Determinants of Mobile Apps Adoption in SMEs of Bangladesh: The Role of Digital Financial Literacy

Md. Amdadul Hoque[1*], Rosli Mahmood[2], Rosalan Ali [3], Nur Shazwani Rosli [4], Md. Mamun Hossain[5]

[1]PhD Research Fellow, Putra Business School, Universiti Putra Malaysia, and Associate Professor, Department of Finance & Banking, Comilla University, Bangladesh; ORCID ID: 0009-0006-7573-3032.
[2]Putra Business School, Universiti Putra Malaysia, Malaysia, ORCID ID: 0000-0003-4869-1851.
[3]Putra Business School, Universiti Putra Malaysia, Malaysia, ORCID ID: 0009-0009-4576-7161.
[4]Sunway University, Malaysia, ORCID ID: 0009-0009-2019-976X
[5]Vice-President, NRBC Bank PLC, Dhaka, Bangladesh
[*]*Corresponding Author: E-mail: amdad527@gmail.com*

Citation: Hoque, M.A., Mahmood, R., Ali, R., Rosli, N.S., & Hossain, M.M. (2025). Determinants of Mobile Apps Adoption in SMEs of Bangladesh: The Role of Digital Financial Literacy. *Finance & Economics Review,* 7(1), 108-123. https://doi.org/10.38157/fer.v7i1.731.

Research Article

Abstract

Purpose: *The objective of this study is to examine the key determinants influencing the adoption of mobile apps among SMEs in Bangladesh, with a particular focus on the role of digital financial literacy.*

Methods: *The research gathered data using a structured questionnaire and probability-stratified random sampling methods. A total of 302 data were collected and analyzed with PLS-SEM. Two urban cities, Chattogram and Cumilla, along with their semi-urban areas, have been selected as the study areas.*

Results: *The study found that relative advantages, competitive pressure, and organizational readiness are significantly correlated with behavioral intentions to adopt mobile payment systems. Nonetheless, compatibility and perceived security do not substantially influence the adoption of mobile apps in SMEs. Simultaneously, digital financial literacy moderates the interaction among competitive pressure, compatibility, and the adoption of mobile apps by SMEs in Bangladesh.*

Originality: *This study contributes to the field by extending the TOE framework with digital financial literacy as a moderating factor, providing new theoretical and practical insights into how TOE dimensions influence the adoption of mobile payment systems by SMEs in Bangladesh.*

Keywords: Mobile Apps Adoption, Extended TOE framework, SMEs, Digital Financial Literacy, Bangladesh.

1. Introduction

The rapid advancement of digital technologies has transformed business operations globally, with mobile applications and payment systems emerging as critical tools for facilitating financial transactions and business management. M-payment systems offer significant convenience by allowing users to make transactions at any time and from anywhere, which is a major driver of their adoption. The ease of use and time-saving nature of these systems are critical factors influencing user behavior (Singh,2020). These systems not only improve operational efficiency for businesses but also enhance customer satisfaction by enabling faster, more secure, and contactless transactions. Particularly in developing economies, m-payment adoption plays a vital role in driving financial inclusion, supporting the unbanked, and fostering

Published by *Research & Innovation Initiative Inc.,* registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

the transition to a cashless society (Best, 2020; Lee, 2021). Globally, SMEs are the backbone of economic growth, contributing more than 90% of businesses, over 50% of global employment, and 60–70% of GDP (UNCTAD, 2023). In developing economies, SMEs are especially critical for poverty reduction, job creation, and sustainable economic development. However, SMEs continue to face significant challenges in accessing finance, integrating digital technologies, and enhancing competitiveness. In this regard, mobile payments represent a promising solution, offering SMEs opportunities to overcome financial constraints, streamline operations, and connect to broader markets. Despite this potential, the adoption of mobile payment systems by SMEs in many developing countries remains limited.

In Bangladesh, technological advancements have paved the way for digital transformation, driven by rising smartphone penetration (projected to reach 63% by 2025) and expanding 4G coverage. Bangladesh has experienced rapid growth in digital ecosystems (GSMA, 2020). Mobile financial services (MFS) and digital payments have witnessed remarkable growth, particularly during the COVID-19 pandemic, which accelerated the shift toward contactless transactions. Between 2016 and 2019, mobile transactions nearly doubled, growing from USD 27 billion to USD 51 billion (Economist, 2020). Additionally, mobile money usage in Bangladesh increased dramatically from 3% to 57% of the population (Bangladesh Bank, 2021). Despite these advancements, merchant payments accounted for only 4.36% of total mobile payment transactions as of October 2021 (Bangladesh Bank, 2021), highlighting the limited integration of mobile payments into SME business processes. This situation presents a crucial problem: while mobile payment infrastructure is expanding and consumer adoption is increasing, SMEs in Bangladesh remain hesitant to integrate digital systems such as AI and fintech into their operations (Jahan et al., 2024). The limited adoption may be attributed to factors such as insufficient digital literacy, lack of trust in digital platforms, inadequate institutional support, and infrastructure challenges. These barriers hinder SMEs from fully leveraging the benefits of mobile payments, which can improve productivity, reduce transaction costs, and enhance customer engagement.

Although numerous studies have examined mobile app usage among SMEs in countries such as Nigeria (Tolani et al., 2019), Indonesia (Adi Wijaya et al., 2025; Manap & Rijal, 2024), South Africa (Slinger et al.,2024), Turkey (Uzkurt et al., 2024), Palestine (Mujahed et al.,2022), and Tanzania (Mushi, 2024), limited attention has been paid to the Bangladeshi SME context, particularly regarding mobile payment adoption. Prior studies have highlighted diverse factors influencing mobile app adoption, including dynamic capabilities, digital literacy, perceived usefulness, facilitating conditions, institutional support, and service quality. However, research specific to Bangladesh has not sufficiently explored the determinants, barriers, and enabling conditions for SMEs' adoption of mobile payments. Thus, a clear research gap exists in understanding why Bangladeshi SMEs have been slow to adopt mobile payment systems, despite a supportive ecosystem and rising consumer demand. Moreover, the role of digital financial literacy in this context has been scarcely explored in prior studies (Gumilar et al.,2024). Addressing this gap is crucial, given that SMEs represent a significant portion of Bangladesh's economic activities and employment, yet struggle with limited access to finance and modern financial tools. This study, therefore, aims to investigate the factors influencing the adoption of mobile payment systems among SMEs in Bangladesh. By addressing this objective, the study will contribute to the broader discourse on digital transformation and financial inclusion in developing economies. It will also generate practical insights for industry stakeholders in Bangladesh, enabling the design of policies and solutions that promote SME digitalization and strengthen the overall economic ecosystem.

2. Theoretical Background and Conceptual Framework

Mobile payments surpassed credit card payments globally in 2019, with 4.8 billion wallets expected by 2025 (Lee, 2021). The leading global players include AliPay, WeChat Pay in China, Apple Pay, and Google

Published by *Research & Innovation Initiative Inc.,* registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

Pay in the United States. SadaPay in Pakistan, Mercado Pago and PicPay in Brazil, Paytm in India, M-Pesa and Kopa Kopa in Kenya, and Rocket, Bkash, and Nagad in Bangladesh are the leading local players (Hoque et al.,2024; Lee, 2021; Piper, 2020). However, M-Pesa and Kopo Kopo have demonstrated to the world how to implement mobile payment systems, and most nations have adopted their models. Moreover, a systematic literature review reveals that numerous researchers (Acquah-Sam & Bugre, 2018; Chingapi & Steyn, 2022; Conwell & Stanislaus, 2020; N.A. Khan et al., 2021; Kirui et al., 2020) have conducted extensive research on M-Payment adoption among SMEs worldwide.

In Bangladesh, mobile financial service (MFS) providers, such as bKash, Rocket, and Nagad, have created new opportunities for SMEs to conduct secure, convenient transactions, reduce their reliance on cash, and expand access to financial services (Hazra & Priyo, 2021). Prior research has widely applied theoretical models such as the Diffusion of Innovation (DOI) (García-Avilés, 2020), the Technology Acceptance Model (TAM) (Davis et al., 1989), the Theory of Planned Behavior (Ajzen, 1991), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) to explain individual-level technology adoption. However, these frameworks predominantly focus on user attitudes and behavioral intentions, which limit their explanatory power for organizational-level adoption, such as SMEs. As a result, scholars (Rahaman & Islam, 2022; Mohiuddin et al., 2023) argue that broader perspectives are necessary to incorporate firm-level, environmental, and institutional factors in explaining the adoption of digital technologies by SMEs, particularly in developing countries such as Bangladesh.

The Technology–Organization–Environment (TOE) framework (Tornatzky & Fleischer, 1990) provides a robust structure for investigating firm-level technology adoption. Unlike individual-centric models, the TOE framework considers the interplay of technological, organizational, and environmental factors that shape adoption behaviors. Empirical studies have demonstrated the successful application of the TOE model in investigating the adoption of social commerce (Abed, 2020), AI Adoption (Hoque et al.,2025), cloud computing (Khayer et al., 2020), blockchain (Clohessy & Acton, 2019), and big data (Maroufkhani et al., 2023). Within the SME context, the TOE framework has been recognized as particularly suitable because it captures the resource constraints, competitive pressures, and government regulations that uniquely influence the technological decisions of smaller firms (Christian et al., 2019; Urumsah et al., 2022). Furthermore, the framework has been widely adopted in developing country contexts, where socio-economic and institutional barriers significantly impact the adoption of financial technology by SMEs (Moreira-Santos et al., 2022). In line with these findings, the TOE framework is particularly relevant for exploring the adoption of mobile payments by Bangladeshi SMEs, where technological readiness, organizational capacity, and environmental support collectively shape digital transformation trajectories.

This study conceptualizes relative advantage, perceived security, competitive pressure, compatibility, and organizational readiness as key independent variables under the TOE framework. Relative advantage, defined as the degree to which mobile apps offer financial or operational benefits over traditional payment methods, has consistently been identified as a strong determinant of adoption (Abed, 2020; Bhowmik et al, 2025). Perceived security, which reflects trust in system integrity and protection from fraud, is especially critical in financial contexts where concerns about privacy and cyber threats may hinder adoption (Khayer et al., 2020). Compatibility captures the alignment of mobile apps with existing business processes and customer expectations, influencing how seamlessly SMEs can integrate new technologies (Eze et al., 2019). Competitive pressure, derived from market rivalry and peer adoption, also accelerates SMEs' engagement with mobile payments (Cruz-Jesus et al., 2019). Lastly, organizational readiness, encompassing financial resources, human capital, and IT infrastructure, is a core organizational dimension that enables firms to effectively deploy and sustain mobile payment systems (El-Haddadeh, 2020; Marei et al., 2023). Together, these TOE-based constructs provide a comprehensive lens to explain SMEs' technological adoption in the Bangladeshi context.

A unique contribution of this study is the integration of digital financial literacy (DFL) as a moderating variable within the TOE framework. Digital financial literacy refers to the ability of SME owners and decision-makers to effectively understand, evaluate, and use digital financial services (Hossain et al.,

Published by *Research & Innovation Initiative Inc.*, registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

2020). Research highlights that low levels of digital literacy often act as barriers to technology adoption in developing countries, while enhanced literacy significantly improves firms' capability to leverage fintech services (Mohiuddin et al., 2023). By moderating the relationship between technological, organizational, and environmental factors and mobile app adoption, DFL provides deeper insights into how knowledge and skills mediate adoption outcomes. For instance, an SME with a high perceived relative advantage may still fail to adopt mobile payments if its decision-makers lack digital literacy (Azevedo & Almeida, 2021). Conversely, SMEs with strong digital literacy are better equipped to assess security risks, respond to competitive pressures, and utilize available organizational resources effectively. Thus, extending the TOE framework with digital financial literacy provides a more nuanced and context-specific explanation of mobile app adoption in SMEs. This theoretical extension not only advances the academic understanding of fintech adoption in emerging economies but also informs policymakers and industry stakeholders in designing literacy-enhancing initiatives to accelerate digital transformation among SMEs in Bangladesh. Based on this theoretical background and empirical evidence, the following conceptual framework was proposed.

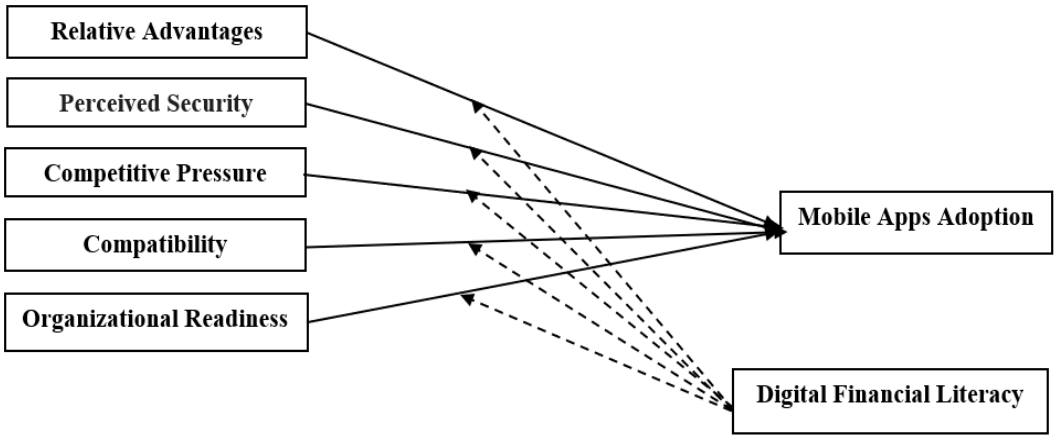


Fig.1: Conceptual Framework

3. Hypothesis Development

3.1 Relative Advantages

Relative advantage refers to the degree to which an innovation is perceived as superior to the existing practice, and it has been widely studied as a determinant of technology adoption. Several studies confirm that relative advantage plays a crucial role in shaping adoption decisions across various technologies. For instance, Aligarh et al. (2023) found that relative advantage had a significant impact on the adoption of cloud computing among Indonesian MSMEs. Similarly, Alasady et al. (2023) found that relative advantage had a positive effect on cloud adoption among Iraqi SMEs, thereby further enhancing firm performance. In the context of financial services, Marei et al. (2024) reported that relative advantage significantly influenced fintech adoption in Jordanian banks. A similar conclusion was drawn by Kumar et al. (2021), who demonstrated that relative advantage is a strong driver of blockchain adoption in Indian SMEs. Moreover, Kuruwitaarachch et al. (2019) found that relative advantage significantly predicted e-commerce adoption in Sri Lankan SMEs. Consistent with these results, Khayer et al. (2020) confirmed the robust role of relative advantage in cloud computing adoption among Bangladeshi SMEs. Based on this evidence, it is expected that relative advantage also influences the adoption of mobile applications in SMEs. Thus, the following hypothesis is proposed:

H_1: Relative advantage significantly influences mobile apps adoption in SMEs.

Published by *Research & Innovation Initiative Inc.,* registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

3.2 Perceived Security

Perceived security has been widely recognized as a critical determinant of technology adoption, particularly in the financial and digital domains. Several studies confirm that when users perceive greater security, their intention to adopt new technologies increases significantly. For instance, Xie et al. (2021) demonstrated that perceived security has a positive influence on individuals' adoption of fintech services in China, while NgoHai and Truong (2023) found that security was the strongest predictor of digital banking adoption among Vietnamese customers. Similarly, Almaiah et al. (2023) confirmed that security perceptions play a central role in mobile banking usage decisions in Jordan. In the organizational context, Arpaci et al. (2015) found that perceived security significantly influenced the acceptance of mobile communication technology among Turkish firms. In contrast, Wong et al. (2024) identified security as a key driver of blockchain adoption among SMEs in Hong Kong. These findings highlight that security is not only a concern for individual users but also a critical organizational factor. Hence, in the context of SMEs, stronger perceptions of security are likely to increase confidence and encourage the adoption of mobile apps. Thus, the following hypothesis is proposed.

H_2: Perceived security significantly influences mobile apps adoption in SMEs.

3.3 Competitive Pressure

Competitive pressure is a critical environmental factor within the TOE framework that shapes technology adoption decisions in organizations. Firms operating in highly competitive markets are often compelled to innovate and adopt digital solutions to sustain profitability and efficiency (Li et al., 2023). Several empirical studies have confirmed the positive role of competitive pressure in technology adoption. For example, Aligarah et al. (2023) demonstrated that competitor pressure significantly influenced cloud computing adoption among Indonesian MSMEs. Similarly, Marei et al. (2023) reported a positive relationship between competitive pressure and fintech adoption, which in turn enhanced the financial performance of Jordanian banks. Abbasi et al. (2022) also found that competitive industrial dynamics strongly influenced the adoption of social media marketing among Malaysian SMEs. In addition, Ali et al. (2023) demonstrated that competitive pressure drives blockchain adoption in halal food SMEs, while Kwarteng et al. (2024) highlighted its role in fostering digitization intentions among European SMEs. These findings collectively suggest that SMEs operating in competitive environments are more likely to adopt mobile apps to enhance efficiency, customer engagement, and market responsiveness. Based on this empirical evidence, the following hypothesis is proposed:

H_3: Competitive Pressure significantly influences mobile apps adoption in SMEs.

3.4 Compatibility

Compatibility refers to the extent to which an innovation aligns with the values, experiences, and needs of potential adopters, thereby influencing its acceptance (Shahadat et al., 2023). The Diffusion of Innovation (DOI) theory posits that technologies perceived as more compatible with existing practices are adopted more readily. Prior studies highlight compatibility as a critical determinant in the adoption of digital technologies by SMEs. For instance, Ahani et al. (2017) found that compatibility was the most influential factor in the adoption of social CRM among SMEs in Malaysia. Similarly, Al-Shboul (2019) emphasized compatibility as a significant driver of cloud ERP adoption in emerging countries. Kumar et al. (2021) also reported a positive effect of technological compatibility on the adoption of blockchain by SMEs in their supply chains. In addition, Santini et al. (2023) found, through a meta-analysis of IT adoption studies, that compatibility was the strongest predictor among antecedents. Likewise, Bag et al. (2023) emphasized the importance of compatibility in blockchain adoption and its impact on the performance of SMEs. Drawing on these findings, this study proposes that compatibility plays a crucial role in influencing the adoption of mobile apps among SMEs and presents the following hypothesis.

H_4: Compatibility significantly influences mobile apps adoption in SMEs.

Published by *Research & Innovation Initiative Inc.*, registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

3.5 Organizational Readiness

Organizational readiness has been widely recognized as a crucial determinant of technology adoption in firms, particularly among SMEs. It refers to the preparedness and capability of organizations to embrace new technological innovations, encompassing aspects such as infrastructure, leadership, culture, and strategic alignment (Clohessy & Acton, 2019; Yoon et al., 2020). Prior studies have consistently demonstrated a positive relationship between organizational readiness and technology adoption. For example, Urumsah et al. (2022) revealed that organizational readiness significantly facilitates fintech adoption, while Lutfi (2022) confirmed its influence on the adoption of cloud-based accounting systems in SMEs. Similarly, Wani and Aligarh (2024) found that organizational readiness is a strong predictor of cloud computing adoption in MSMEs, underscoring its enabling role. Furthermore, Al-Ma'aitah et al. (2024) demonstrated that organizational readiness enhances the adoption of Big Data Analytics, highlighting its relevance across diverse technologies. Collectively, these findings suggest that SMEs with higher levels of organizational readiness are more likely to adopt mobile apps for financial transactions and business operations. Therefore, the following hypothesis is proposed.

H_5: Organizational readiness significantly influences mobile apps adoption in SMEs.

3.6 Moderating Role of Digital Financial Literacy

Recent empirical evidence highlights the crucial role of financial literacy and digital literacy in influencing the adoption of fintech and mobile financial services among SMEs and organizational contexts. Studies in South Asia and beyond indicate that these literacies not only directly influence adoption but can also interact with technological, organizational, and environmental factors to determine adoption outcomes. For example, Islam and Khan (2024) found that financial literacy, digital literacy, and financial self-efficacy significantly enhanced fintech adoption in Bangladeshi SMEs, highlighting the contextual importance of knowledge and skills in developing economies. Similarly, Hidayat et al. (2025) demonstrated that financial literacy moderated the relationships among digital transformation, fintech adoption, and firm performance in Pakistani banks, suggesting that financial literacy can amplify or constrain the effects of organizational and technological enablers. Zaimovic et al. (2025) further emphasized that digital financial literacy mediates the effect of business experience on fintech adoption, underscoring its pivotal role in bridging capability gaps. Although Wibowo et al. (2025) found no moderation effect of financial literacy in Indonesia, the context-specific nature of literacy effects indicates that its moderating role should be tested within Bangladeshi SMEs. Given these findings, digital financial literacy is expected to strengthen or weaken the relationships between key TOE-based antecedents and SMEs' adoption of mobile apps. Hence, the proposed hypothesis is:

H_6-H_{10}: Digital financial literacy moderates the relationship between relative advantage, perceived security, competitive pressure, compatibility, organizational readiness, and the adoption of mobile apps in SMEs in Bangladesh.

4. Research Methodology

The population for this study consisted of all SMEs in Bangladesh. According to the SME Foundation in Bangladesh, there are approximately 7.9 million SMEs in the country (Dhaka Tribune, 2022). This study employed a probability-stratified random sampling process within the specified sampling frame. Since data were collected from owners, managers, and representatives across different SME sectors, this approach minimized sampling bias and enhanced representativeness. By dividing the population into homogeneous strata based on characteristics such as industry type and location, the method ensured an accurate reflection of population diversity. This technique is widely recommended for improving reliability and reducing sampling error (Pallant, 2020; Zikmund et al., 2012).

Published by *Research & Innovation Initiative Inc.,* registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

For data collection, a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), has been used to collect responses to each question. The study employed digital questionnaires distributed via popular social messaging platforms like WhatsApp and LINE, as well as social media platforms such as Instagram and Facebook groups dedicated to SMEs. A panel of experts reviewed the questionnaire prior to pre-testing, and any recommended modifications were incorporated based on their feedback. The constructs' items were incorporated from well-established scales to measure perceived security (Moreira-Santos et al., 2022), relative advantages, competitive pressure, compatibility (Shahadat et al., 2023), organizational readiness (Urumsah et al.,2022), digital financial literacy (Setiawan et al., 2023), and mobile apps adoption (Khayer et al.,2020). In this study, SPSS 26.0 was used to examine and prepare the data, and SmartPLS 4.0 was used for data analysis. The data were analyzed using a two-stage procedure. First, the measurement model's content, convergence, and validity were evaluated, followed by an examination of the model's hypotheses.

5. Findings, Analysis, and Discussions

5.1 Demographic Profile

The table presents the demographic and organizational characteristics of respondents for this study. The respondents primarily hold key decision-making positions, including Owner-Managers (52.6%), Managers/Heads of Units (24.2%), and Managing Directors/CEOs (8.3%). This ensures that insights are collected from individuals who directly influence financial and technological adoption decisions within SMEs. In terms of gender, the majority are male (76.8%), which reflects the male-dominated SME sector in Bangladesh. The age distribution shows that most respondents are relatively young to middle-aged, with 39.1% aged 30 years and below and 39.7% aged 31–40 years, indicating that technologically adaptive groups are well represented.

Table 1: Demographic Profile of the Respondents

Demographics	Categories	Frequency	Percentage (%)
Gender	Male	232	76.8
	Female	70	23.2
Age Range	30 years and below	118	39.1
	31 to 40 years	120	39.7
	41 to 50 years	48	15.9
	51 to 60 years	11	3.6
	Above 60 years	5	1.7
Marital Status	Single	96	31.8
	Married	206	68.2
Education	Secondary	21	7
	Higher Secondary	21	7
	Bachelor’s Degree	96	31.8
	Master’s Degree	105	34.8
	Others	59	19.5
Location	Dhaka Metropolitan	81	26.8
	Chattogram Metropolitan	26	8.6
	Rural area of Dhaka Division	46	15.2
	Rural area of Chattogram Division	149	49.3
Position in this company	Owner-Manager	159	52.6
	Manager/ Head of unit	73	24.2
	Managing Director/ Chief Executive Officer	25	8.3
	Others	45	14.9

Education levels are relatively high, with 66.6% of respondents holding bachelor’s or master’s degrees, indicating that they possess the academic background necessary to understand and evaluate mobile payment systems. Geographically, the sample is diversified, with a significant proportion (49.3%) from rural

Published by *Research & Innovation Initiative Inc.*, registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

Chattogram Division, highlighting the inclusion of SMEs operating in non-metropolitan areas. Regarding business profile, 32.8% of firms are relatively new (3–5 years old), while 16.6% have been established for more than 25 years, ensuring representation across different business life cycles. Turnover data shows that SMEs vary widely in size: 23.2% generate more than BDT 18 million annually, while 17.2% earn less than BDT 500,000. Overall, the table demonstrates that the study's respondents are diverse in terms of demographic and organizational characteristics, strengthening the validity of findings on mobile payment adoption among SMEs.

5.2 Reliability and Validity Test

Table 2 presents the results of the reliability and validity assessment of the study's measurement model. Reliability ensures that items consistently measure a construct, while validity indicates how accurately the construct is captured.

Table 2: Reliability and Validity Test

Construct/Item	Loadings	Cronbach Alpha	CR	AVE
RA1	0.842	0.846	0.853	0.684
RA2	0.856			
RA3	0.784			
RA4	0.826			
PS1	0.752	0.779	0.792	0.599
PS2	0.794			
PS3	0.803			
PS4	0.746			
CP1	0.787	0.763	0.774	0.579
CP2	0.726			
CP3	0.766			
CP4	0.761			
COM1	0.82	0.721	0.762	0.539
COM2	0.656			
COM3	0.773			
COMI4	0.675			
OR1	0.84	0.78	0.817	0.600
OR2	0.857			
OR3	0.652			
OR4	0.732			
DFL1	0.814	0.866	0.868	0.714
DFL2	0.852			
DFL3	0.878			
DFLI4	0.834			
MAA1	0.754	0.813	0.814	0.642
MAA2	0.839			
MAA3	0.828			
MAA4	0.78			

The standardized factor loadings for most items exceed the recommended threshold of 0.70, confirming item reliability. Cronbach's alpha values for all constructs are above 0.70, further indicating internal consistency. Composite Reliability (CR) values also exceed the benchmark of 0.70 (Hair et al., 2017), confirming strong construct reliability. Additionally, Average Variance Extracted (AVE) values are greater than 0.50 for all constructs, indicating convergent validity and confirming that the items effectively explain

Published by *Research & Innovation Initiative Inc.,* registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

their respective constructs (Nabi et al.,2025). Among the constructs, Digital Financial Literacy (CR = 0.868, AVE = 0.714) shows the strongest measurement quality, while Compatibility (CR = 0.762, AVE = 0.539) is comparatively lower but still acceptable. Overall, the results confirm that the measurement model is both reliable and valid for further PLS-SEM structural analysis.

5.3 Discriminant Validity and Correlation

Table 3 presents the discriminant validity of the constructs using the Heterotrait-Monotrait Ratio (HTMT). Discriminant validity ensures that constructs are statistically distinct from one another, thereby avoiding measurement redundancy. According to Henseler et al. (2015), HTMT values below 0.85 (strict) or 0.90 (liberal) indicate acceptable discriminant validity. In this study, most inter-construct correlations fall within the acceptable threshold, confirming that the constructs measure unique aspects of mobile payment adoption. The results show moderate to strong correlations among specific constructs. For example, Compatibility (COM) and Competitive Pressure (CP) exhibit a high correlation (r = 0.862), suggesting conceptual closeness. At the same time, Perceived Security (PS) and CP show the highest correlation (0.962), suggesting overlapping constructs that warrant careful interpretation. Digital Financial Literacy (DFL) shows moderate correlations with organizational readiness (OR = 0.700) and CP (0.774), underscoring its role as a moderator of both organizational and technological factors. Moreover, Mobile Apps Adoption (MAA) shows significant relationships with OR (r = 0.790) and CP (r = 0.668), underscoring its importance in adoption decisions. In contrast, Relative Advantage (RA) maintains comparatively lower correlations with other constructs (e.g., RA–DFL = 0.341, RA–PS = 0.453), confirming its conceptual independence. Overall, the HTMT results validate discriminant reliability, supporting the robustness of the measurement model.

Table 3: Discriminant validity-HTMT.

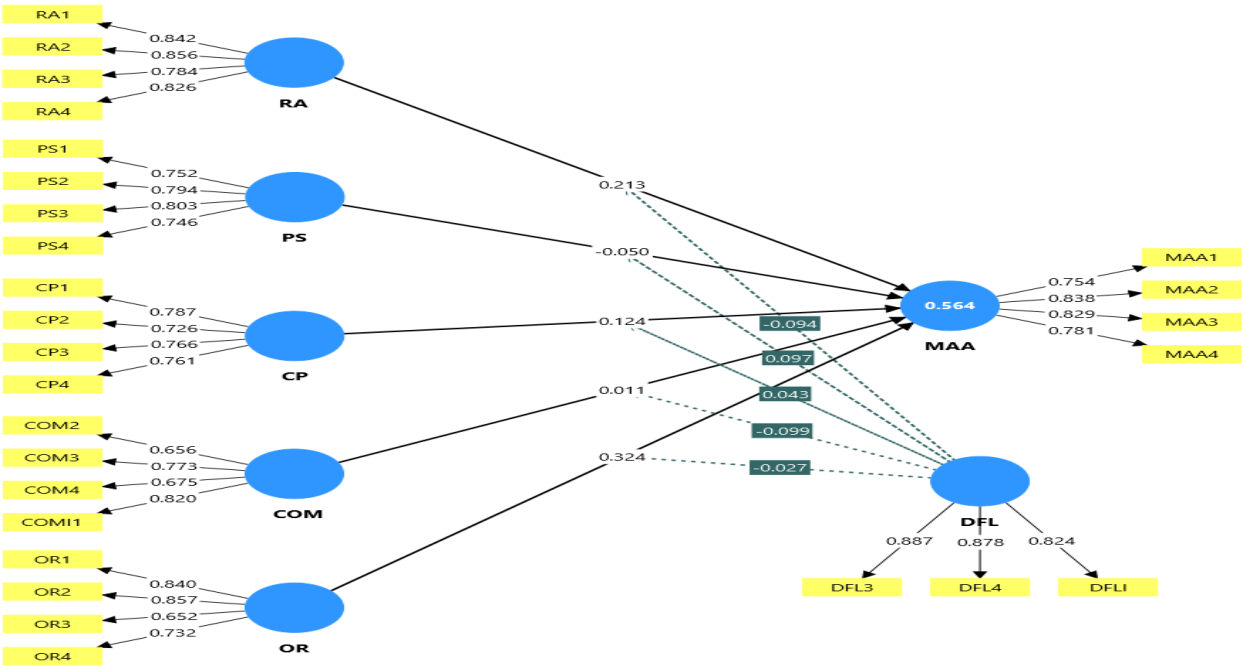
	COM	CP	DFL	MAA	OR	PS
COM						
CP	0.862					
DFL	0.698	0.774				
MAA	0.621	0.668	0.664			
OR	0.782	0.756	0.7	0.79		
PS	0.8	0.962	0.685	0.55	0.694	
RA	0.47	0.541	0.341	0.627	0.555	0.453

Source: Author's calculation

5.4 Structural Model

The structural model in Figure 2 illustrates the relationships among the latent variables that influence Mobile Apps Adoption (MAA) by SMEs in Bangladesh, as analyzed using PLS-SEM. The model indicates that Relative Advantage (RA) has a positive direct effect on MAA (β = 0.213), underscoring its pivotal role in adoption decisions. Perceived Security (PS), however, demonstrates an insignificant negative relationship with MAA (β = -0.050), suggesting that security concerns may not substantially influence adoption intentions in this context. Competitive Pressure (CP) has a small positive effect (β = 0.124), while Compatibility (COM) exerts a marginally positive but insignificant effect (β = 0.011). Organizational Readiness (OR) has the most substantial positive impact on MAA (β = 0.324), indicating that SMEs with adequate resources and preparedness are more likely to adopt mobile payments. Furthermore, the model includes Digital Financial Literacy (DFL) as a moderating variable. The interaction paths (e.g., CP–MAADFL = 0.097; COM–MAADFL = -0.099) show mixed results, with some positive and others negative, though none appear strongly significant. Overall, the model confirms that RA and OR are the most influential factors, while DFL's moderating role remains limited.

Published by *Research & Innovation Initiative Inc.*, registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).



5.5 Multicollinearity Test

Table 4 presents the Variance Inflation Factor (VIF) values, which are used to examine potential multicollinearity among predictors in the structural model. Multicollinearity occurs when independent variables are highly correlated, which can distort regression coefficients and compromise the reliability of the findings. According to Hair et al. (2017), a VIF value above five signals severe multicollinearity, while values exceeding 3.3 are considered more conservative warning thresholds. The results indicate that all VIF values fall well below the critical threshold, ranging between 1.475 and 3.493. The highest VIF is observed for the DFL × COM × MAA interaction (3.493), which is slightly above the conservative cut-off but still acceptable. Similarly, other interaction terms such as DFL × OR (3.323) and DFL × CP (3.097) remain within safe limits. The lowest VIF is for RA (1.475), demonstrating minimal collinearity. Overall, these results confirm that the predictors and moderating constructs are statistically independent and contribute uniquely to the model. Thus, the structural model is free of serious multicollinearity, ensuring the robustness and reliability of subsequent path analyses.

Table 4: Collinearity Statistics (VIF)

Construct	VIF
COM -> MAA	2.16
CP -> MAA	2.948
DFL x COM -> MAA	3.493
DFL x CP -> MAA	3.097
DFL x OR -> MAA	3.323
DFL x PS -> MAA	2.604
DFL x RA -> MAA	2.903
OR -> MAA	2.225
PS -> MAA	2.435
RA -> MAA	1.475

Published by *Research & Innovation Initiative Inc.*, registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

5.6 Results of Hypothesis

The results presented in Table 5 reveal mixed findings regarding the hypothesized relationships between the constructs and mobile app adoption (MAA). First, compatibility (COM → MAA) is found to have an insignificant effect (β = 0.002, t = 0.028, p = 0.128). Although the path coefficient is very close to zero, the extremely low t-value suggests weak explanatory power, implying that compatibility does not play a notable role in predicting MAA in this context. Conversely, Competitive Pressure (CP → MAA) demonstrates a significant positive relationship (β = 0.126, t = 1.688, p = 0.041). This suggests that lower levels of competitive pressure enhance adoption, supporting the notion that when systems are easier to navigate, individuals are more inclined to adopt them, aligning with Rogers' Diffusion of Innovation theory.

Table 5: Test of Hypotheses

Hypotheses	Path Coefficient	T-Values	P values
COM -> MAA	0.002	0.028	0.128
CP -> MAA	0.126	1.688	0.041
OR -> MAA	0.299	4.891	0.000
PS -> MAA	-0.046	0.658	0.511
RA -> MAA	0.213	4.138	0.000
DFL x COM -> MAA	0.117	1.726	0.084
DFL x CP -> MAA	0.073	0.748	0.024
DFL x OR -> MAA	-0.028	0.298	0.046
DFL x PS -> MAA	0.108	1.287	0.198

Organizational readiness (OR → MAA) is also significant (β = 0.299, t = 4.891, p = 0.000), highlighting that resource availability and preparedness strongly facilitate adoption. Similarly, relative advantage (RA → MAA) exhibits a robust positive impact (β = 0.213, t = 4.138, p < 0.001), reinforcing the idea that perceived benefits relative to existing solutions strongly encourage adoption decisions. In contrast, perceived security (PS → MAA) is insignificant (β = -0.046, t = 0.658, p = 0.511), indicating that security concerns do not significantly determine adoption behavior in this setting. Regarding moderating effects, only the interactions of digital financial literacy (DFL) with complexity (β = 0.073, t = 0.748, p = 0.024) and organizational readiness (β = -0.028, t = 0.298, p = 0.046) are significant, albeit with relatively weak coefficients. This suggests that digital financial literacy has a slight moderating effect on these relationships, although the direction of this moderation may vary. Overall, organizational readiness and relative advantage emerge as the strongest determinants of MAA, while other factors demonstrate weaker or nonsignificant effects.

6. Implications of the Study

This research contributes to the body of knowledge by extending the Technology-Organization-Environment (TOE) framework through the inclusion of digital financial literacy as a moderating variable. By doing so, it demonstrates how behavioral and technological factors interact with financial literacy to influence the adoption of mobile payment systems by SMEs in Bangladesh. The findings confirm that relative advantage, competitive pressure, and organizational readiness are critical determinants, while compatibility and perceived security do not exert significant influence. This nuanced understanding enhances theoretical perspectives on technology adoption in developing economies, showing that financial literacy plays a central role in bridging the gap between intention and actual adoption. From a practical standpoint, the study provides valuable insights for policymakers, financial institutions, and mobile payment service providers. It highlights the importance of designing training and awareness programs to strengthen digital financial literacy among SMEs. By enhancing literacy, SMEs can better recognize benefits, cope with competitive pressure, and effectively integrate mobile payment systems, thereby accelerating financial inclusion and digital transformation in Bangladesh.

Published by *Research & Innovation Initiative Inc.*, registered with the Michigan Department of Licensing & Regulatory Affairs, United States (Reg. No. 802790777).

7. Conclusions

This study set out to investigate the determinants of mobile payment system adoption by SMEs in Bangladesh, with a specific focus on the moderating role of digital financial literacy (DFL). By collecting and analyzing 302 responses from SMEs in both urban and semi-urban areas of Chattogram and Cumilla, the study provides valuable insights into how behavioral and technological dimensions shape adoption intentions. The findings highlight that relative advantage, competitive pressure, and organizational readiness have a significant influence on SMEs' behavioral intentions to adopt mobile payment systems. These results emphasize that SMEs are more likely to embrace such technologies when they perceive clear benefits, face competitive market demands, and possess the necessary organizational resources. In contrast, compatibility and perceived security were found to have no significant effect, suggesting that SMEs prioritize tangible advantages and readiness over perceived alignment or security concerns. Notably, the study reveals that DFL moderates the relationship between competitive pressure, compatibility, and adoption, underscoring the importance of financial literacy in enabling SMEs to evaluate and adopt digital financial solutions effectively. Theoretically, this research extends the TOE framework by incorporating DFL as a moderator. Practically, the findings provide crucial guidance for policymakers and service providers to develop strategies and training programs that strengthen DFL and accelerate mobile payment adoption among SMEs in Bangladesh.

7. Limitations and Suggestions for Future Research

Although this study provides valuable insights into the determinants of SMEs' adoption of mobile payment systems in Bangladesh, it has certain limitations. First, the data were collected only from two cities, Chattogram and Cumilla, along with their semi-urban areas. This limited geographical coverage may not fully reflect the experiences of SMEs operating in other regions of Bangladesh, particularly in rural areas, where digital infrastructure and financial literacy levels may differ significantly. Second, the study employed a cross-sectional design, which restricts the ability to observe changes in adoption behavior over time. Third, the reliance on self-reported survey data may have introduced response bias, as participants could have overstated or understated their perceptions and intentions. Finally, only a limited set of constructs from the extended TOE framework was considered, leaving room for additional variables that may influence mobile payment adoption.

Future research could address these limitations by expanding the sample to include SMEs from other regions, such as rural areas, to provide more generalizable findings. Longitudinal studies are recommended to capture dynamic changes in adoption behavior. Additionally, incorporating qualitative methods, such as interviews, may offer deeper insights into the contextual challenges. Future studies may also explore additional moderating variables, such as government support, cultural orientation, and trust in technology, to further enrich the TOE framework.

Author Contributions: Md. Amdadul Hoque conceived the idea, collected data, and wrote the paper. Nur Shazwani Rosli and Md. Mamun Hossain wrote the paper's methodology, while Rosli Mahmood and Rosalan Ali reviewed and edited the paper.

Conflict of interest: The authors declare no conflict of interest.

REFERENCES

Abbasi, G. A., Abdul Rahim, N. F., Wu, H., Iranmanesh, M., & Keong, B. N. C. (2022). Determinants of SME's Social Media Marketing Adoption: Competitive Industry as a Moderator. *SAGE Open*, 12(1). https://doi.org/10.1177/21582440211067220

Abed, S. S. (2020). Social commerce adoption using TOE framework: An empirical investigation of Saudi Arabian SMEs. *International Journal of Information Management*, 53, 102118. https://doi.org/10.1016/j.ijinfomgt.2020.102118

Acquah-Sam, E., & Bugre, D. (2018). Effects of Mobile Money on Beige Bank, Ghana. *European Scientific Journal, ESJ*, 14(31), 29. https://doi.org/10.19044/esj.2018.v14n31p29

Adiwijaya, K., Fauzan, R., Rohman, I. K., Lupiyoadi, R., & Zaber, M. (2025). Do mobile applications give a competitive advantage to Small and Medium Enterprises? Lessons from Indonesia. *Journal of Information Policy*, 15. https://doi.org/10.5325/jinfopoli.15.2024.0003

Ahani, A., Rahim, N. Z. A., & Nilashi, M. (2017). Forecasting social CRM adoption in SMEs: A combined SEM-neural network method. *Computers in human behavior*, 75, 560–578. https://doi.org/10.1016/j.chb.2017.05.032

Alasady, A. S., Hashim, H. S., & Awadh, W. A. (2023). Nexus between Iraqi SMEs' cloud computing adoption intention and firm performance: moderating role of risk factors. *Indonesian Journal of Electrical Engineering and Computer Science*, 31(2), 1128–1135. https://doi.org/10.11591/ijeecs.v31.i2.pp1128-1135

Ali, A. F., Hassan, A. A., Abdullahi, H. O., & Abdulah, R. H. (2023). Analyzing the factors influencing the adoption of cloud computing by SMEs using the SEM approach. *International Journal of Advanced and Applied Sciences*, 10(7), 66–79. https://doi.org/10.21833/ijaas.2023.07.009

Almaiah, M. A., Al-Otaibi, S., Shishakly, R., Hassan, L., Lutfi, A., Alrawad, M., ... & Alghanam, O. A. (2023). Investigating the role of perceived risk, perceived security, and perceived trust on smart m-banking application using SEM. *Sustainability*, 15(13), 9908. https://doi.org/10.3390/su15139908

AL-Shboul, M. D. A. (2019). Towards a better understanding of determinants of logistical factors in SMEs for cloud ERP adoption in developing economies. *Business Process Management Journal*, 25(5), 887–907. https://doi.org/10.1108/BPMJ-01-2018-0004

Arpaci, I., Yardimci Cetin, Y., & Turetken, O. (2015). The Impact of Perceived Security on Organizational Adoption of Smartphones. *Cyberpsychology, Behavior, and Social Networking*, 18(10), 602-608. https://doi.org/10.1089/cyber.2015.0243

Atwah Al-ma'aitah, M. (2024). The Drivers of Big Data Analytics Adoption and Its Impact on Corporate Entrepreneurship. *Journal of Internet Services and Information Security (JISIS)*, volume: 14, number: 2 (May), pp. 145–168. https://doi.org/10.58346/JISIS. 2024.I2.010

Azevedo, A., & Almeida, A. H. (2021). Grasp the challenge of digital transition in SMEs—A training course geared towards decision-makers. *Education Sciences*, 11(4), 151. https://doi.org/10.3390/educsci11040151

Bag, S., Rahman, M. S., Gupta, S., & Wood, L. C. (2023). Understanding and predicting the determinants of blockchain technology adoption and SMEs' performance. The *International Journal of Logistics Management*, 34(6), 1781-1807. https://doi.org/10.1108/IJLM-01-2022-0017

Best, R. (2020). Mobile payments worldwide: statistics & facts. *Statista, November 10*.

Bhowmik, R. C., Islam, S., Roy, S. K., Hridoy, M. A. A. M., Yeamin, M. B., Hoque, M. A., ... & Roshid, M. M. (2025). The role of hydropower, clean energy, renewable energy, FDI, and capital formation in affecting CO2 emissions and environmental sustainability in South Asia. *Environment, Innovation and Management*, *1*, 2550021. doi.org/10.1142/S3060901125500218

Chingapi, A., & Steyn, A. A. (2022). SMEs in South Africa: The Era of Adopting Mobile Payment Solutions. In Proceedings of Sixth International Congress on Information and Communication Technology. *Lecture Notes in Networks and Systems* (Vol. 235, pp. 429– 447). Springer, Singapore. https://doi.org/10.1007/978-981-16-2377-6_41

Christian, S., Herdinata, C., Wiradinata, T., & Setiobudi, A. (2019). Environmental factors affecting the acceleration of financial technology (FinTech) adoption by SMEs in the East Java Region. *Advances in Economics, Business and Management Research*, volume 145,380-385. https://doi.org/10.2991/aebmr.k.200626.065

Clohessy, T., & Acton, T. (2019). Investigating the influence of organizational factors on blockchain adoption: An innovation theory perspective. *Industrial Management & Data Systems*, 119(7), 1457–1491. https://doi.org/10.1108/IMDS-08-2018-0365

Conwell, N. P., & Stanslaus, V. (2020). The Contribution of Mobile Money Services on SMEs Internationalization in Tanzania: A Case of EPZA. *International Journal of Business Management and Economic Review*, 03(02), 61–83. https://doi.org/10.35409/IJBMER.2020.3168

Cruz-Jesus, F., Pinheiro, A., & Oliveira, T. (2019). Understanding CRM adoption stages: empirical analysis building on the TOE framework. *Computers in Industry*, 109(8), 1–13. https://doi.org/10.1016/J.COMPIND.2019.03.007

Davis, F.D., Bagozzi, R.P. & Warshaw, P.R. (1989). "User acceptance of computer technology: a comparison of two theoretical models", *Management Science*, Vol. 35 No. 8, pp. 982–1003. https://doi.org/10.1287/mnsc.35.8.982

El-Haddadeh, R. (2020). Digital innovation dynamics influence on organizational adoption: the case of cloud computing services. *Information Systems Frontiers*, 22(4), 985–999. https://doi.org/10.1007/s10796-019-09912-2

Eze, S. C., Olatunji, S., Chinedu-Eze, V. C., Bello, A. O., Ayeni, A., & Peter, F. (2019). Determinants of perceived information need for emerging ICT adoption: A study of UK small service businesses. *Bottom Line*, 32(2), 158–183. https://doi.org/10.1108/BL-01- 2019/0059

García-Avilés, J. A. (2020). Diffusion of innovation. *The International Encyclopedia of Media Psychology*, *1*(8), 1–8.
Gumilar, D. W. A., Sangka, K. B., & Totalia, N. S. A. (2024). Digital financial literacy and digital financial inclusion in the era of digital disruption: Systematic literature review. *Formosa Journal of Multidisciplinary Research*, 3(5), 1563–1576.
Hair, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). Advanced issues in partial least squares structural equation modeling. Sage Publications, Thousand Oaks, CA, USA.
Hazra, U., & Priyo, A. K. K. (2021). Mobile Financial Services in Bangladesh: Understanding the Affordances. *The Electronic Journal of Information Systems in Developing Countries*, *87*(3), e12166. DOI: 10.1002/isd2.12166
Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. DOI 10.1007/s11747-014-0403-8
Hidayat-ur-Rehman, I. (2025). The Role of Financial Literacy in Enhancing Firms' Sustainable Performance through Fintech Adoption: A Moderated Mediation Analysis. *International Journal of Innovation Science*, 17(4), 754–785. https://doi.org/10.1108/IJIS-03-2024-0056
Hoque, M. A., Jahan, F., & Begum, F. (2024). Exploring the Nexus of ATM Service Quality, Customer Satisfaction, and Loyalty in the Private Banking Sector in Bangladesh. *Pakistan Journal of Life & Social Sciences*, 22(1). https://doi.org/10.57239/PJLSS-2024-22.1.0074
Hoque, M. A., Mahmood, R., Ali, R., Rosli, N. S., & Hossain, M. M. (2025). Drivers of AI Adoption in Banks in Bangladesh: The Moderating Role of Technology Readiness. *ICRRD Journal, 6*(4), 231–246. https://doi.org/10.53272/icrrd.v6i4.6
Hossain, M. I., San, O. T., Ling, S. M., & Said, R. M. (2020). The role of environmental awareness and green technological usage to foster sustainable green practices in Bangladeshi manufacturing SMEs. *International Journal of Advanced Science and Technology*, 29(7s), 3115–3124.
Islam, K. A., & Khan, M. S. (2024). The Role of Financial Literacy, Digital Literacy, and Financial Self-Efficacy in FinTech Adoption. *Investment Management & Financial Innovations*, 21(2), 370. http://dx.doi.org/10.21511/imfi.21(2).2024.30
Jahan, F., Chowdhury, S., Hoque, M. (2024). The effect of AI adoption and green leadership on organizational environmental performance in SMEs. *Int. J. Relig*. 5(11), 2207–2222; https://doi.org/10.61707/j9a56362
Khan, N. A., Khan, A. N., Bahadur, W., & Ali, M. (2021). Mobile payment adoption: a multi-theory model, multi-method approach and multi-country study. *International Journal of Mobile Communications*, 19(4), 467–491. https://doi.org/10.1504/IJMC.2021.116119
Khayer, A., Talukder, M. S., Bao, Y., & Hossain, M. N. (2020). Cloud computing adoption and its impact on SMEs' performance for cloud-supported operations: A dual-stage analytical approach. *Technology in Society*, 60, 101225. https://doi.org/10.1016/j.techsoc.2019.101225
Kirui, E. C. (2022). The Influence of the Regulatory Framework on the Relationship between Factors Affecting Cashless Transactions and the Growth of Cashless Transactions (Doctoral Dissertation, Strathmore University).
Kumar Bhardwaj, A., Garg, A., & Gajpal, Y. (2021). Determinants of blockchain technology adoption in supply chains by small and medium enterprises (SMEs) in India. *Mathematical Problems in Engineering*, 2021(1), 5537395. https://doi.org/10.1155/2021/5537395
Kuruwitaarachch, N., Yajid, M., Khatibi, A., & Azam, F. (2019). Development of Electronic Commerce Adoption Model based on Structural Equation Modeling Techniques. *Global Journal of Computer Science and Technology*, 1–9.
Kwarteng, M. A., Ntsiful, A., Diego, L. F. P., & Novák, P. (2024). Extending UTAUT with competitive pressure for SMEs digitalization adoption in two European nations: a multi-group analysis. *Aslib Journal of Information Management*, 76(5), 842–868. https://doi.org/10.1108/AJIM-11-2022-0482
Lee, Y. (2021, July 8). Southeast Asia Is the World's Fastest-Growing Mobile Wallet Market. Bloomberg. https://www.bloomberg.com/news/articles/2021-07-08/southeast-asia-is-world- s-fastest-growing-mobile-wallet-market
Li, W., Xiao, X., Yang, X., & Li, L. (2023). How does digital transformation impact green supply chain development? An empirical analysis based on the TOE theoretical framework. *Systems*, *11*(8), 416. https://doi.org/10.3390/systems11080416
Lutfi, A. (2022). Understanding the intention to adopt a cloud-based accounting information system in Jordanian SMEs. *International Journal of Digital Accounting Research*, Vol. 22, 2022, pp. 47–70. https://doi.org/10.4192/1577-8517-v22_2
Manap, A., & Rijal, S. (2024). Digital Transformation through Mobile Applications: Innovative Strategies to Enhance MSME Management and Growth in Indonesia. *Technology and Society Perspectives (TACIT),* 2(3), 285–291. https://doi.org/10.61100/tacit.v2i3.235
Marei, A. (2024). An Empirical Study on the Impact of TOE Factors on E-Accounting Adoption: The Moderating Role of Cybersecurity. *Journal of System and Management Sciences*, 14(3), 266–292. DOI:10.33168/JSMS.2024.0316

Marei, A., (2023). The Moderating Role of Big Data and User Satisfaction in the Predictors of Generalized Audit Software among Jordanian Auditing Firms. *WSEAS Transactions on Business and Economics*, 20, 1357–1367. https://doi.org/10.37394/23207.2023.20.121

Maroufkhani, P., Iranmanesh, M., & Ghobakhloo, M. (2023). Determinants of big data analytics adoption in small and medium-sized enterprises (SMEs). *Industrial Management & Data Systems*, 123(1), 278–301. https://doi.org/10.1108/IMDS-11-2021-0695

Mohiuddin, M., Reza, M. N. H., Jayashree, S., Al-Azad, M. S., & Ed-Dafali, S. (2023). The Role of Governments in Driving Industry 4.0 Adoption in Emerging Countries: Mediating Effect of Organizational Structure. *Journal of Global Information Management (JGIM)*, 31(1), 1–31. https://doi.org/10.4018/JGIM.323439

Moreira-Santos, D., Au-Yong-Oliveira, M., & Palma-Moreira, A. (2022). Fintech Services and the Drivers of Their Implementation in Small and Medium Enterprises. *Information*, 13(9), 1– 25. https://doi.org/10.3390/info13090409

Mujahed, H. M. H., Musa Ahmed, E., & Samikon, S. A. (2022). Factors Influencing Palestinian Small and Medium Enterprises' Intention to Adopt Mobile Banking *Journal of Science and Technology Policy Management*, 13(3), 561–584. https://doi.org/10.1108/JSTPM-05-2020-0090

Mushi, R. M. (2024). Assessing the acceptance of mobile phone technology in Tanzanian SMEs. *Journal of Electronic Business & Digital Economics*, 3(2), 170–183. https://doi.org/10.1108/JEBDE-10-2023-0026

Ngo, H. Q., & Le, M. T. (2023). The role of perceived security and social influence on the usage behavior of digital banking services: An extension of the technology acceptance model. *Edelweiss Applied Science and Technology*. SSN: 2576-8484 Vol. 7, No. 2, 136–153. DOI: 10.55214/25768484.v7i2.396

Pallant, J. (2020). SPSS Survival Manual: A step-by-step guide to data analysis using IBM SPSS (7th ed.). Routledge. https://doi.org/10.4324/9781003117452

Piper, K. (2020, September 11). What Kenya can teach its neighbors — and the US — about improving the lives of the "unbanked." Vox. https://www.vox.com/future- perfect/21420357/kenya-mobile-banking-unbanked-cellphone-money.

Rahman, M. A., & Islam, M. A. (2022). Identifying The Factors Affecting the Adoption of Mobile Payment Systems by Small and Medium-Sized Enterprises in Bangladesh. *Journal of Business Studies*, 42(2), 47–73. https://doi.org/10.3329/dujbst.v42i2.59715

Santini, F. D. O., Matos, C. A. D., Ladeira, W. J., Jardim, W. C., & Perin, M. G. (2023). Information technology adoption by small and medium enterprises: A meta-analysis. *Journal of Small Business & Entrepreneurship*, 35(4), 632–655. https://doi.org/10.1080/08276331.2022.2145787

Setiawan, B., Dai Phan, T., Medina, J., Wieriks, M., Nathan, R. J., & Fekete-Farkas, M. (2023). Quest for Financial Inclusion via Digital Financial Services (Fintech) during the COVID-19 Pandemic: A Case Study of Women in Indonesia. *Journal of Financial Services Marketing*, 1. https://doi.org/10.1057/s41264-023-00217-9

Shahadat, M. M. H., Nekmahmud, M., Ebrahimi, P., & Fekete-Farkas, M. (2023). Digital Technology Adoption in SMEs: What Technological, Environmental, and Organizational Factors Influence SMEs' ICT Adoption in Emerging Countries? *Global Business Review*, February. https://doi.org/10.1177/09721509221137199

Singh, S. (2020). An integrated model combining ECM and UTAUT to explain users' post-adoption behaviour towards mobile payment systems. *Australasian Journal of Information Systems*, 24. https://doi.org/10.3127/ajis.v24i0.2695

Slinger, E. I., Pather, S., & du Plessis, M. (2024). Determinants of mobile application adoption among micro-entrepreneurs. *South African Journal of Information Management*, 26(1), 1731. https://doi.org/10.4102/sajim.v26i1.1731

Tolani, A., Owoseni, A., & Twinomurinzi, H. (2019, April). *Exploring the effect of mobile apps on SMEs in Nigeria: a critical realist study*. In International Conference on Social Implications of Computers in Developing Countries (pp. 606–618). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-18400-1_50

Tornatzky, L. G., & Fleischer, M. (1990). The Processes of Technological Innovation. In The Processes of Technological Innovation (January 1990). Lexington Books, Lexington, Mass. https://www.worldcat.org/title/20669819

Urumsah, D., Ispridevi, R. F., Nurherwening, A., & Hardinto, W. (2022). Fintech adoption: Its determinants and organizational benefits in Indonesia. *Jurnal Akuntansi dan Auditing Indonesia*, 88-101. https://doi.org/10.20885/jaai.vol26.i ss1.art9

Uzkurt, C., Ekmekcioglu, E. B., Ceyhan, S., & Hatiboglu, M. B. (2024). Digital technology use of SMEs during the COVID-19 pandemic in Turkey: mobile applications' role on motivation and job performance. Kybernetes, 53(4), 1354-1373. https://doi.org/10.1108/K-08-2022-1189

Venkatesh V, Thong J, & Xu X (2003). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly* 36: 57–178. https://doi.org/10.2307/41410412

Wani, L. N., & Aligarh, F. (2024, November). Factors Influencing Cloud Computing Adoption: A Technology, Organization, Environment (TOE) Framework Approach. In *International Conference of Business and Social Sciences* (pp. 518–529).

Wibowo, A. (2025). The Influence of Financial Literacy on Investment Behavior with Spiritual Attitude and Self-Efficacy as Mediating Variables Among Economics Teachers in Bekasi District. *Journal of Digital Business and Global Economy*, 1(3). https://doi.org/10.64243/JODIGBI.01.3.03

Wong, S., Yeung, J. K. W., Lau, Y. Y., Kawasaki, T., & Kwong, R. (2024). A Critical Literature Review on Blockchain Technology Adoption in Supply Chains. *Sustainability*, 16(12), 5174. https://doi.org/10.3390/su16125174

Xie, J., Ye, L., Huang, W., & Ye, M. (2021). Understanding FinTech platform adoption: impacts of perceived value and perceived risk. *Journal of Theoretical and Applied Electronic Commerce Research*, 16(5), 1893-1911. https://doi.org/10.3390/jtaer16050106

Yoon, C., Lim, D., & Park, C. (2020). Factors Affecting the Adoption of Smart Farms: The Case of Korea. *Computers in Human Behavior*, 108, 106309. https://doi.org/10.1016/j.chb.2020.106309

Zaimovic, A., Omanovic, A., Dedovic, L., & Zaimovic, T. (2025). The effect of business experience on fintech behavioral adoption among MSME managers: the mediating role of digital financial literacy and its components. *Future Business Journal*, 11(1), 26. DOI:10.1186/s43093-025-00432-x

Zikmund-Fisher, B. J., Witteman, H. O., Fuhrel-Forbis, A., Exe, N. L., Kahn, V. C., & Dickson, M. (2012). Animated graphics for comparing two risks: a cautionary tale. *Journal of Medical Internet Research*, *14*(4), e2030.