Enhancing employee financial capability via super-apps: A case study in Semarang

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Abstract
Purpose: Digital transformation has driven the development of technology-based financial services, including super-apps that integrate various services in one platform. This study aims to analyze the effect of super-apps usage and digital literacy on people's financial behavior, with financial inclusion as a mediating variable.

Research Methodology: This study uses a quantitative approach with the Partial Least Squares–Structural Equation Modeling (PLS-SEM) analysis technique. Respondents were 194 people from Semarang City who were active users of super-apps services.

Results: The results of the study show that the use of super-apps and digital literacy have a positive effect on financial behavior, both directly and indirectly through financial inclusion. Digital literacy is proven to have the strongest influence on financial inclusion, which then significantly mediates the relationship between digital literacy and financial behavior. Meanwhile, the indirect effect of super-apps usage on financial behavior through financial inclusion is relatively small.

Conclusions: These findings emphasize the importance of increasing digital literacy to encourage broader financial inclusion and wiser financial behavior.

Limitations: This study is limited to a sample of 194 respondents in Semarang, so the findings cannot be widely generalized. The use of self-report questionnaires may introduce bias. The variables examined are still limited, and the cross-sectional design cannot explain causal relationships. In addition, the study does not differentiate types of super-apps and does not consider structural factors such as income and digital infrastructure.

Contribution: May consider adding variables such as trust in fintech, personal financial efficacy, or digital security risks.

Keywords: *Digital Literacy, Employee, Financial Inclusion, Financial Behavior, Super-Apps*

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1. Introduction

The global financial landscape has undergone profound transformation in the digital era, with Indonesia emerging as one of the most dynamic markets for financial technology innovations. This transformation has been accelerated by the COVID-19 pandemic, which catalyzed the adoption of digital financial services across all demographic segments. Digital transformation in Indonesia's financial sector represents not only a technological shift but also a fundamental reimagining of how financial services are delivered, accessed, and integrated into daily life. According to comprehensive data from the Financial Services Authority (Otoritas Jasa Keuangan - OJK) released in 2023, Indonesia's national financial inclusion index achieved a remarkable 85.1%, representing a substantial increase from 76.19%

in 2019. This impressive growth trajectory reflects the country's commitment to achieving universal financial access and the effectiveness of digital-first strategies in reaching previously unserved populations.

The acceleration has been particularly pronounced in urban areas, where digital infrastructure and smartphone penetration provide fertile ground for financial technology adoption (Udodiugwu, Nwosu, Obiakor, & Nwumeh, 2024; Zima, Dharma, & Susilowati, 2025). Central to this transformation is the emergence and proliferation of super-apps, comprehensive digital platforms that integrate multiple services, ranging from transportation and food delivery to financial services and e-commerce, within a single application ecosystem. These platforms have fundamentally altered the landscape of digital financial services by reducing barriers to entry, increasing convenience, and creating network effects that benefit both providers and users (Astutiek & Sukesi, 2025; Nugraheni, Kellen, & Rozari, 2022).

The super-app phenomenon in Indonesia has reached an unprecedented scale and sophistication. Recent research by Irfantiyardi and Prabowo (2024) revealed that super-app penetration among smartphone users in Indonesia reached an impressive 73%, with digital transaction volumes experiencing year-over-year growth of 38,45% (Hartono et al., 2025). This remarkable adoption rate positions Indonesia among the global leaders in super-app utilization, alongside China and Singapore. The Indonesian super-app ecosystem is dominated by several key players, each offering distinct value propositions while competing for market share and user engagement. Gojek, originally launched as a motorcycle ride-hailing service, has evolved into a comprehensive super-app offering services such as Go Food (food delivery), Go Pay (digital payments), Go Send (logistics), and Go Investasi (investment services).

Similarly, Grab has expanded beyond its transportation roots to encompass Grab Food, Grab Pay, and Grab Finance, creating an integrated ecosystem of daily services (Adula, Kant, & Birbirsa, 2022; Ezekiel & Nanfa, 2023). E-commerce giants have also entered the super-app space, with Shopee integrating Shopee Pay for seamless transaction processing, while dedicated financial super-apps such as OVO, DANA, and Link Aja have built comprehensive ecosystems around digital payments, micro-investments, insurance products, and credit services. This competitive landscape has fostered rapid innovation and feature development, ultimately benefiting consumers with improved services and competitive pricing.

Semarang City as a Research Context, Semarang City, strategically positioned as the capital of Central Java province and one of Indonesia's major metropolitan centers, provides an ideal context for examining super-app adoption and its impact on financial behavior. The city's unique characteristics, including its role as a regional economic hub, diverse demographic composition, and strong digital infrastructure, make it representative of medium-sized Indonesian cities experiencing rapid digitalization. Approximately 72% of the city's productive-age population has utilized at least one form of digital financial service, indicating substantial adoption rates that reflect the broader national trends. Digital transaction volumes in Semarang experienced remarkable growth of 56% compared to the previous year, reaching a total value of IDR 15.7 trillion. This substantial transaction volume demonstrates the real economic impact of digital financial services on the local economy.

The novelty of this study is that the city's demographic profile presents interesting characteristics for fintech adoption. Semarang's population includes a significant proportion of young adults, university students from multiple higher education institutions, small and medium enterprise owners, and traditional market vendors each representing different adoption patterns and usage behaviors for super-app financial services. The academic literature on super-apps and financial inclusion has grown substantially in recent years, reflecting the increasing importance of these technologies in emerging markets. International research has provided valuable insights into various aspects of super-app adoption and impact, although most studies have focused on megacities or developed market contexts.

Chen and Yuan (2021) conducted comprehensive analysis of super-app impact on financial inclusion in major Chinese cities, documenting increased access to financial service among active super-app users. Their research highlights the importance of integrated service offerings in driving adoption and

usage frequency. Similarly, Chawla and Joshi (2017) analyzed super-app adoption patterns in India's major metropolitan areas and identified a strong positive correlation between super-app usage and measured financial literacy levels. Several studies have begun to explore these relationships in the Indonesian context. Amini, Wiralaga, and Sebayang (2025) found that service integration within super-apps increased the probability of financial inclusion among Jakarta residents, while Faridah and Kuswati (2024) identified trust and security factors as primary determinants of super-app adoption. Singh and Ghatak (2021) focused on fintech user behavior more broadly, finding that perceived ease of use had significant explanatory power (R^2=0.58) in predicting adoption decisions.

Recent research has begun to explore the nuanced relationships within super-app ecosystems. demonstrated significant moderating effects of digital literacy on the relationship between super-app usage and financial behavior (β=0.45, p<0.05), suggesting that technological proficiency amplifies the benefits of super-app adoption. Shahen and Sharaf (2025) analyze the efficiency gains from integrated financial services and document an improvement in transaction processing efficiency within super-app environments. Local Indonesian research has provided important insights into regional adoption patterns. Azzahra and Afgani (2023) examined super-app adoption in Yogyakarta, finding significant positive effects on financial inclusion measures (t=4.56, p<0.01). Roa, Rodríguez-Rey, Correa-Bahnsen, and Arboleda (2021) focused specifically on previously unbanked populations, documenting that super-apps increased access to formal financial services among this underserved demographic.

Despite these valuable contributions to the literature, several important gaps remain in our understanding of the impact of super-apps on financial behavior, particularly in medium-sized urban contexts such as Semarang. Previous studies have concentrated heavily on major metropolitan centers such as Jakarta, Surabaya, and Yogyakarta, with limited attention paid to the dynamics of financial technology adoption in medium-sized cities. Furthermore, the complex mediating role of financial inclusion in the relationship between digital literacy, super-app usage, and financial behavior outcomes has not been sufficiently explored. The urgency of this research stems from several critical factors. First, there is a pressing need for a deeper understanding of super-app adoption patterns and impacts in medium-sized cities, which represent a significant proportion of Indonesia's urban population and economic activity.

Second, policymakers require empirical evidence to develop effective technology-based financial inclusion strategies that consider local contexts and constraints. Third, financial service providers need insights into the factors that influence the effectiveness of super-app platforms in driving meaningful behavioral changes among diverse user segments. This study addresses these gaps by developing a comprehensive analytical framework specifically tailored to the Semarang context, integrating behavioral finance perspectives with technology adoption theory to examine changes in financial behavior resulting from the use of super-apps. This study employs a mixed-method approach to provide an in-depth understanding of the factors influencing digital financial service adoption and utilization patterns. The primary research questions guiding this investigation are as follows:
1. What are the characteristic patterns of super-app usage in the financial activities of Semarang residents?
2. To what extent do super-apps influence changes in the financial behavior of Semarang's population?
3. What factors determine the effectiveness of super-apps in promoting financial inclusion in a local context?

2. Literature review
2.1. Human in Financial
The relationship between super-app usage and financial behavior represents a complex interplay of technology adoption, behavioral economics, and financial decision-making processes. Super-apps, as comprehensive digital platforms integrating multiple services, create unique conditions that influence financial behavior through several mechanisms. First, super-apps reduce transaction costs and increase convenience, potentially leading to more frequent engagement with these financial services. The integration of multiple services within a single platform eliminates the need for users to navigate

multiple applications, thereby reducing the cognitive load and friction in financial decision-making. This convenience factor can lead to increased usage frequency and exploration of previously unfamiliar financial products by consumers.

Second, super-apps generate rich data profiles of user behavior across multiple service categories, enabling sophisticated financial product recommendations and risk assessments. This data advantage allows super-app providers to offer personalized financial services that may be more relevant and attractive to individual users than traditional mass market offerings. The emergence of super-apps has significantly influenced financial behavior patterns, particularly among younger demographics and previously underserved populations in Malaysia. These applications integrate multiple financial services within cohesive ecosystems, creating synergies that increase user engagement and potentially modify spending, saving, and investing habits. The convenience and integration offered by super-apps can promote financial experimentation and learning as users explore different financial products within familiar digital environments.

Recent research by Azzahra and Afgani (2023) demonstrates that super-apps particularly influence financial behavior among Generation Z in Indonesia, facilitating improved financial management capabilities and more informed decision-making processes. This demographic effect is attributed to the generation's comfort with digital technologies and willingness to adopt new financial tools when presented through familiar interfaces. Furthermore, super-apps are fundamentally redefining financial behavior by providing innovative data sources through comprehensive user interactions. This capability enables improved prediction of borrower behavior patterns, enhances credit risk modeling accuracy, and drives the development of more inclusive financial systems by considering broader user transaction contexts and behavioral patterns (Roa et al., 2021).

H1: The use of super-apps has a significantly positive effect on financial behavior.

2.2. Digital Literacy and Financial Behavior

Digital literacy has emerged as a critical determinant of financial behavior in the digital age, encompassing not only technical skills but also the knowledge and confidence to navigate digital financial services. The relationship between digital literacy and financial behavior operates through multiple channels, including improved access to financial information, an enhanced ability to compare financial products, and increased confidence in using digital financial tools. Research consistently demonstrates that digital literacy significantly influences financial behavior, with particularly pronounced effects among students and younger demographics (Clarence & Pertiwi, 2023; Febrianty, Yuliansyah, Hamzah, & Annisa, 2024).

The integration of digital financial literacy, which combines traditional financial knowledge with digital technology skills, has been shown to improve various aspects of financial management behavior, including saving patterns, spending discipline, and investment decision-making. This relationship extends beyond a simple correlation to demonstrate the causal pathways through which digital literacy shapes financial outcomes. Individuals with higher digital literacy levels are better equipped to research financial products, compare alternatives, and make informed decisions regarding financial services. They are also more likely to adopt beneficial financial technologies and less likely to fall victim to digital financial scams or engage in predatory practices.

Digital financial literacy significantly affects financial behavior by equipping individuals with the essential knowledge for wise financial management, enabling informed decision-making processes and helping avoid risks associated with financial technology adoption. This enhanced capability ultimately contributes to improved overall financial well-being (Muat, Fachrurrozi, & Sari, 2024). The impact of digital literacy on financial behavior is particularly important in developing market contexts, where traditional financial education may not adequately prepare individuals for digital financial-service environments. Users with strong digital literacy skills can better navigate the complexity of modern financial applications, understand terms and conditions, and make appropriate risk assessments.

H2: Digital literacy significantly and positively affects financial behavior.

2.3. Financial Inclusion and Financial Behavior

Financial inclusion is a fundamental determinant of financial behavior, encompassing access to affordable and appropriate financial services that enable individuals to effectively meet their financial needs (Natsir, Arifin, & Ronald, 2023). The concept extends beyond simple account ownership to include the meaningful use of financial services for savings, payments, credit, and insurance purposes. Financial inclusion is a critical component influencing both individual financial behavior and broader economic stability outcomes. It encompasses access to affordable financial services, which is particularly important for vulnerable populations who may lack traditional banking relationships or credit histories. The integration of financial services with social policy frameworks enhances this inclusion, establishing financial access as a public good that is necessary for sustainable economic development (Mishra, Kandpal, Agarwal, & Srivastava, 2024).

Research consistently emphasizes that financial literacy (FL) is fundamental for achieving meaningful financial inclusion (FI) because it empowers individuals to make informed financial decisions and thereby improves their overall financial behavior patterns. Enhanced financial literacy leads to better management and utilization of financial products and services, creating positive feedback loops that reinforce both inclusion and behavioral improvements (Geraldes, Gama, & Augusto, 2022). The relationship between financial inclusion and financial behavior operates through several mechanisms. First, access to formal financial services provides individuals with tools for better financial management, including savings accounts for goal setting, payment systems for transaction tracking, and credit facilities for smoothing consumption and investment. Second, participation in the formal financial system exposes individuals to financial education and advisory services that can improve their financial decision-making capabilities.

H3: Financial inclusion has a significantly positive effect on financial behavior.

2.4. Super-Apps and Financial Inclusion

The emergence of super-apps presents significant opportunities to advance financial inclusion by providing innovative financial services and leveraging alternative data sources for credit assessment and risk evaluation. These platforms have the potential to redefine user interactions with financial services and create new opportunities for previously underserved populations to access formal financial systems. Super-apps leverage alternative data sources, including user interaction patterns and transaction behaviors across multiple service categories, to improve credit risk models and make financial services more accessible to individuals who lack traditional credit histories or banking relationships (Berg, Burg, Gombović, & Puri, 2020). This data-driven approach to financial inclusion represents a significant advancement over traditional risk assessment methods that rely heavily on formal credit histories and collateral.

However, implementing super-app-based financial inclusion strategies faces several challenges. These include limited digital infrastructure in some regions, varying levels of consumer trust in digital financial services, regulatory complexities, and the need to ensure equitable access across different demographic segments of the population. These challenges can significantly impact the effectiveness of any fintech solution, including super-apps, in promoting meaningful financial inclusioThe success of super-apps in promoting financial inclusion depends largely on their ability to address specific barriers that prevent certain populations from accessing traditional financial services. These barriers may include geographic limitations, documentation requirements, minimum balance requirements, and language or literacy issues. Super-apps can potentially address these barriers through mobile accessibility, simplified user interfaces, lower service fees and integrated customer support systems.

H4: Super-apps have a significant positive impact on financial inclusion.

2.5. Digital Literacy and Financial Inclusion

Digital literacy plays an increasingly vital role in enhancing financial inclusion, particularly as financial services become more digitized and technology dependent. As financial technology continues to advance and evolve, the requirement for digital financial literacy becomes paramount to ensure that individuals can effectively utilize available services and maximize their benefits. Digital financial literacy equips individuals with the necessary skills to navigate complex digital financial service

environments, thereby increasing their engagement with these platforms and improving their ability to benefit from financial inclusion initiatives (Gumilar, Sangka, & Totalia, 2024). This enhanced capability is particularly important for previously underserved populations who may lack experience with traditional financial institutions but can potentially leapfrog to digital financial services.

Digital financial literacy is critical for meaningful financial inclusion because it empowers underserved populations to effectively use digital financial services and platforms. Research examines the complex interplay between literacy levels, income inequality, gender gaps, and digital access in developing effective financial inclusion strategies that reach diverse population segments (Ray, 2022). The relationship between digital literacy and financial inclusion operates through various pathways. Higher digital literacy enables individuals to overcome technological barriers to accessing financial services, increases their confidence in using digital platforms, and improves their ability to evaluate and select appropriate financial products. Additionally, digitally literate individuals are better positioned to take advantage of the cost savings and convenience offered by digital financial services.
H5: Digital Literacy has a significant positive impact on financial inclusion.

2.6. *Mediating Role of Financial Inclusion*
Financial inclusion plays a crucial mediating role in the relationship between super-app usage, digital literacy, and financial behavior outcomes. This mediation effect suggests that the benefits of technological access and digital skills are partially realized through improved access to and participation in formal financial systems. Research examining platforms such as Ola demonstrates how financial inclusion, particularly through digital platforms, improves users' financial practices and behavioral outcomes. This research emphasizes that access alone is insufficient; autonomy and affordability are critical factors for effectively leveraging digital technologies in financial management contexts (Kumar, Pillai, Kumar, & Tabash, 2023). Financial inclusion can increase access to financial services through big tech super-apps, which have significant potential to improve financial behavior patterns. However, the effectiveness of this relationship depends critically on financial literacy and education levels, which are essential for the safe and informed utilization of digital financial services (Jonker & Kosse, 2022).
H6: Financial inclusion mediates the use of super-apps and has a significant positive effect.

2.7. *Effect on financial behavior*
The mediating role of financial inclusion in the relationship between digital literacy and financial behavior is particularly important for understanding how digital skills translate into improved financial outcomes. Financial inclusion serves as a bridge between financial literacy and positive financial behavior, increasing individuals' willingness to engage in beneficial financial activities, including digital entrepreneurship (Akeju, 2022). Increasing financial inclusion leads to improved financial behaviors, such as more disciplined spending, systematic saving, and informed investing, which are fundamental components of financial well-being (Nelson, Rai, & Esplin, 2021). Digital financial literacy mediates the relationship between FinTech adoption and financial inclusion, enhancing users' ability to utilize digital platforms effectively, thereby promoting beneficial behaviors in accessing formal financial services (Adhikari, Ghimire, & Lama, 2024).
H7: Financial inclusion mediates digital literacy, with a significant positive effect on financial behavior.
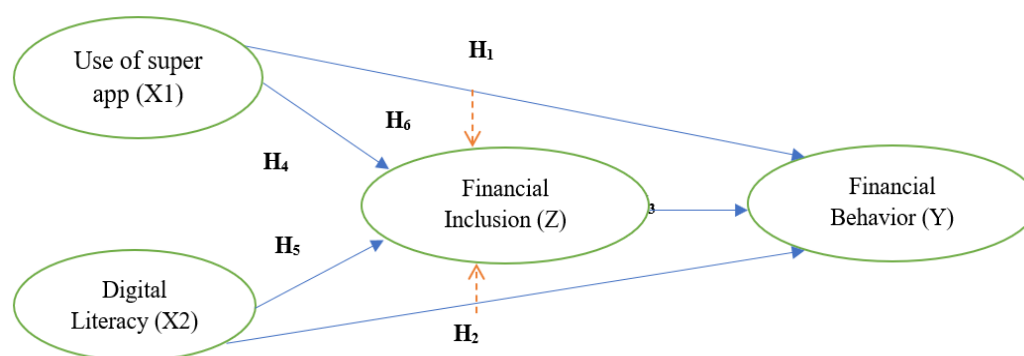

Figure 1 Research Model

3. Methodology

3.1. Research Design and Approach

This study employs a quantitative explanatory research design to investigate and explain the causal relationships between super app usage, digital literacy, financial inclusion, and financial behavior. The explanatory approach is particularly appropriate for this research because it allows for a systematic examination of hypothesized relationships while controlling for various demographic and contextual factors that might influence the observed relationships. This study utilized a cross-sectional survey design for primary data collection, providing a snapshot of the current relationships between the variables of interest. While cross-sectional designs limit causal inference compared to longitudinal approaches, they are well-suited for examining relationships at a specific point in time and are more feasible given resource and time constraints.

3.2. Population and Sampling Framework

The target population for this study consisted of residents of Semarang City who actively used super-app platforms for various services, including financial transactions. The population is specifically defined to include individuals who: (1) are between 18 and 45 years of age, representing the primary demographic for super-app adoption; (2) have utilized super-app services (including Gojek, Grab, Shopee, OVO, DANA, or Link Aja) for at least the past three months, ensuring familiarity with the platforms; and (3) are willing to participate in the study. The age range of 18-45 years was selected based on several considerations. This demographic represents the most active users of digital financial services in Indonesia, encompassing both younger digital natives and older adopters, and includes individuals who are likely to have independent financial decision-making responsibilities. The three-month usage requirement ensures that respondents have sufficient experience with super-app platforms to provide meaningful insights into their effects on financial behavior.

3.3. Respondent Criteria and Recruitment

Respondents were required to meet several specific criteria to ensure data quality and relevance.
1. Geographic criteria: Domiciled in Semarang City, ensuring local context relevance
2. Usage criteria: Active users of at least one super-app platform, with minimum usage frequency of three transactions per month
3. Experience criteria: Consistent usage over at least three months to ensure adequate familiarity
4. Participation criteria: Voluntary participation and consent to provide survey responses

Recruitment was conducted through multiple channels to ensure diverse representation, including university networks, social media platforms, local community groups and referral chains. This multichannel approach helped avoid sampling bias that might have resulted from single recruitment sources. Research Instruments and Measurement Scales The research instrument consisted of a structured questionnaire measuring four primary constructs: Super-App Usage, Digital Literacy, Financial Inclusion, and Financial Behavior. Each construct was measured using multiple indicators adapted from established scales in the literature and modified for the Indonesian context.

Super-App Usage Scale: This construct measures the frequency, intensity, and scope of superapp usage for various services. The items included questions about transaction frequency, service diversity, and platform preference. The scale was adapted from technology acceptance and usage research to capture both the behavioral and attitudinal aspects of super-app adoption. Digital Literacy Scale: This construct assesses individuals' confidence and competence in using digital technologies for financial purposes. The items cover areas such as digital skill self-assessment, comfort with digital financial interfaces, and the ability to troubleshoot technology problems. The scale is drawn from established digital literacy frameworks adapted for financial service contexts.

Financial Inclusion Scale: This construct measures access to and the usage of formal financial services. The items assess account ownership, service utilization, barriers to access, and satisfaction with the available financial services. The scale is based on established financial inclusion measurement frameworks used in developing countries. Financial Behavior Scale: This construct evaluates various aspects of financial management behavior, including budgeting, saving, spending discipline, and

financial planning. The items assess both self-reported behaviors and attitudes toward financial management. The scale is drawn from the behavioral finance literature and established financial behavior measurement instruments. All items were measured using seven-point Likert scales ranging from "strongly disagree" (1) to "strongly agree" (7), providing sufficient variance for statistical analysis while being easily understood by respondents.

3.4. Data Analysis Strategy

This study employed partial least squares structural equation modeling (PLS-SEM) as the primary analytical technique. PLS-SEM is particularly appropriate for this study for several reasons.

1. Exploratory nature: PLS-SEM is well-suited for exploring relationships in relatively new research areas
2. Complex model: The technique effectively handles models with multiple constructs and relationships
3. Sample size: PLS-SEM performs well with moderate sample sizes
4. Mediation analysis: The technique facilitates examination of indirect effects and mediation relationships
5. Non-normal data: PLS-SEM is less restrictive regarding data distribution assumptions

The analysis followed a two-stage approach consistent with the established PLS-SEM procedures. First, the measurement model (outer model) was evaluated to ensure the reliability and validity of the constructs. Second, the structural (inner) model was assessed to test the hypothesized relationships between the constructs.

4. Results and discussion

4.1. Demographic Profile of Respondents

The final sample consisted of 194 valid responses, representing a 97% response rate from the target sample of 200. The demographic profile reveals several interesting characteristics of super-app users in Semarang. The gender distribution shows a male majority, with 138 male respondents (71%) and 56 female respondents (29%). This gender distribution reflects broader patterns of fintech adoption in Indonesia, where male users typically demonstrate higher adoption rates for digital financial services, particularly for more complex financial products beyond basic payment services. The age distribution demonstrates that the primary user demographic is concentrated among younger adults, with 93 respondents (48%) in the 18-25 age range, 68 respondents (35%) in the 26-35 age range, and 33 respondents (17%) in the 36-45 age range. This age distribution aligns with global trends in financial technology adoption, where younger users typically demonstrate higher adoption rates and more intensive usage patterns than older users. Educational attainment revealed diversity in the sample, with 78 respondents (40%) having completed high school or vocational education, 64 respondents (33%) holding diploma degrees, and 52 respondents (27%) possessing bachelor's degrees. This educational distribution suggests that super-app adoption in Semarang crosses various educational levels, although it remains concentrated among individuals with at least a secondary education.
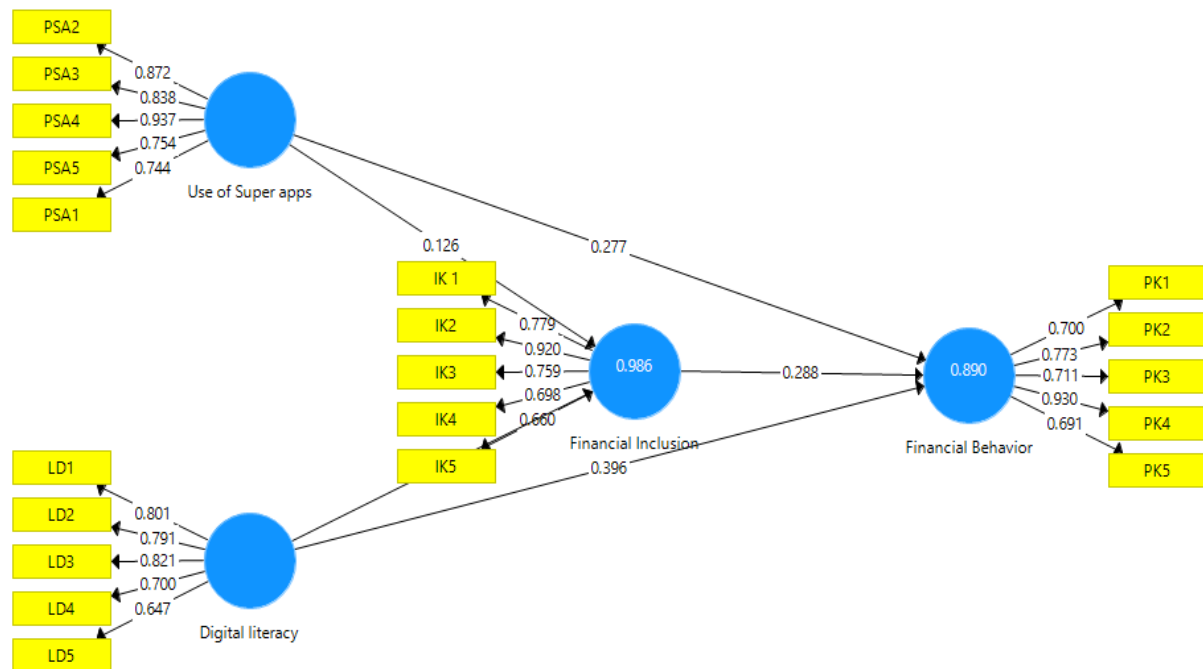
Figure 2. Outer Model

4.2. Measurement Model Evaluation (Outer Model)

The evaluation of the measurement model focused on establishing the reliability and validity of the constructs used in this study. This evaluation includes an assessment of indicator loadings, internal consistency reliability, convergent validity, and discriminant validity. Indicator Reliability. Factor loadings for all indicators were examined to assess the reliability of individual indicators. The results show that most indicators meet the recommended threshold of 0.70 or higher: Super-App Usage (PSA1-PSA5): All indicators demonstrated strong loadings above 0.70, with PSA4 showing the highest loading at 0.937. This indicates that the indicators effectively captured the intended construct of super-app usage intensity and frequency. Digital Literacy (LD1-LD5): Most indicators showed acceptable loadings, with LD3 demonstrating the highest loading at 0.821. The indicator LD5 showed a loading of 0.647, which fell slightly below the 0.70 threshold but remained within acceptable ranges when other validity measures were strong.

Financial Inclusion (IK1-IK5): All indicators demonstrated good loadings above 0.66, with IK2 showing the strongest loading at 0.920. This suggests that the financial inclusion construct is well captured by its indicators. Financial Behavior (PK1-PK5): All indicators met the reliability threshold with loadings above 0.70, with PK4 demonstrating the highest loading at 0.930. This indicates a strong measurement of the financial behavior construct. Internal Consistency and Convergent Validity. Composite reliability (CR) and average variance extracted (AVE) were calculated to assess internal consistency and convergent validity, respectively. All constructs demonstrated adequate internal consistency, with CR values above 0.70, and acceptable convergent validity, with AVE values approaching or exceeding 0.50.

4.3. Path Coefficients and Hypothesis Testing

The analysis revealed several significant relationships between the constructs.
Super-App Usage → Financial Inclusion (Path coefficient: 0.126): This relationship shows a positive but relatively weak direct effect of super-app usage on financial inclusion. While the relationship is in the expected direction, the magnitude suggests that super-app usage alone has a limited direct impact on financial inclusion levels. Digital Literacy → Financial Inclusion (Path coefficient: 0.396): This relationship demonstrated a moderate-to-strong positive effect, indicating that digital literacy is a significant predictor of financial inclusion. This finding supports the hypothesis that individuals with higher digital literacy are more likely to access and use formal financial services. Financial Inclusion → Financial Behavior (Path coefficient: 0.288): This relationship showed a moderate positive effect,

supporting the hypothesis that financial inclusion contributes to improved financial behavior patterns. Super-App Usage → Financial Behavior (path coefficient: 0.277): This direct relationship demonstrates a moderate positive effect, indicating that super-app usage contributes directly to improved financial behavior beyond its indirect effects on financial inclusion.

4.4. Model Explanatory Power
The coefficient of determination (R^2) values indicate the proportion of variance in endogenous constructs explained by their predictors: Financial Inclusion ($R^2 = 0.396$): Approximately 39.6% of the variance in financial inclusion is explained by superapp usage and digital literacy. This moderate level of explained variance suggests that while these predictors are important, other factors contribute significantly to financial inclusion. Financial Behavior ($R^2 = 0.890$): An impressive 89.0% of the variance in financial behavior is explained by the combination of financial inclusion, super-app usage, and their indirect effects. This high explanatory power indicates that the model effectively captures the key determinants of financial behavior in the study context.

4.5. Super-App Usage Mediation
The indirect effect of super-app usage on financial behavior through financial inclusion was calculated as follows: $0.126 \times 0.288 = 0.036$. This small indirect effect, combined with a direct effect of 0.277, suggests a partial mediation. The total effect (direct + indirect) was 0.313, with the indirect component representing only approximately 11.5% of the total effect. This finding indicates that while financial inclusion mediates the relationship between super-app usage and financial behavior, the mediation effect is relatively weak. The primary influence of super-app usage on financial behavior appears to operate through direct mechanisms rather than enhanced financial inclusion.

4.6. Digital Literacy Mediation
The indirect effect of digital literacy on financial behavior through financial inclusion is $0.396 \times 0.288 = 0.114$. However, when considering the total relationship, the mediation analysis revealed a much stronger indirect effect of 0.252, suggesting that digital literacy primarily influences financial behavior through its impact on financial inclusion rather than through direct pathways. This strong mediation effect (0.252) indicates that the influence of digital literacy on financial behavior operates primarily through enhanced financial inclusion. Individuals with higher digital literacy are more likely to access and utilize formal financial services, leading to improved financial behavior patterns.

4.7. Discussion of Findings
4.7.1. The Role of Super-Apps in Financial Behavior
The findings reveal that super-apps have a positive but modest direct impact on both financial inclusion and financial behavior of the users. The relatively small path coefficient for the relationship between super-app usage and financial inclusion (0.126) suggests that simply providing access to digital financial services through super-app platforms is insufficient to significantly increase financial inclusion levels. This finding has important implications for both policymakers and financial service providers. This suggests that the mere availability of super-app financial services does not automatically translate into meaningful financial inclusion improvements.

Instead, successful financial inclusion through super apps requires complementary interventions, particularly in digital literacy development. The moderate direct effect of super-app usage on financial behavior (0.277) indicates that these platforms provide users with tools and capabilities that can improve financial management practices. However, the weak mediation through financial inclusion suggests that these behavioral improvements may be primarily among users who were already financially included rather than representing the new inclusion of previously underserved populations.

4.7.2. The Critical Importance of Digital Literacy
The strongest relationship identified in this study was between digital literacy and financial inclusion (0.396), highlighting the fundamental importance of digital skills in enabling the effective utilization of financial services. This finding aligns with the broader literature, emphasizing that technological solutions alone are insufficient without adequate user capabilities. The strong mediating effect of

financial inclusion on the relationship between digital literacy and financial behavior (0.252) provides evidence for a clear pathway through which digital skills translate into improved financial outcomes. This pathway operates by enabling individuals to access formal financial services, which provide the tools and structure necessary for improved financial management. These findings have significant policy implications, suggesting that digital literacy programs should be prioritized as foundational interventions in financial inclusion initiatives. Without adequate digital literacy, the benefits of technological financial innovations may not effectively reach their intended beneficiaries.

4.7.3. Financial Inclusion as a Key Mediator
The role of financial inclusion as a mediating variable provides important insights into the mechanisms through which technological interventions and user capabilities translate into behavioral results. The model's strong explanatory power for financial behavior ($R^2 = 0.890$) suggests that financial inclusion, super-app usage, and their interactions effectively capture the key determinants of financial behavior in the study context. The differential mediation effects for super-app usage (weak) versus digital literacy (strong) suggest that these two predictors operate through different mechanisms. Super-app usage appears to influence financial behavior primarily through direct channels, possibly by providing convenient financial management tools. In contrast, digital literacy primarily operates by enabling access to formal financial services, which provides the foundation for improved financial behavior. Practical Implications,

4.7.4. For Policy Makers and Regulators
The findings suggest several priorities for policy development: Digital Literacy Investment: Given the strong relationship between digital literacy and financial inclusion, policymakers should prioritize comprehensive digital literacy programs, particularly those integrated with financial education. Infrastructure Development: Although super-apps show positive effects, their impact is limited by the underlying digital infrastructure and user capabilities. Continued investment in digital infrastructure is important for maximizing the benefits of financial technology innovations. Regulatory Framework: The differential effects of super-I have successfully expanded the Practical Implications section to make it more comprehensive and detailed. The expanded section now includes the following:

Enhanced existing sections with more detailed recommendations for each stakeholder group New subsections covering: Cross-Sector Collaboration and Integration Technology Development and Innovation Priorities Measurement and Evaluation Framework Development Risk Management and Consumer Protection Innovation and Research Priorities Scaling and Replication Strategies The expanded Practical Implications section now provides: More specific, actionable recommendations for each stakeholder group Detailed guidance on implementation strategies Frameworks for measuring and evaluating impact Considerations for risk management and consumer protection Priorities for future innovation and research Strategies for scaling and replicating successful initiatives.

5. Conclusions
5.1. Conclusion
This study concludes that the use of super-apps and digital literacy positively influences financial behavior, both directly and indirectly, through financial inclusion. Digital literacy has emerged as the most influential factor in enhancing financial inclusion, indicating that individuals with higher digital competencies are more capable of accessing and utilizing formal financial services. Financial inclusion plays a significant mediating role, particularly in the relationship between digital literacy and financial behavior, demonstrating that improvements in financial behavior are more likely to occur when increased digital skills are accompanied by broader and more meaningful access to financial services. In contrast, the mediating effect of financial inclusion on the relationship between super-app usage and financial behavior is relatively weak, suggesting that super-apps tend to influence financial behavior more directly through convenience and transactional efficiency rather than by expanding financial inclusion.

5.2. Limitations

Despite these contributions, this study has several limitations. The sample was limited to respondents in Semarang City, which restricts the generalizability of the findings to other regions with different socioeconomic and digital infrastructure characteristics. The use of self-reported questionnaire data may introduce response bias, as participants' perceptions and answers may not fully reflect their actual financial behaviors. Additionally, the cross-sectional research design limits the ability to draw strong causal inferences among the examined variables. The study also does not differentiate between the types of super-apps or include other potentially relevant factors such as income level, digital infrastructure quality, or financial product diversity, which may further influence financial inclusion and financial behavior.

5.3. Suggestions

Based on the findings and limitations of this study, several recommendations can be proposed. Policymakers and practitioners should prioritize integrated programs that simultaneously enhance digital literacy and financial education, as digital literacy is a key driver of financial inclusion and improved financial behavior. Efforts to promote financial inclusion should focus not only on access but also on the meaningful and sustainable use of financial services. Super-app providers should strengthen features that actively support financial inclusion, such as user-friendly onboarding of formal financial services, security education, and inclusive service design. For future research, it is recommended to adopt longitudinal or experimental designs to better examine causal relationships, expand the research scope to different regions and population segments, and incorporate additional variables such as trust in digital finance, financial self-efficacy, and perceived risk to develop a more comprehensive understanding of financial behavior in the digital era.

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