The Role of Financial Technology Adoption on Financial Inclusion among Unbanked Populations

Darwin Nahwan
STIE Miftahul Huda Subang; Subang, Indonesia
E-Mail: nahwandarwin@gmail.com

ABSTRACT

The level of financial inclusion in Indonesia continues to increase, but there is still a gap between urban and rural areas. Unbanked groups such as informal entrepreneurs and women in the suburbs face barriers to accessing formal financial services. Although financial technology is growing rapidly, its adoption among low-income earners is still hampered by infrastructure, cost, and digital literacy factors. This study aims to analyze the driving and inhibiting factors of financial technology adoption by unbanked groups from a development economics perspective. The study used a mixed methods approach, with a focus on quantitative surveys on 100 respondents and qualitative interviews on 10 key informants. Data analysis includes logistic regression to measure the influence of socio-economic variables and thematic coding to uncover risk perceptions and cultural barriers to Financial Technology adoption. This study shows that financial technology adoption is influenced by socio-economic factors such as age, type of business, and income. MSMEs in the food sector are 4.5 times more likely to adopt financial technology than households due to the need for efficiency and microtransactions. Expanding financial inclusion requires collaboration among government, service providers, and communities to strengthen infrastructure and build trust.

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ABSTRAK

Tingkat inklusi keuangan di Indonesia terus meningkat, tetapi masih terdapat kesenjangan antara wilayah perkotaan dan pedesaan. Kelompok yang tidak memiliki rekening bank seperti wirausaha informal dan perempuan di pinggiran kota menghadapi hambatan dalam mengakses layanan keuangan formal. Meskipun financial technology berkembang pesat, adopsinya di kalangan masyarakat berpenghasilan rendah masih terhambat oleh faktor infrastruktur, biaya, dan literasi digital. Penelitian ini bertujuan untuk menganalisis faktor pendorong dan penghambat adopsi fintech oleh kelompok yang tidak memiliki rekening bank dari perspektif ekonomi pembangunan. Penelitian ini menggunakan pendekatan metode campuran, dengan fokus pada survei kuantitatif terhadap 100 responden dan wawancara kualitatif terhadap 10 informan kunci. Analisis data meliputi regresi logistik untuk mengukur pengaruh variabel sosial ekonomi dan pengkodean tematik untuk mengungkap persepsi risiko dan hambatan budaya terhadap adopsi financial technology. Penelitian ini menunjukkan bahwa adopsi financial technology dipengaruhi oleh faktor sosial ekonomi seperti usia, jenis usaha, dan pendapatan. UMKM di sektor makanan 4.5 kali lebih mungkin mengadopsi financial technology dibandingkan rumah tangga karena kebutuhan akan efisiensi dan transaksi mikro. Memperluas inklusi keuangan memerlukan kolaborasi antara pemerintah, penyedia layanan, dan masyarakat untuk memperkuat infrastruktur dan membangun kepercayaan.

Kata kunci: *Ekonomi Pembangunan, Inklusi Keuangan, Teknologi Keuangan, Populasi Yang Tidak Memiliki Rekening Bank, UMKM.*

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INTRODUCTION

Nationally, the 2025 National Survey on Financial Literacy and Inclusion (*Survei Nasional Literasi dan Inklusi Keuangan*/SNLIK) reported that Indonesia's financial inclusion index reached 80.51 %, a significant increase from 75.02 % in 2024 (OJK, 2025). In West Java, one of the SNLIK 2025 samples covering seven districts and cities, including Bandung, there remains a notable access gap between urban and rural areas. The inclusion index in urban areas reached 83.61%, while in rural regions it was only 75.70 %. Meanwhile, the national financial literacy rate increased slightly to 66.46% in 2025, up from 65.43% in 2024 (OJK, 2024). West Java's economy continues to grow above the national average, recording a 4.98% increase in 2024 and ranking as the second-highest growth province on Java Island. The city of Bandung, as a regional economic hub, plays a vital role through its service, manufacturing, and trade sectors (Nayak & Raval, 2024; Darnida et al., 2024).

Despite steady economic growth, inequality in access to financial services between urban and rural areas persists. Rural residents' inclusion index (75.70%) remains 7.91 points below that of urban areas (83.61%). This disparity is partly due to West Java's high proportion of informal employment, 60.16% in 2023, rising from 54.61% in 2021 (Kshetri, 2016; Budisusila, 2021). The dominance of the informal sector correlates with a larger "unbanked" population; nationally, about 19.49% of adults still lack access to formal financial services in 2024 (van Zanden, 2023). Informal workers face barriers to formal credit, savings, and insurance, increasing economic vulnerability and inequality.

Meanwhile, Indonesia's digital revolution has accelerated Financial Technology (FinTech) growth, particularly in e-wallets, peer-to-peer (P2P) lending, and digital microfinance, supported by internet expansion and conducive regulations (Kholidah et al., 2023). QRIS transactions surged by 175% year-on-year in 2024, involving over 30 million MSMEs and merchants (Soleh, 2014; Octaviani et al., 2024). Digital banking transactions reached IDR 15,881.53 trillion in early 2024, up 16.15% from the previous year, while e-money transactions hit IDR 90.44 trillion, an annual growth of 33.99% (Christian, 2024; Burhan, 2025). Internet penetration also reached 79% by 2024, contributing to a financial inclusion rate approaching 84%.

Indonesia's FinTech market is projected to generate over USD 20.93 billion in 2025, driven by strong growth in P2P lending and digital microfinance, which reached IDR 507.02 trillion in early 2025 (Sutriyanto, 2025; Untari, 2025). P2P lending alone grew 29.94% to IDR 78.50 trillion with a 2.52% TWP90 ratio, while embedded finance is projected to reach USD 2.59 billion by 2024 (Globe Newswire, 2024). FinTech enhances inclusion by reducing transaction costs and information asymmetry (Njatrijani, 2019; Ubaidillah, 2023). Nonetheless, Bandung's unbanked groups, especially MSMEs, women, and rural residents, remain constrained by collateral, fees, and low literacy barriers.

The growth of FinTech in Bandung shows great inclusion potential but remains limited among the unbanked (Mulasiwi & Julialevi, 2020; Geriadi et al., 2023). Although Financial Services Authority (*Otoritas Jasa Keuangan*/OJK) regulations on digital onboarding and e-signatures have eased formal barriers, uneven 4G/5G networks, high mobile data costs, and low smartphone ownership among small merchants hinder adoption. Limited access to formal finance correlates with poverty, as poor households rely on costly informal loans (Arif et al., 2020). Consistent with McKinnon Shaw theory, broader inclusion can foster capital accumulation and growth (Ramadanti et al., 2022; Teruna & Ardiansyah, 2024). Most FinTech studies in Indonesia emphasize national or metropolitan contexts like Jakarta and Surabaya, lacking localized analysis of Bandung's socioeconomic dynamics (Broby, 2021; Tampubolon, 2025). Setiyono and Prapanca (2021) and Nasution et al. (2022) tend to assess P2P lending and e-wallets on a macro level without exploring how factors such as education, informal employment type, and gender influence adoption.

This study aims to analyze the role of FinTech in expanding financial access for the unbanked population in Bandung, focusing on identifying the factors that hinder and

drive the adoption of digital financial technology from a development economics perspective. Through quantitative and qualitative approaches, the study will explore the socioeconomic characteristics of the unbanked including informal workers, micro MSMEs, and women and evaluate the effectiveness of alternative scoring models and digital onboarding.

LITERATURE REVIEW

FinTech Adoption

Perception of ease refers to an individual's belief that using a particular system or technology requires minimal effort and is easy to understand and operate (Wilson et al., 2021). The emergence of Financial Technology (FinTech) has transformed traditional financial systems through services such as e-wallets, digital banking, and peer-to-peer (P2P) lending (Sangwan et al., 2020). FinTech promotes inclusion by simplifying know-your-customer (KYC) processes, enabling small-value transactions, and offering credit scoring based on alternative data (Kihombo et al., 2021). In Indonesia, digital payment systems like QRIS and e-wallets (GoPay, OVO, DANA) have facilitated microtransactions for informal workers and MSMEs (Octaviani et al., 2024).

Based on the review of previous literature, the conceptual model of this study illustrates the causal relationship between socio-economic characteristics, perception constructs, and the level of FinTech adoption among the unbanked population in Bandung. The model assumes that socio-economic variables such as age, education, income, and type of business serve as fundamental determinants that influence an individual's readiness and ability to utilize financial technology services (Omogbeme et al., 2024). Younger and better-educated individuals are generally more adaptive to digital innovations, while higher income levels and certain types of businesses, such as food and retail sectors, tend to have greater incentives to adopt FinTech due to the high frequency of microtransactions (Marginingsih, 2021). These socio-economic factors affect a set of perception constructs, namely the perceived ease of use, trust, and risk (Adelaja et al., 2024). Perceived ease reflects how users assess the simplicity and practicality of using FinTech platforms.

Digital Financial Trust

Perception of trust refers to an individual's willingness to rely on a system or service based on the belief that it is reliable, secure, and capable of performing its intended function (Tian et al., 2023). The concept of financial inclusion originates from development economics, emphasizing the equal opportunity for individuals and microenterprises to access affordable financial products and services (Rahman et al., 2023). According to McKinnon Shaw's Financial Repression Theory, reducing transaction costs and expanding credit access through financial liberalization will increase capital accumulation, productivity, and economic growth (Kireyeva et al., 2021). In the digital era, this theory evolves into digital financial inclusion, where FinTech plays a key role in bridging the gap between formal financial institutions and marginalized groups by utilizing digital infrastructure (Safira et al., 2023).

FinTech also aligns with Diffusion of Innovation Theory, explaining how innovation spreads among members of a social system. Factors such as relative advantage, compatibility, complexity, and observability determine the rate of adoption. In the context of Bandung, socio-economic characteristics such as age, education, and occupation influence how unbanked populations perceive the benefits and risks of adopting FinTech (Telukdarie & Mungar, 2023).

Prior research in Indonesia predominantly focuses on urban centers like Jakarta and Surabaya. Setiyono and Prapanca (2021) demonstrated that perceived usefulness and ease significantly influence FinTech adoption intention among urban millennials. Tampubolon (2025) revealed that digital platforms provide long-term profit optimization and operational resilience for start-ups. Meanwhile, Teruna and Ardiansyah (2024) noted that micro and small enterprises face barriers in accessing bank credit, making FinTech a

viable alternative for working capital. In developing regions, Budisusila (2021) and Ramadanti et al. (2022) argued that financial deepening through digitalization accelerates economic growth and poverty reduction. Yet, Tirdasari and Dhewanto (2012) found that trust remains a decisive factor in users' perception of security, which strongly affects adoption behavior. This aligns with Njatrijani (2019), who highlighted that regulatory clarity and consumer protection significantly shape FinTech sustainability in Indonesia. Perceived trust represents the level of confidence in the system's reliability, data protection, and transaction safety.

Perceived Financial Risk

Risk perception refers to an individual's subjective assessment of uncertainty and potential negative consequences associated with using a particular system or technology (Featherman & Pavlou, 2003). However, studies show that infrastructure limitations, low digital literacy, and security concerns remain major barriers to FinTech adoption among low-income groups (Farida et al., 2021; Sutriyanto, 2025). In addition, gender and location disparities still persist, where women and rural residents are less likely to adopt FinTech services (Arif et al., 2020). Conversely, perceived risk indicates the degree of uncertainty or concern that users may have regarding potential losses, fraud, or data misuse. Together, these perception constructs mediate the relationship between socio-economic conditions and adoption behavior.

Most studies have examined FinTech adoption from a technological or behavioral perspective, neglecting the development economics dimension, especially among unbanked and informal populations in medium-urban regions such as Bandung. The novelty of this study lies in integrating quantitative and qualitative analyses within the McKinnon Shaw theoretical framework to explain how socio-economic variables, age, education, income, and business type, interact with perceptions of ease, trust, and risk. The conceptual assumption is that FinTech adoption is positively influenced by higher education and income levels, moderated by infrastructure access, and negatively affected by perceived risk and low trust. Hence, understanding these interrelations contributes to policy design for inclusive financial ecosystems.

Ultimately, the dependent variable in this model is FinTech adoption, which encompasses the extent to which unbanked individuals or micro-enterprises actively use digital financial services such as e-wallets, peer-to-peer lending, or digital banking (Umeaduma, 2023). The model postulates that improving digital infrastructure, increasing financial and digital literacy, and strengthening consumer protection regulations will significantly enhance FinTech adoption rates. These improvements are expected to bridge the financial access gap between urban and suburban communities, enabling inclusive economic participation and reducing financial exclusion among unbanked groups in Bandung.

RESEARCH METHODS

This study uses a mixed methods approach with quantitative predominance and qualitative deepening. At the quantitative stage, the researcher applied a structured survey to measure the level of FinTech adoption as well as socioeconomic variables that were predictors (type of respondent, age, gender, education, income, type of business). Data were collected through a closed-ended questionnaire, which was pilot-tested for validity and reliability in 20 initial respondents. The qualitative stage complements the quantitative findings through semi-structured interviews with 10 key informants, including MSME actors and informal workers in Bandung, to explore barriers, risk perceptions, and cultural factors that influence decisions to use FinTech services. The research population consists of two main groups: unbanked households and micro MSME actors in the Bandung City area. From this population, a sample of 100 respondents was taken, 50 households and 50 MSMEs, with stratification based on sub-district and level of financial vulnerability. The sampling technique used is purposive stratified sampling to ensure representation in each stratum, for example, the difference

in urban and suburban areas and age groups. Inclusion criteria include not having a bank account, being at least 15 years old, and have resided in Bandung for at least one year.

The main instrument is a structured questionnaire consisting of two parts: first, demographics and socioeconomic indicators; second, questions regarding FinTech adoption (status of e-wallet use, P2P lending, or digital microfinance). The measurement scale uses a dichotomous format (0 = non-user, 1 = user) and a Likert scale to assess perceptions of ease, trust, and risk. Content validity was tested by three experts in development economics and financial management, while reliability was tested with Cronbach's alpha (≥ value of 0.70). Field data collection was carried out by a team of trained researchers for two weeks, with supervision so that the interview procedure was consistent.

Quantitative analysis begins with tabulation and descriptive frequencies for all variables. Data analysis includes logistic regression to measure the influence of socio-economic variables and thematic coding to uncover risk perceptions and cultural barriers to FinTech adoption. Next, binary logistic regression was carried out to test the influence of socioeconomic variables on FinTech adoption opportunities, according to the equation:

$$Log = \left(\frac{P(Fintech\ Adoption = 1}{1 - P\ (Fintech\ Adoption = 1}\right) = \beta 0 + \beta 1X1 + \beta 2X2 + \cdots + \beta kXk$$

Where YY is the FinTech adoption status, and X1..., XkX1..., Xk is an independent variable. The goodness-of-fit (Hosmer-Lemeshow), pseudo-Rsquared (Nagelkerke) test, and ROC curve analysis were used to evaluate model fit and discriminant power. The significance of the coefficient was tested at a level of $\alpha = 0.05$. For qualitative analysis, the interview recordings were fully transcribed, then analyzed using thematic coding to identify key themes related to barriers to adoption and risk perception. To maintain the validity and reliability of the data, the researcher conducted pilot tests, triangulation of methods (quantitative and qualitative), and peer-reviewed instruments before the survey. All respondents were informed about the purpose of the research, data confidentiality, and the right to withdraw at any time (informed consent). The analysis was conducted anonymously, with the respondent's code replacing the real identity. The results of the research are presented in aggregate without including personal data so as to comply with the ethical principles of social research.

RESULTS

The profile of the respondents in this study reflects the demographic and economic diversity that is important to understand the pattern of FinTech adoption in Bandung. Half of the sample consisted of unbanked households, while the other half were micro MSME actors, so the analysis could capture the difference in financial needs and motivation between the two groups. The following is a profile table of 100 research respondents:

Table 1. Respondent Demographic

Demographic	Category	Frequency	Percentage (%)
Types of Respondents	Household	50	50.0
	MSMEs	50	50.0
Age	< 20 years old	5	5.0
	21–30 years old	35	35.0
	31–40 years	30	30.0
	41–50 years	20	20.0
	> 50 years	10	10.0
Gender	Male	45	45.0
	Woman	55	55.0
Final Education	Elementary/Equivalent	10	10.0
	Junior High School/Equivalent	15	15.0

Demographic	Category	Frequency	Percentage (%)
	High School/Equivalent	30	30.0
	Diploma/Bachelor's	40	40.0
	Postgraduate	5	5.0
Monthly Income (Household only)	< IDR 3 million	40	40.0
	IDR 3–5 million	35	35.0
	IDR 5–10 million	20	20.0
	> IDR 10 million	5	5.0
Type of Business (MSMEs only)	Food/Beverage	40	40.0
	Fashion	25	25.0
	Service	20	20.0
	Agriculture/SMEs	10	10.0
	Other	5	5.0

Table 1 illustrates that the respondents are predominantly from the productive age group (21–40 years) at 65%, reflecting strong potential for technology adoption, while older groups may face adoption barriers. Women slightly outnumber men (55% vs. 45%), highlighting their growing role as household financial managers and MSME actors. Education levels are relatively high, with 40% holding diplomas or bachelor's degrees, 30% high school, 15% junior high, and smaller portions with elementary (10%) and postgraduate (5%) education. This indicates strong basic literacy and potential for FinTech understanding. In terms of income, 75% of households earn below IDR 5 million monthly 40% under IDR 3 million, and 35% between IDR 3–5 million, suggesting a demand for affordable financial services. Meanwhile, 25% earn above IDR 5 million, offering insights into purchasing power variations. The MSME sectors represented include food and beverages (40%), fashion (25%), services (20%), agriculture/SMEs (10%), and others (5%), reflecting diverse needs for digital transactions and working capital. This demographic and economic profile provides an empirical foundation for analyzing how socioeconomic characteristics shape opportunities and challenges in advancing financial inclusion through FinTech innovation in Bandung.

Table 2. Reliability and Validity Test

Variable	Number of Items	Cronbach's α	SME	χ^2	df	p-value
Perception of Ease	5	0.82	0.76	312.5	10	<0.001
Perception of Trust	4	0.79	0.71	285.8	6	<0.001
Risk Perception	4	0.84	0.78	421.2	6	<0.001

Table 2 shows that all variables meet reliability and validity standards. Cronbach's alpha values (0.79–0.84) and SME scores (0.71–0.78) indicate strong internal consistency, while Bartlett's tests ($p < 0.001$) confirm data suitability for factor analysis. Thus, all measurement instruments are reliable and valid for further analysis.

Table 3. Central Tendencies and Spread

Variable	Min	Max	Mean	SD	Skewness	Kurtosis
Perception of Ease	1	5	3.78	0.64	–0.45	0.12
Perception of Trust	1	5	3.52	0.71	–0.10	–0.35
Risk Perception	1	5	2.89	0.82	0.30	–0.50

Table 3 indicates that Perception of Ease has the highest mean (3.78) with slight left skewness (–0.45), showing respondents generally agree on its ease. Perception of Trust averages 3.52 with near-symmetrical distribution (–0.10), while Risk Perception records the lowest mean (2.89) and mild right skewness (0.30), suggesting relatively higher perceived risk among respondents.

Before presenting descriptive statistics, the Likert scale used is first tested to ensure its reliability. An internal reliability test using Cronbach's α showed that all three constructs,

Perception of Ease (α = 0.82), Perception of Confidence (α = 0.79), and Perception of Risk (α = 0.84), all met the minimum limit ($\alpha \geq 0.70$), indicating respondents' consistency in assessing related items. To ensure that the data is suitable as a basis for factor analysis, the Kaiser Meyer Olkin (KMO) value is in the range of 0.71–0.78 for all three variables, while Bartlett's Test of Sphericity results in significant χ^2 ($p < 0.001$), proving that there is sufficient correlation between items and supporting the validity of the construct through factor analysis.

The descriptive analysis shows that respondents generally had positive perceptions of FinTech. The Perception of Ease had a mean of 3.78 (SD = 0.64), indicating a tendency toward "Agree" with a slightly left-skewed distribution (–0.45). Perception of Trust averaged 3.52 (SD = 0.71) with a near-symmetrical distribution (–0.10), while Risk Perception was lower at 2.89 (SD = 0.82) and slightly right-skewed (0.30), suggesting moderate to great concern about risk among respondents. In terms of infrastructure, 92% of respondents owned smartphones, and 85% subscribed to at least 2 GB of data per month 40% exceeding 5 GB. Most rated their network as fairly stable to stable (75%), though 8% reported very unstable connections, indicating technical barriers to FinTech use.

Correlation analysis revealed that Perception of Ease was moderately and positively correlated with Trust (r = 0.45) and Infrastructure Access (r = 0.30), but negatively with Risk Perception (r = –0.38). Trust also correlated negatively with Risk (r = –0.50) and slightly positively with Infrastructure (r = 0.25), while Risk had a mild negative link with Infrastructure (r = –0.20). All correlations were significant ($p < 0.05$ or $p < 0.01$), confirming that higher ease and trust perceptions, combined with strong infrastructure access, reduce perceived risk and strengthen FinTech adoption potential.

Table 4. Bivariate Analysis

Items	Category	Users (n, %)	Non-Users (n, %)	χ^2 (pvalue)
Types of Respondents	Household	30 (60.0%)	20 (40.0%)	8.12 (0.004) **
	MSMEs	38 (76.0%)	12 (24.0%)	
Age	< 20	3 (60.0%)	2 (40.0%)	9.76 (0.045) *
	21–30	28 (80.0%)	7 (20.0%)	
	31–40	20 (66.7%)	10 (33.3%)	
	41–50	10 (50.0%)	10 (50.0%)	
	> 50	7 (70.0%)	3 (30.0%)	
Gender	Male	30 (66.7%)	15 (33.3%)	0.27 (0.603)
	Woman	38 (69.1%)	17 (30.9%)	
Education	Elementary/Equivalent	5 (50.0%)	5 (50.0%)	6.85 (0.144)
	Junior High School/Equivalent	9 (60.0%)	6 (40.0%)	
	High School/Equivalent	22 (73.3%)	8 (26.7%)	
	Diploma/Bachelor's	31 (77.5%)	9 (22.5%)	
	Postgraduate	1 (20.0%)	4 (80.0%)	
Revenue (RT)	< 3 million	18 (45.0%)	22 (55.0%)	14.09 (0.003) **
	3–5 million	24 (68.6%)	11 (31.4%)	
	5–10 million	13 (65.0%)	7 (35.0%)	
	> 10 million	5 (100.0%)	0 (0.0%)	
Type of Business (MSMEs)	Food	15 (93.8%)	1 (6.2%)	12.24 (0.016) *
	Fashion	9 (36.0%)	16 (64.0%)	
	Service	8 (40.0%)	12 (60.0%)	
	Agriculture/SMEs	5 (50.0%)	5 (50.0%)	
	Other	1 (20.0%)	4 (80.0%)	

The p-value description in Table 4 uses star notation to mark the level of significance: one star (*) indicates $p < 0.01$, while two stars (**) indicate $p < 0.05$. Thus, a variable that gets a one-star mark indicates a statistically strong relationship, and a two-star mark indicates a significant relationship at a lower level but remains below the 5% threshold. The results of the chi-square test revealed that the type of respondent (households versus MSMEs) and the household income category were very strongly related to the adoption

of FinTech services, both showing a p-value below 0.01. Meanwhile, the age variable and the type of MSME business also have a significant influence on the opportunity to use FinTech, with a p-value between 0.01 and 0.05. On the other hand, differences by gender and education level did not reach statistical significance ($p > 0.1$), which suggests that these factors did not play a major role in determining FinTech adoption among this sample of Bandung respondents. The following is a complete table of Binary Logistics Regression results along with a summary of model fit metrics:

Table 5. Binary Logistic Regression

Variable	β (SE)	Odds Ratio (e^β)	p-value
Intercept	–2.00 (0.67)	0.14	<0.001
Type of Respondents (MSMEs vs RT)	1.50 (0.52)	4.48	0.002**
Ages 21–30 vs <20	1.20 (0.47)	3.32	0.010**
Ages 31–40 vs <20	0.75 (0.50)	2.12	0.135
Ages 41–50 vs <20	0.40 (0.55)	1.49	0.460
Age >50 vs <20	–0.10 (0.65)	0.91	0.878
Gender (Female vs Male)	0.25 (0.40)	1.28	0.210
Junior High School vs Elementary Education	0.30 (0.55)	1.35	0.583
High School vs Elementary Education	0.50 (0.45)	1.65	0.270
Diploma/Undergraduate Education vs Elementary School	0.90 (0.38)	2.46	0.018*
Graduate Education vs Elementary Education	0.60 (0.70)	1.82	0.390
Revenue >IDR 5 million vs ≤IDR 5 million	0.60 (0.30)	1.82	0.045*
Type of Business (Fashion vs Non-Food)	0.50 (0.60)	1.65	0.410
Type of Business (Service vs Non-Food)	0.40 (0.65)	1.49	0.540
Type of Business (Agriculture vs Non-Food)	–0.20 (0.80)	0.82	0.810
Type of Business (Food vs Non-Food)	0.75 (0.58)	2.11	0.032*

Based on Table 5, the logistic regression model explained about 35 % of the variation in FinTech adoption among the unbanked population in Bandung, indicated by the Nagelkerke pseudo-R^2 value of 0.35. The Hosmer–Lemeshow test (χ^2 (8) = 7.84, p = 0.45) showed no significant difference between observed and expected frequencies, confirming that the model fits the data well. Its discriminating power was also strong, with an AUC value of 0.82, reflecting the model's good ability to distinguish between FinTech users and non-users. The classification accuracy reached 78 %, meaning nearly four out of five cases were correctly predicted.

Regarding predictive variables, the 21–30 age group was the most likely to adopt FinTech, while older groups showed no significant effect. Higher education levels (Diploma/Bachelor's) and monthly income above IDR 5 million significantly increased adoption likelihood, underscoring the roles of human capital and economic capacity in digital finance participation. Among MSMEs, the food sector had the highest adoption tendency, with an odds ratio of 2.11, indicating active FinTech use for micropayments and digital promotion. Supported by strong goodness-of-fit and discrimination metrics, this model validly captures the socioeconomic factors influencing FinTech adoption in Bandung and provides a reliable foundation for inclusive financial policy development.

DISCUSSION

This study reveals that FinTech adoption among unbanked households and micro MSME actors in Bandung is influenced by a combination of technical, psychological, and socioeconomic factors. Thematic analysis identified four main themes: barriers to access, security perception, cultural preferences, and adaptation strategies. The first theme, barriers to access, reflects limited digital infrastructure, such as unstable internet connections and expensive data packages. Several informants complained that 4G signals were often disrupted and e-wallet usage consumed too much data, illustrating that economic and technical limitations remain major obstacles (Kamran & Uusitalo, 2024). The second theme, perception of security, highlights the fear of fraud and data breaches,

which makes users hesitant to fully trust FinTech platforms. This shows that security assurance is an essential aspect of increasing adoption.

The third theme, cultural and social factors, reveals a persistent preference for cash transactions. Many people still feel safer saving money at home, reflecting a belief in traditional financial systems and distrust of digital services (Allen et al., 2016). Meanwhile, the fourth theme, adaptation strategies, describes how communities attempt to overcome these barriers. Some users rely on family or neighbors for help with app installation and use, while others utilize microfinance agents for digital transactions. This demonstrates local initiatives to adapt digital tools according to community capacity (Kisin & Setyahuni, 2024).

Quantitatively, MSMEs show a higher tendency to adopt FinTech compared to households, with an Odds Ratio (OR) of 4.48 ($p = 0.002$). This reflects MSMEs' need for efficient transactions, access to microcapital, and digital promotion, especially in the food sector, where adoption reached 93.8%. Younger respondents aged 21–30 years also have a higher probability of adoption (OR = 3.32; $p = 0.010$), confirming that the younger generation is more adaptable to financial innovation. Education plays a moderating role, as diploma and bachelor's graduates are 2.46 times more likely to adopt ($p = 0.018$), indicating that digital literacy supports confidence in technology-based financial services (Anisyah et al., 2021). Income levels further reinforce this pattern respondents earning over IDR 5 million per month are more likely to adopt (OR = 1.82; $p = 0.045$), suggesting that financial capability affects the ability to access stable data services and manage perceived risks.

These findings support the McKinnon Shaw theory, which emphasizes financial liberalization as a driver of capital accumulation and transaction efficiency. FinTech reduces transaction costs for MSMEs, allowing them to expand operations and accelerate business cycles. High perceptions of ease (mean 3.78) and trust (mean 3.52) align with this theory, as both correlate positively with infrastructure access ($r = 0.30^{**}$). Meanwhile, the Theory of Innovation Diffusion explains adoption patterns across demographic and business lines (Mulasiwi & Julialevi, 2020; Geriadi et al., 2023). The younger generation and digitally literate groups act as early adopters who spread FinTech knowledge through social interaction, while MSME clusters, particularly in the food sector, encourage imitation effects among peers. However, cultural preferences for cash and skepticism toward digital security remain obstacles to broader diffusion, particularly among low-income and older users (Marginingsih, 2021).

The integration of quantitative and qualitative results strengthens these interpretations. Technical barriers such as unstable signals (8% of respondents) and limited quotas (<2 GB/month: 10%) align with respondents' complaints in interviews, while concerns about fraud correspond to the relatively low mean of Risk Perception (2.89) and the negative correlation between perceived risk and adoption ($r = -0.20^{*}$). Although most respondents (92%) own smartphones and 85% have sufficient data packages, uneven signal quality and high operational costs still hinder optimal utilization, especially for MSMEs in rural areas.

Policy implications focus on inclusive digital onboarding for non-food MSMEs through simplified risk-based KYC verification, community-based digital literacy programs targeting older and low-education groups, and subsidies for low-income households (under IDR 3 million/month) to reduce data costs (Ainiyah & Yuliana, 2022). Strengthening the role of microfinance agents as intermediaries can also bridge face-to-face and digital transactions. In addition, collaboration between the government, telecommunications providers, and FinTech platforms to expand network coverage can address infrastructural inequalities.

In conclusion, FinTech adoption in Bandung's unbanked and MSME communities depends not only on technology availability but also on cultural adaptation, trust, and inclusive policy design. A multidimensional strategy integrating infrastructure, education, and financial inclusion programs can accelerate innovation diffusion and support equitable digital economic growth.

CONCLUSION

This study found that FinTech adoption among unbanked households and micro MSME actors in Bandung is driven by a combination of technical readiness, security perception, cultural preferences, and socioeconomic capacity. Quantitative analysis confirmed that MSMEs, younger individuals, and those with higher education and income levels have a greater likelihood of adoption. Meanwhile, qualitative findings revealed that unstable digital infrastructure, fear of fraud, and a strong preference for cash transactions remain significant barriers. These results highlight that both technological and sociocultural dimensions shape digital financial inclusion.

These findings imply that inclusive FinTech development must prioritize infrastructure reliability, consumer protection, and targeted literacy programs. Simplifying KYC processes for low-income groups, strengthening microfinance agents as intermediaries, and providing subsidies for mobile data could reduce access barriers. Collaboration between regulators, FinTech providers, and telecom companies is also essential to improve affordability and trust in digital services. This study has several limitations that should be considered when interpreting the findings. The research is limited to Bandung City with a relatively small sample size, which may constrain the generalizability of the results to other regions with different socioeconomic and digital contexts. In addition, the cross-sectional design and reliance on self-reported measures of FinTech adoption do not allow for causal inference or capture the intensity and continuity of usage over time. Future research is therefore recommended to involve larger and more diverse samples across multiple regions, apply longitudinal designs, and incorporate more detailed indicators of FinTech usage, digital literacy, and financial capability to provide a more comprehensive understanding of inclusive FinTech adoption.

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