

Influence of Financial Technology Usage, Consumer Protection, and Financial Literacy on Financial Inclusion

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Abstract

Financial inclusion is essential for the economic development and stability of a society, particularly in developing regions. The rapid advancement of financial technology (fintech), coupled with the necessity for consumer protection and enhanced financial literacy, plays a crucial role in promoting financial inclusion. This research aims to examine the factors influencing financial inclusion, focusing on the use of financial technology, consumer protection, and financial literacy among women aged 17-27 residing in Jakarta who have been using financial technology for at least one year. Data were collected via online questionnaires, resulting in responses from 208 participants. The research employs a quantitative approach using the method Partial Least Squares Structural Equation Modeling (PLS-SEM) and using Smart PLS 3 software for data analysis. The findings indicate that the use of financial technology, consumer protection, and financial literacy each have a significant positive impact on financial inclusion. The results support the hypothesis that these factors are critical in enhancing financial inclusion.

Keywords: Financial Technology, Consumer Protection, Financial Literacy, Financial Inclusion

INTRODUCTION

In recent years many developing countries have been innovating in the financial industry by creating digital financial services, known as financial technology (fintech) (Antwi-Wiafe et al., 2023). This advancement supports a country's economic growth (Setiana & Gunawan, 2023). Fintech represents an innovation in financial institutions by leveraging technology (Yuliati & Gunawan, 2022), merging financial services with technology to transform traditional business models into more moderate ones. Consumers turn to fintech for faster services and greater transparency (Allen et al., 2021).

Fintech has shifted financial behavior towards cashless transactions, enabling remote payments to be made in seconds without face-to-face interaction (Yuliati & Gunawan, 2022). In Indonesia, fintech development is supported by ease of use, innovative technology, and

flexibility (Diana & Leon, 2020). This financial development enhances financial inclusion by providing broader access to fintech, which traditional financial services cannot achieve (Odei-Appiah et al., 2022). Generally fintech is categorized into four main areas: payments, lending, investment, and insurance. New types of financial services have emerged, such as peer-to-peer lending, crowdfunding, e-money, and mobile payments. In Indonesia, fintech primarily involves mobile payment products, with many banking, telecommunications, securities, and e-commerce companies offering their own fintech solutions. Examples include BCA with BCA Mobile, my BCA, Sakuku, Bank Tabungan Pensiunan Nasional (BTPN) with Jenius, Bank Rakyat Indonesia (BRI) with Pegadaian, Telkomsel with LinkAja, Gojek with Gopay, Grab with OVO, and Shopee with ShopeePay (Diana & Leon, 2020).

According to Temasek et al., (2023) in the e-Economy SEA 2023 report, Indonesia leads Southeast Asia in digital economy value at US\$82 billion. The Bank Indonesia's Rapat Dewan Gubernur BI, (2024) reported electronic money transactions worth Rp835.84 trillion, digital banking transactions at Rp58,478.24 trillion, debit and credit card transactions at Rp8,178.69 trillion, and QRIS transactions at Rp229.96 trillion for 2023. Financial technology providers and the government aim to expand digital payment systems and cross-border payment collaborations to boost financial inclusion and economic growth (Ciptarianto, 2022). Creating fintech accounts requires personal data for activation, raising consumer concerns about data collection, usage, and security (Allen et al., 2021). Consumer protection is crucial for the sustainability of digital financial institutions, as data breaches can harm consumers by allowing their data to be sold and misused (Liyanaarachchi et al., 2020).

Fraud manifests in two main forms: technical hacking, which involves unauthorized access to computer systems to steal personal data (Haq et al., 2022), and social engineering, which manipulates victims psychologically to gain their trust and exploit them (Wang et al., 2021). An example of technical hacking is the 2020 breach of Indonesian e-commerce platform Tokopedia, compromising 91 million accounts (Perkasa & Saly, 2022). Social engineering was demonstrated in a 2018 Twitter scam involving a fake Elon Musk account (Bhusal, 2021). To mitigate these risks, consumers need financial literacy, which includes understanding and safely using fintech (Tony & Desai, 2020). Defined by the Organization for Economic Co-operation and Growth (OECD), (2023) as a combination of awareness, knowledge, ability, attitude, and behavior, financial literacy enhances financial decision-making and management. Despite improvements in Indonesia's financial literacy and inclusion indices, a significant gap remains, indicating that many use financial services without adequate understanding, underscoring the need for better financial education (Widodo et al., 2022).

The use of financial technology, consumer protection, and financial literacy are crucial for enhancing financial inclusion, which is essential for improving the lives of low-income individuals, especially in rural areas of developing countries (Telukdarie & Mungar, 2022). Financial inclusion, linked to sustainable economic growth, ensures access to affordable financial services for low-income individuals (Kanta & Arifin, 2022). However,

barriers exist on both supply and demand sides, including inadequate infrastructure, high account opening fees, and consumers' lack of financial knowledge (Ciptarianto, 2022). Research indicates that fintech usage, consumer protection, and financial literacy significantly impact financial inclusion positively, though this impact varies across different demographics and regions (Kanta & Arifin, 2022; Odei-Appiah et al., 2022; Shen et al., 2018; Widodo et al., 2022). However Hasan et al., (2022) found that financial literacy does not significantly affect financial inclusion among female entrepreneurs.

Previous research has conducted surveys abroad, such as at Xi'an University of Technology China (Shen et al., 2018), and in Indonesia, such as in Bandar Lampung involving SMEs (Widodo et al., 2022). This research differs by selecting respondents in Jakarta, the capital and economic center of Indonesia, which has more advanced financial infrastructure and is suitable for surveying financial technology users. Jakarta is also known as a city that adopts technology, or a smart city (Syalianda & Kusumastuti, 2021). This research focuses on women because they often face gender discrimination and challenges in accessing financial services (Saluja et al., 2023), and they are a primary target in enhancing financial literacy and inclusion in Indonesia. The respondents are aged 17-27 years, falling within Generation Z, who are considered experienced in using technology (Chan & Lee, 2023). This research follows (Shen et al., 2018) with the variables of financial literacy and financial technology, adding the consumer protection variable to assess its impact on financial inclusion. Consumer protection is included to encourage financial institutions to strengthen security systems and raise consumer awareness of the importance of protecting personal data, given the rise in cybercrime and identity theft (Liyanaarachchi et al., 2020).

LITERATURE REVIEW

Theory of Planned Behavior

Theory of Planned Behavior (TPB) developed by Ajzen, (1985) is an extension of the Theory of Reasoned Action (TRA). TPB explains that an individual's behavior can be predicted by their intention to engage in that behavior, influenced by three factors: attitude, subjective norm, and perceived behavioral (Ajzen, 1991).

Behavior is thus determined by the intention and perceived control over the behavior, with ease of performing the behavior influencing these factors. In financial contexts, an individual's intention to manage finances effectively is shaped by their attitude, subjective norms, beliefs, and perceived control, leading to better financial decision-making and outcomes (Bongomin et al., 2024). This research uses TPB to explore the relationship between the use of financial technology, consumer protection, and financial literacy on financial inclusion in daily financial service usage. TPB helps to understand how positive attitudes towards using financial technology, confidence in consumer protection by financial institutions, and perceived control over financial literacy can enhance financial inclusion.

Influence of Financial Technology Usage on Financial Inclusion

The primary challenge in achieving financial inclusion is the limited access to financial services for many people, particularly those living in rural areas who may not understand how to save or invest. Financial institutions face accessibility issues due to the high operational costs of providing services to remote areas (Telukdarie & Mungar, 2022). Research by Saqib et al., (2023) suggests that developing countries should accelerate financial technology innovations to offer financial services to regions with limited access. Financial technology serves as an intermediary for groups often excluded by traditional financial services. Studies in China by Shen et al., (2018) show that internet and mobile device use provides easier access to financial services and products. Similarly, research by Elouaourti & Ibourk, (2024) indicates that mobile device ownership and internet access significantly and positively impact financial inclusion. Aleemi et al., (2023) and Yakubi et al., (2022) also found that financial technology positively and significantly influences financial inclusion.

H₁ : Financial technology usage has a impact on financial inclusion.

Influence of Consumer Protection on Financial Inclusion

Fintech offers faster, better, or cheaper financial services, but risks remain inherent (Allen et al., 2021). Consumer protection ensures that personal data is safeguarded when using financial technology and provides clear information and support if issues arise. Effective consumer protection from financial crimes and educating them about financial technology products can boost consumer confidence and trust in the financial system, thereby enhancing financial inclusion (Bongomin & Ntayi, 2020). Kanta & Arifin, (2022) highlight that consumer protection involves transparency in the financial industry, providing essential information about financial products, and treating consumers fairly and ethically. Consequently, consumer protection has a positive impact on financial inclusion, as supported by Bongomin et al., (2024), who found a significant positive effect of consumer protection on financial inclusion.

H₂ : Consumer protection has a impact on financial inclusion.

Influence of Financial Literacy on Financial Inclusion

Financial literacy is crucial for enhancing financial inclusion and ensuring financial stability (Hasan et al., 2022). It increases consumer awareness of economic realities, helps them understand the importance of managing finances, avoid unwanted risks, and prevent excessive debt (Bongomin et al., 2024). Financial literacy involves both understanding and usage: understanding refers to knowledge about personal financial products gained through education or experience, while usage involves the ability or confidence to apply this knowledge effectively (Bajaj & Kaur, 2021). Research by Widodo et al., (2022) and Shen et al., (2018) found that financial literacy positively and significantly impacts financial inclusion.

H₃ : Financial literacy has a impact on financial inclusion.

The Research Framework is this research.

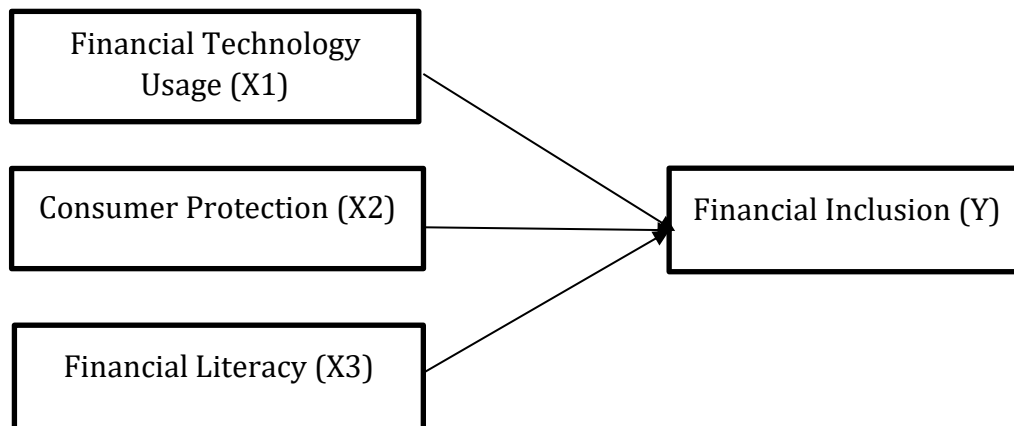


Figure 1 Conceptual Framework

METHODOLOGY

This research design uses a quantitative method design to explore financial inclusion influenced by variables such as financial technology usage, consumer protection, and financial literacy. The research uses the Theory of Planned Behavior (TPB) to analyze consumer behavior through intentions, attitudes, and perceived behavioral control. Data is collected via questionnaire surveys, and Confirmatory Factor Analysis (CFA) is used within Structural Equation Modeling (SEM) to validate the indicator variables forming the latent variables. SEM, combining regression and path analysis, is processed using Partial Least Squares Structural Equation Modeling (PLS-SEM) due to its ability to handle complex models, non-normal data distributions, and smaller sample sizes (Hair et al., 2019). Smart PLS 3 software aids in data analysis, facilitating clear interpretation of results.

This research focuses on a female population, addressing gender discrimination in education, wages, and economic control, which hampers women's financial development and access to financial services (Saluja et al., 2023). By targeting women, the research aims to reduce gender discrimination and improve financial inclusion. The sampling method used is non-probability sampling, specifically purposive sampling, which selects participants based on specific criteria (Deepublish, 2021). The criteria are residing in Jakarta, aged 17-27 years, and using financial technology for at least one year. The sample size is determined using a ratio of 5 to 10 times the number of questionnaire indicators, totaling 17 questions, suggesting a sample size of 170 respondents. Ultimately, 208 respondents participated in the survey.

RESULTS

Validity Test

Convergent validity is measured using an outer loading above 0.70 for each indicator (Hair et al., 2019).

Table 1 Validity Test

Constructs and Variables	Factor Loading
Financial Technology Usage	
I don't feel any difficulty when using financial technology.	0,813
I save time when using financial technology.	0,859
I know how to maintain personal security with financial technology.	0,779
I will continue to use financial technology as long as it exists.	0,889
Consumer Protection	
The financial services provider provided many security instructions on how to protect my account from crime.	0,731
I can easily get information about financial services, such as costs, benefits, and how to use these features.	0,843
Financial service providers have regulations to protect personal information without regard to race, religion, or otherwise.	0,842
I am sure that financial services will not provide my personal information to anyone.	0,754
Financial service providers help me when my pin or password is blocked.	0,840
Financial Literacy	
I think it's important to learn about the different types of financial services before using them.	0,782
I regularly set aside some money to save.	0,785
I feel better when I plan my finances for the next 1-2 years.	0,862
I am careful with the money I have before using it.	0,851
I have a financial budget.	0,720
Financial Inclusion	
Creating an account with financial services is very easy.	0,783
I use financial services according to my needs such as shopping, saving, credit financing and insurance.	0,861
I feel comfortable when making transactions using financial services.	0,894

Based on the results of the obtained values from the outer loading test results, it shows that all indicators in these variables are declared suitable for use as measuring tools in testing the measurement model (outer model), because all values for each variables are > 0.7. This it can be declared valid.

Reliability Test

The reliability test aims to measure the extent to which data measurement can be trusted. The reliability test is conducted using composite reliability of the variable items to measure the accuracy and consistency of a variable. The recommended composite reliability value is > 0.7 (Hair et al., 2019).

Table 2 Reliability Test

	Composite Reliability	Cronbach's Alpha
Financial Technology Usage	0.884	0.803
Consumer Protection	0.899	0.863
Financial Literacy	0.902	0.857
Financial Inclusion	0.901	0.863

Based on the table above, the reliability test shows CR values > 0.7 , indicating that the reliability test meets the requirements based on Composite Reliability. The recommended Cronbach's Alpha value is 0.6 (Shen et al., 2018). Based on the table above, the reliability test shows CA values > 0.6 , indicating that the reliability requirements are met based on Cronbach's Alpha. It can be concluded that all reliability test results exhibit a high level of reliability.

Structural Model Results (Inner Model)

Table 3 R-Square

	R Square
Financial Inclusion	0,448

From the R-Square test results, a value of 0.448 or 44.8% was obtained. This indicates that Financial Inclusion can be explained by 44.8% through the Use of Financial Technology, Consumer Protection, and Financial Literacy. Meanwhile, 55.2% is explained by other variables not included in the independent variables of this research.

Table 4 F-Square

	Financial Inclusion
Financial Technology Usage	0.136
Consumer Protection	0.118
Financial Literacy	0.120

Based on the table above, the following can be observed:

- The variable Use of Financial Technology on Financial Inclusion has an f-square value of 0.136, indicating a moderate effect.
- The variable Consumer Protection on Financial Inclusion has an f-square value of 0.118, indicating a moderate effect.
- The variable Financial Literacy on Financial Inclusion has an f-square value of 0.120, indicating a moderate effect.

Table 5 Predictive Relevance (Q2)

	Q ²
Financial Inclusion	0,305

Based on the table 5 the Q2 value for Financial Inclusion is 0.305 > 0, indicating that the Use of Financial Technology, Consumer Protection, and Financial Literacy have good predictive relevance for Financial Inclusion.

Table 6 Goodness Of Fit (GOF)

	Saturated Model
SRMR	0.070

Based on the table 6 above, it shows that the SRMR value is 0.070, meaning the model is appropriate and meets the GoF criteria.

Hypothesis Test

Table 7 Hypothesis Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Financial Technology Usage -> Financial Inclusion	0.308	0.307	0.106	2.898	0.004
Consumer Protection -> Financial Inclusion	0.283	0.278	0.096	2.938	0.003
Financial Literacy -> Financial Inclusion	0.288	0.284	0.100	2.867	0.004

1. Influence of Financial Technology Use on Financial Inclusion

Based on the results of data analysis, the variable use of financial technology obtained t-statistical test results of $2,898 > 1.96$, with a p-value of $0.004 < 0.05$. So H_0 is rejected and H_a is accepted and it can be concluded that the use of financial technology has a significant positive effect on financial inclusion. This is influenced by several factors such as convenience, effectiveness, knowledge and interest which influence consumers to accept and use financial technology. The existence of financial technology helps women create accounts on digital-based financial services, because it is easy to create an account and affordable administration costs. Financial technology is very popular with all generations, especially generation Z aged 17-27 years, this age is very used to using cell phones for transactions, by living in Jakarta, they can use various financial technology services such as e-wallet, mobile banking, investment, and others more actively and quickly, making it easier to fulfill daily needs.

This research found the existence of subjective norms, subjective norms reflect the extent to which individuals feel social pressure or support from people around them to use financial technology. If individuals feel a strong subjective norm for using financial technology, then they tend to be more motivated to continue using financial technology. Perceived behavioral control also refers to an individual's belief in his ability to use financial technology and overcome obstacles that may arise in using financial technology. These responses create a positive attitude from respondents in using financial technology, the average response of respondents strongly agrees that financial technology helps them in making transactions, a positive attitude towards financial technology tends to increase financial inclusion rates because individuals will be more interested in using financial services provided through that technology. This is in line with the aspects contained in the theory of planned behavior. The results of this research are supported by research conducted by Bongomin & Ntayi, (2020), who said that the use of financial technology has a significant positive influence on financial inclusion, with the existence of financial technology it will help financial consumers make transactions more efficiently.

2. Influence of Consumer Protection on Financial Inclusion

Based on the results of data analysis, the consumer protection variable obtained t-statistical test results of $2,938 > 1.96$, with a p-value of $0.003 < 0.05$. So H_0 is rejected and H_a is accepted and it can be concluded that consumer protection has a significant positive effect on financial inclusion. This is influenced by several factors such as education, transparency, fair treatment, data confidentiality and security, as well as handling complaints. Women have the same rights to financial services, and are protected without any gender differences. Women aged 17-27 years are considered capable of protecting the security of their own data or financial services, namely by not providing important information such as date of birth, parents' names, or others to anyone. Especially for those who live in Jakarta, apart from being the center of the economy and adequate infrastructure,

Jakarta has many irresponsible criminals so consumers are expected to maintain the security of data and financial services.

The existence of protection from financial service providers indirectly motivates consumers themselves to take steps to protect themselves and maintain account security. This is included in the aspect of subjective norms, namely behavior that is influenced by the surrounding environment. Furthermore, it is related to perceived behavioral control in individuals' beliefs about their ability to protect themselves in using financial services and confidence in financial service providers who will continue to safeguard consumers' personal data. These behaviors and attitudes are very positive, individuals who have a positive attitude towards consumer protection will tend to use financial services that have good protection policies. A positive attitude toward consumer protection can encourage individuals to pay attention to their rights as consumers, seek necessary information before making purchasing decisions, and report fraudulent or abusive practices they experience.

3. Influence of Financial Literacy on Financial Inclusion

Based on the results of data analysis, the financial literacy variable obtained t-statistical test results of $2,867 > 1.96$, with a p-value of $0.004 < 0.05$. So H_0 is rejected and H_a is accepted and it can be concluded that financial literacy has a significant positive effect on financial inclusion. Financial literacy is based on a person's knowledge, skills, beliefs, attitudes and behavior regarding their financial situation. Many women aged 17-27 years now manage their finances well, whereas previously women were subject to gender discrimination, but over time women have developed, especially in education, so that women have knowledge that can be applied in finance. Women who live in Jakarta will have superior financial literacy because the city of Jakarta has become an economic center and has adequate educational infrastructure. So this makes the financial literacy rate increase as evidenced by the results of respondents with the highest education level being bachelor's degrees.

When carrying out an action is sometimes influenced by other people, this is included in the aspect of subjective norms. Individuals see how other people's conditions become better when they have an understanding of financial literacy so they can manage their finances well. This makes individuals motivated to learn and develop their understanding of finance. So that the individual gets a positive attitude towards developing the financial knowledge and skills needed to manage finances better. However, of course there is still a need to control perceived behavior, referring to individuals' beliefs about their ability to improve their financial literacy. If individuals believe that they have control over their efforts to improve financial literacy, they will be more motivated to take concrete steps to improve their understanding of finances. These results are in line with research by Widodo et al., (2022), which states that financial literacy has a significant positive influence on financial inclusion, the more individuals who have financial literacy, the higher the financial inclusion rate.

CONCLUSION AND RECOMMENDATIONS

This research investigates the factors affecting financial inclusion, specifically targeting a group of women aged 17-27 living in Jakarta who have been using financial technology for at least a year. The research employs the Partial Least Squares (PLS) method for data analysis. The findings of the analysis lead to the following conclusions:

1. The use of financial technology significantly positively impacts financial inclusion, confirming the first hypothesis.
2. Consumer protection significantly positively influences financial inclusion, validating the second hypothesis.
3. Financial literacy significantly positively affects financial inclusion, supporting the third hypothesis.

This research faced limitations such as relying solely on online questionnaires without direct interviews due to time constraints. The research provides several implications: for academics, it offers insights into factors influencing financial inclusion and serves as a reference for future research with different samples; for consumers, it emphasizes cautious use of financial technology and enhanced financial literacy; for companies, it suggests strategies for developing better financial services while protecting consumer data and educating about financial products. Recommendations for future research include adding more independent variables, using different samples, increasing the number of respondents, and conducting direct surveys for more accurate data.

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