

Exploring the Mediating Role of Fintech Adoption in Reducing Perceived Risks and Promoting SME Sustainability

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Abstract: This study examines the role of fintech adoption in mediating the relationship between perceived risk and business sustainability in Small and Medium Enterprises (SMEs) in Samosir Regency. Using a quantitative approach with data analyzed through Structural Equation Modeling (SEM), the study finds that fintech adoption significantly reduces the perceived risks faced by SME owners, which in turn contributes to long-term business sustainability. Digital technologies such as electronic payment systems, peer-to-peer lending platforms, crowdfunding, and mobile banking have proven to enhance operational efficiency, expand market reach, and improve financial transparency and control. These benefits help SMEs build resilience and competitiveness, especially in rural areas like Samosir where access to conventional financial services is limited. Despite the potential benefits, challenges such as limited technological knowledge, digital infrastructure gaps, regulatory uncertainty, and the lack of skilled human resources remain major barriers to effective fintech implementation. The study highlights that the role of government and stakeholders is vital in creating an enabling environment for fintech adoption. This includes policies that encourage innovation, facilitate access to digital infrastructure, provide education and training to increase digital literacy, and foster partnerships between SMEs and fintech service providers. Additionally, support from local communities and continuous awareness campaigns can further reduce resistance to change and increase trust in digital financial solutions. Overall, this research emphasizes that fintech adoption plays a crucial role in not only mitigating business risks but also supporting the long-term sustainability and growth of SMEs in the digital era.

Keywords: Fintech, Adoption Perceived, Risk Business Sustainability, Perceived Risks, Financial Technology

1. INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a crucial role in driving Indonesia's economic growth (Razaq et al., 2024). According to data from the Ministry of Cooperatives and MSMEs, these enterprises contribute over 60% to Indonesia's Gross Domestic Product (GDP) and are responsible for absorbing a significant portion of the nation's workforce (Fadli, 2021). The success of MSMEs in enhancing product quality also has a considerable impact on reducing unemployment rates (Lubis et al., 2023). By creating job opportunities and stimulating local economies, MSMEs serve as a cornerstone of the national economy, contributing to economic stability and public welfare (Pasaribu et al., 2023). Supporting the development of MSMEs is essential for strengthening Indonesia's economy in a sustainable manner (Wakhyuni et al., 2024).

Business sustainability for MSMEs refers to the ability of micro, small, and medium enterprises to remain operational, grow, and endure over the long term, while considering economic, social, and environmental aspects (Nurhidayah et al., 2025). Sustainable MSMEs not only focus on financial profits but also take into account the social impact on communities and environmental sustainability (Hou et al., 2024). The sustainability of MSMEs is crucial as it contributes to economic stability, improves public welfare, reduces poverty, and supports overall economic development (Hardiansyah et al., 2025).

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Currently, consumers prefer services that are fast, practical, and digital-based, which demands MSMEs to innovate in product marketing, transactions, and business operations (Oktafianto et al., 2024). Digitalization has thus become an inevitable necessity. In response to these challenges, many MSME operators have begun adopting digital technologies to enhance competitiveness and expand market reach (Hamidah, 2024). One of the key digital innovations addressing this need is financial technology (fintech), which provides more inclusive and efficient access to financial services (Islam et al., 2025).

The advancement of digital technology has brought significant changes across various sectors, including the micro, small, and medium enterprises (MSMEs) sector (Khuc et al., 2025). One of the main impacts of this transformation is the emergence of digital businesses and the use of financial technology (fintech) as a solution for payment systems, funding, and financial management (Kunal et al., 2025). Fintech allows MSMEs to access financial services more quickly and efficiently, which in turn enhances operational performance and expands market reach (Barbu et al., 2025). Additionally, fintech reduces barriers to funding access, thus supporting the sustainability and growth of MSMEs (Kini et al., 2024).

In the digital economy era, an MSME's ability to adopt technology is a key factor in ensuring business continuity (Cornelli et al., 2024). Financial technology (fintech) plays a crucial role in sustaining businesses, particularly for MSME operators. Fintech provides easy access to financing through digital platforms, enabling entrepreneurs who previously struggled to access formal financial institutions to secure capital more quickly and easily (Liana & Fadli, 2023). Additionally, fintech simplifies transaction and payment processes by offering services such as digital wallets, QRIS, and payment gateways, which support operational efficiency and enhance customer convenience (Iskandar, 2022).

Indonesia is home to approximately 20% of fintech startups in ASEAN, and this sector is expected to generate revenues of up to USD 8.6 billion by 2025 (S. A. Basar et al., 2024). In terms of user behavior, recent research indicates that 60% of fintech users engage with it daily, 30% weekly, and 10% occasionally, with perceived usefulness and ease of use ratings ranging from 4.1 to 4.3 out of 5 (Anggara, 2025). According to a Jakpat survey of 2,015 respondents, 93% of the population uses digital payment services as their primary financial activity, followed by saving (34%), paying bills (29%), investing (20%), and insurance (20%). This data highlights that digital payments have now become the new norm for managing finances, both individually and for businesses, including MSMEs, further emphasizing the urgency of digital transformation in the financial sector (Zhao et al., 2024).

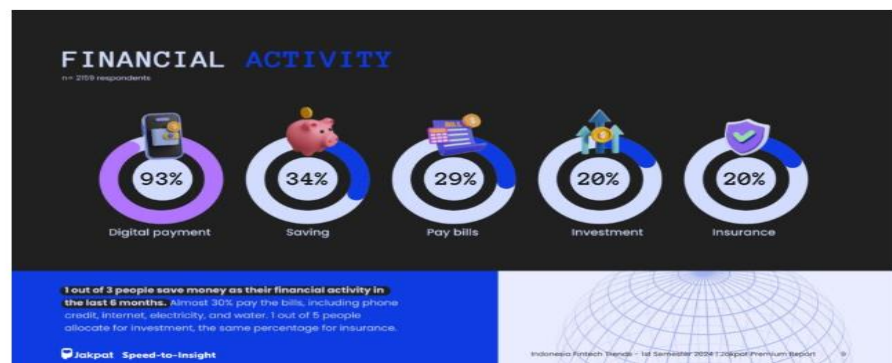


Figure 1. Financial Activities

Based on Figure 1 above, fintech plays a crucial role in supporting the digitalization of financial management by providing cash flow tracking and automated bookkeeping applications. These features enable MSME operators to make more accurate business decisions. With these conveniences, MSMEs can operate more efficiently, expand their market reach through innovative digital business models, and improve their resilience during crises such as the pandemic. The presence of fintech allows MSME operators to optimize operations and finances, create greater growth opportunities, and reduce reliance on traditional methods that are less effective in facing contemporary challenges.

Perceived risk refers to consumers' perception of potential loss or harm that may occur when making a purchase or investment decision (Liu et al., 2024a). This risk can be financial, functional, social, psychological, or related to time (Liu et al., 2024b). Financial risk concerns the fear of losing money that does not align with the benefits gained (Kumar, 2023). Functional risk involves the uncertainty of whether a product will meet the intended needs (Berto & Bursan, 2023). Social risk pertains to the judgment of others regarding the

purchasing decision (Wicaksono & Darpito, 2023). Psychological risk is associated with feelings of dissatisfaction or regret after the purchase (Nematpour et al., 2023). Meanwhile, time risk involves concerns about the time spent using a product or service (Bernarto1, 2022). The higher the perceived risk, the lower the consumer's willingness to buy or invest in a product or service (de Carvalho et al., 2024).

Several studies have indicated that perceived risk plays a significant role in consumer decisions, particularly in the context of MSMEs and technology adoption (Alrawad, Lutfi, Almaiah, & Elshaer, 2023). Perceived risk influences the use of QRIS by MSMEs, although factors such as perceived usefulness and ease of use have a more dominant effect on these decisions (Rasoolimanesh, 2021). Product performance risk and general risk also have a substantial impact on online purchasing decisions (Mwemezi & Mandari, 2024). Moreover, perceived financial risk has been shown to affect consumers' intention to make online purchases, a factor that is further reinforced by fintech support (Setyaningtyas, 2024). Perceived risk also influences the intention to use e-wallets (Adam, 2024).

Samosir Regency, known for its rich natural and cultural heritage, presents significant opportunities for the development of Micro, Small, and Medium Enterprises (MSMEs). With a rapidly growing tourism sector, MSMEs in Samosir can leverage the potential market of both local and international tourists visiting Lake Toba and Samosir Island. According to the 2024 data from the Central Statistics Agency (BPS) of Samosir Regency, the following key information is provided:

Table 1. Number of Active Cooperatives by Subdistrict in Samosir Regency, 2020-2023

Kecamatan District	2020	2021	2022	2023
(1)	(2)	(3)	(4)	(5)
1. Sianjur Mulamula	1	2	3	5
2. Harian	2	2	4	6
3. Siotio	2	3	3	5
4. Onan Runggu	2	3	3	5
5. Nainggolan	1	2	2	3
6. Palipi	4	4	7	9
7. Ronggur Nihuta	1	2	3	3
8. Pangururan	9	10	17	27
9. Simanindo	6	8	8	12
Kabupaten Samosir Samosir Regency	28	36	50	75

Source: BPS (2025)

Based on Table 1, the growth of MSMEs between 2020 and 2023 shows a significant and gradual increase. However, MSMEs still face several challenges, such as limited understanding of technology, restricted access to financial services, and low effectiveness in utilizing technology. These challenges remain key obstacles in optimizing business growth potential and enhancing competitiveness in an increasingly competitive market. One solution that should be considered is the adoption of financial technology (fintech) by MSME operators. Fintech can help address these issues by facilitating transactions and providing more efficient access to financial services, thus driving the development of MSMEs to higher and more sustainable levels.

This study is crucial given that the adoption of Financial Technology (fintech) among Micro, Small, and Medium Enterprises (MSMEs) in Samosir Regency remains limited, particularly concerning perceived risk or the risks perceived by business operators. These risks include concerns about transaction security, data confidentiality, and uncertainty regarding the sustainability of fintech platforms. Understanding how fintech can mitigate

these perceived risks is essential for ensuring the sustainability of MSME businesses in the region.

However, there is still a gap in the literature that specifically addresses the relationship between fintech adoption and the sustainability of MSME businesses in rural areas such as Samosir. Most studies have focused on urban areas or more developed regions. This research aims to fill this gap by examining the role of fintech as a mediator in reducing perceived risks faced by MSMEs and its impact on strategic decision-making by business operators. Consequently, this study makes a significant contribution to the development of MSMEs and the strengthening of the digital economy in Samosir Regency, while also supporting policies that promote fintech adoption in more remote areas.

2. LITERATURE REVIEW

Perceived Risks to Business Sustainability

Perceived risk, or the risk perceived by business owners, refers to the uncertainty or concerns related to the potential losses in business activities (Adam, 2024). Perceived risks play a crucial role, particularly in the face of challenges to survive and grow in an increasingly competitive market (Abu Hatab et al., 2023). These risks are often caused by both external and internal factors that influence business decisions, including economic uncertainty, regulatory changes, market fluctuations, and rapid technological advancements (Glowka et al., 2024). For MSMEs, these risks can be even more complex due to limited resources and a lack of knowledge and experience in risk management (Alrawad, Lutfi, Almaiah, Alsyounf, et al., 2023). In an increasingly digitalized business world, fintech (financial technology) has emerged as a solution widely used by MSMEs to enhance operational efficiency and access to financial services (Alrawad, 2023). However, despite the various advantages offered by fintech, the adoption of this technology still comes with perceived risks that may be felt by MSME operators (Khuc et al., 2025). These risks encompass several aspects, such as data security, information confidentiality, the reliability of fintech platforms, and changes in policies or regulations that could affect business operations (Elhamma, 2023).

One significant type of perceived risk for MSMEs is transaction security risk (Zhao & Khaliq, 2024a). When adopting fintech, MSME operators face concerns about potential data breaches or system hacking, which could threaten the security of business transactions (Escandon-Barbosa & Salas-Paramo, 2024). Although many fintech providers offer advanced encryption systems and data protection, MSMEs often remain skeptical about the actual level of security, especially if business operators are unfamiliar with this technology (Telukdarie et al., 2024). The uncertainty regarding the protection of customer data and business information may make MSMEs hesitant to transition to more modern fintech systems, even though these could help improve efficiency and support business growth (Mwemezi & Mandari, 2024). Additionally, another perceived risk relates to the reliability and sustainability of the fintech platform itself (Hudakova et al., 2023).

Many MSME operators are concerned about the stability of the fintech platforms they use (Alrawad, Lutfi, Almaiah, & Elshaer, 2023). If the fintech service provider experiences technical disruptions or even goes bankrupt, MSMEs could lose access to invested funds or face disruptions in executing critical business transactions (Erdiaw-Kwasie et al., 2023). This can directly impact business sustainability, as reliance on a single platform increases the operational risks associated with it. Confidentiality of information is also a major concern for MSME owners when adopting fintech (Hipólito et al., 2025). MSMEs often handle sensitive data related to company finances, customer data, and other business information. Uncertainty about how fintech platforms manage and protect this data can increase the perceived risk for MSME owners. Data breaches or the leakage of personal customer information could damage the company's reputation, which in turn would affect customer trust and the sustainability of the business (Masdupi et al., 2024).

Additionally, changes in government regulations related to fintech can also pose a risk factor (Zhao & Khaliq, 2024b). Although the Indonesian government has started to regulate the fintech industry, unexpected policy changes can affect MSME operations (Bhat et al., 2024). Uncertainty about how regulations will evolve and their impact on MSMEs' access to fintech platforms or service fees can be a significant source of risk (Adedoyin Tolulope

Oyewole et al., 2024). These perceived risks may hinder the broader adoption of fintech among MSMEs, ultimately affecting the sustainability of business operations (Zafar, 2022). Therefore, it is crucial for MSME operators to understand and manage these risks effectively (Yang et al., 2025). One step that can be taken is to choose a reliable fintech platform with a proven track record in terms of security, reliability, and compliance with existing regulations (Zouaoui, 2022). Furthermore, educating MSMEs on risk management and providing a deeper understanding of the long-term benefits of fintech can help mitigate perceived risks and maximize fintech's potential to support business growth and sustainability (Zaid & Yaqub, 2024).

Fintech Adoption on Business Sustainability

The adoption of Financial Technology (fintech) has brought significant changes in the way business operators manage their enterprises, including for Micro, Small, and Medium Enterprises (MSMEs) (Ming et al., 2025). Fintech, which encompasses a range of technology-based financial services, offers businesses ease of access to financing, faster transactions, and more efficient financial management (Tarigan & Muharam, 2025). For MSMEs, fintech adoption can be a key factor in enhancing business sustainability (Megat et al., 2024). Business sustainability refers to the ability to survive and grow over the long term, despite facing various challenges (Siddik et al., 2023). One critical factor driving fintech adoption in MSMEs is improved access to financial services (A. Basar et al., 2024). In many regions, particularly outside major cities, MSMEs often struggle to obtain financing from banks or traditional financial institutions (Peni et al., 2024). Fintech provides a solution by offering quicker, easier loans or financing without the need for complicated collateral requirements (Sharma et al., 2024). With fintech, MSMEs can secure the capital needed for expansion or to sustain operations amidst economic uncertainty (Almaqtari, 2024).

In addition, fintech also provides the ease of transactions that are crucial for MSMEs (Bhat et al., 2024). Many small businesses struggle with making payments or receiving payments from customers and partners (Arshi et al., 2024). Through fintech, MSMEs can leverage digital wallets, bank transfers, or payment platforms to conduct transactions online more quickly and efficiently (Sreenu, 2024). This simplified payment process not only enhances operational efficiency but also strengthens relationships with customers and suppliers, which can contribute to business growth (S. A. Basar et al., 2024). More effective financial management is also one of the key benefits of fintech adoption (Anggara, 2025). With fintech applications, MSMEs can easily monitor cash flow, plan budgets, and manage business finances in a more structured manner (Sanga & Aziakpono, 2024). This enables MSME owners to make more informed decisions while reducing financial risks that could threaten business sustainability (Khuc et al., 2025). Furthermore, fintech can assist in automating transaction recording and financial reporting, minimizing human error and enhancing transparency in financial management (Zhao & Khaliq, 2024a).

One of the challenges that fintech faces in supporting the sustainability of MSME businesses is the limited knowledge and technological skills of MSME operators (Kunal et al., 2025). Many MSME owners, particularly in remote areas, are not familiar with financial technology and struggle to utilize fintech effectively (Zhao et al., 2024). Additionally, data security and transaction safety remain key concerns that must be addressed. MSMEs must ensure that the fintech platforms they choose have robust security systems in place to protect personal data and business transactions (Barbu et al., 2025).

3. METHODS

Research Approach

This study employed a quantitative approach using a survey method to examine the influence of digital business, perceived benefits, and perceived risks on business sustainability through fintech adoption among MSME actors. Classified as an associative quantitative study, it aims to analyze the relationships among variables based on numerical data. The quantitative approach was selected for its ability to provide a clear depiction of variable interrelationships and to generalize the findings to a broader population.

A survey was administered to collect data from a sample drawn from the population of MSME actors. The sampling technique applied was saturated sampling, wherein all 75

members of the population were included in the study, considering the relatively small and accessible population size. The survey data offer valuable insights into MSME actors' perceptions regarding fintech adoption and the factors influencing the sustainability of their businesses.

Data Sources and Literature Selection Criteria

The data utilized in this study was sourced from primary data, specifically through a closed-ended questionnaire distributed to MSME actors. The questionnaire was designed based on indicators of the relevant variables for this research, using a five-point Likert scale to measure respondents' perceptions of various statements related to perceived benefits, perceived risks, and business sustainability.

The literature selection criteria for this study focused on research related to fintech adoption, perceived risks, and the sustainability of MSMEs in Indonesia. The chosen literature must be relevant and contribute to the development of a conceptual model linking fintech and business sustainability.

Data Analysis Strategy

Data analysis in this study was conducted using Partial Least Squares – Structural Equation Modeling (PLS-SEM), with the assistance of SmartPLS software. The PLS-SEM technique was chosen due to its suitability for studies with small to medium sample sizes and complex, predictive models. PLS-SEM allows for testing causal relationships among latent variables and assessing the validity and reliability of the research constructs.

In this analysis, the first step was to test construct validity to ensure that the indicators used in the questionnaire accurately measured the intended variables. Following this, the analysis was conducted to identify the relationships among the variables under investigation, such as the influence of perceived benefits and perceived risks on business sustainability through fintech adoption.

Methodological Limitations

This study has several limitations. First, it relies on secondary data collected through a questionnaire distributed to MSME actors, meaning the results are dependent on the respondents' perceptions and may not fully reflect the broader situation. Second, although PLS-SEM was used to test the relationships between variables, the model remains predictive and cannot numerically test the variables as done in experimental research. Third, this study focuses on fintech adoption and business sustainability, without considering other factors such as consumer behavior or marketing strategies, which may also influence MSME sustainability.

4. RESULTS

Respondent Description

Table 2. Respondent Demographics

	Category	N	Percentage (%)
Gender	Man	34	45.3%
	Woman	41	54.7%
Length of Business	< 1 year	6	8.0%
	1 – 3 years	20	26.7%
	4 – 6 years	26	34.7%
	> 6 years	23	30.6%
Total Respondents		75	100%

This study involved 75 respondents who were MSME actors. The respondents were selected using a saturated sampling technique, where all members of the population, totaling 75 individuals, were included as the research sample. In terms of gender, the distribution of respondents showed that females were slightly more dominant, with 41 individuals (54.7%), while males accounted for 34 individuals (45.3%). This indicates that, although the number

of females is slightly higher, MSME actors in Samosir Regency are composed of both genders in nearly equal proportions.

Regarding business tenure, the distribution of respondents showed considerable variation. The majority of respondents (34.7%) had business experience ranging from 4 to 6 years, followed by 23 individuals (30.6%) with more than 6 years of experience. Meanwhile, 20 respondents (26.7%) had business experience ranging from 1 to 3 years, and only 6 respondents (8.0%) were newly established with less than 1 year of experience. These findings suggest that the majority of MSME actors in Samosir Regency have considerable experience in running their businesses, with a number of relatively new entrepreneurs who show good potential for growth.

Measurement Model Analysis (Outer Model)

The analysis of the measurement model (outer model) was carried out through two primary assessments: (1) the evaluation of construct reliability and validity, and (2) the assessment of discriminant validity. The outcomes of these tests are presented below to evaluate the appropriateness of the research instrument.

Table 3. Outer Model Results

Indicators	Adopsi Fintech (X)	Perceived Risk (Z)	Business Sustainability (Y)
FT1	0.915		
FT2	0.890		
FT3	0.910		
FT4	0.934		
FT5	0.901		
FT6	0.912		
PR1		0.850	
PR2		0.889	
PR3		0.811	
PR4		0.870	
PR5		0.830	
PR6		0.801	
FB1			0.792
FB2			0.843
FB3			0.889
FB4			0.902
FB5			0.924
FB6			0.871
FB7			0.881

Table 3 presents the results of the measurement model (outer model) analysis, showing the loading factor values for each indicator associated with the latent variables: Fintech Adoption (X), Perceived Risk (Z), and Business Sustainability (Y). The majority of the loading factor values exceed 0.70, indicating that these indicators effectively represent their respective constructs. For instance, the FT1 indicator shows a loading value of 0.915 for Fintech Adoption, which suggests a strong representation of this construct. Similar results are observed for the PR2 and FB5 indicators, with loading values of 0.889 for Perceived Risk and 0.924 for Business Sustainability, respectively. These high loading factor values signify that the constructs of Fintech Adoption, Perceived Risk, and Business Sustainability are adequately represented by their corresponding indicators. Notably, the FT4 indicator for Fintech Adoption, with a loading value of 0.934, strongly reflects the Fintech Adoption construct, demonstrating a high association between fintech adoption and its measurement. Similarly, for Business Sustainability, indicators FB5 (0.924) and FB7 (0.880) exhibit a robust relationship with the Business Sustainability construct, further affirming the model's reliability.

Table 4. Composite Reliability

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Adopsi Fintech (Z)	0.866	0.867	0.903	0.651
Perceived Risk (X)	0.885	0.888	0.921	0.744
Business Sustainability (Y)	0.872	0.873	0.907	0.662

The table above presents the results of the reliability and construct validity tests, including the Cronbach's Alpha, rho_A, Composite Reliability, and Average Variance Extracted (AVE) values for each variable. All variables exhibit Cronbach's Alpha and Composite Reliability values exceeding 0.7, indicating that the instruments used are reliable. Additionally, the AVE values are all above 0.5, suggesting that each construct demonstrates good convergent validity. Therefore, all constructs in the model are considered valid and reliable for subsequent analysis.

Table 5. Discriminant Validity Results

Indicators	Adopsi Fintech (X)	Perceived Risk (Z)	Business Sustainability (Y)
FT1	0.984	0.674	0.981
FT2	0.983	0.673	0.978
FT3	0.925	0.621	0.916
FT4	0.969	0.664	0.962
FT5	0.926	0.61	0.911
FT6	0.932	0.619	0.918
PR1		0.916	0.738
PR2		0.983	0.734
PR3		0.972	0.729
PR4		0.926	0.664
PR5		0.932	0.671
PR6		0.911	0.683
FB1			0.783
FB2			0.899
FB3			0.841
FB4			0.768
FB5			0.959
FB6			0.896
FB7			0.941

Table 5 presents the results of the loading factor (outer loading) analysis for each indicator associated with the latent variable constructs: Fintech Adoption (X), Perceived Risk (Z), and Business Sustainability (Y). The majority of the loading factor values exceed 0.70, indicating that these indicators possess good convergent validity in measuring the intended constructs.

Structural Model Analysis (Inner Model)**R-Square****Table 6. Determination Coefficient (R-Square)**

	R Square	R Square Adjusted
Adopsi Fintech (Z)	0.700	0.687
Business Sustainability(Y)	0.837	0.828

The table above presents the R Square and Adjusted R Square values for the Fintech Adoption (Z) and Business Sustainability (Y) variables. The R Square value of 0.700 for Fintech Adoption indicates that 70% of the variability in Fintech Adoption is explained by the independent variables in the model. Meanwhile, the R Square value of 0.837 for Business Sustainability indicates that 83.7% of its variability is explained by the other constructs in the model. Both values are considered strong, suggesting that the model has high explanatory power for these dependent variables.

Hypothesis Testing (Direct Effect)**Table 7. Hypothesis Testing**

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Adopsi Fintech (Z) -> Business Sustainability (Y)	0.567	0.551	0.105	5.371	0.000
Perceived Risk (X) -> Business Sustainability (Y)	0.057	0.069	0.108	2.526	0.002
Perceived Risk (X3) -> Adopsi Fintech (Z) -> Business Sustainability(Y)	0.101	0.088	0.082	2.225	0.001

The Influence of Perceived Risk on Fintech Adoption

The hypothesis testing results indicate that perceived risk has a significant effect on the adoption of fintech among MSME actors in Samosir Regency. This finding is consistent with previous studies which suggest that concerns about security and uncertainty in using financial technology can hinder fintech adoption among MSMEs (Abdul-Rahim et al., 2022)(Appiah & Agblewornu, 2025)(Jain & Raman, 2023). MSME actors who perceive high risks are generally reluctant to adopt new digital payment systems, as they view them as vulnerable to fraud or system failures (Dawood et al., 2023). These concerns create barriers for MSMEs to fully leverage fintech, despite its potential to enhance operational efficiency and expand market access (C. Li et al., 2025). To promote fintech adoption, it is essential to reduce perceived risks by providing education and building trust in the fintech systems being used (Xia et al., 2023).

Fintech adoption among MSME actors tends to be low among those who are skeptical about the benefits of this technology (Manrai et al., 2024). Concerns regarding personal data protection and the financial risks associated with digital transaction errors further exacerbate this mistrust (Zhao & Khaliq, 2024b). Many MSME actors perceive the risks of using financial technology to outweigh the potential benefits (Wasiuzzaman et al., 2022). To address this, increasing trust in fintech becomes crucial (Essel, 2023). Fintech service providers can reduce perceived risks by enhancing transparency regarding the operation of the technology and assuring the security of data and transactions (Adam, 2024). In this way, fintech providers can encourage its adoption by MSMEs, leading to improved efficiency and business growth (Glowka et al., 2024).

Based on these findings, the managerial implications highlight the importance for fintech providers and MSME managers in Samosir Regency to reduce the perceived risks experienced by MSME actors. One approach to achieving this is by providing more comprehensive training and education on fintech usage, enabling MSME actors to better understand the benefits of the technology and how to manage potential risks, such as data security issues or transaction errors. Additionally, fintech service providers should enhance the security and transparency of transactions to build trust among MSME actors.

Demonstrating successful experiences from other MSMEs that have adopted fintech can also be an effective way to encourage more MSMEs in Samosir Regency to follow suit. With these measures, it is hoped that fintech adoption will be more widely accepted, supporting increased efficiency and business sustainability among MSMEs in the region.

The Effect of Perceived Risk on Business Sustainability

The hypothesis testing results indicate that perceived risk has a significant impact on the adoption of fintech among MSME actors in Samosir Regency. This finding supports previous studies that have shown concerns about security and uncertainty in the use of financial technology can hinder fintech adoption among MSMEs (Alrawad, Lutfi, Almaiah, Alsayouf, et al., 2023)(Magalhães-Teixeira et al., 2024)(Alrawad, 2023). MSME actors with a high perception of risk are generally hesitant to use new digital payment systems, as they perceive them as vulnerable to fraud or system failures (Khuc et al., 2025). These concerns act as barriers for MSMEs in utilizing fintech, despite its potential to enhance operational efficiency and expand market access (Zhao & Khaliq, 2024a).

Efforts to encourage fintech adoption must focus on reducing perceived risk by providing education and building trust in the fintech systems being used (Zhao & Khaliq, 2024b). MSME actors who are skeptical about the benefits of fintech are often influenced by concerns about personal data protection and the financial risks associated with errors in digital transactions (Masdupi et al., 2024). These concerns exacerbate the mistrust of business actors toward the technology. Many MSME actors perceive financial technology as riskier than the potential benefits it offers (Erdiaw-Kwasie et al., 2023). To address this, enhancing trust in fintech becomes a key priority (Alrawad, Lutfi, Almaiah, & Elshaer, 2023). Fintech service providers can reduce perceived risks by increasing transparency regarding the operation of the technology offered and providing assurances about the security of data and transactions (W. Li, 2024). Through this approach, fintech providers can encourage MSMEs to be more open to adopting this technology, which in turn will enhance efficiency and foster business growth among MSMEs (Mwemezi & Mandari, 2024).

Based on these findings, the managerial implications suggest the importance for fintech providers and the Department of Cooperatives and MSMEs in Samosir Regency to reduce the perceived risks experienced by MSME actors. One way to achieve this is by offering more in-depth training and education on the use of fintech, enabling MSME actors to better understand the benefits of this technology and how to manage potential risks, such as data security issues or transaction errors. Additionally, fintech service providers should enhance the security and transparency of transactions to build trust among MSME actors. Providing examples of successful experiences from other MSMEs that have adopted fintech can also be an effective way to encourage more MSMEs in Samosir Regency to follow suit.

The Effect of Fintech Adoption on Business Sustainability

The hypothesis testing results indicate that fintech adoption significantly affects Business Sustainability among MSME actors in Samosir Regency. These findings are consistent with previous research, which shows that the implementation of financial technology can enhance operational efficiency and expand market access for MSMEs, thereby supporting Business Sustainability (A. Basar et al., 2024)(S. A. Basar et al., 2024)(Bhat et al., 2024). The use of fintech has the potential to reduce operational costs and expand access to capital, which is crucial for the sustainability of small and medium-sized enterprises (Kunal et al., 2025). Through fintech adoption, MSMEs can conduct transactions more quickly and securely, which strengthens their Business Sustainability in the long term (Faruque et al., 2024). This technology offers MSMEs the opportunity to operate more efficiently, improve competitiveness, and accelerate business growth and expansion (Almaqtari, 2024).

In addition to enhancing transaction efficiency, fintech also provides MSMEs with the opportunity to expand their customer reach through digital platforms (Megat et al., 2024). By implementing fintech, MSMEs can optimize payment and transaction processes while accessing a broader market (Anggara, 2025). This enables business actors to introduce products or services to a larger audience (Arshi et al., 2024). Furthermore, fintech adoption enhances MSME performance and competitiveness in an increasingly competitive market, thereby supporting Business Sustainability (Siddik et al., 2023). By leveraging the right

technology, MSMEs can improve operational efficiency, reduce costs, and more easily adapt to the evolving market changes (Hidayat-ur-rehman & Alsolamy, 2023).

Based on the research findings, several important managerial implications for MSME actors in adopting fintech can be identified. The role of local government in engaging more actively with MSME actors to provide education on the benefits of fintech, such as improved operational efficiency, cost reduction, and expanded market access, is crucial. Fintech service providers must also enhance the transparency and security of their systems to reduce the perceived risks faced by MSME actors. Additionally, more in-depth training on the use of fintech is essential to ensure that MSME actors can fully maximize this technology in their business operations. Providing guidance on successful experiences from MSMEs that have already adopted fintech can also be an effective way to encourage adoption among other MSMEs.

The Effect of Perceived Risk on Business Sustainability through Fintech Adoption

The hypothesis testing results confirm that fintech adoption significantly mediates the relationship between perceived risk and Business Sustainability among MSME actors in Samosir Regency. This finding is consistent with previous studies, which indicate that perceived risk impacts Business Sustainability (Abu Hatab et al., 2023)(Adam, 2024)(Glowka et al., 2024). Fintech adoption can reduce the perceived risks experienced by business actors, ultimately supporting the sustainability of their businesses (Zhao & Khaliq, 2024b). Fintech serves to mitigate uncertainty in business transactions, particularly in payment and financial management, making MSME actors feel more secure in conducting business (Masdupi et al., 2024).

The use of fintech can reduce operational costs and increase efficiency, which is crucial for supporting the sustainability of small and medium-sized enterprises (Hipólito et al., 2025). Fintech adoption provides MSMEs with greater access to capital and expands their market reach, thereby enhancing their competitiveness and Business Sustainability (Alrawad, Lutfi, Alyatama, et al., 2023). Although high perceived risk can hinder the adoption of new technology, research indicates that once MSMEs begin adopting fintech, business actors are able to overcome these risks (Alrawad, Lutfi, Almaiah, & Elshaer, 2023). The benefits derived from fintech use, such as cost efficiency and broader market access, outweigh the perceived risks (Hudakova et al., 2023).

Based on the findings indicating that fintech adoption can reduce perceived risk and support Business Sustainability for MSMEs in Samosir Regency, several managerial implications should be considered by fintech providers and MSME managers. Fintech service providers should focus on enhancing the security and transparency of their platforms. Providing assurances regarding security and ease of use will alleviate MSME actors' concerns about the risks associated with digital transactions. MSME managers should educate business actors about the benefits of fintech through training and workshops, enabling them to leverage this technology wisely and effectively. Additionally, sharing success stories of MSME actors who have already adopted fintech can serve as an effective strategy to encourage more MSMEs to follow suit.

5. CONCLUSION

This study investigates the role of adoption of fintech in mediating the relationship between perceived risk and business sustainability among SMEs in Samosir Regency. The findings suggest that adopting fintech helps reduce the perceived risks faced by SMEs, contributing to the long-term sustainability of their businesses. Digital technologies such as electronic payment systems, peer-to-peer lending, and other fintech solutions have been shown to enhance operational efficiency, expand market access, and improve financial management. However, challenges such as limited technological knowledge, regulatory uncertainty, and human resource constraints remain significant barriers to the adoption of these technologies. Government policies, digital literacy training, and collaboration with fintech service providers are crucial to overcoming these barriers. This study emphasizes the importance of adopting fintech to support the sustainability of SMEs in the digital age. Further research should explore the role of fintech in different business sectors and assess the impact of policy support in facilitating fintech adoption.

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