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DIGITAL FINANCIAL INCLUSION, DIGITAL FINANCIAL LITERACY, AND FINANCIAL SELF-EFFICACY

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A B S T R A C T

As empirically demonstrated in previous literature, digital financial inclusion is an essential factor in promoting inclusive and sustainable economic growth. However, behavioral factors influencing individual adoption remain under-researched. This study focuses on the variables influencing digital financial inclusion in Indonesia, with an emphasis on the effect of digital financial literacy and financial self-efficacy. The data were obtained from a survey of 258 purposively selected respondents and analyzed using logistic regression. The results indicate that digital financial literacy plays a significant role in shaping financial self-efficacy and encouraging individual participation in using digital financial services. However, financial self-efficacy is not found to directly affect digital financial inclusion or act as a mediating variable. Additional findings reveal that increasing age tends to reduce the extent of digital financial inclusion, whereas income is positively associated with it, and education level is inversely associated with it. Digital financial literacy is considered a key determinant, compared with psychological factors, in expanding digital financial inclusion. Therefore, strengthening education and community empowerment programs is crucial for building an inclusive digital financial ecosystem.
Keywords: *digital financial literacy, financial self-efficacy, digital financial inclusion*

Studi ini bertujuan untuk menganalisis pengaruh tata kelola dan lingkungan. Sebagaimana telah dibuktikan secara empiris dalam literatur sebelumnya, inklusi keuangan digital merupakan faktor penting dalam mendorong pertumbuhan ekonomi yang inklusif dan berkelanjutan. Namun, faktor perilaku yang memengaruhi adopsi individu masih kurang diteliti. Studi ini berfokus pada variabel yang memengaruhi inklusi keuangan digital di Indonesia, dengan penekanan pada pengaruh literasi keuangan digital dan efikasi diri finansial. Data diperoleh dari survei terhadap 258 responden yang dipilih secara purposif dan dianalisis menggunakan regresi logistik. Hasil menunjukkan bahwa literasi keuangan digital memainkan peran penting dalam membentuk efikasi diri finansial dan mendorong partisipasi individu dalam menggunakan layanan keuangan digital. Namun, efikasi diri finansial tidak ditemukan secara langsung memengaruhi inklusi keuangan digital atau bertindak sebagai variabel mediasi. Temuan tambahan mengungkapkan bahwa peningkatan usia cenderung mengurangi tingkat inklusi keuangan digital, sedangkan pendapatan berhubungan positif dengannya, dan tingkat pendidikan berhubungan negatif dengannya. Literasi keuangan digital dianggap sebagai penentu utama, dibandingkan dengan faktor psikologis, dalam memperluas inklusi keuangan digital. Oleh karena itu, penguatan program pendidikan dan pemberdayaan masyarakat sangat penting untuk membangun ekosistem keuangan digital yang inklusif.
Kata kunci: kinerja startup, tata kelola, kedinamisan lingkungan, keunggulan kompetitif

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INTRODUCTION

To promote inclusive and sustainable economic growth, particularly in emerging markets, digital financial inclusion (DFI) is gaining increasing attention (Erlando et al., 2020; Yaqin & Safuan, 2023). By incorporating digital technology into the Formal financial system, formal financial services such as digital payment systems, electronic transfers, savings facilities, and online investment platforms have become more accessible than previously, through conventional banking institutions (World Bank, 2014). Advances in digital transformation create new opportunities to reduce the social and economic disparities

experienced by groups not included in formal financial services (Sha'ban et al., 2020; Tay et al., 2022). According to the World Bank (2022). More than 76% of adults worldwide now have access to formal financial services, largely driven by digital financial innovations. In Indonesia, the rapid spread of digital financial services is reflected in the increasing adoption of e-wallets, mobile banking, and fintech platforms, supported by initiatives from the Financial Services Authority (OJK) as well as Bank Indonesia. Despite the rapid growth of financial services, unequal access remains a challenge in Indonesia, particularly for aging populations, economically disadvantaged communities, and individuals with limited digital competencies. Furthermore, the current era of digital advancement also brings several challenges, including a widening digital skills gap, increasing cybersecurity threats, and unequal access due to unequal digital technology infrastructure (Arner et al., 2020; World Bank, 2022).

Digital Financial Literacy (DFL) is a key factor in promoting digital financial services because it can help develop individuals' competence in using technology-based financial services effectively (Ozili, 2018; Morgan et al., 2019). DFL improves individuals' understanding of digital financial products by encouraging them to use financial services such as e-wallets and mobile banking (Morgan et al., 2019). Second, DFL can also raise awareness of digital financial risks and help individuals avoid losses. Third, DFL can strengthen financial management skills, which can ultimately encourage them to use digital financial services, as well as other services such as savings and investment products (Hasan et al., 2022). Furthermore, DFL can support positive behavior and individual confidence in using digital financial services, thereby increasing individual participation in the formal financial system (Amatucci & Crawley, 2011). Theoretically, DFL can be understood through Gary Becker's Human Capital Theory (1964), which holds that knowledge and skills enhance an individual's ability to make decisions and use resources effectively. In the digital finance landscape, DFL is a valuable form of human capital that enables individuals to engage more effectively with financial technologies. In addition, Financial Capability Theory (Sherraden et al., 2013), emphasizes that financial capability arises from the integration of knowledge, skills, and access, which collectively support effective financial behavior and inclusion.

In addition to DFL, Financial Self-Efficacy (FSE) is also a significant determinant of encouraging individual participation in DFI. Individuals with high FSE tend to be more active, confident, and effective in using digital financial services and engaging in financial decision-making (Hasan et al., 2022). Furthermore, FSE enhances an individual's capability to deal with economic risks and stress (Ghosh & Vinod, 2017). Empirically, FSE has also been shown to be positively correlated with DFI, with individuals possessing strong FSE exhibiting a greater likelihood of using formal and digital financial services (Mindra et al., 2017; Noor et al., 2020).Therefore, strengthening FSE, along with increasing DFL, is key to encouraging more inclusive and optimal use of digital financial services (Hasan et al., 2022 ; Tay et al., 2022).

Studies by Mindra et al. (2017) and Tay et al. (2022) suggest that DFL and FSE are complementary factors in shaping financial behavior in an increasingly digitalized environment. Zaimovic et al. (2025) showed that digital financial knowledge increases financial inclusion through behavioral mechanisms such as financial attitudes and practices. Similarly, Muat et al. (2025) found that financial literacy and digital payment adoption jointly improve financial well-being, indicating more effective use of digital financial services. Furthermore, DFL was identified as a key determinant of digital financial inclusion due to its role in enabling individuals to use financial technology. However, research examining the importance of FSE in promoting DFI has yielded mixed results. Previous research found that FSE serves as a mediating variable that bridges financial literacy with

the degree of financial (Farrell et al., 2016; Amagir et al., 2020). Other research also supports this relationship, emphasizing the importance of FSE in promoting DFI Liu & Zhang, 2021; Rustandi Kartawinata et al., 2021). However, a study by Noor et al. (2020) found that individual participation in digital financial services is not consistently significantly associated with the level of FSE.

Due to inconsistencies in previous research, a gap has emerged in understanding the influence of FSE on the relationship between DFL and DFI. Previous studies have examined similar topics, but still have limitations. For example, Setiawan et al. (2022) focused on financial behavior, while Widyastuti et al. (2024) emphasized demographic factors, but neither included self-efficacy in their research. Meanwhile, Noor et al. (2020) examined financial literacy and FSE in a general financial context, not a digital context. The role of FSE in digital finance, particularly as a mediating variable, remains uncertain. Differences in socio-demographic characteristics, digital access, and financial experience may help explain these mixed findings, as they may shape how effectively self-efficacy translates into actual financial behavior. Drawing on Social Cognitive Theory (Bandura, 1991), FSE is expected to strengthen the relationship between DFL and DFI by enabling individuals to translate knowledge into actual financial participation. This study integrates DFL, FSE, and DFI into a comprehensive model. Unlike previous studies that generally focus on the general financial context or examine these relationships partially, this study emphasizes the digital context and specifically analyzes the mediating role of FSE in the relationship between DFL and DFI. Based on this perspective, this study offers a renewed examination of the role of FSE, both as a direct factor and as a mediator in the relationship between DFL and DFI, to further illuminate the existing literature. We are using Surakarta, Indonesia, as the sample setting for this study because it is an urban locale characterized by significant digital financial adoption, facilitated by robust fintech infrastructure and development, yet still distinguished by disparities in digital competencies and financial confidence. By integrating cognitive and psychological perspectives, this study aims to offer a more comprehensive explanation of digital financial behavior in an urban economy of a developing country.

The organization of this article consists of several sections. The first section begins with a literature review and the formulation of a hypothesis. This section lists the main theories and hypotheses proposed. The next section, the research methodology, discusses how the study was conducted. Results and discussion present the study's findings. The final section presents the main findings, along with limitations and ideas for improvement and future research.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Digital Financial Literacy and Digital Financial Inclusion

Digital financial literacy (DFL) is very important for reducing obstacles to financial participation in getting financial services and for getting more people involved in the financial system, especially in emerging economies. Through digital platforms, individuals and households can more easily access a range of financial services, such as savings products, digital payments, financing, and insurance, at lower costs and with fewer geographic and transactional barriers (World Bank 2014; Chu, 2018). Furthermore, DFI is not just about access, but also about the intensity and effectiveness with which these services are used. It also reflects the reliability and quality of digital financial products, as well as the real economic benefits users derive from their participation Tay et al., (2022) and Widyastuti et al., (2024), DFI is not just about access, but also reflects how frequently and effectively financial services are used, as well as the reliability and quality of technology-based financial products and the economic benefits they provide to users.

DFL plays an important role in

promoting Digital Financial Inclusion (DFI) by strengthening individuals' ability to utilize, evaluate, and use a wide variety of technology-based financial services. Individuals with stronger DFL are generally more competent in understanding the features of digital financial products, anticipating potential risks, and conducting financial transactions more securely. Consequently, they increase their likelihood of active participation in the digital financial system. From a theoretical perspective, Human Capital Theory proposed by Gary Becker (1964), asserts that knowledge and skills constitute essential forms of capital that enhance an individual's capacity to undertake informed decisions and use available resources effectively. The results of studies in the field of digital finance indicate that individuals with high levels of DFL are better prepared to use and understand digital financial services. In addition, Michael Sherraden et al. (2013) 's Financial Capability framework highlights that financial capability does not rely exclusively on knowledge but also on a set of skills, attitudes, and engagement with financial services. With all these aspects, one can manage their finances better. It is important to recognize that the factors discussed above make a person more ready to interact with the digital financial system.

As discovered by Morgan & Long (2020), DFL is not limited to basic technical capabilities but is also complemented by an awareness of risks, consumer rights, and dispute-resolution procedures. Overall, all of these aspects enable people to make more logical decisions about their finances. Indeed, such an influence of DFL is confirmed by several results presented by Prasad et al. (2018). Namely, increased knowledge of digital payments and online banking was associated with greater utilization of DFL services. Likewise, Setiawan et al. (2022) argue that DFL influences savings behavior and leads to higher adoption rates for digital financial services, especially among millennials. In turn, Zaimovic et al. (2025) highlight the importance of financial attitudes in mediating the effect of knowledge on financial inclusion, whereas Kanungo (2025) demonstrates the value of digital operational knowledge required to leverage financial technologies. Hence, in this context, DFL is an important variable that facilitates individuals' capacity to access, analyze, and use financial services digitally. As a result, enhanced DFL would eliminate information asymmetries and contribute to more rational decision-making, leading to greater utilization of the digital financial system. Hence, the following hypothesis can be formulated:

H1: Digital financial literacy has a positive impact on digital financial inclusion.

Digital Financial Literacy and Financial Self-Efficacy

DFL plays a crucial role in supporting the effective expansion of DFI. It reflects an individual's capability to interact with digital financial instruments and platforms, recognize and manage potential risks, and be aware of their rights as users in the digital financial system (Morgan et al., 2019; Morgan & Long, 2020). Previous research also shows that greater DFL is linked to more constructive financial behaviors. For example, Prasad et al. (2018) showed that individuals with greater DFL were more likely to adopt digital payment methods and exhibited more responsible savings practices, particularly among younger populations. From a Capability Approach perspective, increased DFL helps individuals better use digital financial services, thereby driving greater progress in DFI (Sen, 2007). Furthermore, increased competence can strengthen individuals' perceived ability to manage their finances, as reflected in financial self-efficacy.

In addition to increasing the ability to participate in and use financial services through digital platforms, DFL also plays a significant role in strengthening FSE, as reflected in an individual's level of self-confidence in making sound financial decisions. DFL enhances an individual's competence to interpret, assess, and optimally use digital financial information to support more effective financial decision -making (World Bank, 2014). Within the framework of Social Cognitive Theory,

Bandura, (1991) explains that self-efficacy develops through a continuous process of learning and repetition of knowledge. This means that increasing financial literacy has the capability to strengthen an individual's belief in carrying out various financial transactions.

Existing literature by Farrell et al. (2016), Amagir et al. (2020), and Liu & Zhang (2021) shows that individuals with better financial literacy exhibit stronger FSE due to their increased perceived ability to deal with the multifaceted nature of the financial system. Research by Rustandi Kartawinata et al. (2021) and Noor et al. (2022) also confirms that increasing digital financial literacy can boost an individual's confidence in accessing and using digital financial services. Therefore, the following hypothesis is proposed

H2: Digital financial literacy has a positive impact on financial self-efficacy.

Financial Self-Efficacy and Digital Financial Inclusion

Financial Self-Efficacy (FSE) reflects the extent to which individuals perceive their competence to control financial responsibilities and make prudent financial decisions (Bandura, 1991). Within the framework of Social Cognitive Theory, self-efficacy is developed through mastery experiences, indirect learning, social persuasion, and an individual's psychological state. As a psychological factor, FSE indicates confidence in managing financial products and services while making wise financial decisions. Individuals with higher FSE tend to feel more confident in managing risk, use more complex financial products, and adapt to digital financial innovations. Consequently, they are generally more willing to adopt digital financial services.

Empirical evidence suggests that FSE can increase participation in technology-based financial services and act as a mediator between DFL and DFI. In this case, FSE enables individuals to translate financial knowledge into actual financial behavior (Rustandi Kartawinata et al., 2021; Liu & Zhang, 2021; Hasan et al., 2022). Thus, FSE can be understood as a mediating factor linking the influence of DFL and DFI. Individuals with higher levels of FSE to engage more actively with digital financial platforms, utilize a broader portfolio of financial services, and respond more adaptively to financial innovations (Liu & Zhang, 2021). Furthermore, FSE reduces psychological barriers, such as uncertainty and perceived complexity, which often hinder the adoption of digital financial services (Bandura, 1991; Hasan et al., 2022). Thus, FSE is a key mediating factor that bridges the impact of DFL on financial behavior within digital platforms and ultimately increases the level of DFI.

However, the effect of self-efficacy and financial habits within digital platforms can be complex and context-dependent. From a decision science perspective, the financial decision-making process is susceptible to cognitive biases, such as overconfidence and the availability heuristic, which can limit the conversion of self-confidence into rational financial behavior (Kahneman, 2011; Lusardi & Mitchell, 2014). In line with Social Cognitive Theory Bandura, (1991). emphasized that the effectiveness of self-efficacy is highly dependent on self-regulation and realistic capacity evaluation. Therefore, although self-efficacy is a relevant psychological factor in driving digital financial participation, its influence is contextual and influenced by the level of self-efficacy and an individual's ability to control cognitive biases (Kahneman, 2011). These findings also imply that expanding digital financial inclusion depends not only on strengthening financial self-confidence but also on developing reflective capacity so that self-efficacy can effectively contribute to sustainable digital financial behavior (Lusardi & Mitchell, 2014). Nevertheless, self-efficacy remains a crucial determinant in promoting engagement with digital financial systems. Based on existing theoretical arguments and empirical support, the research hypothesis is formulated as follows:

H3: Financial self-efficacy has a positive impact on digital financial inclusion.

The Mediating Role of Financial Self-Efficacy

DFL and FSE work together to influence individual participation in the digital financial system. In addition to DFL's direct influence on digital service adoption, FSE serves as a psychological channel that transforms digital financial knowledge into behavior. Confidence in one's abilities is influenced by the degree to which acquired competencies and capabilities can be realistically applied in everyday life (Bandura, 1991). With higher FSE, individuals are better able to operationalize their digital knowledge to manage the risks and complexities of financial services. Empirical research by Hasan et al. (2022) found that FSE facilitates the active application of digital financial knowledge, while Liu & Zhang (2021) and Rustandi Kartawinata et al. (2021) found that FSE represents a mediator in the relationship between DFL and DFI. Drawing on theoretical foundations and prior empirical findings, the following hypothesis is formulated:

H4: Financial self-efficacy mediates the relationship between digital financial literacy and digital financial inclusion.

Figure 1 shows the theoretical relationship between DFL, FSE, and DFI, with DFI as the dependent variable indicating an individual's involvement in digital financial services, DFL as the primary variable reflecting their understanding and technical ability to utilize digital-based financial instruments, and FSE as the connecting construct representing an individual's level of confidence in handling financial activities through digital means. The research framework suggests that higher levels of DFL directly contribute to the escalation of DFI (H1) and also strengthen FSE (H2). Furthermore, FSE is expected to influence DFI (H3) directly and also act as a mediator in the relationship between DFL and DFI (H4). To provide a more comprehensive analysis, this study also considers individual differences by including demographic characteristics after accounting for demographic covariates, including age, gender, employment status, income level, and educational attainment.

RESEARCH METHODS

This research employs a quantitative methodology to analyze the correlation between DFL and DFI, integrating FSE as a mediating variable and demographic characteristics as control variables. This quantitative methodology is employed to facilitate extensive statistical evaluation of

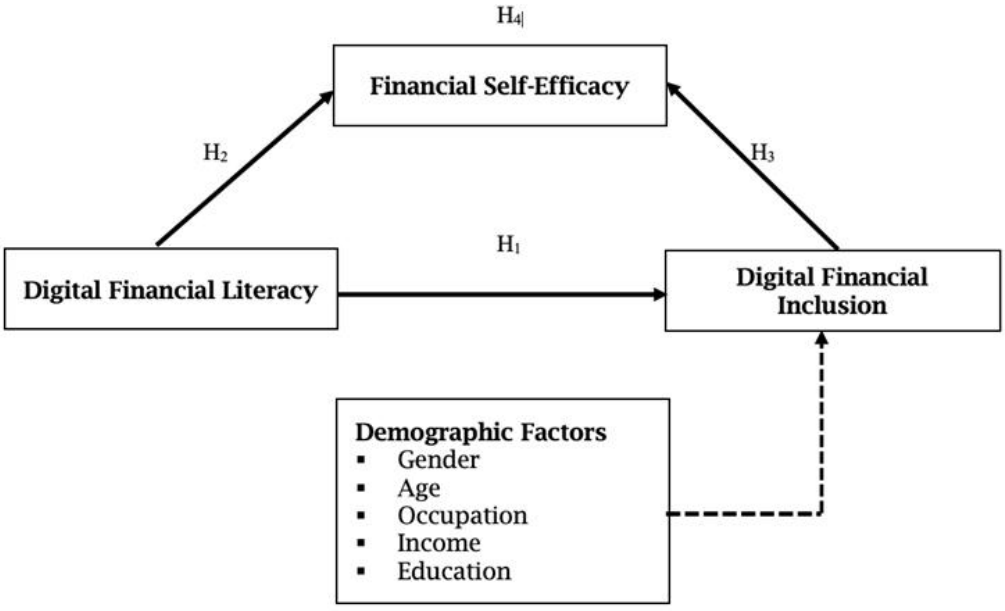


Figure 1.

Research Framework

the formulated hypotheses and to analyze the causal associations among the examined variables. The target population consists of residents of Surakarta City, an urban area with a high rate of digital finance adoption, supported by infrastructure and rapid fintech development, yet still facing gaps in digital competency and financial confidence. Respondents were selected via purposive sampling based on established criteria, specifically bank account ownership and active participation in digital financial platforms. According to Hair et al. (2019), at least 5 data points per indicator are needed for a sample of this size. This study needs at least 125 respondents to assess the 25 measurement indicators used. An online questionnaire distributed via Google Forms served as the data collection instrument from May to July 2025. Of the 282 responses received, 24 responses were excluded due to incomplete or invalid information, resulting in a final sample of 258 valid observations for empirical analysis.

This study involved four groups of variables. DFI served as the dependent variable, measured through access, usage intensity, and quality of technology-based financial services (Setiawan et al., 2022); Widyastuti et al., (2024). DFI was classified as a dichotomous variable (included = 1; excluded = 0). DFL served as the independent variable and was measured using 11 indicators reflecting an individual's competence to understand, implement, and safely use digital financial services (Setiawan et al., 2022). FSE was included as a mediating variable, representing self-confidence in managing financial activities independently and was measured using five indicators. (Noor et al., 2020). Both DFL and FSE were measured using a five-point Likert scale and categorized into high and low based on the median score. while demographic factors, gender, age, employment status, income, and marital status were considered as control variables that could influence the relationships between the main constructs (see Table 1).

This study explores the effect of DFL on DFI by placing FSE as a mediating variable and including demographic factors as control variables. The empirical relationship between the variables is stated in the following general specification:

$$\text{Ln}\,(P/(1-P)) = \beta 0 + \beta_1 DFL + B_2 FSE + \ldots + \beta_k X_k \ldots (1)$$

Where: P=P(DFI = 1) denotes the probability that an individual is financially included in digital financial services, DFI=Digital Financial Inclusion (dependent variable: 1 = inclusion, 0 = no), DFL = Digital Financial Literacy, FSE = Financial Self-Efficacy, $X_1 \ldots X_k$ =Control variables (e.g. education, occupation, income, age, gender), β_0= Intercept (constant), β_1, β_2,…, β_k= Regression coefficients, Ln (P/(1-P) = Log-odds (logit), which is the transformation of probability into a linear form.

This study employed two complementary analytical approaches: probit/logit regression and Structural Equation Modeling (SEM). Probit/logit regression was used to estimate the effect of independent variables on the probability of a dichotomous dependent variable, namely digital financial inclusion, as it is suitable for modeling binary data. Meanwhile, SEM was adopted to evaluate the structural relationships between variables and test the mediating effect of FSE. In this study, Hypotheses H1 (the effect of DFL on DFI), H2 (the effect of DFL on FSE), and H3 (the effect of FSE on DFI) were tested using probit/logit regression models to examine the direct relationships among the variables, and Hypothesis H4 was tested using SEM to assess the indirect pathway and mediation mechanism. SEM in this study was estimated using the covariance-based SEM (CB-SEM) approach in Stata, rather than Partial Least Squares SEM (PLS-SEM). The two methods were used in a complementary manner, with probit/logit regression testing direct relationships, while SEM tested simultaneous relationships and mediating mechanisms. In addition, Ordinary Least Squares (OLS) regression with robust standard errors was employed as an additional robustness check to examine whether the direction and statistical significance of the estimated coefficients remained consistent across alternative model specifications. Control

Table 1.
Variable Definition

Variable	Definition	Indicator
Digital Financial Inclusion (DFI)	DFI shows how easily people can access, utilize, and derive meaningful benefits from digital financial services efficiently and sustainably. Setiawan et al., (2022) and Widyastuti et al., (2024)	• I access my financial accounts, including bank accounts and digital wallets, via telepon atau internet. • I settle bills or make payments using digital debit and credit instruments, mobile and internet banking services, and online financial platforms • I purchase goods online through internet services, electronic wallets, digital credit and debit instruments, electronic money, and mobile or online banking services. • I withdraw cash using a debit card. • I invest in products such as mutual funds or stocks through digital financial applications (fintech). • I buy or manage insurance policies using digital financial applications (fintech). • I receive income, salary, or other payments through my accounts. • I pay regular monthly bills, such as for electricity or internet, via digital financial applications. • I transfer funds using a mobile phone or online services.
Digital Financial Literacy (DFL)	DFL represents an individual's level of understanding of information and technical skills that support the safe and efficient use of digital financial services. Setiawan et al., (2022) and Widyastuti et al., (2024)	• I am familiar with digital payment mechanisms, including electronic wallets, digital credit and debit instruments, electronic money, and mobile and online banking services • I am familiar with digital asset management tools like Bareksa, Finansialku, and Tanamduit. • I am well-versed in alternative financial digital services, such as Investree and Kreditku platforms. • I am familiar with digital insurance platforms and products like Rajapremi, Cekpremi, and W+. • am aware of the complaint processes, protection guidelines, and consumer rights provided by digital financial service providers. • I've used fintech services, such as OVO, Gopay, and LinkAja, for digital payments in the real world. • I've used fintech platforms for investment and financing activities such as CoinWorks, bInvestree, Modalku, and Amartha • I've used digital asset management solutions including Finansialku, Tanamduit, and Bareksa. • I am aware of the possible financial risks connected to fintech or digital financial providers, such as provider legality, interest rates, and transaction fees. • I am able to track the costs of digital transactions and manage financial activity through digital platforms. • By examining and assessing my expenditures, I am able to efficiently monitor and manage my financial activities on digital platforms.

Table 1.
Variable Definition (continue)

Variable	Definition	Indicator
Financial Self-Efficacy (FSE)	FSE indicates self-assessed ability to manage and controlling aspects of personal finance, such as preparing a budget, managing expenses, and making wise financial decisions. Noor et al., (2 020)	• I feel capable of taking care of my own financial decisions. • I am able to create a spending plan to determine areas requiring adjustment. • I set financial goals that will contribute to my long-term financial security. • I am able to create plans to reach my financial objectives. • I have confidence in my ability to select financial items that suit my needs.
Demographic Factors	Control variables consist of gender, age, employment status, income, and marital status, as these factors can influence individuals' financial behavior and their engagement with digital financial services. Widyastuti et al., (2024)	• Gender • Age • Occupation • Income • Education

variables such as gender and age were included in the model using dummy or numerical coding, following the approach of Sekaran & Bougie (2016).

ANALYSIS AND DISCUSSION

Validity and Reliability

Validity and reliability assessments were conducted to ensure that the measurement instrument accurately captured the constructs examined in this study. According to the validity analysis, each questionnaire component effectively represented its own construct, with item-total correlations exceeding the threshold of 0.30. Furthermore, reliability testing showed that each variable had a Cronbach's alpha coefficient above 0.70 and an overall reliability of 0.9103, suggesting a strong level of internal reliability in the research instrument. These results indicate that the instrument meets the established standards of validity and reliability and is therefore suitable for further statistical analysis (see Table 2).

The demographic information for respondents and the distribution of research variables are summarized in Table 3 using descriptive statistics. This study involved 258 respondents, with 56 percent women, 68 percent aged under 30, and most respondents working in the private sector (46 percent). Forty-two percent of respondents had a high school or vocational high school education, while 41 percent had a bachelor's degree. The most common income category was IDR 1,500,001–3,000,000 per month, accounting for 34 percent of respondents. Using the median as the cutoff, 121 respondents were classified as having high DFL, while 137 were classified as having low DFL. Similarly, 135 participants were classified as having high FSE, while 123 were classified as having low FSE. Overall, the level of digital financial inclusion was limited, with only 100 respondents considered digitally included, compared to 158 respondents categorized as digitally excluded (see Table 3)

The estimation results from the probit, logit, and structural equation modeling (SEM) analyses are shown in Table 4. Specifically, the robust probit and logit model coefficients of 0.846 ($p < 0.01$) and 1.395 ($p < 0.01$) indicate that

individuals characterized by higher levels of of DFL are found to positively influence DFI. This supports Hypothesis 1. A significant positive linkage exists between DFL and FSE, as demonstrated by additional analyses. The results of the probit and logit analyses yielded significant positive coefficients. This indicates that greater understanding and competence with digital financial platforms can increase individuals' confidence in managing their personal finances, thus confirming Hypothesis 2.

Conversely, FSE did not show a significant effect on DFI. The coefficients from the probit analysis 0.249 and logit analysis 0.407 did not reach significance. This means that FSE does not directly increase participation in digital financial services, thus Hypothesis 3 is rejected. Next, the potential mediating role of FSE was tested using SEM. The results showed that the direct effect of DFL on DFI was positive and significant (coefficient 0.370, $p < 0.01$), but the path from FSE to DFI remained statistically insignificant (coefficient –0.0306). Thus, Hypothesis 4 was rejected. A summary of the acceptance and rejection of all research hypotheses derived from the regression analysis and SEM is shown in Table 5.

Robustness Checks

The variables in this study are dichotomous, so the primary analysis uses binary logistic regression. To check the robustness of the findings, additional estimations were conducted using a linear probability model (OLS) with robust standard errors. This design helps assess whether the direction and significance of the coefficients remain consistent across model specifications, thus ensuring the stability of the results. A summary of the details of this analysis are provided in Table 6.

The Ordinary Least Squares (OLS) results are consistent with those from the probit and logit analyses. As shown in Table 7, DFL has a significant positive impact on DFI (coefficient = 0.299, $p < 0.01$), supporting Hypothesis 1. DFL also shows a positive, statistically significant correlation with FSE (coefficient = 0.344, $p < 0.01$), supporting Hypothesis 2. Collectively, the evidence indicates that the relationship between DFL and DFI is stable across various model specifications. However, FSE does not show a significant effect on DFI in the OLS model (coefficient = 0.0888), which leads to the rejection of Hypothesis 3. These results are consistent

Table 2.

Item	Item-Test Correlation	Item-Rest Correlation	Alpha if Item Deleted	Description
DL1	0.6240	0.5672	0.9057	Valid and Reliable
DL2	0.7208	0.6612	0.9025	Valid and Reliable
DL3	0.7437	0.6833	0.9013	Valid and Reliable
DL4	0.7292	0.6724	0.9021	Valid and Reliable
DL5	0.6966	0.6328	0.9035	Valid and Reliable
DL6	0.5490	0.4774	0.9085	Valid and Reliable
DL7	0.6436	0.5701	0.9060	Valid and Reliable
DL8	0.7089	0.6426	0.9034	Valid and Reliable
DL9	0.6185	0.5473	0.9065	Valid and Reliable
DL10	0.7153	0.6669	0.9026	Valid and Reliable
DL11	0.7099	0.6608	0.9028	Valid and Reliable
EF1	0.5420	0.4818	0.9081	Valid and Reliable
EF2	0.6299	0.5787	0.9058	Valid and Reliable
EF3	0.5565	0.5009	0.9076	Valid and Reliable
EF4	0.6353	0.5843	0.9056	Valid and Reliable
EF5	0.6504	0.6007	0.9049	Valid and Reliable
Total Score (Scale)	0.4806	–	0.9103	All items are valid and

with the SEM analysis, which also indicates that FSE does not mediate the relationship between DFL and DFI. Although DFL has a strong and significant direct effect on DFI (coefficient = 0.370, $p < 0.01$), the indirect path through FSE is not significant. The consistency of the results across OLS, probit, logit, and SEM models provides strong support for the robustness of this study's main findings. A more detailed discussion of the effects of DFL and FSE on DFI is presented in the following subsections.

How Digital Financial Inclusion is Affected by Digital Financial Literacy

These findings support Hypothesis 1 (H1), which posits that DFL positively contributes to DFI. Individuals with greater DFL are generally more frequent users of multiple digital financial services, such as fintech-based investment platforms, mobile banking, and e-wallets. These results are consistent with prior research by Morgan et al. (2019) and Setiawan et al. (2022), which showed that an enhanced understanding of digital financial products improves individuals' capacity to gain access and use technology-based financial services effectively. In addition to confirming previous findings, this study also shows that DFL helps reduce obstacles to financial inclusion by supporting individuals to assess risks better, compare financial options, and make more informed decisions.

From a theoretical perspective, these findings can be explained by Gary Becker (1964), Human Capital Theory, which emphasizes that knowledge and skills

Table 3.
Descriptive Statistics

Variable	Category	Code	Count
Gender	Male	1	114
	Female	2	144
Age	Under 25 years	1	97
	25–30 years	2	77
	31–35 years	3	30
	36–40 years	4	20
	41–45 years	5	10
	Over 45 years	6	24
Occupation	Civil Servant	1	27
	Private Employee	2	118
	Entrepreneur	3	45
	Student	4	68
Income	< IDR 1,500,000	1	62
	IDR 1,500,001–3,000,000	2	87
	IDR 3,000,001–4,500,000	3	33
	IDR 4,500,001–6,000,000	4	45
	> IDR 6,000,000	5	31
Education	High School/Vocational	1	109
	Diploma	2	29
	Bachelor's Degree	3	106
	Postgraduate	4	14
	Total		258
Digital Financial Literacy	High DFL	Total score equal to or above the median	121
	Low DFL	Total score below the median	137
Financial Self-Efficacy	High FSE	Total score equal to or above the median	135
	Low FSE	Total score below the median	123
Digital Financial Inclusion	Financially Included	Total score equal to or above the median	100
	Financially Excluded	Total score below the median	158

enhance an individual's ability to make effective decisions and use resources more efficiently. In the context of digital finance, DFL can be seen as a crucial component of human capital, helping individuals understand and navigate financial technology. Furthermore, the Financial Capability framework introduced by Michael Sherraden et al. (2013) emphasizes that financial capability emerges from the integration of knowledge, skills, and access to financial services. Together, these elements support more effective financial behavior. Therefore, individuals with greater financial capability are more disposed to translate their knowledge into actual financial participation, particularly in the digital financial ecosystem.

DFL also plays an important role in expanding public interaction with the increasingly digitalized formal financial system. This supports improved risk control and better-informed and rational investment decisions (Hasan et al., 2022). As DFL increases, individuals are not only able to access digital financial services but also better equipped to use them effectively and sustainably (Morgan et al., 2019). This means that DFL not only increases the intensity of digital financial service use but also deepens the quality of individual engagement in the financial ecosystem. In the end, this helps expand financial inclusion and supports more inclusive and sustainable economic development (World Bank, 2014; Lusardi & Mitchell, 2014).

How Financial Self-Efficacy is Affected by Digital Financial Literacy

The regression results support Hypothesis 2, showing that DFL is positively and significantly associated with FSE. Individuals with higher levels of DFL are more likely to feel confident in managing their financial resources, especially in the increasingly complex digital financial environment. This finding is consistent with Albert Bandura's (1991) Social Cognitive Theory, which states that self-efficacy develops through experience, learning, and cognitive understanding. This is also supported by previous research showing that higher financial literacy is associated with stronger self-efficacy in financial decision-making (Farrell et al., 2016); Amagir et al., 2020; Liu & Zhang, 2021).

Increasing familiarity with financial innovations such as mobile banking services, digital payment apps, and online trading platforms can increase individuals' perceived competence and, in turn, strengthen their FSE (Liu & Zhang, 2021;

Table 4.
Regression Test Results

	(Probit)	(Logit)	(Probit)	(Logit)	(Probit)	(Logit)	(SEM)
	H1		H2		H3		H4
	DFI	DFI	FSE	FSE	DFI	DFI	
DFL	0.846***	1.395***	0.930***	1.509***			0.370***
	(4.84)	(4.77)	(5.34)	(5.22)			(6.14)
FSE					0.249	0.407	-0.0306
DFI					(1.46)	(1.46)	(-0.50)
Gender	-0.238	-0.397	0.0812	0.131	-0.300	-0.489	
	(-1.34)	(-1.34)	(0.47)	(0.46)	(-1.75)	(-1.73)	
Age	-0.216**	-0.373**	0.0470	0.0751	-0.268***	-0.453***	
	(-3.02)	(-2.98)	(0.70)	(0.67)	(-3.95)	(-3.83)	
Occupation	-0.0233	-0.0506	0.0529	0.0885	0.00533	0.00824	
	(-0.23)	(-0.29)	(0.52)	(0.52)	(0.05)	(0.05)	
Income	0.222*	0.388*	0.0615	0.102	0.291***	0.498***	
	(2.56)	(2.57)	(0.71)	(0.70)	(3.50)	(3.44)	
Education	0.140	0.219	-0.259**	-0.418**	0.132	0.201	
	(1.49)	(1.39)	(-2.82)	(-2.75)	(1.44)	(1.31)	
_cons	-0.662	-1.048	-0.644	-1.052	-0.364	-0.579	0.227***
N	258	258	258	258	258	258	258

Hasan et al., 2022). This suggests that DFL not only represents a form of knowledge but also acts as a psychological mechanism that builds confidence in financial decision-making. Several previous studies support this relationship by showing that higher financial literacy is consistently associated with stronger self-efficacy (Farrell et al., 2016; Amagir et al., 2020). Further understanding of the growing literature on this subject is presented by examining the role of DFL in shaping FSE in the context of digital finance. The relationship between DFL and FSE can be understood through the process of knowledge internalization, in which a deeper understanding of financial products, risks, and processes helps reduce uncertainty and builds individual confidence (Bandura, 1991; Lusardi & Mitchell, 2014). Therefore, individuals are better equipped to make effective financial decisions in the digital financial environment. Furthermore, these results also indicate that higher levels of DFL not only enhance financial capability but also strengthen psychological readiness to engage in digital financial activities, ultimately supporting more effective participation in the digital financial ecosystem (Lusardi & Mitchell 2014; Liu & Zhang, 2021).

How Digital Financial Inclusion is Affected by Financial Self-Efficacy

This section discusses the influence of financial self-efficacy on digital financial inclusion. The findings of this study indicate that Hypothesis 3 is not supported, indicating that FSE does not have a significant impact on DFI. Furthermore, these findings also indicate a gap between individuals' perceived financial capabilities and their actual behavior in adopting digital financial services. According to Albert Bandura's Social Cognitive Theory (1991), self-efficacy

Table 5.
Hypothesis Test Results

Hypothesis	Statement	Decision
H1	Digital financial literacy has a positive impact on digital	Accepted
H2	Digital financial literacy has a positive impact on financial	Accepted
H3	Financial self-efficacy has a positive impact on digital	Rejected
H4	Financial self-efficacy mediates the relationship between digital financial literacy and digital financial inclusion.	Rejected

Table 6.
Robustness Check Results Using OLS Regression

	(OLS) H1 DFI	(OLS) H2 FSE	(OLS) H3 DFI	(SEM) H4
DFL	0.299***	0.344***		0.370***
	(5.13)	(5.67)		(6.14)
FSE			0.0888	-0.0306
DFI			(1.49)	(-0.50)
Gender	-0.0781	0.0287	-0.105	
	(-1.35)	(0.48)	(-1.73)	
Age	-0.0689**	0.0165	-0.0933***	
	(-3.09)	(0.71)	(-4.10)	
Occupation	-0.00850	0.0181	0.00283	
	(-0.25)	(0.51)	(0.08)	
Income	0.0741*	0.0216	0.105***	
	(2.59)	(0.72)	(3.59)	
Education	0.0451	-0.0886**	0.0452	
	(1.48)	(-2.80)	(1.40)	
_cons	0.269	0.264	0.360*	0.227***
N	258	258	258	258

is more likely to influence behavior when supported by adequate capabilities and a favorable environment. Thus, without adequate DFL and access to technological infrastructure, FSE may remain a latent psychological factor that does not fully translate into concrete actions (Bandura, 1991; Lusardi & Mitchell, 2014; Noor et al., 2022).

Furthermore, Kahneman (2011) stated that individuals do not always act rationally, as their decisions are often shaped by cognitive biases such as overconfidence and the availability heuristic. Individuals with high levels of FSE may feel confident in their abilities, yet remain hesitant to adopt digital financial services due to perceived risks, uncertainty about the technology, or a preference for more familiar, conventional methods. This condition also implies an intention-behavior gap, where confidence does not always translate into actual behavior (Kahneman 2011; Hasan et al., 2022). This issue is particularly relevant in semi-urban areas like Surakarta, where the adoption of technology-based financial services is determined not only by psychological factors but also by constraints such as limited digital infrastructure, varying levels of technological literacy, and continued reliance on conventional transactions. Previous studies have shown that confidence in financial management does not always translate into active use of digital financial services, especially when individuals face contextual and structural barriers (Noor et al., 2022; Hasan et al., 2022).

Several previous studies have also shown that financial behavior is more strongly shaped by objective knowledge than subjective beliefs. Financial literacy plays a more decisive role in supporting effective financial decision-making (Lusardi & Mitchell, 2014). This view is supported by Farrell et al. (2016) and Amagir et al. (2020), who consistently found that higher financial literacy is associated with better decision-making competence. Empirical evidence also suggests that without adequate support from DFL, it may not be sufficient to encourage participation in the digital financial system. The findings of this study highlight that the role of self-efficacy in digital finance is complex, rather than simple, and depends on its interaction with cognitive and structural factors. Therefore, integrating cognitive, psychological, and structural dimensions is necessary to encourage more inclusive and sustainable participation in the digital financial ecosystem.

How Financial Self-Efficacy Mediates

This section discusses how financial self-efficacy mediates the relationship between DFL and DFI. Our findings indicate that FSEE does not mediate between DFL and DFI. This result implies that, in this study, the influence of DFL has a direct psychological mechanism like FSE. In other words, an individual's knowledge and skills in digital finance appear to have a greater influence on FSE in shaping financial behavior. Our findings align with previous findings by Amagir et al. (2020) and Noor et al. (2022), which revealed that FSE does not significantly influence digital financial behavior or engagement. Similarly, Farrell et al. (2016) highlighted a stronger and more direct effect of financial literacy on financial actions. However, our results contradict prior evidence from Liu & Zhang (2021) and Rustandi Kartawinata et al. (2021), which identified a mediating role for FSE. We assume that the difference in findings lies in the characteristics of the sample, which consisted primarily of younger individuals with relatively high levels of digital literacy in Surakarta. Furthermore, financial behavior may be driven more by familiarity with digital tools, ease of use, and perceived usefulness than by self-efficacy-based considerations.

This finding aligns with the Social Cognitive Theory proposed by Albert Bandura (1991), which states that self-efficacy influences behavior only when individuals possess sufficient capabilities and are supported by a conducive environment. Regarding digital finance, decision-making can also be influenced by intuitive and heuristic processes, as highlighted by Kahneman (2011), potentially diminishing the role of

reflective self-evaluation. Lusardi & Mitchell (2014) stated that financial literacy is an important cognitive asset that directly shapes financial behavior through practical skills. This view is consistent with the Human Capital Theory developed by Gary Becker (1964) and the Financial Capability framework proposed by Michael Sherraden et al. (2013), both of which emphasize that knowledge, skills, and access are key drivers of effective financial behavior. Finally, our findings imply that the mediating role of FSE is context-dependent and may be weakened in environments where DFL is relatively high and access to financial technology is widespread. Therefore, policies aimed at promoting DFI should prioritize strengthening DFL, improving inclusive digital infrastructure, and encouraging the widespread and productive use of financial technology.

CONCLUSION

This study explores the factors influencing digital financial inclusion in the Surakarta community using survey data from 258 respondents in 2025. The analysis confirms that these factors significantly influence digital financial inclusion (DFI) and enhance digital financial inclusion (DFI), thus supporting H1. The results indicate that individuals with higher levels of DFL are generally more actively involved in technology-based financial services. Furthermore, this study found that DFL can increase financial self-efficacy (FSE), suggesting that a better understanding and mastery of digital financial instruments can increase individuals' confidence in managing their finances, supporting H2. The findings also indicate that financial inclusion (FSE) has no direct effect on DFI and also does not mediate the relationship between DFL and DFI, thus H3 is not supported. Instead, we found that DFL appears to have a stronger, more direct effect on DFI, whereas the mediating role of FSE is not statistically significant. These findings imply that the adoption of digital financial services is more influenced by practical digital financial skills, such as the ability to use financial applications, understand digital transactions, and evaluate financial risks. Furthermore, our findings confirm that DFL is a key factor in shaping digital financial behavior, while the influence of FSE appears to depend on individual characteristics and environmental conditions. This study adds new insights by showing that DFL, particularly in Indonesia, has a greater impact on driving DFI than individual perceptions or attitudes, including FSE. These findings underscore the importance of prioritizing efforts to improve DFL, for example, through educational programs that increase users' understanding of financial services, transaction security, and potential risks. Furthermore, collaborative community-based initiatives involving local governments, banks, financial institutions, and fintech providers are crucial to promoting broader DFI across Indonesia.

LIMITATIONS AND SUGGESTIONS.

This study has several limitations. First, it used cross-sectional data, thereby limiting the ability to draw causal conclusions about the relationships among DFL, FSE, and DFI. Therefore, future studies should consider conducting research using time-series data to better test causal relationships over time. Second, the sample in this study was limited to respondents from a narrow region, namely Surakarta, which may ultimately limit the findings to this region and not to broader regions or regions with other characteristics. Future research could include larger and more diverse populations from other regions to help increase the generalizability of the findings. Finally, the study's findings indicate that FSE does not mediate, suggesting that the results may differ in other contexts. Future research could examine this relationship across different demographic groups and incorporate additional factors, such as socioeconomic conditions, the regulatory environment, and the availability and quality of digital infrastructure, to provide a more comprehensive discussion.

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