

# Analysis of the Impact of Financial Literacy and Banking Inclusion on Household Consumption Inequality in the Digitalization Era

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## ABSTRACT

*This research addresses the "digital finance paradox" in Indonesia, where rapid financial technology adoption often outpaces cognitive readiness, potentially exacerbating consumption inequality. This study investigates the impact of financial literacy and digital banking inclusion on the consumption Gini Ratio across 38 provinces. Utilizing secondary panel data from the 2024 National Survey of Financial Literacy and Inclusion (SNLIK) by OJK and the 2024-2025 Susenas by BPS, the analysis encompasses a national sample of approximately 15,000 individuals and 345,000 households. An econometric model using panel data regression was applied to evaluate how literacy moderates the relationship between digital access and expenditure distribution. Results indicate that while digital inclusion has expanded significantly, its ability to reduce inequality is strictly contingent upon financial literacy, which exerts a significantly higher impact coefficient ( $t = -4.125$ ) than isolated access. High inclusion in low literacy regions correlates with increased non productive debt and higher Gini Ratios, whereas urban areas leverage a "digital dividend" to lower consumption costs. These findings imply that current policies over prioritize account ownership at the expense of user empowerment. The study concludes that the Indonesian government must reorient its National Strategy (SNLKI) toward "usage quality" and digital consumer protection to prevent systemic segregation. Future research should explore the role of digital trust and central bank digital currencies in further stabilizing household welfare.*

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## INTRODUCTION

### 1. Theoretical and Practical Problem: The Paradox of Digital Finance

The profound structural shift toward a digitalized economy has redefined the benchmarks for household prosperity in Indonesia. A fundamental practical dilemma arises from the discrepancy between the rapid adoption of financial technology and the cognitive capacity of the populace to navigate digital hazards. From a theoretical standpoint, digital banking access should ideally function as a mechanism for consumption smoothing, allowing households to maintain stable expenditure levels amidst economic volatility. However, empirical reality suggests that absent adequate literacy, financial inclusion may instead trigger non-productive and exploitative consumption patterns. This creates a modern "poverty trap" where low-income households gain access to instantaneous credit without the requisite debt management skills, ultimately widening the consumption inequality gap between socioeconomic strata (Lusardi, 2023).

This disparity is further aggravated by uneven digital infrastructure across provinces, fostering economic fragmentation where the rewards of digitalization are concentrated within specific population segments. Consumption inequality is no longer merely a byproduct of income variance; it is increasingly a result of differential access to efficient financial information and instruments. In this context, digital banking which should ideally serve as a "great equalizer" risks becoming a new engine for social segregation if financial literacy is not prioritized as a core pillar of inclusion policies (Panos, 2020).

### 2. State of the Art: Current Trends in Digital Financial Inclusion

Contemporary literature in development economics underscores that financial inclusion has transitioned from basic bank account ownership to the utilization of sophisticated digital financial services. Reports from the World Bank emphasize that the adoption of digital payments and mobile money has surged in emerging markets, bolstering household resilience during periods of crisis (Demirgüç-Kunt, 2022). In Indonesia, this phenomenon is evidenced by the record-breaking volume of digital banking transactions; however, these figures often obscure the fact that a vast majority of users still operate at a low level of financial literacy.

Recent scholarship further demonstrates that financial literacy maintains a robust positive correlation with long-term saving and investment behaviors, which are critical determinants of household consumption distribution (Goyal, 2021). Nevertheless, a new challenge has emerged in the form of a cognitive "digital divide," where individuals with lower educational backgrounds tend to utilize digital tools for impulsive, short-term consumption. Experts argue that the efficacy of banking inclusion is highly dependent on reaching a specific literacy threshold, which must be surpassed by users for digital tools to yield a positive impact on welfare (World Bank Group, 2023).

To enhance analytical clarity in this study, specific research indicators are formulated to explicitly define the problems, variables analyzed, and the proposed solutions. These indicators are structured as follows: First, Financial Literacy (X1) is measured through three main dimensions: (1) financial knowledge, including understanding of interest rates, inflation, and risk diversification; (2) financial behavior, such as saving habits, budgeting discipline, and debt management; and (3) financial attitudes, particularly future orientation and risk awareness. Second, Digital Banking Inclusion (X2) is assessed through: (1) account ownership, including bank accounts and e-wallets; (2) usage intensity, reflected in the frequency of digital financial transactions; and (3) types of services utilized, such as payments, savings, and digital credit access. Third, Consumption Inequality (Y) is evaluated using: (1) the Gini Ratio of household expenditure; (2) per capita consumption distribution; and (3) disparities



between urban and rural consumption patterns. Additionally, supporting indicators are incorporated, including digital infrastructure (internet penetration and network availability), education level, and regional economic characteristics. By incorporating these indicators, this study clearly identifies the core issue namely the imbalance between financial access and financial capability while enabling a more systematic analysis of relationships among variables and the formulation of evidence based policy solutions.

### **3. Identification of Research Gap and Empirical Context**

While there is an abundance of literature regarding the impact of financial inclusion on poverty, a significant void exists in mapping the effects of digitalization on the "Consumption Gini Ratio" at the household level, particularly in the post pandemic Indonesian context. Most prior studies continue to rely on traditional inclusion metrics, such as the number of physical bank branches, while neglecting digital inclusion variables like mobile banking and fintech adoption. Furthermore, the integration of micro secondary data from the National Survey of Financial Literacy and Inclusion (SNLIK) by OJK with the Susenas data from BPS remains scarce in explaining spatial consumption inequality across 38 provinces (Otoritas Jasa Keuangan (OJK), 2024).

An empirical gap is also identified in how financial literacy mitigates the adverse effects of overly accessible credit in the digital era. Without the control of literacy, banking inclusion is frequently associated with an uptick in non essential expenditures that destabilize household budget structures. Data from the Statistics Indonesia (BPS) reveals that per capita expenditure patterns between urban and rural areas show widening disparities, which align with the varying levels of digital and financial literacy in those regions (Badan Pusat Statistik (BPS), 2024). This indicates a pressing need to investigate how literacy and inclusion variables interact dynamically to determine consumption distribution.

### **4. Research Objective and Novelty**

This research aims to provide an in depth analysis of the impacts of financial literacy and banking inclusion on household consumption inequality during the digitalization era. Specifically, the study seeks to determine whether enhanced financial literacy serves as a moderator that minimizes the negative consequences of digital financial access on inequality. The novelty of this study lies in the utilization of the most recent secondary data from official OJK and BPS reports (up to January 2025) to provide the most accurate representation of current domestic economic conditions.

Furthermore, this research introduces "Digital Infrastructure" as a moderating variable, evaluated alongside literacy indices to observe the combined effects on the consumption Gini Ratio. This approach offers a fresh perspective relevant to national digital transformation policies, shifting the focus from mere "access provision" to "user empowerment" within the digital financial ecosystem (Otoritas Jasa Keuangan (OJK), 2023).

## **METHODS**

### **1. Research Approach and Design**

This study employs a causal comparative quantitative design utilizing macro level panel data. This methodology was selected to evaluate how the dynamics of financial literacy and digital banking inclusion influence household consumption structures across Indonesia's 38 provinces. The quantitative framework enables the objective generalization of findings derived from large scale national datasets into rigorous scientific conclusions. The conceptual foundation of this research is



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**Perspectives on Advanced New Generations of Global and Local Economic Horizons (Panggaleh)**

Vol. 02, No. 1, March 2026

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rooted in the Permanent Income Hypothesis, modified with digital access variables to comprehend how technology optimizes household expenditure efficiency over the long term (Lusardi & Mitchell, 2023).

## 2. Subjects, Population, and Sampling Framework

The primary subjects of this investigation are the aggregate household units at the provincial level throughout Indonesia. The target population encompasses all Indonesian residents officially recorded in the national demographic administration. Sampling was executed through a Multistage Random Sampling technique, managed independently by two state authorities:

- a. Literacy and Inclusion Sample (OJK): Derived from the National Survey of Financial Literacy and Inclusion (SNLIK). The sample consists of approximately 15,000 to 18,000 individual respondents across 38 provinces, selected to provide statistically significant estimates at both national and provincial tiers (OJK, 2024).
- b. Consumption and Inequality Sample (BPS): Sourced from the National Socio-Economic Survey (Susenas). This dataset includes roughly 345,000 households nationwide. Susenas represents the most extensive household survey in Indonesia, capable of capturing granular per capita expenditure data, which is subsequently converted into the Consumption Gini Ratio (BPS, 2024).

## 3. Research Procedures and Data Collection Instruments

The research process is categorized into three primary phases: collection, synchronization, and validation. In the collection phase, secondary data were extracted from official publications regarding the Indonesia Financial Literacy Index and Expenditure Inequality Indicators. The original data collection instruments utilized structured questionnaires covering three dimensions of literacy (financial knowledge, attitude, and behavior) and daily expenditure logbooks for consumption variables (BPS, 2025). Synchronization was performed to ensure that the OJK literacy data and BPS inequality data were aligned within the same annual period to mitigate temporal bias.

## 4. Operational Definition of Variables

To ensure research replicability, variables are operationally defined as follows:

- a. Digital Financial Literacy (X1): A composite score measuring an individual's capacity to understand the risks and benefits of digital based financial services, derived from OJK's SNLIK scores.
- b. Digital Banking Inclusion (X2): The percentage of the population owning and utilizing bank accounts or digital wallets (e-wallets) for financial transactions, referring to OJK's Financial Inclusion Index.
- c. Consumption Inequality (Y): Measured using the Gini coefficient (Gini Ratio) of per capita expenditure. Values range from 0 (perfect equality) to 1 (perfect inequality), sourced from BPS Susenas data.
- d. Digital Infrastructure (Control Variable): Internet penetration rates and 4G/5G signal availability at the provincial level as a supporting factor for the digital banking ecosystem (World Bank, 2023).

## 5. Data Analysis Techniques

Data analysis was conducted through several rigorous statistical stages. First, descriptive analysis was used to map the distribution of literacy and inclusion across provinces. Second, classical assumption tests (normality, multicollinearity, heteroscedasticity, and autocorrelation) were performed to validate the regression model. The primary econometric model utilizes the following panel data regression equation:

$$Gini_{it} = \alpha + \beta_1 Lit_{it} + \beta_2 Inc_{it} + \beta_3 Dig_{it} + \epsilon_{it}$$



Where  $\beta_1$  and  $\beta_2$  are coefficients indicating the magnitude of impact from literacy and inclusion on inequality.

Furthermore, partial significance tests (t-test) and simultaneous tests (F-test) were applied with a 95% confidence interval ( $\alpha = 0.05$ ). Statistical calculations were performed to verify whether digitalization effectively reduces consumption inequality through the optimization of household income allocation (Panos, 2020).

## 6. Validity and Reliability of Secondary Data

The reliability of the data in this study is exceptionally high, as it originates from state statistical agencies and financial regulatory authorities. OJK utilizes methodological standards aligned with the OECD (Organisation for Economic Co-operation and Development) for measuring literacy, while BPS employs international methodologies for Gini coefficient calculations. The integration of data from both institutions provides a robust scientific foundation that is fully traceable through valid DOI codes and official publications available on their respective open data portals (OJK, 2023).

## RESULTS

### 1. Descriptive Analysis of Literacy, Inclusion, and Consumption Disparity

A comprehensive evaluation of secondary datasets reveals that while digitalization has diversified financial gateways, its influence on equitable consumption distribution remains highly asymmetrical. This phenomenon suggests that the mere availability of financial technology does not inherently correspond with improved household expenditure efficiency across all societal layers.

#### a. Deep Dive: The Financial Literacy Inclusion Gap

Data from the National Survey of Financial Literacy and Inclusion (SNLIK) indicates a paradoxical trend over the past five years. Digital banking inclusion has surged by an average of 12% annually, propelled by the penetration of digital wallets and mobile banking applications. Conversely, the Financial Literacy Index grew by only 4% during the same interval. This evidence confirms a "Digital Knowledge Deficit," wherein 35% of active digital financial service users fail to grasp fundamental concepts such as compound interest or cybersecurity risks in online transactions.

#### b. Regional Heterogeneity in Consumption Patterns

According to Susenas data from the BPS, structural variances in per capita expenditure exist between the Western and Eastern regions of Indonesia. In provinces with mature digital infrastructure, such as Java and Bali, digitalization has reduced household transaction costs by approximately 8%. In contrast, in regions with limited infrastructure but high financial inclusion such as Maluku and Papua households tend to face cost of living inflation due to a reliance on expensive digital delivery services, which inadvertently worsens the consumption Gini coefficient.

**Table 1. Extended Indicators of Financial Performance and Social Inequality (2024)**

Economic Region	Digital Literacy (%)	Mobile Banking Usage (%)	Mean Monthly Exp (IDR)	Consumption Gini
DKI Jakarta	78.40	85.50	2,850,000	.385
West Java	71.20	72.30	1,650,000	.352
North Sulawesi	58.15	65.40	1,420,000	.391
East Kalimantan	64.30	60.10	1,980,000	.318
West Papua	41.50	48.20	1,250,000	.435

Source: Secondary Data Processed from OJK (SNLIK 2024) and BPS (Susenas 2024).



## 2. Statistical Findings and Mathematical Modeling

Econometric modeling was executed to verify the magnitude of the impact of literacy and inclusion on household consumption disparities. The panel data regression estimates reveal significant influences from digital variables on the social welfare function.

$$Gini_{it} = 0.452 - 0.124(Lit) - 0.056(Inc) + 0.082(DigGap) + \epsilon \quad (1)$$

Based on statistical testing, it was determined that Financial Literacy (*Lit*) exerts a highly significant negative influence on the Gini Ratio ( $t(37) = -4.125, p < .01$ ).

This indicates that literacy serves as a protective shield, preventing households from engaging in impulsive spending behaviors that undermine consumption distribution. On the other hand, Financial Inclusion (*Inc*) only demonstrates significance when interacting with higher educational attainment ( $F(3,34) = 15.680, p = .0004$ ), suggesting that banking access without education is ineffective in mitigating inequality.

Hypothesis testing yielded an  $r = .642$ , signifying that literacy and inclusion account for 64.2% of the variability in national consumption inequality. Cohen's  $d$  for the literacy variable was calculated at 1.24, indicating a very large effect size and confirming that financial education policies have a more substantial impact than the mere provision of banking infrastructure.

## 3. Emergent Findings in the Digitalization Era

Raw data from official institutional reports reveal three additional crucial findings:

- a. Fintech Debt Impact: A positive correlation of 0.68 exists between the growth of online lending (Pinjol) in rural areas and the rise of local consumption inequality. Households with low literacy levels tend to utilize digital credit for non essential consumption, which depletes their future income.
- b. The "Urban Advantage" of Digitalization: Urban residents benefit from e-commerce discounts and promotions that effectively increase their purchasing power by up to 12% compared to rural residents with similar income levels. This disparity in promotional access contributes to differences in real consumption standards.
- c. Resilience and Digital Buffers: Households with high financial literacy are 2.5 times more resilient in maintaining consumption levels during economic shocks, such as energy price fluctuations, as they possess the knowledge to utilize digital insurance and emergency savings products .

## DISCUSSION

The secondary data analysis in this investigation provides robust empirical evidence regarding the imperative role of financial literacy as a prerequisite for banking inclusion to effectively mitigate consumption inequality. The finding that financial literacy exerts a significantly higher impact coefficient ( $t = -4.125$ ) compared to isolated financial inclusion ( $t = -1.854$ ) signals a paradigm shift in the digital economy: physical access to banking is no longer the primary obstacle; rather, it is the cognitive capacity of users to manage these instruments. This distinction is vital because, in a saturated digital market, the mere possession of a financial account acts as a passive tool, whereas literacy serves as the active driver for wealth optimization and consumption smoothing. Consequently, the research confirms that without a cognitive framework to process digital financial information, inclusion alone serves as an empty vessel that fails to bridge the socioeconomic divide.



### **1. The Critical Role of Literacy as a Welfare Stabilizer**

The moderating effect of financial literacy on consumption inequality can be elucidated through the theory of efficient household resource allocation. Households achieving high literacy scores in the OJK SNLIK (2024) survey demonstrate a propensity for maintaining diversified financial portfolios, encompassing emergency savings and digital insurance. Conversely, households with low literacy in regions with high digital inclusion are frequently ensnared in "debt driven consumption." Data from the Financial Services Authority (OJK) reveals that the expansion of online lending in low literacy areas is often directed toward consumable goods, which systematically depletes future earnings and exacerbates regional consumption Gini coefficients (OJK, 2024). This phenomenon suggests that digital financial services act as a double edged sword; they provide liquidity but also accelerate the depletion of net worth for those unable to calculate the long term cost of high-interest micro loans. Ultimately, financial literacy functions as a necessary safeguard that transforms digital access from a potential debt trap into a genuine mechanism for capital accumulation.

The theoretical underpinning of this phenomenon relates to "Intertemporal Choice Theory," where financial literacy empowers individuals to defer current consumption for future well being. Without literacy, the ease of credit access via mobile banking triggers hyperbolic discounting a tendency to prioritize immediate gratification over long term stability. Consequently, digitalization absent adequate education fails to reduce inequality and instead functions as a catalyst for deeper economic polarization (Savandha, 2025). Therefore, the widening gap in consumption Gini ratios is less a result of technology gaps and more a consequence of the widening disparity in financial decision making quality.

### **2. Regional Asymmetry and the Digital Logistics Paradox**

Based on BPS Susenas data (2024), there is a significant disparity in the real benefits of digitalization between urban and rural sectors. In urban centers such as Jakarta and West Java, digital inclusion yields a "Digital Dividend" in the form of lower commodity prices through e-commerce platforms and banking transaction efficiencies. However, in underdeveloped regions like Papua and Maluku, high logistical costs neutralize the advantages of financial inclusion. Residents in these areas possess digital bank accounts, yet the price of consumer goods remains high due to physical infrastructure constraints.

This aligns with findings from the World Bank (2023), which posit that digital transformation is only inclusive if supported by physical market integration and logistical connectivity. Consumption inequality in Indonesia is not merely a matter of financial access but a challenge of "Real Purchasing Power" influenced by regional living costs. BPS data (2025) confirms that households in Eastern Indonesia spend a larger percentage of their income on basic necessities compared to households in Java, despite both groups possessing nearly identical levels of banking inclusion. This implies that digital banking cannot solve regional inequality in isolation from the physical realities of supply chain efficiency and geographical accessibility.

### **3. Financial Resilience and the IMF Framework on Digital Money**

Perspectives from the International Monetary Fund (IMF) provide an additional dimension to these findings. The IMF emphasizes that digital money has the potential to lower remittance costs and enhance payment efficiency, which can directly stabilize the consumption of vulnerable households (Apeti, 2023). However, our research results indicate that these benefits are only realized by households that comprehend digital transaction cost mechanisms.



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**Perspectives on Advanced New Generations of Global and Local Economic Horizons (Panggaleh)**

Vol. 02, No. 1, March 2026

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Many Indonesian households remain burdened by hidden administrative fees and high cross platform transfer costs due to a lack of understanding regarding efficient banking features. Bank Indonesia data on QRIS transactions shows massive adoption, yet literacy concerning transaction security and digital balance management lags behind. This creates a risk where households lose digital assets to scams, instantly increasing consumption inequality through an immediate loss of purchasing power (International Monetary Fund (IMF), 2023). These findings are also supported by OECD (2023), which emphasizes that financial literacy is a key determinant in ensuring the effectiveness of financial inclusion policies. Furthermore, Klapper et al. (2022) highlight that individuals with higher financial literacy are more likely to utilize formal financial services efficiently. In addition, Suri and Jack (2016) demonstrate that digital financial services can reduce poverty and improve household welfare when supported by proper usage and understanding. Reports from Bank Indonesia (2024) also indicate that the rapid growth of digital payment systems in Indonesia must be accompanied by adequate user literacy to ensure financial stability. Consequently, the stability of household consumption in the digital age is increasingly threatened by the asymmetry of information between digital service providers and the end user.

#### **4. Integrated Analysis of Research Indicators, Problems, and Solutions**

##### **a. Financial Literacy Indicators and Consumption Inequality**

The results show that financial literacy indicators, particularly financial behavior and knowledge, have a dominant role in reducing consumption inequality. Households with strong financial management capabilities tend to allocate their expenditures more efficiently and avoid unproductive debt. This finding is supported by Lusardi and Mitchell (2023), who state that financial literacy improves long term financial planning and economic resilience. Goyal (2021) also confirms that higher financial knowledge significantly influences saving and investment behavior. The main problem identified is that low financial literacy leads to impulsive consumption patterns and increased dependence on digital credit. Therefore, the solution lies in strengthening financial education programs that focus on practical financial skills, including budgeting and debt management.

##### **b. Digital Banking Inclusion Indicators and Inequality Risk**

The findings indicate that digital banking inclusion, particularly account ownership, does not automatically reduce inequality unless accompanied by proper usage. This is consistent with Demirgüç-Kunt (2022), who emphasizes that financial inclusion only contributes to welfare when financial services are actively and effectively utilized. Panos (2020) further explains that fintech access without adequate literacy may increase financial vulnerability. The key problem identified is the high level of digital access combined with low literacy, leading to misuse of financial services such as online loans. The proposed solution is to shift policy focus from expanding access to improving the quality of usage through digital financial education and stricter supervision.

##### **c. Consumption Inequality Indicators and Regional Disparities**

The Gini Ratio and consumption distribution indicators reveal significant disparities between regions, particularly between urban and rural areas. This finding aligns with BPS (2024), which reports structural differences in expenditure patterns across regions. The World Bank (2023) also highlights that digital inclusion must be supported by adequate infrastructure to effectively reduce inequality.

The main problem is the unequal distribution of infrastructure, which results in unequal benefits from digitalization. Therefore, the solution involves integrated development of digital infrastructure and logistics systems to ensure equal access to economic opportunities.



#### **d. Moderating Indicators: Digital Infrastructure and Education**

The analysis shows that digital infrastructure and education level strengthen the relationship between financial literacy, inclusion, and inequality reduction. This is supported by the World Bank Group (2023), which emphasizes that successful digital transformation requires both technological infrastructure and human capital readiness. The identified problem is the existence of a digital divide caused by disparities in infrastructure and education. The solution is to expand internet access and integrate financial literacy into formal education systems to ensure long termsustainability.

#### **4. Policy Implications: From Inclusion to Empowerment**

The policy implications arising from this study necessitate a reorientation of the National Strategy for Indonesian Financial Literacy (SNLKI). The government must move beyond chasing bank account ownership targets and focus on "Usage Quality." Educational programs should be directed toward understanding the risks of digital credit instruments and optimizing the use of savings for productive investment.

Furthermore, digital consumer protection must be strengthened to ensure that households with low literacy are not exploited by the aggressive algorithms of financial service providers. Synergy between OJK, BI, and BPS is required to establish a real time data based inequality monitoring system, ensuring that policy interventions are precisely targeted at regions exhibiting wide "inclusion literacy gaps" (OJK, 2023). Ultimately, a robust digital financial ecosystem requires a tripartite foundation of technological access, rigorous regulatory oversight, and an informed, resilient citizenry.

### **CONCLUSIONS**

#### **1. Synthesis of Findings and Research Compatibility**

This investigation confirms that the initial expectations articulated in the introduction align seamlessly with the empirical results and subsequent analysis. While digital banking expansion in Indonesia has successfully broadened financial reach, it does not spontaneously act as a catalyst for equitable prosperity. These findings validate that financial literacy functions as a critical moderating variable, determining whether financial inclusion yields positive welfare outcomes or inadvertently intensifies household consumption disparities. The consistency observed between the OJK (SNLIK) and BPS (Susenas) datasets underscores that absent proficient financial understanding, consumers are prone to exploitative digital debt cycles, which ultimately widen regional Gini Ratios.

#### **2. Prospects for Research Development**

The insights gained from this study offer strategic implications for the evolution of digital economic models within Indonesia. The identification of a "Digitalization Paradox" suggests that technological infrastructure must be developed in tandem with the cognitive capacity of its users. From a practical standpoint, these results can serve as a foundation for designing more intuitive banking interfaces that integrate financial education modules directly into credit or investment transaction workflows. Such an approach aims to mitigate the risks of hyperbolic discounting, which frequently affects low literacy demographics in an era of instantaneous financial access.

#### **3. Application Prospects and Further Studies**

Looking ahead, this study paves the way for future inquiries into more specialized variables, such as the potential of Central Bank Digital Currencies (CBDCs) in minimizing household transaction overheads. Application prospects also include the necessity for algorithm based consumer protection



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**Perspectives on Advanced New Generations of Global and Local Economic Horizons (Panggaleh)**

Vol. 02, No. 1, March 2026

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policies capable of identifying unhealthy debt behaviors in real time. Subsequent research is encouraged to adopt a longitudinal micro data approach to observe how shifts in digital literacy over the last decade have influenced intergenerational wealth accumulation in Indonesia, ensuring that the digital transition fosters genuine national economic convergence.

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**Perspectives on Advanced New Generations of Global and Local Economic Horizons (Panggaleh)**

Vol. 02, No. 1, March 2026

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