the composite reliability (CR) values for all latent constructs exceed 0.80, ranging from 0.865 to 0.952, further reinforcing the reliability of the scales. The consistently high CR values indicate strong internal consistency among the items used in the study.

Table 1. Construct reliability and validity

Variables	Cronbach's alpha	Rho_A	Composite reliability (CR)	Average variance extracted (AVE)
BI	0,922	0,923	0,951	0,866
CD	0,907	0,911	0,941	0,843
COM	0,856	0,863	0,912	0,776
COST	0,800	0,800	0,882	0,714
CPLX	0,766	0,767	0,865	0,681
EC	0,823	0,823	0,894	0,739
GS	0,925	0,926	0,952	0,869
RA	0,822	0,828	0,894	0,737
TMS	0,891	0,896	0,932	0,821

Note: BI = Behavioral Intention; CD = Customer Demand; COM = Compatibility; COST = Perceived Cost; CPLX = Complexity; EC = Employee Competence; GS = Government Support; RA = Relative Advantage; TMS = Top Management Support.

Source: Author's research findings (2025)

Convergent validity assessment

The results reported in Table 1 indicate that all constructs satisfy the criterion for convergent validity. The Average Variance Extracted (AVE) values range from 0.681 to 0.869, all of which exceed the widely accepted threshold of 0.50. As noted by Hair et al. (2017), an AVE value above 0.50 signifies that the latent construct accounts for more than half of the variance in its observed indicators, thereby demonstrating adequate explanatory power. An AVE below this level would suggest that error variance dominates the explained variance. Based on these results, it can be concluded that the constructs used in the study exhibit strong convergent validity.

Discriminant validity assessment

To assess discriminant validity, the square root of the AVE for each latent construct must exceed its correlations with other constructs. In SmartPLS, following the Fornell–Larcker criterion, the square roots of the AVE values appear on the diagonal of the correlation matrix, while the inter-construct correlations are placed below the diagonal. As shown in Table 2, the diagonal values (bolded) are consistently greater than the corresponding off-diagonal correlations, indicating that the measurement scales satisfy the requirement for discriminant validity.

Table 2. Fornell-Larcker criterion

Variables	BI	CD	COM	COST	CPLX	EC	GS	RA	TMS
BI	0,930								
CD	0,558	0,918							
COM	0,530	0,420	0,881						
COST	-0,527	-0,413	-0,325	0,845					
CPLX	-0,550	-0,367	-0,351	0,414	0,825				
EC	0,583	0,467	0,459	0,316	0,455	0,859			
GS	0,593	0,502	0,426	0,433	0,491	0,543	0,932		
RA	0,439	0,372	0,330	0,251	0,228	0,347	0,345	0,859	
TMS	0,318	0,271	0,096	0,145	0,167	0,172	0,200	0,119	0,906

Note: BI = Behavioral Intention; CD = Customer Demand; COM = Compatibility; COST = Perceived Cost; CPLX = Complexity; EC = Employee Competence; GS = Government Support; RA = Relative Advantage; TMS = Top Management Support.

Source: Author's research findings (2025)

In addition, discriminant validity was further examined using the Heterotrait–Monotrait Ratio (HTMT). The results indicate that all construct pairs exhibit HTMT values below the threshold of 0.90, which is consistent with accepted guidelines. This provides additional evidence that the constructs in the model are empirically distinct (Table 3).

Table 3. Heterotrait-Monotrait ratio (HTMT)

Variables	BI	CD	COM	COST	CPLX	EC	GS	RA	TMS
BI									
CD	0,607								

COM	0,592	0,475							
COST	0,612	0,482	0,389						
CPLX	0,652	0,439	0,431	0,530					
EC	0,667	0,538	0,545	0,389	0,574				
GS	0,642	0,545	0,475	0,504	0,583	0,624			
RA	0,501	0,428	0,392	0,309	0,284	0,422	0,392		
TMS	0,349	0,299	0,110	0,168	0,195	0,204	0,214	0,140	

Note: BI = Behavioral Intention; CD = Customer Demand; COM = Compatibility; COST = Perceived Cost; CPLX = Complexity; EC = Employee Competence; GS = Government Support; RA = Relative Advantage; TMS = Top Management Support.

Source: Author's research findings (2025)

These results indicate that the measurement scales used in the study satisfy the required standards of reliability and discriminant validity.

Structural model assessment

According to Hair et al. (2017), multicollinearity may arise when tolerance falls below 0.20 or when the Variance Inflation Factor (VIF) exceeds 5. The VIF is computed as the inverse of tolerance, where tolerance is defined as $1 - R^2$. Therefore, when R^2 is below 0.80, multicollinearity is generally not a concern. The results presented in Table 4 show that all VIF values are below the threshold of 5, confirming that the structural model does not exhibit multicollinearity.

Table 4. Outer loadings and collinearity statistics (VIF)

Variables	BI	CD	COM	COST	CPLX	EC	GS	RA	TMS	VIF
BI1	0,934									3,545
BI2	0,927									3,256
BI3	0,930									3,545
CD1		0,920								3,050
CD2		0,920								2,842
CD3		0,913								3,012
COM1			0,870							2,149
COM2			0,882							2,148
COM3			0,891							2,111
COST1				0,841						1,664
COST2				0,845						1,695
COST3				0,849						1,793
CPLX1					0,831					1,662
CPLX2					0,829					1,553
CPLX3					0,816					1,496
EC1						0,871				2,024
EC2						0,842				1,681

EC3						0,865				1,959
GS1							0,928			3,494
GS2							0,930			3,300
GS3							0,940			3,977
RA1								0,881		1,974
RA2								0,860		1,994
RA3								0,835		1,674
TMS1									0,917	3,111
TMS2									0,898	2,593
TMS3									0,903	2,432

Note: BI = Behavioral Intention; CD = Customer Demand; COM = Compatibility; COST = Perceived Cost; CPLX = Complexity; EC = Employee Competence; GS = Government Support; RA = Relative Advantage; TMS = Top Management Support.

Source: Author's research findings (2025)

Model fit assessment

The goodness of fit of the model was assessed using the coefficient of determination (R^2). As reported in Table 5, the R^2 value for the BI variable is 0.629, with an adjusted R^2 of 0.620. These values meet the statistical criteria for model adequacy and indicate that the independent variables in the model explain approximately 62.0% to 62.9% of the variance in BI.

Table 5. R-square

	R-square	R-square adjusted
BI	0,629	0,620

Note: BI = Behavioral Intention.

Source: Author's research findings (2025)

The overall fit of the model was evaluated using the SRMR, d_ULS, and d_G indices. As shown in Table 6, the SRMR value is 0.051, which is lower than the recommended threshold of 0.08 proposed by Hu and Bentler (1998), indicating a good fit between the model and the empirical data. The values of d_ULS (1.002) and d_G (0.573) are stable, reflecting consistency in the estimation process. In addition, the Chi-square statistic of 1,284.395 and the NFI value of 0.804 fall within acceptable ranges; notably, the NFI exceeds the 0.80 benchmark, providing further support for the overall fit of the PLS-SEM model.

Table 6. Model_Fit

	Saturated model	Estimated model
SRMR	0,051	0,051
d_ULS	1,002	1,002
d_G	0,573	0,573
Chi-square	1284,395	1284,395
NFI	0,804	0,804

Source: Author's research findings (2025)

Hypothesis testing

Using the bootstrapping technique with 5,000 resamples (Hair et al., 2016), the estimated path coefficients are reported in Table 7. The results indicate that all hypothesized relationships in the model are statistically significant.

Among the factors influencing BI, COST demonstrates the strongest effect, with $\beta = 0.189$ ($T = 4.912$; $p = 0.000$), followed by CPLX ($\beta = 0.176$; $T = 4.441$; $p = 0.000$) and EC ($\beta = 0.174$; $T = 3.992$; $p = 0.000$). The variables COM and TMS also exhibit meaningful effects, with coefficients of $\beta = 0.168$ and $\beta = 0.144$, respectively (both $p = 0.000$).

Although CD, GS, and RA show more modest coefficient values (β ranging from 0.111 to 0.133), these relationships remain statistically significant ($p < 0.05$), confirming their supplementary role in shaping BI.

Overall, these findings show that all hypotheses are supported, indicating that each construct in the model exerts a positive influence on BI, albeit with varying magnitudes of impact across factors.

Table 7. Hypothesis testing

Hypothesis	Original sample (O)	Standard deviation (STDEV)	T statistics ($ O/STDEV $)	P values	Kết luận
CD $\rightarrow$ BI	0,111	0,039	2,840	0,005	Accept
COM $\rightarrow$ BI	0,168	0,041	4,107	0,000	Accept
COST $\rightarrow$ BI	-0,189	0,039	4,912	0,000	Accept
CPLX $\rightarrow$ BI	-0,176	0,040	4,441	0,000	Accept
EC $\rightarrow$ BI	0,174	0,043	3,992	0,000	Accept
GS $\rightarrow$ BI	0,129	0,050	2,579	0,010	Accept
RA $\rightarrow$ BI	0,133	0,037	3,557	0,000	Accept
TMS $\rightarrow$ BI	0,144	0,031	4,712	0,000	Accept

Note: BI = Behavioral Intention; CD = Customer Demand; COM = Compatibility; COST = Perceived Cost; CPLX = Complexity; EC = Employee Competence; GS = Government Support; RA = Relative Advantage; TMS = Top Management Support.

Source: Author's research findings (2025)

Discussion

The SEM-PLS results indicate that all three dimensions of the TOE framework exert statistically significant effects on the intention to adopt smart digital financial solutions (BI), with a clearly differentiated pattern of influence across groups. Overall, these findings are consistent with Tornatzky and Fleischer (1990), who argue that organizational innovation behavior emerges from the interplay between technological characteristics, organizational capabilities, and environmental conditions. A notable feature in the Vietnamese context is the relatively high sensitivity to cost and complexity, suggesting that SMEs and startups continue to face substantial resource constraints when implementing digital financial solutions.

The Technological dimension exerts the strongest influence on BI, aligning with observations from prior TOE studies in emerging markets (Oliveira and Martins, 2011; Awa et al., 2017). Among its components, compatibility (COM) shows the largest positive effect, reinforcing Rogers' (2003) assertion that the

alignment of a technology with existing systems reduces perceived risk and facilitates adoption intention. By contrast, implementation cost (COST) and complexity (CPLX) both demonstrate sizable negative effects, consistent with the findings of Baker (2012) and Gangwar et al. (2015), indicating that financial and operational barriers remain significant deterrents for SMEs and startups. Unlike firms in developed economies that often benefit from diversified financing channels, Vietnamese startups rely heavily on internal funds, short-term bank credit, or informal capital networks. Under such conditions, investment decisions are evaluated primarily through short-term cash-flow impact rather than long-term strategic gains. Consequently, even if smart digital financial solutions promise efficiency improvements, high upfront costs increase perceived financial vulnerability, making firms more price-sensitive than strategy-oriented. Meanwhile, relative advantage (RA), although positively associated with BI, exhibits a relatively weak effect. This may reflect a pragmatic managerial mindset prevalent in emerging markets, where survival and liquidity stability take precedence over long-term strategic optimization. Managers may acknowledge the benefits of advanced analytics or automation; however, unless these benefits translate into immediate operational feasibility, they are insufficient to drive adoption intention.

Within the Organizational dimension, both top management support (TMS) and employee competence (EC) show positive effects, albeit at moderate levels. This pattern aligns with Low et al. (2011) and Zhu et al. (2006), which suggest that organizational characteristics primarily serve as enabling conditions rather than dominant drivers of technological intention. Notably, employee competence exerts a stronger influence than managerial support, underscoring the importance of digital skills and absorptive capacity, consistent with the findings of Singh et al. (2019) and Baker (2012). However, compared with studies conducted in more advanced economies, the overall impact of organizational factors in Vietnam is markedly lower, implying that adoption decisions among SMEs and startups remain strongly shaped by external forces and technological considerations rather than internal readiness.

In the Environmental dimension, both customer demand (CD) and government support (GS) positively influence BI, highlighting the role of market conditions and regulatory frameworks in driving innovation behaviors. These findings correspond with the conclusions of Oliveira and Martins (2011) and Baker (2012), both of which emphasize the importance of market pressure in catalyzing digital innovation among SMEs and startups. Nevertheless, the effect of GS is weaker than that of CD, reflecting a characteristic feature of Vietnam: the fintech policy framework is still evolving and primarily functions to stabilize the environment rather than to act as a direct catalyst for adoption. This observation is consistent with Nguyen and Pham (2021), who note that Vietnamese firms often view policy support as a foundational condition, while market demands serve as the immediate source of pressure driving technology adoption. Taken together, the results depict a three-layer influence structure: Technology as the decisive driver, Environment as the enabling force, and Organization as the supporting foundation. This configuration accurately reflects the current trajectory of digital transformation among Vietnamese SMEs and startups. The model not only aligns with the classical TOE framework but also highlights a notable shift in innovation behavior within emerging markets, where technological advancement and market demand increasingly serve as the two primary engines of adoption, while organizational capability plays a stabilizing role that ensures feasibility and sustainability during implementation. These insights offer a meaningful contribution to the existing literature, particularly in the context of the accelerating expansion of fintech and digital transformation in Vietnam.

CONCLUSION AND RECOMMENDATION

Conclusion

The study was conducted to address an existing gap in both academic research and practical understanding regarding SMEs' and startups' intention to adopt smart digital financial solutions in Vietnam, a topic that has received limited attention despite the growing importance of digital financial technologies

in enterprise management. Building on the Technology–Organization–Environment (TOE) framework, the research model examined the effects of eight factors across the three contextual dimensions on the intention to adopt digital financial technologies.

The findings indicate that all three contextual dimensions statistically significant effects on BI. The Technological context demonstrates the strongest influence, particularly through factors related to implementation cost and perceived complexity, reflecting SMEs' practical concerns regarding technical feasibility and limited resource capacity. The Organizational context, represented by top management support and employee competence, shows moderate influence, functioning primarily as a set of enabling conditions. The Environmental context, which includes customer demand and government support, also exhibits meaningful effects, highlighting the role of market pressure and institutional frameworks in shaping SMEs' innovation behavior.

Overall, SMEs' intention to adopt digital financial solutions emerges from the interaction of three layers of influence: (i) the capability and suitability of the technology, (ii) the organization's readiness and internal capacity, and (iii) signals and pressures from the external environment. These findings align with the initial research goals and extend the application of the TOE framework to the domain of smart digital finance, an area that remains relatively nascent in the Vietnamese context.

Although this study focuses on Vietnam, the pattern of findings may reflect broader conditions found in many emerging economies. The strong impact of cost and complexity suggests that firms in this context are primarily concerned with financial feasibility and operational risk. In other words, before thinking about long-term strategic benefits, managers first ask whether they can afford the technology and whether it can be implemented smoothly.

This priority may be linked to structural conditions. In environments where access to capital is limited and regulatory systems are still developing, firms tend to be cautious. Even if a digital solution promises efficiency gains, high upfront investment or implementation difficulty can discourage adoption. In contrast, in countries with more stable financial systems and stronger institutional support, firms may place greater weight on strategic advantage or organizational capability rather than immediate cost concerns.

Cultural context may also play a role. In societies where businesses are more risk-averse, perceived complexity and financial uncertainty may have a stronger deterrent effect. In settings that emphasize long-term orientation, firms may be more willing to absorb short-term costs in exchange for future gains. Similarly, the influence of environmental pressures, such as customer demand, may vary depending on how digitally mature the market is.

Recommendations

(1) Recommendations for SMEs and startups

First, SMEs and startups should prioritize assessing technological feasibility prior to implementation. The results indicate that cost and integration capability are the two most critical determinants of adoption. Firms therefore need to evaluate the total lifecycle cost of the technology, its ability to interface with existing systems and the operational complexity it may introduce.

Second, strengthening the digital capability of employees is essential. Since employee competence has a clear influence on the intention to adopt digital financial solutions, firms should invest in internal training, encourage continuous learning of new technologies and develop specialized teams responsible for financial and technological functions.

Third, firms should proactively respond to evolving customer needs. As customers increasingly expect digitalized experiences, SMEs and startups should accelerate the adoption of digital financial tools in payment processing, invoice management, cash-flow forecasting and customer service to enhance competitiveness.

(2) Recommendations for digital financial solution providers

First, solution providers should design products that simplify the user experience and minimize perceived complexity. Since complexity has a substantial influence on adoption intention, solutions need to be intuitive, easy to implement and capable of integrating quickly with existing accounting systems, ERP platforms or other operational tools used by SMEs. Second, providers should develop flexible pricing models. Given the limited resources of SMEs and startups, solution packages should be cost-effective and scalable, potentially offered through monthly subscription plans or usage-based pricing tailored to the size and needs of each firm.

(3) Recommendations for regulatory agencies

First, regulatory agencies should enhance the legal framework and standardize data practices. The finding that government support influences BI underscores the role of institutional conditions in reducing perceived risk and strengthening confidence among SMEs and startups. Continued improvements are needed in areas such as electronic identification, enterprise data sharing, digital payments and information security.

Second, targeted programs to support financial digital transformation for SMEs and startups should be expanded. Policy instruments such as incentive schemes, financial support funds, training programs and shared digital platforms can help reduce investment costs and strengthen operational capacity for firms. Third, broader financial digital literacy initiatives should be promoted. Government bodies and business associations should collaborate on communication campaigns aimed at raising awareness and reducing firms' perceived risks related to adopting digital financial solutions.

Limitations and directions for future research

This study has several limitations. First, the data were collected mainly from specific locations and groups of firms, which may limit the extent to which the sample represents the diversity of the overall SME and startup ecosystem in Vietnam. Second, the study focuses on measuring intention based on employees' perceptions and does not observe actual post-adoption behavior after the technology has been implemented. Third, the research model incorporates organizational factors at the micro level but does not account for macro-level characteristics such as financial capacity, organizational structure or firm size-factors that may create substantial differences across enterprises and influence their ability to absorb innovations. This limitation partly reflects the nature of SMEs and startups, in which macro-level variation is often less pronounced, but it also reveals a gap regarding the role of organizational macro-environment in digital transformation.

Future research may extend in several directions: (i) integrating macro-level characteristics such as financial capacity, organizational structure or firm size to provide a more comprehensive assessment of firms' innovation readiness; (ii) examining actual usage behavior after implementation to test the sustainability of adoption intention; (iii) comparing SMEs, startups and large enterprises to identify differences in technological adoption mechanisms; and (iv) incorporating dynamic factors such as digital organizational culture, organizational learning capability or innovation capacity to better capture the full process of digital transformation.

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