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Analysis of Determinants of Fintech Adoption by MSMEs in Balikpapan City: DOI and TAM Approaches

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Abstract

Purpose: This study investigates how Diffusion of Innovation (DOI) factors shape perceived usefulness and ease of use in MSMEs' fintech adoption, and how these perceptions influence behavioral intention and actual usage. Motivated by low digital literacy and uneven fintech adoption in Balikpapan, the study provides insights for stakeholders to enhance fintech utilization..

Methodology/approach: A quantitative survey was conducted targeting MSMEs in Balikpapan that are familiar with or have used fintech. Data were collected through online and offline questionnaires from 100 respondents and analyzed using SEM-PLS with SmartPLS 4.0.

Results/findings: Six hypotheses were supported, while relative advantage → perceived usefulness and complexity → perceived ease of use were not significant. This suggests that MSMEs emphasize ease of use over perceived benefits. Accordingly, training, technical assistance, and more intuitive app designs are needed to strengthen effective adoption. Compatibility significantly improves perceived usefulness and ease of use, and observability enhances perceived usefulness, which in turn increases behavioral intention and actual usage.

Conclusion: The integrated DOI–TAM model effectively explains fintech adoption among MSMEs in Balikpapan. Perceptual factors play a crucial role, while some DOI attributes do not significantly influence fintech perceptions..

Limitations: This study is limited to MSME fintech users in Balikpapan and uses a quantitative approach, which restricts deeper exploration of subjective motivations and user experiences.

Contribution: The findings underscore the need for fintech solutions aligned with MSMEs' digital literacy and operational needs. Strengthening government-led digital literacy initiatives and incorporating factors such as trust, perceived risk, and environmental influences is recommended for future research.

Keywords: *DOI, Financial Technology, MSME, TAM, Technology Adoption*

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1. Introduction

Information technology has driven various aspects of life toward innovation, including the business sector. Micro, Small, and Medium Enterprises (MSMEs) in Indonesia play a significant role given their substantial number. As business actors, MSMEs must keep pace with these technological developments (Saadah & Setiawan, 2024). Furthermore, MSMEs serve as the primary pillar of rural economies and a source of income for low-income households, while also acting as indispensable drivers of national and

global economic development through their contributions to macroeconomic growth and local community empowerment (Oktarendah, Tunut, Nadea, & Bangsawan).

Current technological advancements have accelerated a global transformation toward the digital sphere, affecting individuals and various industrial sectors. These advancements not only optimize communication processes but also accelerate the dissemination and acquisition of information (Permana & Apriani, 2025). This transformation, commonly referred to as digital transformation, involves the use of disruptive technologies not only to enhance productivity but also to create value and improve social welfare (Ebert & Duarte, 2018). Digital transformation has driven the demand for innovation across industries worldwide, particularly in the financial sector. The financial sector has actively embraced digital transformation, giving rise to financial technology (Fintech) products.

Fintech represents the integration of technology and financial systems as an innovation within the rapidly evolving financial services sector (Verma, Shome, & Hassan, 2023). Moreover, fintech enhances financial service processes by offering technology-based solutions to various business challenges Leong and Sung (2018). Furthermore, the adoption and integration of fintech can provide 1.6 billion individuals in developing countries with access to diverse financial services. The implementation of cost-reduction methods and strategies to minimize tax revenue losses can substantially increase the credit capacity of individuals and firms, resulting in an estimated increase of $2.1 trillion. Additionally, these methodologies enable governments to achieve annual cost reductions of up to $110 billion (Akbar Islamic, 2023).

Since its initial emergence, financial technology (fintech) has experienced rapid growth and has become one of the strategic sectors driving Indonesia's digital economic transformation. According to data compiled by the Indonesian Fintech Association (AFTECH), as of 2023, more than 350 fintech companies were actively operating in Indonesia, with total transaction values reaching IDR 1,778 trillion in 2022, a significant increase from IDR 1,148 trillion in the previous year. The services offered span various sectors, including digital payments, technology-based lending (peer-to-peer lending), and digital investment platforms. Additionally, in 2017, fintech transaction values in Indonesia amounted to approximately USD 18.6 billion, of which 99% originated from the digital payments sector. This sub-sector has demonstrated substantial growth in both developed and developing countries (Akbar Islamic, 2023). On the other hand, Indonesia exhibits best practices in fintech implementation by fulfilling the five dimensions of the DIPLOMA model: Digitalization, Innovation, Pricing, Learning, and Modernity. This indicates that Indonesia can serve as a model for other countries in implementing fintech within their respective contexts (Haripin & Warsono, 2024).

Fintech (Financial Technology) has evolved into a strategic innovation that plays a significant role in financial transformation, particularly in supporting Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. In Balikpapan City alone, as of March 2025, approximately 87,000 MSMEs have been officially registered. Given this substantial number, digitalization has become a crucial solution for optimizing services and capacity-building efforts for MSME actors, with fintech being one of the key enablers (Pramesti et al., 2022). Accordingly, the utilization of internet-based financial services continues to increase, becoming more diverse and exhibiting intensified competition in attracting a larger user base (Candy et al., 2022).

Fintech offers various benefits to MSMEs, such as access to digital payment systems, online financing, and more efficient financial management. Although financial technology is designed to facilitate transactions, it can also pose challenges for business actors. Low levels of education or insufficient understanding of fintech limit the ability of some MSME actors to effectively operate these services (Munasib & Fitriyah, 2025). Moreover, MSMEs are expected to face a range of strategic challenges in the future, including adaptation to technological innovation, enhancement of digital literacy, productivity improvement, access to financing, development of branding and marketing strategies, improvement of human resource quality, compliance with standards and certifications, equitable access to development and training programs, and the establishment of integrated database systems (Fiqih & Ika, 2025). Therefore, despite the widely recognized benefits of fintech, adoption levels among MSMEs

remain varied, underscoring the importance of understanding the factors influencing MSMEs' decisions to adopt fintech.

To explain this phenomenon, the Diffusion of Innovation (DOI) theory proposed by Rogers (2003) is employed to examine how innovation characteristics such as relative advantage, compatibility, complexity, and observability influence perceptions of new technologies (Rogers, 2003). Meanwhile, the Technology Acceptance Model (TAM) developed by Davis, Bagozzi, and Warshaw (1989)is used to evaluate how perceived usefulness and perceived ease of use affect behavioral intention to adopt technology.

Numerous studies on fintech adoption by MSMEs have applied various theoretical models, including the Technology Acceptance Model (TAM), which emphasizes perceived usefulness and ease of use, as well as the Diffusion of Innovation (DOI) theory, which explains how innovations spread within a population. However, prior studies have predominantly relied on a single theoretical framework, such as the study by K. Y. Chin, Zakaria, Purhanudin, and Pin (2021), thereby limiting comprehensive understanding. Other approaches, including the Technology-Organization-Environment (TOE) framework and the Unified Theory of Acceptance and Use of Technology (UTAUT), have also been employed to analyze technology adoption factors among MSMEs (Bouteraa, 2024; Christian, Herdinata, Wiradinata, & Setiobudi, 2019).

Nevertheless, the integration of DOI and TAM in the context of fintech adoption by MSMEs remains limited, with existing studies largely focusing on corporate sectors or other industries, and rarely addressing MSMEs in regions such as Balikpapan, which exhibit distinct characteristics in terms of digital literacy and infrastructure readiness (De La Cruz et al., 2024; Nezamdoust, Abdekhoda, & Rahmani, 2022). Furthermore, the integration of frameworks is supported by several studies that demonstrate more comprehensive explanations of technology acceptance, such as Haripin and Warsono (2024), who integrated UTAUT2 and TOE, and Firmansyah and Warsono (2022), who integrated the UTAUT and DOI models.

Considering these research gaps, this study aims to empirically analyze the factors influencing fintech adoption among MSMEs in Balikpapan. Furthermore, this research contributes to addressing theoretical and practical gaps through an extended integration of the DOI–TAM framework, incorporating local contextual factors and employing a robust quantitative methodological approach. The findings are expected to provide significant contributions to both the development of technology adoption theory and the

2. Literature Review and Hypotheses

2.1. Financial Technology (Fintech) and MSMEs

FinTech represents an advanced and disruptive innovation that has gradually replaced traditional financial services and gained substantial momentum worldwide (Bouteraa, 2024). According to the Financial Stability Board (2017), financial technology (fintech) is defined as innovation in financial services driven by technological advancements, resulting in the emergence of new business models, applications, processes, and products that significantly affect the way financial services are delivered. Fintech encompasses a wide range of services, including digital payment systems, technology-based lending or peer-to-peer (P2P) lending, financial management, application-based investments, and digital insurance services (Leong & Sung, 2018).

In the context of MSMEs, fintech plays a strategic role as a bridge to financial access that was previously limited through conventional channels. Fintech offers alternative financing solutions, cash flow management tools, and transaction digitalization that support productivity enhancement and business accountability (Verma et al., 2023). However, fintech adoption among MSMEs in Indonesia still faces significant challenges, such as low levels of digital literacy, limited trust in digital systems, and infrastructure constraints (Akbar Islamic, 2023).

2.2. Diffusion of Innovation (DOI) Theory

The Diffusion of Innovation (DOI) theory introduced by Rogers (2003) posits that the spread of innovation within a society is influenced by the characteristics of the innovation itself. Five key attributes affect the adoption of an innovation:

1. Relative Advantage: The degree to which an innovation is perceived as better than the previous method.
2. Compatibility: The extent to which an innovation aligns with users' values, experiences, and needs.
3. Complexity: The degree of difficulty in understanding or using an innovation.
4. Trialability and Observability: The extent to which the results of an innovation can be tested and observed prior to adoption decisions.

This study focuses on four primary attributes relative advantage, compatibility, complexity, and observability as they are considered the most relevant in explaining MSMEs' initial decisions to adopt fintech technology (Rogers, 2003).

2.3. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis et al. (1989), explains that technology acceptance and usage are influenced by two core constructs. First, Perceived Usefulness (PU) refers to the extent to which an individual believes that using a particular technology enhances task effectiveness or performance. Second, Perceived Ease of Use (PEOU) refers to the extent to which an individual believes that using the technology requires minimal effort. These two factors influence users' attitudes and behavioral intention to use technology. TAM has been widely applied in technology adoption studies, including those focusing on MSMEs and financial information systems. K. Y. Chin et al. (2021) demonstrate that PU and PEOU significantly influence fintech adoption decisions among small business operators. Other studies reveal that TAM is grounded in users' perceptions of the benefits provided by an information system while minimizing negative perceptions. This model explains that individuals are more likely to use a system if it is perceived as easy to understand and beneficial (Ardila, Wibasuri, & Lestari, 2025).

2.4. Integration of DOI and TAM

The integration of DOI and TAM aims to combine the explanatory strengths of both models. DOI focuses on innovation characteristics, while TAM emphasizes individual perceptions of technology. By integrating these frameworks, the model becomes more comprehensive in explaining the cognitive and environmental processes influencing technology adoption (Firmansyah & Warsono, 2022).

Previous studies integrating DOI and TAM have shown significant results in understanding digital technology acceptance across education, healthcare, and business sectors. Min, So, and Jeong (2021) found that relative advantage, complexity, and observability significantly influence perceived ease of use and perceived usefulness. Similarly, Nezamdoust et al. (2022) reported that compatibility and complexity significantly affect perceived ease of use and perceived usefulness. Furthermore, Al-Rahmi et al. (2019)identified significant effects of relative advantage and observability on perceived usefulness.

Other studies, including Ayanwale and Ndlovu (2024), Putri, Widagdo, and Setiawan (2023), and Belmonte, Prasetyo, Cahigas, Nadlifatin, and Gumasing (2024), confirm that perceived usefulness and perceived ease of use significantly influence behavioral intention. Finally, Wei et al. (2025) and Patnaik and Bakkar (2024) demonstrate that behavioral intention significantly affects fintech adoption decisions. Nevertheless, the combined application of DOI and TAM in the context of MSMEs and fintech remains limited, particularly in eastern Indonesia, such as Balikpapan, where digitalization levels and infrastructure readiness are relatively underdeveloped.

2.5. Hypotheses

2.5.1. Relative Advantage and Perceived Usefulness

Relative advantage is defined as the extent to which an innovation is perceived as superior to previous technologies or methods (Al-Rahmi et al., 2019). In this study, relative advantage reflects the extent to

which MSME actors believe that fintech usage enhances efficiency and financial performance compared to conventional financial methods. This relationship is consistent with the findings of (Al-Rahmi et al., 2019; Min et al., 2021).

H1: Relative advantage has a positive effect on perceived usefulness.

2.5.2. Compatibility and Perceived Usefulness and Perceived Ease of Use

Compatibility reflects individuals' perceptions of how well an innovation aligns with existing values, prior experiences, and user needs (Rogers, 2003). Ayanwale and Ndlovu (2024) further define compatibility as the alignment of a system with existing technological infrastructure, organizational processes, and strategic and cultural objectives. This alignment plays a critical role in the successful implementation of fintech, as it affects user acceptance, active system use, and the achievement of organizational goals (Tu, Yuan, Archer, & Connelly, 2018). These relationships are consistent with the findings of (Ayanwale & Ndlovu, 2024; Nezamdoust et al., 2022).

H2a: Compatibility has a positive effect on perceived usefulness.

H2b: Compatibility has a positive effect on perceived ease of use.

2.5.3. Complexity and Perceived Ease of Use

Complexity refers to the perceived difficulty in understanding and using a technology (Rogers, 2003). In the MSME context, when fintech is perceived as complex, perceived ease of use is likely to decrease. This finding aligns with studies by Nezamdoust et al. (2022) and Min et al. (2021), which indicate that higher system complexity reduces perceived ease of use.

H3: Complexity has a negative effect on perceived ease of use.

2.5.4. Observability and Perceived Usefulness

Observability refers to the extent to which the results of an innovation are visible to others (Rogers, 2003). When fintech benefits are clearly observable to MSME actors through user testimonials or case studies, for instance the perceived usefulness of the system increases. This relationship is consistent with the findings of (Al-Rahmi et al., 2019; Min et al., 2021)

H4: Observability has a positive effect on perceived usefulness.

2.5.5. Perceived Usefulness and Behavioral Intention

According to TAM, perceived usefulness is a primary determinant of an individual's intention to use technology. When MSME actors believe that fintech provides tangible benefits to their businesses, their intention to adopt fintech increases (Davis et al., 1989). This relationship is supported by (K. Y. Chin et al., 2021; Putri et al., 2023). However, this finding contradicts Ayanwale and Ndlovu (2024), who report no significant effect of perceived usefulness on behavioral intention.

H5: Perceived usefulness has a positive effect on behavioral intention.

2.5.6. Perceived Ease of Use and Behavioral Intention

In addition to perceived usefulness, ease of use is a key determinant of behavioral intention. When fintech is perceived as easy to understand and operate, MSME actors are more inclined to use it. This relationship is supported by Belmonte et al. (2024), although it contradicts the findings of (Ayanwale & Ndlovu, 2024).

H6: Perceived ease of use has a positive effect on behavioral intention.

2.5.7. Behavioral Intention and Fintech Adoption Decision

Behavioral intention reflects an individual's willingness and tendency to use a technology. In both TAM and DOI frameworks, behavioral intention is often considered a direct predictor of actual behavior, which in this context refers to MSMEs' fintech adoption decisions. This relationship is consistent with the findings of (Patnaik & Bakkar, 2024; Wei et al., 2025).

H7: Behavioral intention has a positive effect on fintech adoption decisions.

Based on the development of these hypotheses, a research framework is established to guide this study. The proposed research framework derived from the hypotheses is presented in **Figure 1** below.

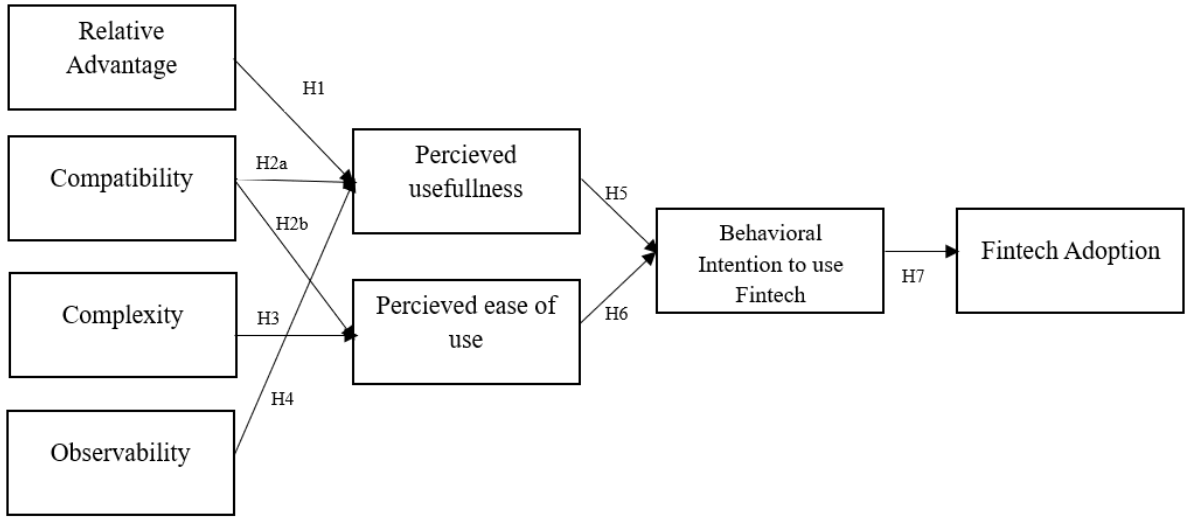

Figure 1. Research Framework
Source: Authors' elaboration, 2025

3. Research Methodology

This study employs a quantitative research approach by integrating the Diffusion of Innovation (DOI) theory and the Technology Acceptance Model (TAM) to obtain more comprehensive results. This integration aims to identify DOI factors that focus on innovation characteristics, while TAM emphasizes individual perceptions of technology. By combining both frameworks, the proposed model provides a more holistic explanation of the cognitive and environmental processes influencing technology adoption.

The sampling method applied in this study is purposive sampling. Based on the predefined purposive sampling criteria, a total of 100 respondents were selected. Data were collected using both online and offline questionnaires. The measurement instrument employed a five-point Likert scale, where 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree. The questionnaires, administered both online and offline, were completed by MSME owners and managers from various sectors who had already adopted fintech in their business operations. Data collection was conducted from 14 June to 26 June 2025.

This study utilizes Partial Least Squares–Structural Equation Modeling (PLS-SEM) to analyze both the measurement model and the structural model. The data analysis was performed using SmartPLS version 4.0. The interpretation of PLS-SEM results should be undertaken with caution, as this method produces associative rather than strictly causal relationships. Consequently, although path coefficients indicate the direction and strength of relationships among constructs, they should not be interpreted as definitive evidence of causality.

Table 1. Respondent Characteristics

Description	Category	Frequency (n)	Percentage (%)
Gender	Female	75	75%
	Male	25	25%
Age	< 30 years	20	20%
	30 – 45 years	60	60%
	>. 45 years	20	20%
Business Duration	< 3 years	45	45%
	3 – 5 years	30	30%

	>. 5 years	25	25%
Type of Business	Trade	70	70%
	Services	10	10%
	Manufacturing	20	20%

Source: Authors' elaboration, 2025

4. Results and Discussion

4.1. Measurement Model (Validity and Reliability)

The measurement model for reflective constructs was evaluated through composite reliability, construct validity, and discriminant validity assessments. In PLS-SEM, indicators are considered acceptable when they exhibit factor loadings of ≥ 0.70; indicators with loadings below 0.70 should be eliminated to improve model fit. Composite Reliability and Cronbach's Alpha values must also be ≥ 0.70 to demonstrate adequate internal consistency of the constructs. In addition, the Average Variance Extracted (AVE) should reach a minimum threshold of ≥ 0.50 to ensure that the construct explains more than half of the variance of its indicators. Discriminant validity was assessed using the Fornell–Larcker criterion (Hair, Risher, Sarstedt, & Ringle, 2019).

Table 2. Measurement Model Test Results (Validity and Reliability)

Variable	Item	Indicator	Outer loading	Cronbach's Alpha	Composite Reliability	AVE
Behavioral Intenation (Davis et al., 1989; Nezamdoust et al., 2022; Wei et al., 2025)	BI1	I intend to use fintech in my business operations.	0,895	0,935	0,951	0,797
	BI2	I will use fintech regularly for business activities.	0,952			
	BI3	I am committed to continuously using fintech services.	0,920			
	BI4	I plan to try other fintech services in the future.	0,795			
	BI5	I intend to recommend fintech services to others, particularly MSME actors.	0,892			
Compatibility (Okour, Chong, & Abdel Fattah, 2021; Rogers, 2003)	COMP1	Fintech is compatible with the way I run my business.	0,905	0,937	0,952	0,800
	COMP2	Fintech fits well with my business workflow and operational procedures.	0,922			
	COMP3	Fintech aligns with the financial needs of my business.	0,906			
	COMP4	Fintech is consistent with my values and beliefs as a business owner.	0,868			
	COMP5	Fintech is suitable for my current business situation.	0,869			

Variable	Item	Indicator	Outer loading	Cronbach's Alpha	Composite Reliability	AVE
Complexity (Okour et al., 2021; Rogers, 2003)	COMPLX1	I find it difficult to understand the features of fintech applications.	0,790	0,921	0,926	0,807
	COMPLX2	Using fintech is too complicated for me.	0,903			
	COMPLX3	I often feel confused when using fintech services.	0,991			
Fintech Adoption (Okour et al., 2021; Patnaik & Bakkar, 2024)	AD3	I believe that adopting fintech is the right decision for my business.	0,890	0,857	0,913	0,778
	AD4	I use fintech as part of my long-term business strategy.	0,911			
	AD5	I have planned to increase my level of fintech adoption.	0,843			
Observability (Rogers, 2003; Suryafma, Haryadi, & Afni, 2023)	OBS1	I can see tangible benefits from fintech usage by other business owners.	0,848	0,933	0,950	0,790
	OBS2	Many MSMEs appear to be more successful after adopting fintech.	0,919			
	OBS3	I am aware of positive outcomes from fintech usage in similar businesses.	0,904			
	OBS4	I often hear about successful experiences of other business owners using fintech.	0,870			
	OBS5	Evidence of fintech success among other MSMEs increases my confidence in using it.	0,902			
Percieved Ease of Use (Belmonte et al., 2024; Davis et al., 1989)	PEOU1	I find it easy to learn how to use fintech.	0,863	0,930	0,947	0,782
	PEOU2	Fintech is easy to use even when trying it for the first time.	0,936			
	PEOU3	I feel comfortable using fintech without assistance from others.	0,897			
	PEOU4	Fintech has a clear and easy-to-understand interface.	0,872			

Variable	Item	Indicator	Outer loading	Cronbach's Alpha	Composite Reliability	AVE
	PEOU5	I do not experience difficulties in adapting to fintech services.	0,851			
Percieved Usefulness (Belmonte et al., 2024; K. Y. Chin et al., 2021; Davis et al., 1989)	PU1	Fintech helps me make better financial decisions.	0,852	0,912	0,935	0,741
	PU2	Fintech accelerates financial management processes.	0,893			
	PU3	Fintech improves the quality of my business management.	0,884			
	PU4	Fintech makes it easier for me to monitor cash flow.	0,836			
	PU5	Fintech serves as a flexible financial service solution.	0,836			
Relative Advantage (Okour et al., 2021; Rogers, 2003; Suryafma et al., 2023)	RA1	Fintech provides greater benefits compared to traditional financial methods.	0,937	0,939	0,957	0,846
	RA2	Fintech makes my business financial management more efficient.	0,922			
	RA3	Fintech increases my productivity in running the business.	0,900			
	RA4	Fintech helps me save time when conducting financial transactions.	0,920			

Source: SmartPLS data processing, 2025

Table 2 presents the results of validity and reliability testing. The overall values of Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's Alpha (CA) all meet the acceptable thresholds; therefore, discriminant validity is established. Furthermore, the obtained CR values range from 0.913 to 0.957, all of which exceed the recommended threshold of 0.70. The CA values range from 0.939 to 0.957, also surpassing the minimum acceptable value of 0.70. In addition, the AVE values range from 0.741 to 0.846, all exceeding the required threshold of 0.50. These results indicate that all AVE values are significant and greater than 0.50, thereby satisfying the recommended criteria (Hair et al., 2019).

4.2. Discriminant Validity

Discriminant validity is an assessment conducted to ensure that constructs are theoretically distinct and can be empirically supported through statistical testing. The Fornell–Larcker criterion states that the square root of the AVE for each construct should be greater than its correlations with other constructs in the model (Hair et al., 2019).

Table 3. Discriminant Validity (Fornell–Larcker Criterion)

Variabel	BI	COMP	COMPLX	AD	OBS	PEOU	PU	RA
BI	**0,893**							
COMP	0,775	**0,894**						
COMPLX	-0,044	0,015	**0,899**					
AD	0,887	0,798	-0,103	**0,882**				
OBS	0,767	0,787	-0,120	0,814	**0,889**			
PEOU	0,774	0,776	-0,137	0,774	0,810	**0,884**		
PU	0,803	0,823	-0,138	0,861	0,805	0,799	**0,861**	
RA	0,604	0,688	-0,108	0,656	0,615	0,639	0,645	**0,920**

Source: SmartPLS data processing, 2025

Based on Table 3, the results indicate that the square root of the AVE for each construct is greater than its correlations with other constructs. For example, the Fintech Adoption construct has a square root of AVE value of 0.882, which is higher than its correlations with observability (0.814), perceived ease of use (0.774), perceived usefulness (0.861), and relative advantage (0.656). These findings demonstrate that discriminant validity is adequately established for all constructs in the model.

4.3. Structural Model Analysis

4.3.1. Hypothesis Testing

Hypothesis testing is a component of structural model analysis used to examine the relationships among variables derived from the proposed hypotheses. Hypothesis testing between variables is conducted by evaluating the path coefficients and p-values. A relationship is considered statistically significant when the p-value is less than 0.05. In addition, path coefficients are assessed to determine the magnitude and direction of the relationships between variables. Furthermore, the f^2 effect size is used to evaluate the direct impact of exogenous variables at the structural level, with thresholds of 0.02 (small), 0.15 (moderate), and 0.35 (large).

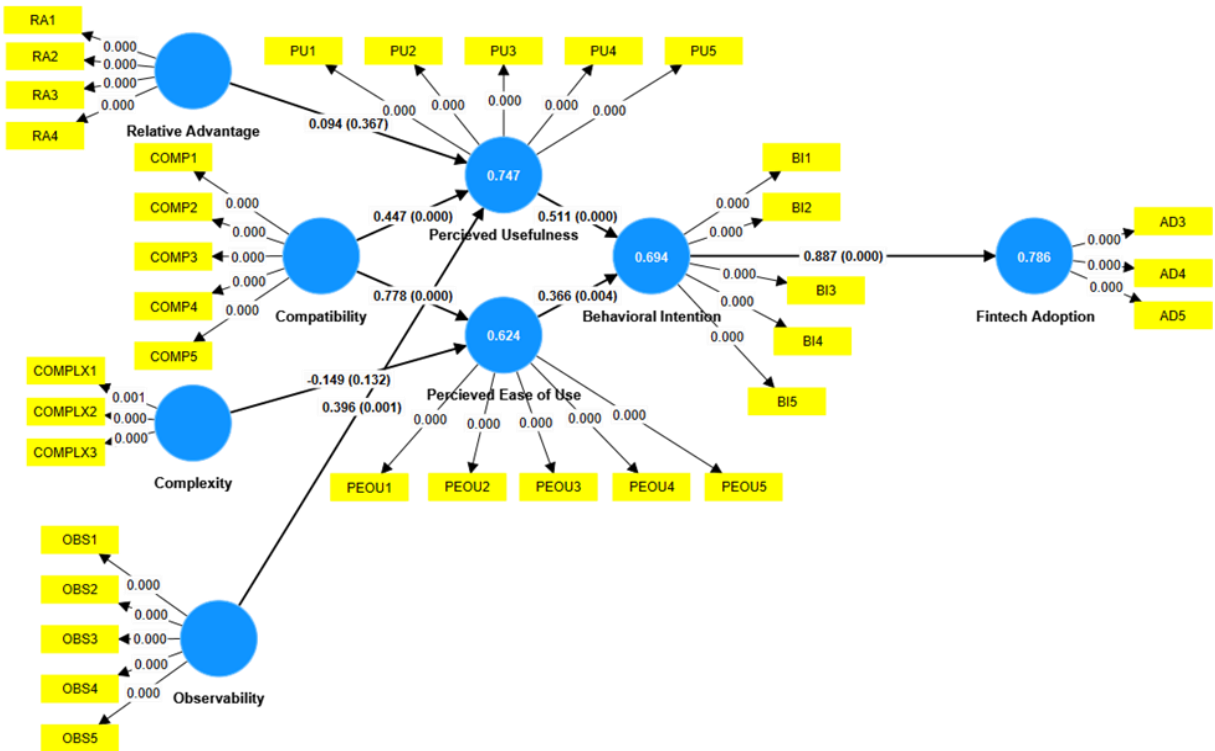

Figure 2. Hypothesis Testing Results
Source: SmartPLS data processing, 2025

Table 4. Hypothesis Test Results

Hypothesis	Path Coefficient	p-value	F Square	Results
H1. Relative Advantage → Percieved Usefulness	0,094	0,367	0,018	Rejected
H2a. Compatibility → Percieved Ease of Use	0,778	0,000	1,610	Accepted
H2b. Compatibility → Percieved Usefulness	0,447	0,000	0,249	Accepted
H3. Complexity → Percieved Ease of Use	-0,149	0,132	0,059	Rejected
H4. Observability → Percieved Usefulness	0,396	0,001	0,231	Accepted
H5. Percieved Usefulness → Behavioral Intention	0,511	0,000	0,309	Accepted
H6. Percieved Ease of Use → Behavioral Intention	0,366	0,004	0,159	Accepted

Source: Processed data from Smart-PLS, 2025

4.4. Evaluation of Model Fit and Goodness

4.4.1. R-Square Test

R-square explains the proportion of variance in endogenous variables that can be explained by exogenous variables or other endogenous variables within the model. The interpretation thresholds for R-square values are 0.19 (weak), 0.33 (moderate), and 0.66 (substantial) (W. W. Chin, 1998).

Table 5. R-Square Test Results

Measurement	Value			
	BI	AD	PEOU	PU
R-squared	0,694	0,786	0,624	0,747
R-squared adjusted	0,688	0,784	0,616	0,740

Source: Processed data from Smart-PLS, 2025

Based on Table 5, the results show that all endogenous variables have R-squared values that fall into the high category according to the interpretation of W. W. Chin (1998) as explained below:

a. Behavioral Intention (BI) has an R-squared value of 0.694, meaning that 69.4% of the variance in users' behavioral intention to adopt fintech, which is considered high, can be explained by Perceived Ease of Use and Perceived Usefulness. This indicates that the model is sufficiently strong in explaining behavioral intention.
b. Fintech Adoption (AD) has an R-squared value of 0.786, indicating that 78.6% of the variance in fintech adoption, which is categorized as high, is explained by Behavioral Intention. This represents a very strong influence, suggesting that behavioral intention is the dominant predictor in explaining technology adoption decisions.
c. Perceived Ease of Use (PEOU) has an R-squared value of 0.624, meaning that 62.4% of the variance in perceived ease of use, which is classified as high, is explained by the variables Compatibility and Complexity. This value is relatively close to the high threshold, indicating that the model is fairly strong in explaining this perception.
d. Perceived Usefulness (PU) has an R-squared value of 0.747, which means that 74.7% of the variance in perceived usefulness, categorized as high, is explained by Compatibility, Observability, and Relative Advantage. This indicates that these factors collectively make a substantial contribution to perceived usefulness.

4.4.2. Q-Square Test

The Q-square test is used as an indicator to evaluate the predictive capability of the model by measuring the extent to which variation in exogenous and endogenous variables can explain the endogenous variables. This index serves as a measure of predictive validity in the PLS approach, and the resulting values indicate the model's suitability in predicting the data. A Q-square value greater than 0 indicates that the model has predictive relevance. The interpretation of Q-square values includes 0 (low), 0.25 (moderate), and 0.50 (high) (Hair et al., 2019).

Table 6. Q-Square Test Results

Measurement	Measurement Value			
	BI	AD	PEOU	PU
Q-Squared	0,626	0,657	0,587	0,700

Source: SmartPLS data processing, 2025

Based on Table 6, the Q-squared values are greater than zero (0), indicating that the proposed model demonstrates predictive relevance or a high level of predictive accuracy, with values exceeding 0.50.

4.4.3. Goodness of Fit Index (GoF Index) Test

The Goodness of Fit (GoF) Index is an indicator used to evaluate the overall fit of the model, calculated based on the reflective measurement model. This value is obtained from the square root of the geometric mean of the average communality and the average R-square values (Henseler, Ringle, & Sarstedt, 2015). According to Wetzels, Odekerken-Schröder, and Van Oppen (2009), the interpretation of GoF values is categorized into three levels: 0.10 indicates a small fit, 0.25 indicates a medium fit, and 0.36 indicates a large fit.

Table 7. GoF Index Test Results

Measurement	Measurement Value
Goodness of Fit Index (GoF)	0,752

Source: SmartPLS data processing, 2025

Based on Table 7, the results of the Goodness of Fit (GoF) Index test show a value of ≥ 0.36, indicating that the overall model evaluation demonstrates a high level of model fit, with a GoF value of 0.752. This finding confirms that the proposed model is well fitted to the empirical data.

4.5. Discussion

4.5.1. The Effect of Relative Advantage on Perceived Usefulness

Based on the results of hypothesis testing for H1, Relative Advantage does not have a significant effect on Perceived Usefulness, with a path coefficient of 0.094 and a p-value of 0.367. This result indicates that the relative advantages offered by fintech services do not directly enhance users' perceptions of usefulness. MSMEs, as fintech users, do not immediately perceive fintech advantages as beneficial or performance-enhancing, even though fintech offers faster, cost-saving, and more efficient features compared to traditional methods. This condition may occur because MSMEs have not yet fully understood or trusted the advantages of fintech (S. Wulandari, Keni, & Teoh, 2023). This finding is consistent with the study (S. Wulandari et al., 2023), which found no significant relationship between relative advantage and perceived usefulness. Therefore, it can be concluded that MSME actors do not prioritize relative advantage as the primary basis for evaluating the usefulness of fintech services. Instead, they tend to consider other factors, such as ease of use and actual business needs. Consequently, although fintech possesses technological advantages over traditional methods, these advantages alone are insufficient to shape the perception that fintech is genuinely useful for sustaining business operations.

4.5.2. The Effect of Compatibility on Perceived Ease of Use

Based on the results of hypothesis testing for H2a, Compatibility has a positive and significant effect on Perceived Ease of Use, with a path coefficient of 0.778 and a p-value of 0.000. This finding indicates that the more fintech services align with users' needs, values, and lifestyles, the more likely users are to perceive fintech as easy to use. MSMEs are more receptive to fintech when the technology aligns with their business patterns and habitual practices. For example, fintech services integrated with mobile banking or online marketplaces are easier for MSMEs to understand due to their familiarity. This result is consistent with previous studies by Min et al. (2021) and S. Wulandari et al. (2023), which report a positive and significant effect of compatibility on perceived ease of use. Thus, MSME actors are more likely to adopt fintech when the services offered are compatible with their operational needs, business values, and habitual work practices. Such compatibility creates the perception that fintech adoption does

not require substantial additional effort for adaptation. Therefore, the higher the level of compatibility between fintech systems and MSMEs' working methods, the greater the users' comfort and ease in operating the services.

4.5.3. The Effect of Compatibility on Perceived Usefulness

Based on the results of hypothesis testing for H2b, Compatibility has a positive and significant effect on Perceived Usefulness, with a path coefficient of 0.447 and a p-value of 0.000. The more relevant fintech is to MSMEs' business processes, the more important the technology is perceived to be for business sustainability. Fintech provides MSMEs with easier access to financing, digital payments, improved financial management, and broader market reach, making it an essential component of MSME operations and development (Sholeha & Kharisma, 2024). This finding aligns with Min et al. (2021), who also found a positive and significant relationship between compatibility and perceived usefulness. Accordingly, MSME actors tend to perceive fintech as useful when the services align with their business needs and operational context. High compatibility enables fintech to be perceived as providing tangible added value, such as operational efficiency, productivity enhancement, and ease of financial decision-making. Therefore, the greater the alignment between fintech characteristics and MSMEs' business processes, the stronger the perception that fintech offers strategic benefits for business continuity.

4.5.4. The Effect of Complexity on Perceived Ease of Use

Based on the results of hypothesis testing for H3, Complexity does not have a significant effect on Perceived Ease of Use, with a path coefficient of –0.149 and a p-value of 0.132. This indicates that the complexity of fintech systems does not significantly influence users' perceptions of ease of use. This finding suggests that system complexity is not a primary concern for MSME actors. Users' technological competence and the availability of user-friendly system designs facilitate fintech usage. In other words, even if fintech systems involve certain levels of complexity, as long as users possess adequate digital literacy and fintech applications are designed with simple and intuitive interfaces, MSMEs tend to perceive fintech as easy to use (Moruk, de Rozari, Makatita, & Ndoen, 2025; Udango & Ishak, 2022). These factors reduce technical barriers and encourage broader fintech adoption among MSMEs. This result is consistent with Ismail, Hadjaratie, and Kaluku (2022), who found no significant effect of complexity on perceived ease of use. Thus, MSME actors are not substantially hindered by technical complexity as long as they feel capable of operating the system. Training programs, technical support, and user-friendly application designs play crucial roles in shaping perceptions of ease of use, even when systems contain complex elements. Consequently, educational approaches and intuitive feature development remain essential to ensure fintech accessibility and optimal utilization by MSMEs.

4.5.5. The Effect of Observability on Perceived Usefulness

Based on the results of hypothesis testing for H4, Observability has a positive and significant effect on Perceived Usefulness, with a path coefficient of 0.511 and a p-value of 0.000. This finding indicates that when individuals can clearly observe the benefits of a technology, their perception of its usefulness increases. For MSME actors, observability plays a crucial role, as they often gain insights into fintech benefits through the experiences of others. For example, when MSMEs observe peers conducting transactions more efficiently, obtaining financing more quickly, or producing more systematic financial reports through fintech usage, their confidence in fintech's ability to support business sustainability increases. These findings support prior studies by Min et al. (2021) and R. T. Wulandari and Damayanti (2022), which reported a positive and significant effect of observability on perceived usefulness. Thus, MSME actors are more likely to perceive fintech as useful when they can directly or indirectly observe tangible outcomes of fintech usage by others. Observability facilitates social learning processes, whereby MSMEs gain information and confidence from peer experiences and testimonials. Therefore, enhancing the visibility of successful fintech use through case studies or experience-based promotion may be an effective strategy to strengthen perceived usefulness and expand fintech adoption among MSMEs.

4.5.6. The Effect of Perceived Usefulness on Behavioral Intention

Based on the results of hypothesis testing for H5, Perceived Usefulness has a positive and significant effect on Behavioral Intention, with a path coefficient of 0.511 and a p-value of 0.000. This finding

indicates that the greater MSME actors' confidence in the tangible benefits provided by fintech, the stronger their intention to adopt it. Trust in fintech benefits such as easier access to financing, transaction efficiency, and more systematic financial management encourages MSMEs to consider fintech usage in their business operations. When MSMEs perceive fintech as adding value and supporting business objectives, they are more motivated to initiate or intensify its use. This result is consistent with previous studies Belmonte et al. (2024) and R. T. Wulandari and Damayanti (2022), which found a positive and significant effect of perceived usefulness on behavioral intention. Accordingly, enhancing MSMEs' understanding and confidence in fintech benefits directly strengthens their intention to adopt fintech services in daily business activities.

4.5.7. The Effect of Perceived Ease of Use on Behavioral Intention

Based on the results of hypothesis testing for H6, Perceived Ease of Use has a positive and significant effect on Behavioral Intention, with a path coefficient of 0.367 and a p-value of 0.004. This result indicates that the easier fintech is perceived to be, the stronger users' intention to use it. Fintech features such as multi-device accessibility, practical and efficient transaction processes, and simplified functionalities motivate MSMEs to select and use fintech services. This finding is consistent with studies by Min et al. (2021), R. T. Wulandari and Damayanti (2022), K. Y. Chin et al. (2021), and Putri et al. (2023), all of which reported a positive and significant relationship between perceived ease of use and behavioral intention. Thus, perceived ease of use plays a critical role in encouraging MSMEs' intentions to adopt fintech. When fintech systems are designed to be simple, intuitive, and free from complex technical requirements, MSMEs feel more confident and comfortable initiating fintech usage.

4.5.8. The Effect of Behavioral Intention on Fintech Adoption

Based on the results of hypothesis testing for H7, Behavioral Intention has a positive and significant effect on Fintech Adoption, with a path coefficient of 0.887 and a p-value of 0.000. This finding indicates that users with strong behavioral intentions are more likely to adopt fintech services, thereby increasing the likelihood of actual fintech usage. Behavioral intention serves as a strong indicator of the realization of fintech adoption in business activities. When MSME actors possess firm confidence and readiness to use fintech, they are more inclined to integrate fintech services into their daily business processes. This finding aligns with previous studies by Wei et al. (2025) and Patnaik and Bakkar (2024), which reported a positive and significant effect of behavioral intention on fintech adoption. Therefore, behavioral intention plays a crucial role in driving MSMEs' actual decisions to adopt fintech. Once the intention to use fintech is firmly established, it becomes a critical foundation for the realization of fintech usage in everyday business practices. In other words, behavioral intention is not merely a tendency but a determining factor that drives actual adoption behavior.

5. Conclusion

5.1. Conclusion

This study analyzes the factors influencing fintech adoption among MSMEs in Balikpapan by integrating the Diffusion of Innovation (DOI) and Technology Acceptance Model (TAM) approaches. Based on data from 100 respondents, the results indicate that compatibility has a significant effect on both perceived usefulness and perceived ease of use, implying that alignment between fintech services and business needs fosters positive perceptions regarding usefulness and ease of use. Observability is also found to have a positive effect on perceived usefulness, suggesting that tangible outcomes experienced by other users enhance perceived benefits. Furthermore, both perceived usefulness and perceived ease of use contribute positively to behavioral intention, which ultimately drives actual fintech adoption decisions. Conversely, relative advantage and complexity do not exhibit significant effects, indicating that relative superiority and perceived complexity are not the primary determinants of fintech adoption decisions among MSMEs.

5.2. Implications

5.2.1. Theoretical Implications

This study strengthens the integration of the DOI–TAM framework by demonstrating that compatibility serves as a key linkage between innovation attributes and user perceptions, as it significantly enhances both perceived usefulness and perceived ease of use. The finding that observability influences perceived

usefulness further extends theoretical understanding by highlighting that observable experiences of other users can shape benefit perceptions prior to the formation of adoption intentions. Conversely, the non-significant effects of relative advantage and complexity suggest that, in the context of widely adopted fintech services, certain DOI attributes may lose their predictive power. At the same time, the strong effects of perceived usefulness and perceived ease of use on behavioral intention reaffirm the core validity of TAM. Overall, these findings indicate that the DOI–TAM integration is more effective when innovation attributes are mediated through perceptual mechanisms rather than directly linked to adoption intention.

5.2.2. Managerial Implications

The findings provide several important managerial implications. For fintech service providers, aligning system features and designs with the characteristics and business processes of MSMEs is crucial. This implies that service providers should conduct in-depth research into MSMEs' specific needs, such as ease of use, affordability, and transactional flexibility. Such alignment should encompass not only technical aspects but also varying levels of digital literacy among MSME actors, ensuring that system interfaces and functionalities are accessible to diverse user groups. Accordingly, fintech providers need to develop responsive and adaptive strategies to ensure their services are widely accepted and optimally utilized within the MSME sector.

5.2.3. Policy Implications

Governments and policymakers should encourage the development of fintech systems with flexible integration and more user-friendly interfaces to enhance MSMEs' perceptions of ease of use and usefulness. In addition, digital literacy programs and experiential training initiatives should be strengthened, including the dissemination of successful user testimonials, to increase observability and build trust among MSME actors toward digital financial technologies.

5.3. Limitations and Future Research Directions

This study has several limitations that should be considered in future research. First, the geographical scope is limited to Balikpapan City, which restricts the generalizability of the findings to other regions with different MSME characteristics and levels of digital infrastructure. Second, the respondents consist solely of MSMEs that have already adopted fintech services, which limits the ability to capture barriers or determinants affecting non-adoption among MSMEs that have not yet used fintech. Third, the study employs a purely quantitative approach, which does not fully explore subjective motivations, personal perceptions, or user experiences. Therefore, future studies are encouraged to adopt mixed-method approaches to provide a more comprehensive and in-depth understanding of fintech adoption behavior among MSMEs.

Future research is also recommended to expand the model by incorporating additional variables such as trust, perceived risk, financial literacy, or external environmental factors such as regulation and infrastructure support. The model may further be integrated with other prominent theories, including the Theory of Planned Behavior (TPB) and the Unified Theory of Acceptance and Use of Technology (UTAUT), to provide a more comprehensive understanding of fintech adoption behavior among MSMEs.

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