



Financial Technology Adoption Among MSMEs in Sarawak: An Extended TOE Conceptual Framework

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) constitute the economic backbone of Sarawak, driving employment, community resilience, and localized commercial growth. However, despite aggressive state-level digital initiatives such as the Sarawak Digital Economy Blueprint 2030, a substantial gap persists in the actual adoption of advanced Financial Technology (Fintech) solutions among local firms. Grounded in the Technology-Organization-Environment (TOE) framework, Diffusion of Innovation (DOI) theory, and Resource-Based View (RBV), this conceptual paper develops an extended structural model to evaluate the determinants of Fintech adoption and its subsequent impact on business performance. Crucially, the model introduces Financial Literacy and Trust as dual moderates that condition the relationship between TOE drivers and Fintech adoption. A quantitative methodology using Partial Least Squares Structural Equation Modeling (PLS-SEM) is proposed to test the hypothesized direct, moderating, and structural relationships using sample data from MSME business owners in Kuching, Sarawak. The proposed framework provides theoretical extensions to enterprise-level technology models while offering actionable insights for policymakers and financial institutions aiming to close regional digital divides.

Keywords: Financial Technology, MSMEs, TOE Model, Financial Literacy, Trust, Business Performance, Sarawak, PLS-SEM

1. Introduction

1.1 Background

Over the past decade, rapid technological evolution has reshaped micro, small, and medium enterprise (MSME) operations across developing economies (Shahadat et al., 2023; Zide & Jokonya, 2022). Digitalization enables small firms to enhance operational efficiency, streamline supply networks, and navigate volatile market conditions (Shahadat et al., 2023). At the core of this economic evolution is Financial Technology (Fintech) the integration of digital technology into financial processes, spanning e-wallets, mobile banking, peer-to-peer (P2P) lending, crowdfunding, insurtech, and automated accounting tools (Firmansyah et al., 2023; Yáñez-Valdés & Guerrero, 2023). In Malaysia, MSMEs serve as vital growth engines. According to the Department of Statistics Malaysia (DOSM, 2024), MSMEs accounted for 96.9% of total business establishments in 2023 (1,101,725 firms), contributing 39.1% (RM613.1 billion) to national Gross Domestic Product (GDP) and employing 48.5% (7.86 million workers) of the workforce. Sarawak represents the fourth-largest state economy in Malaysia, with its services sector contributing 38.3% to state GDP (Sarawak Tribune, 2024). MSMEs comprise an estimated 60% to 70% of all businesses in Sarawak (approximately 57,000 to 67,000 firms), operating heavily in wholesale, retail, food and beverage, agriculture, and services (BigGrain Capital, 2025). The Sarawak State Government has established targeted policy measures and infrastructural programs to accelerate digital transformation across local micro, small, and medium enterprises (MSMEs). Key initiatives under this framework include:

- **State Targets:** The Post COVID-19 Development Strategy (PCDS) 2030 aims to onboard 30,000 MSMEs onto digital platforms by the year 2030.
- **Infrastructure Push:** The state is deploying 600 telecommunication towers to expand 4G and 5G network coverage across rural and remote zones.
- **State Fintech Platform:** The state-backed e-wallet, S Pay Global, has been integrated with the national DuitNow QR standard to facilitate cross-border and national transaction compatibility.

1.2 Problem Statement

Despite national blueprints (e.g., MyDIGITAL) targeting a 22.6% digital contribution to GDP by 2030 and digitalizing 875,000 MSMEs (EPU, 2021), a sharp digital divide exists. National reports indicate that approximately 77% of Malaysian MSMEs remain stuck at basic levels of digitalization relying primarily on basic payment collection or social media while failing to integrate advanced Fintech tools (DOSM, 2023; Khaliq et al., 2022).

MSMEs encounter systemic structural hurdles:



- **Infrastructure Disparities:** Substantial gaps in fixed broadband access (ranging from 18.5% to 70.5% depending on sub-region) and recurring connectivity disruptions (MyDIGITAL, 2021).
- **Resource and Financial Constraints:** High initial implementation costs, hardware/software expenses, and transaction fees relative to small operational turnovers (Donovan, 2012; Ozili, 2018).
- **Knowledge & Skill Gaps:** Low digital literacy and primary-only education backgrounds among micro-entrepreneurs, impeding their capacity to evaluate digital credit tools or navigate financial software safely (Wong & Juma'at, 2023).
- **Relational Security Hesitancies:** Prevalent mistrust regarding cybersecurity, data privacy, online fraud, and a cultural preference for cash transactions based on face-to-face social trust (Ghosh, 2020; Jack & Suri, 2014; Ozili, 2018).

While traditional adoption theories such as TAM (Davis, 1989) or UTAUT (Venkatesh et al., 2003) address individual usage intentions, enterprise-level adoption requires structural models like the Technology-Organization-Environment (TOE) framework (Tornatzky & Klein, 1982). However, standard TOE models treat technological, organizational, and environmental factors as direct deterministic drivers, neglecting crucial cognitive boundary conditions (Financial Literacy) and relational governance dynamics (Trust) unique to regional developing contexts (Fatima et al., 2025). Furthermore, existing empirical studies rarely extend the adoption chain to measure.

2. Literature Review & Theoretical Framework

2.1 Underpinning Theories

- **Technology-Organization-Environment (TOE) Framework:** Proposed by Tornatzky and Fleischer (1990) and Tornatzky and Klein (1982), TOE categorizes firm-level adoption drivers into Technological context, Organizational readiness, and External Environmental pressures (Ahad & Busch, 2024; Al-Dmour et al., 2023).
- **Diffusion of Innovation (DOI) Theory:** Rogers et al. (2014) defines key technological attributes include Relative Advantage, Compatibility, Simplification, and Observability which explain how innovations spread within enterprise systems (Baig et al., 2019).
- **Resource-Based View (RBV):** Asserts that internal firm capabilities (Infrastructure Maturity, Financial Readiness, Top Management Support) combined with digital financial tools yield sustained competitive advantages and performance gains (Gupta et al., 2022; Lai et al., 2018).

2.2 Conceptual Framework and Structural Model

The conceptual framework links the three core TOE dimensions to Fintech Adoption, incorporates Financial Literacy and Trust as moderating variables, and examines the impact of adoption on MSME Business Performance.

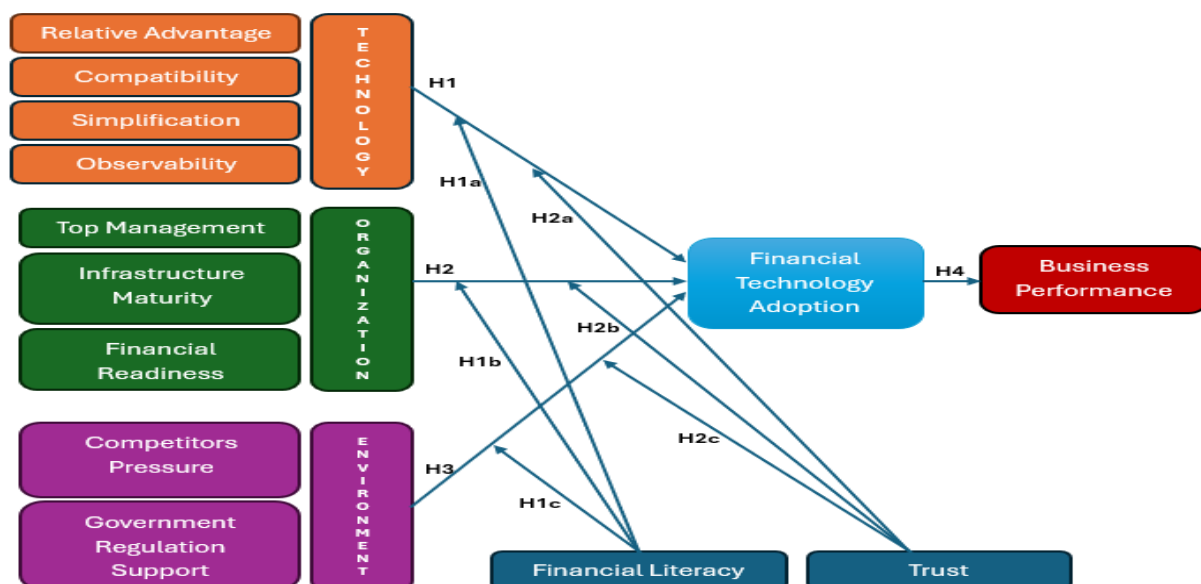


Figure 1: Conceptual Framework



2.3 Hypotheses Formulation

Direct Structural Relationships

- **Technological Dimension:** Superior functionality, ease of integration, task simplicity, and visible peer success drive firm-level tech implementation (Alam et al., 2022; Ekasari et al., 2021; Ojo et al., 2023; Qatawneh, 2024).
 - **H1:** There is a positive relationship between the technological element and financial technology adoption among MSMEs.
- **Organizational Dimension:** Strong leadership vision, operational infrastructure maturity, and available capital reduce internal friction during technology integration (Bag et al., 2022; Maroufkhani et al., 2022; Urumsah et al., 2022).
 - **H2:** There is a positive relationship between the organizational element and financial technology adoption among MSMEs.
- **Environmental Dimension:** Intense rivalry, customer demands, and supportive government regulatory frameworks compel small firms to adopt modern financial tools (Malik et al., 2021; Salimon et al., 2021; Sarabdeen, 2023).
 - **H3:** There is a positive relationship between the environmental element and financial technology adoption among MSMEs.
- **Downstream Business Impact:** Streamlined financial processing, reduced transaction overheads, expanded market access, and better cash-flow visibility directly improve enterprise performance metrics (Abebe, 2014; Iskandar et al., 2020; Lee et al., 2021; Ramli et al., 2018).
 - **H4:** There is a positive relationship between financial technology adoption and business performance among MSMEs.

Moderating Effects of Financial Literacy

Financial literacy represents an owner's capacity to evaluate complex financial tools, interpret cost structures, and manage digital credit risks (Demirgüç-Kunt et al., 2018; Mandell, 2008). Higher financial literacy amplifies the positive impact of technological capabilities, internal organizational resources, and external pressures by converting perceived potential into active execution (Angeles, 2022; Susan, 2020).

- **H1a:** Financial literacy moderates the relationship between technological elements and financial technology adoption.
- **H1b:** Financial literacy moderates the relationship between organizational elements and financial technology adoption.
- **H1c:** Financial literacy moderates the relationship between environmental elements and financial technology adoption.

Moderating Effects of Trust

Trust acts as a structural risk-mitigation mechanism (Gefen et al., 2003; Kim, 2008). High institutional and system trust reinforces the positive effects of favorable technology attributes, managerial readiness, and market pressures by alleviating security concerns regarding digital transactions (Foroughi et al., 2023; Senali et al., 2024; Talwar et al., 2020).

- **H2a:** Trust moderates the relationship between technological elements and financial technology adoption.
- **H2b:** Trust moderates the relationship between organizational elements and financial technology adoption.
- **H2c:** Trust moderates the relationship between environmental elements and financial technology adoption.

3. Research Methodology

3.1 Research Design and Sampling Strategy

- **Approach:** Quantitative, deductive, cross-sectional design (Creswell, 1994, 2003).
- **Unit of Analysis:** Business owners or top managers of MSMEs in Kuching, Sarawak.
- **Sampling Technique:** Purposive non-probability sampling, selected to target decision-makers with direct knowledge of firm financial operations (Etikan et al., 2016; Sekaran & Bougie, 2010).
- **Sample Size Determination:** Calculated using G*Power 3.1 for structural power analysis (Erdfelder et al., 1996). For 5 main predictors and 2 interaction blocks ($f^2 = 0.15$, $\alpha = 0.05$, $1 - \beta = 0.95$), the minimum statistical requirement is $N = 175$. To safeguard against non-response and missing data, 300 questionnaires will be administered by six field enumerators.

3.2 Measurement Instrument

The questionnaire contains structured items adapted from established literature using a 7-point Likert Scale (1 = Strongly Disagree, 7 = Strongly Agree) to optimize variance (Joshi et al., 2015; Malhotra & Birks, 2003):

3.3 Data Analysis Strategy: PLS-SEM



Structural Equation Modeling via Partial Least Squares (PLS-SEM) using SmartPLS 4 will be executed due to its suitability for complex models with interaction effects and predictive orientation (Chin, 1998; Hair et al., 2017).

4. Expected Contributions and Policy Implications

4.1 Theoretical Significance

- Extends classic enterprise adoption models by demonstrating that TOE forces are not universally uniform but depend heavily on cognitive managerial attributes (Financial Literacy) and relational environment governance (Trust) (Fatima et al., 2025).
- Clarifies the structural mechanism connecting digital financial transformation directly to enterprise performance indicators (Iskandar et al., 2020).

4.2 Managerial & Policy Implications

- **For MSME Owners:** Highlights that investing in internal technological capabilities must be paired with financial management skills to maximize performance gains.
- **For Policymakers (SME Corp, SDEC, KUSKOP):** Advocates for shifting policy from standard hardware/grant subsidies toward integrated digital-financial literacy training, cyber-security guarantee frameworks, and localized infrastructure enhancements under the Sarawak Digital Economy Blueprint 2030.

5. Conclusion

This conceptual paper addresses the persistent digital adoption gap among Micro, Small, and Medium Enterprises (MSMEs) in Sarawak by introducing an extended structural model grounded in the Technology-Organization-Environment (TOE) framework, Diffusion of Innovation (DOI) theory, and the Resource-Based View (RBV). While aggressive state initiatives such as the Sarawak Digital Economy Blueprint 2030, the Post COVID-19 Development Strategy (PCDS) 2030, and the S Pay Global infrastructure expansion aim to accelerate enterprise-level digital transformation, structural hurdles like infrastructure disparities, resource constraints, digital skill gaps, and relational security concerns continue to hinder advanced Financial Technology (Fintech) integration. To bridge these empirical and theoretical gaps, the proposed model extends standard deterministic TOE frameworks by embedding Financial Literacy and Trust as critical moderating mechanisms. By examining direct structural impacts alongside these cognitive and relational boundary conditions, the framework offers a holistic perspective on how internal firm readiness, external market drivers, and technological attributes translate into active Fintech adoption and subsequent business performance gains. Using Partial Least Squares Structural Equation Modeling (PLS-SEM) on sample data from MSME owners in Kuching, Sarawak, the empirical validation of this model will provide crucial theoretical insights into regional enterprise digital behavior. Practically, the study offers actionable guidance for institutions like SME Corp, SDEC, and KUSKOP to shift policy from basic infrastructure grants toward targeted digital-financial literacy programs, trust-building cybersecurity frameworks, and localized support mechanisms, ultimately fostering sustainable MSME resilience and regional economic growth.

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