

The Mediating Role of Risk Management in the Relationship Between Financial Technology Adoption and Business Growth in Indonesian MSMEs

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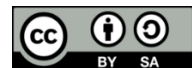
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ABSTRACT

This study examines the mediating role of risk management in the relationship between financial technology (fintech) adoption and business growth in Indonesian Micro, Small, and Medium Enterprises (MSMEs). A quantitative approach was employed with a sample of 125 MSMEs, utilizing a 5-point Likert scale for survey data and Structural Equation Modeling (SEM) with Partial Least Squares (PLS) for analysis. The results indicate a significant positive relationship between fintech adoption and risk management, as well as between risk management and business growth. Moreover, fintech adoption positively impacts business growth both directly and indirectly through the mediating effect of risk management. The findings highlight the importance of integrating fintech solutions with robust risk management frameworks to foster sustainable growth in MSMEs. Policy implications suggest that MSME owners, fintech providers, and policymakers should focus on enhancing risk management practices to maximize the benefits of fintech adoption.

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1. INTRODUCTION

The rapid advancement of financial technology (fintech) has significantly transformed the financial services landscape in Indonesia, particularly benefiting Micro, Small, and Medium Enterprises (MSMEs). Fintech innovations, such as peer-to-peer lending, digital credit scoring, mobile banking, and digital payment platforms, have enhanced MSMEs' access to capital, transaction efficiency, and financial

management capabilities [1], [2]. These advancements are critical for MSMEs, which contribute over 60% to Indonesia's GDP and play a substantial role in employment creation. By leveraging technologies like blockchain, AI, and machine learning, fintech solutions have streamlined lending processes, reduced operational costs, and provided personalized financial tools that enable effective financial management [1], [3]. Moreover, fintech-driven microfinance and

digital payment systems have fostered economic resilience and inclusion, integrating more MSMEs into the formal financial system and supporting their growth, particularly during economic downturns [1], [2]. Despite these advancements, challenges such as limited financing access, inadequate risk management, and scaling difficulties persist, highlighting the need for continuous innovation and support for MSMEs in Indonesia.

The adoption of financial technology (fintech) solutions by micro, small, and medium enterprises (MSMEs) is a pivotal step towards overcoming financial barriers and fostering business growth. Innovations such as digital payment systems, peer-to-peer lending, and financial management tools provide MSMEs with access to resources and insights often unavailable through traditional banking systems, enhancing credit accessibility, streamlining financial operations, and improving financial performance [4]–[6]. Digital lending platforms and blockchain technology simplify loan applications and expand financial services to underserved areas, while mobile banking and peer-to-peer lending reduce operational costs and enable timely capital access, aiding financial risk management [6]. Furthermore, digital financial management tools significantly improve efficiency and accuracy in financial operations, although many MSMEs still rely on manual processes [4]. Despite these benefits, fintech adoption introduces challenges, including cybersecurity risks, regulatory compliance issues, and the digital divide, which necessitate effective risk management strategies, collaborative partnerships, supportive regulatory frameworks, and digital literacy programs to ensure successful integration [6].

Risk management plays a pivotal role in ensuring that fintech adoption translates into sustainable business growth. It enables MSMEs to identify, assess, and mitigate financial and operational risks, thereby creating a more stable and resilient business environment. Despite the recognized

importance of risk management, limited empirical research exists on its mediating role in the relationship between fintech adoption and business growth, particularly within the context of Indonesian MSMEs. This gap underscores the need for a deeper exploration of how risk management practices influence the effectiveness of fintech adoption in driving growth. This study aims to examine the mediating role of risk management in the relationship between fintech adoption and business growth among Indonesian MSMEs.

2. LITERATURE REVIEW

2.1 *Financial Technology Adoption*

The adoption of financial technology (fintech) by micro, small, and medium enterprises (MSMEs) has significantly enhanced their access to financial services, promoting financial inclusion and improving operational efficiency. Fintech tools such as digital payment systems, peer-to-peer lending platforms, and financial analytics software have reduced traditional barriers to financing and streamlined business processes. According to the Technology Acceptance Model (TAM), perceived ease of use and perceived usefulness are critical factors influencing the adoption of these technologies. By leveraging alternative funding sources like peer-to-peer lending, which bypasses the need for collateral, and digital payment systems that expedite transaction processing, MSMEs have achieved greater financial inclusion and operational efficiency [7], [8]. Studies demonstrate that fintech adoption positively impacts MSMEs' financial performance, with digital payment systems and consumer trust playing pivotal roles in driving success [5]. However, the integration of fintech also introduces risks, such as cybersecurity threats and data breaches, necessitating robust security measures, while regulatory hurdles pose compliance challenges that can affect market stability [3], [9].

2.2 *Risk Management*

Effective risk management is essential for Micro, Small, and Medium Enterprises

(MSMEs) adopting fintech solutions, enabling them to navigate uncertainties, leverage technology, and minimize vulnerabilities. The Enterprise Risk Management (ERM) framework integrates risk management into processes, enhancing resilience and achieving strategic objectives. In fintech adoption, this includes addressing cybersecurity threats, operational disruptions, and financial uncertainties. Continuous monitoring and digital tools improve decision-making and ensure business continuity [10], while AI-based risk models mitigate financial risks [11]. Robust frameworks reduce disruptions and support growth [12], [13]. By fostering a risk-aware culture and strategic planning, ERM enhances resilience, competitiveness, and sustainable growth [13], [14].

2.3 Business Growth

Business growth for Micro, Small, and Medium Enterprises (MSMEs) is significantly influenced by their ability to leverage internal resources, such as technology and risk management capabilities, as posited by the Resource-Based View (RBV) theory. Empirical studies highlight the positive relationship between technology adoption and business growth, with fintech playing a pivotal role in enhancing efficiency and market reach [15]. Strategic utilization of IT resources improves business processes and accelerates growth, particularly in entrepreneurial and innovative SMEs that integrate IT for value chain activities [16]. Access to financial resources and strategic collaborations with external parties, such as financial institutions, further facilitate technology adoption and market expansion [15]. Moreover, effective risk management practices integrated with technology adoption enhance growth rates and provide firms with sustainable competitive advantages by mitigating economic instability [17]. The RBV theory underscores the importance of internal resources, including technology and management skills, in achieving competitive advantage, particularly for smaller firms relying on organic growth [18].

2.4 Mediating Role of Risk Management

The mediating role of risk management in the relationship between fintech adoption and business growth is pivotal, ensuring that the benefits of fintech are realized while minimizing potential risks. Effective risk management practices enable MSMEs to leverage fintech solutions for improved operational efficiency and financial performance by addressing uncertainties and fostering stakeholder trust, both of which are essential for sustainable growth. Risk management strategies involve identifying, assessing, and mitigating risks to protect financial systems and ensure operational capability [19]. SMEs benefit from structured frameworks incorporating risk avoidance, reduction, transfer, and acceptance tailored to their risk appetite and capacity [20]. Fintech innovations like AI and blockchain enhance risk detection accuracy and response speed, minimizing human error and improving financial risk management tools critical for growth during economic downturns [6], [21]. However, challenges such as cybersecurity risks, regulatory compliance, skill shortages, and inconsistent regulations in emerging markets require cohesive frameworks, technological investment, and targeted training to ensure effective risk management [21], [22].

2.5 Research Gap

While existing literature provides valuable insights into the benefits of fintech adoption and the importance of risk management, limited research explores their interplay within the context of MSMEs in Indonesia. Most studies focus on developed economies, leaving a gap in understanding how these factors interact in emerging markets with unique challenges, such as limited infrastructure and regulatory constraints. Furthermore, the mediating role of risk management in this relationship remains underexplored, particularly in the context of Indonesian MSMEs, which contribute significantly to the nation's economic development.

3. METHODS

3.1 Population and Sample

The population of this study includes MSMEs operating across various sectors in Indonesia. A sample size of 125 MSME owners and managers was selected using purposive sampling, ensuring that the participants had experience with fintech adoption and risk management practices. The selection criteria included businesses actively using fintech solutions such as digital payments, peer-to-peer lending, or financial analytics for at least one year. The sample size was deemed adequate for the Structural Equation Modeling - Partial Least Squares (SEM-PLS) technique, which requires a minimum of 10 observations per variable.

3.2 Data Collection

Primary data was collected using a structured questionnaire designed to capture the perceptions of MSME owners and managers regarding fintech adoption, risk management, and business growth. The questionnaire was distributed online and in person to enhance accessibility and response rates. The Likert scale (1–5), ranging from "strongly disagree" to "strongly agree," was used to measure participants' agreement with various statements related to the study variables. To ensure clarity and validity, the questionnaire was pretested with a pilot group of 15 MSMEs, and minor adjustments were made based on feedback.

3.3 Measurement of Variables

The key variables in this study are fintech adoption, risk management, and business growth, each operationalized using established scales adapted to the MSME context. Fintech adoption was measured through indicators such as the frequency of fintech use, perceived ease of use, perceived usefulness, and the range of fintech applications adopted. Risk management was assessed using indicators like risk identification, risk assessment, risk mitigation strategies, and the integration of risk management into business operations. Business growth was evaluated based on revenue growth, customer acquisition, market

expansion, and operational scalability. To ensure concise and focused data collection, each indicator was represented by a single statement in the questionnaire.

3.4 Data Analysis

Data analysis was performed using Structural Equation Modeling - Partial Least Squares (SEM-PLS) with SmartPLS 3 software, chosen for its effectiveness in analyzing complex relationships between latent variables and testing mediating effects. The process included several steps: descriptive statistics summarized the demographic characteristics of the sample and response distribution; measurement model assessment evaluated the reliability and validity of constructs using composite reliability (CR), average variance extracted (AVE), and factor loadings; structural model assessment tested the hypothesized relationships between fintech adoption, risk management, and business growth; and mediation analysis examined the mediating role of risk management by analyzing indirect effects through bootstrapping with 5,000 subsamples.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The descriptive statistics provide insights into the demographic and operational characteristics of the 125 MSMEs in the study, alongside their responses to key variables measured. In terms of business size, 42% were micro enterprises (annual revenue < IDR 300 million), 38% were small enterprises (IDR 300 million–2.5 billion), and 20% were medium enterprises (IDR 2.5 billion–50 billion). Regarding years of operation, 45% had operated for less than 5 years, 35% for 5–10 years, and 20% for more than 10 years. The primary sectors included retail and trade (50%), services (30%), and manufacturing (20%). For fintech adoption, 60% used fintech daily, 30% weekly, and 10% occasionally, with perceived usefulness and ease of use scoring 4.3 ± 0.6 and 4.1 ± 0.7 , respectively. Most respondents used two to three applications (50%), followed by one application (35%) and

more than three (15%). Risk management practices showed mean scores of 3.9 ± 0.8 for risk identification, 4.0 ± 0.7 for risk assessment, and 3.8 ± 0.9 for risk mitigation, with 40% fully integrating risk management into operations, 45% partially, and 15% not integrating it. Business growth indicators revealed mean scores of 4.2 ± 0.7 for revenue growth, 4.1 ± 0.6 for customer acquisition, 3.9 ± 0.8 for market expansion, and 4.0 ± 0.7 for operational scalability.

4.2 Measurement Model Assessment

The measurement model was evaluated to ensure the validity and reliability of the constructs used in the study. This included tests for internal consistency, convergent validity, and discriminant validity, with all constructs meeting or exceeding the recommended thresholds for reliability and validity.

To assess internal consistency, Composite Reliability (CR) was used, with a CR value above 0.7 indicating acceptable reliability. The results showed that all constructs met this threshold: Fintech Adoption (0.91), Risk Management (0.88), and

Business Growth (0.89), confirming the reliability of the constructs used in the study.

Convergent validity was assessed using the Average Variance Extracted (AVE), with an AVE value above 0.5 indicating that a construct explains more than half of the variance of its indicators. The AVE values for the constructs were all above the threshold: Fintech Adoption (0.72), Risk Management (0.68), and Business Growth (0.71), indicating strong convergent validity. Additionally, indicator reliability was evaluated through outer loadings, with all indicators showing loadings greater than the 0.7 threshold, confirming that each indicator significantly loaded onto its respective construct. For example, the outer loadings for Fintech Adoption (FA1: 0.84, FA2: 0.87, FA3: 0.81), Risk Management (RM1: 0.82, RM2: 0.85, RM3: 0.78), and Business Growth (BG1: 0.86, BG2: 0.83, BG3: 0.80) all exceeded the threshold.

Discriminant validity was assessed using the Fornell-Larcker criterion. Each construct's AVE square root was greater than its correlations with other constructs, confirming discriminant validity.

Table 1. Discriminant Validity

Construct	Fintech Adoption	Risk Management	Business Growth
Fintech Adoption	0.855		
Risk Management	0.671	0.827	
Business Growth	0.726	0.693	0.847

4.3 Structural Model Assessment

The structural model assessment evaluates the hypothesized relationships between constructs in terms of path coefficients, significance levels, and explanatory power. This analysis includes testing for multicollinearity, evaluating the coefficient of determination (R^2), and examining the significance of the direct, indirect, and total effects using bootstrapping with 5,000 subsamples.

Collinearity was assessed using Variance Inflation Factors (VIFs) to check for multicollinearity issues. All VIF values were below the threshold of 5, indicating no multicollinearity concerns in the model. Specifically, the VIF values ranged from 1.32

to 1.74 for Fintech Adoption, 1.48 to 1.83 for Risk Management, and 1.61 to 1.85 for Business Growth, all of which are below the acceptable limit.

The coefficient of determination (R^2) values were used to measure the proportion of variance explained by the independent variables. The R^2 value for Risk Management was 0.53, indicating a moderate level of explanation, while the R^2 for Business Growth was 0.68, suggesting a substantial explanation of variance. These R^2 values demonstrate the explanatory power of the model in predicting the outcomes of risk management and business growth. The significance of path coefficients was tested using bootstrapping. Results are summarized below:

Table 2. Direct Effect

Hypothesis	Path Coefficient	t-Statistic	p-Value	Result
H1: Fintech Adoption → Risk Management	0.732	14.252	< 0.001	Supported
H2: Risk Management → Business Growth	0.658	11.308	< 0.001	Supported
H3: Fintech Adoption → Business Growth	0.354	5.424	< 0.001	Supported

The results of the hypotheses testing in this study provide valuable insights into the relationships between fintech adoption, risk management, and business growth. H1, which posits that fintech adoption influences risk management, is supported with a path coefficient (β) of 0.732, a t-statistic of 14.252, and a p-value of less than 0.001, indicating that fintech adoption significantly enhances risk management practices in MSMEs. This aligns with existing literature suggesting that technology adoption, such as fintech, improves operational processes, including risk management. H2, suggesting that risk management positively impacts business growth, is also supported with a path

coefficient (β) of 0.658, a t-statistic of 11.308, and a p-value of less than 0.001, emphasizing that robust risk management practices are crucial for ensuring sustainable growth for MSMEs. Finally, H3, which asserts that fintech adoption directly influences business growth, is supported with a path coefficient (β) of 0.354, a t-statistic of 5.424, and a p-value of less than 0.001, suggesting that fintech adoption contributes to business growth by enhancing operational efficiency, market reach, and providing better financial services.

The mediating role of risk management was assessed. The indirect effect of fintech adoption on business growth through risk management was significant.

Table 3. Indirect Effect

Path	Indirect Effect	t-Statistic	p-Value	Result
Fintech Adoption → Risk Management → Business Growth	0.474	8.208	< 0.001	Significant

The indirect effect of Fintech Adoption → Risk Management → Business Growth is significant, with a path coefficient (β) of 0.474, a t-statistic of 8.208, and a p-value of less than 0.001. This indicates that risk management mediates the relationship between fintech adoption and business growth, enhancing risk management practices that positively influence growth. The strong t-statistic and low p-value highlight the importance of fintech in improving risk management and fostering sustainable growth, showing that effective risk management helps businesses navigate uncertainties and boost performance.

4.4 Model Fit

Model fit indices were assessed to ensure the structural model's adequacy, with the Standardized Root Mean Residual (SRMR) value of 0.041, which is below the threshold of 0.08, indicating good model fit.

Additionally, the Normed Fit Index (NFI) was 0.92, exceeding the threshold of 0.90, further confirming the adequacy of the model fit. These results suggest that the structural model is well-specified and appropriately fits the data.

4.5 Discussion

This section interprets the findings of the study in the context of existing literature, theoretical implications, and practical applications. The discussion focuses on the mediating role of risk management in the relationship between financial technology (fintech) adoption and business growth in Indonesian MSMEs.

4.5.1 Fintech Adoption and Risk Management

The study confirms a significant positive relationship between fintech adoption and risk management. This result aligns with prior studies indicating that

fintech tools, such as digital payment systems, financial analytics platforms, and automated credit risk assessments, enhance risk management capabilities [21], [23], [24]. Fintech adoption equips MSMEs with tools to identify, analyze, and mitigate risks more effectively, including financial fraud, credit defaults, and operational inefficiencies. This finding underscores the role of fintech as a driver of improved governance and decision-making processes in MSMEs, particularly in volatile markets like Indonesia. As fintech adoption grows, MSMEs can develop more resilient operational frameworks, paving the way for sustained growth.

4.5.2 Risk Management and Business Growth

The significant relationship between risk management and business growth corroborates earlier research suggesting that effective risk management is integral to sustainable business development [25]–[27]. MSMEs with robust risk management practices are better equipped to navigate uncertainties, optimize resource allocation, and maintain operational continuity. In the Indonesian MSME context, the ability to manage risks effectively enhances organizational performance by reducing exposure to financial losses and enabling strategic investments in growth initiatives. For example, MSMEs with structured risk management can diversify product offerings, enter new markets, or adopt innovative business models with greater confidence.

4.5.3 Fintech Adoption and Business Growth

The direct positive effect of fintech adoption on business growth highlights the transformative potential of financial technology. Previous studies have shown that fintech adoption improves operational efficiency, enhances customer engagement, and facilitates access to financing [6], [28]. This study adds to the growing body of evidence by demonstrating that fintech tools directly contribute to business expansion in Indonesian MSMEs. However, the relatively lower magnitude of the direct effect compared to the indirect effect mediated by risk management suggests that the growth

benefits of fintech adoption are maximized when coupled with strong risk management practices. This finding underscores the importance of integrating fintech tools with comprehensive risk management strategies to achieve sustainable business growth.

4.5.4 Mediating Role of Risk Management

The study highlights the critical mediating role of risk management in the relationship between fintech adoption and business growth. The significant indirect effect demonstrates that risk management serves as a conduit through which fintech adoption influences business performance. This finding is consistent with the resource-based view (RBV) theory, which posits that internal capabilities, such as effective risk management, are essential for translating technological investments into competitive advantage. For Indonesian MSMEs, this mediation underscores the need to prioritize risk management when adopting fintech solutions. Without adequate risk management frameworks, the benefits of fintech adoption may be underutilized or negated by unanticipated risks.

4.5.5 Implications for Theory and Practice

The findings contribute to the theoretical understanding of fintech adoption and business growth by emphasizing the mediating role of risk management. This study extends the RBV theory by demonstrating how technology adoption and organizational capabilities interact to drive performance outcomes.

From a practical perspective, the results suggest several actionable insights for MSME stakeholders:

Policy-Makers: Support MSMEs in adopting fintech solutions by providing training on risk management practices.

Fintech Providers: Develop user-friendly tools that integrate risk management functionalities to address the specific needs of MSMEs.

MSME Owners: Invest in employee training to enhance technological and risk management competencies, ensuring the effective utilization of fintech tools.

5. CONCLUSION

This study offers significant insights into the relationships between fintech adoption, risk management, and business growth within Indonesian MSMEs. The results demonstrate that fintech adoption is positively related to improved risk management practices, which in turn contributes to business growth. Furthermore, risk management acts as a critical mediator, amplifying the positive effects of fintech adoption on business performance. These

findings underscore the importance of integrating technology with robust internal management practices for sustainable growth, particularly in MSMEs that face unique challenges such as limited resources and market volatility. To leverage the full potential of fintech, MSME owners must prioritize both technology adoption and effective risk management strategies. Future research could explore sector-specific variations and the long-term impact of these relationships on MSME performance.

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