EcoProfit
EcoProfit: Sustainable and Environment Business
EcoProfit 4(1): 45–62
ISSN 3024-9872

Institute for Advanced Science, Social and Sustainable Future
MORALITY BEFORE KNOWLEDGE

Digitalization of gold pawn services as an inclusive financial innovation strategy

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Received Date: February 12, 2026 Revised Date: April 23, 2026 Accepted Date: July 27, 2026

ABSTRACT

Background: The rapid development of digital finance has fundamentally transformed the delivery of financial services and opened new opportunities for expanding financial inclusion while contributing to sustainable business transformation. In Indonesia, gold pawn (*rahn*) services play a strategic role as a microfinance instrument for unbanked and underbanked communities. However, existing studies on gold pawn services largely focus on operational efficiency and regulatory compliance, with limited attention to digitalization as an inclusive financial innovation strategy. **Methods:** This study employs a qualitative descriptive approach using a literature review method. Data were collected from national and international academic journals, regulatory documents issued by the Financial Services Authority (Otoritas Jasa Keuangan, OJK) and Bank Indonesia, and institutional publications related to digital finance, gold pawn services, microfinance, and financial inclusion. The analysis was conducted through thematic identification, conceptual categorization, and critical narrative analysis. **Findings:** The findings indicate that the digitalization of gold pawn services represents an institutional transformation rather than a mere technological upgrade. Digital platforms have enhanced access to microfinance by reducing geographical and administrative barriers, improving transaction efficiency, increasing transparency, and expanding service reach to micro-enterprises and younger digital-oriented users, while simultaneously reducing the environmental footprint associated with paper-based and branch-dependent pawn transactions. Nevertheless, several challenges persist, including digital literacy gaps, data security risks, public trust issues, regulatory readiness, and the risk of digital exclusion. **Conclusion:** Digitalization of gold pawn services has significant potential as an inclusive financial innovation strategy, provided that it is embedded within a comprehensive institutional framework that prioritizes accessibility, consumer protection, environmental efficiency, and governance. **Novelty/Originality of this article:** This study contributes to the literature by positioning digitalization of gold pawn services as a strategic instrument for sustainable financial inclusion, offering an institutional and inclusive perspective aligned with green microfinance transformation that goes beyond efficiency-oriented approaches.

KEYWORDS: digital financial services; financial inclusion; gold pawn services.

1. Introduction

The development of digital finance over the past two decades has brought fundamental changes to the way financial services are designed, delivered, and accessed by the public. Digital transformation in the financial sector enables the creation of services that are more efficient, faster, and flexible compared to conventional financial systems, while also altering intermediation patterns, market structures, and consumer behavior (Sugianto et al., 2025). Digitalization not only impacts the internal efficiency of financial institutions but also drives the emergence of financial service innovations aimed at expanding access to financing for

Cite This Article:
Amima, A. F., Raikhana, A. W., & Nasution, R. R. (2026). Digitalization of gold pawn services as an inclusive financial innovation strategy. *EcoProfit: Sustainable and Environment Business, 4*(1), 45-62. https://doi.org/10.61511/ecoprofit.v4i1.2026.3528

low-income communities and micro-entrepreneurs who were previously underserved by the formal financial system. Digital service innovations through fintech, mobile banking, and electronic payment systems also facilitate access to financing and investment services for remote populations (Afsari & Hasbi, 2025). Aziz et al., (2025) stated that financial technology–based services have been proven to make a positive contribution to financial inclusion among micro and small entrepreneurs. An empirical study by Sun & Zhang (2024) indicated that digital inclusive finance can lower service access barriers, reduce transaction costs, and expand the reach of financial services to previously underserved segments.

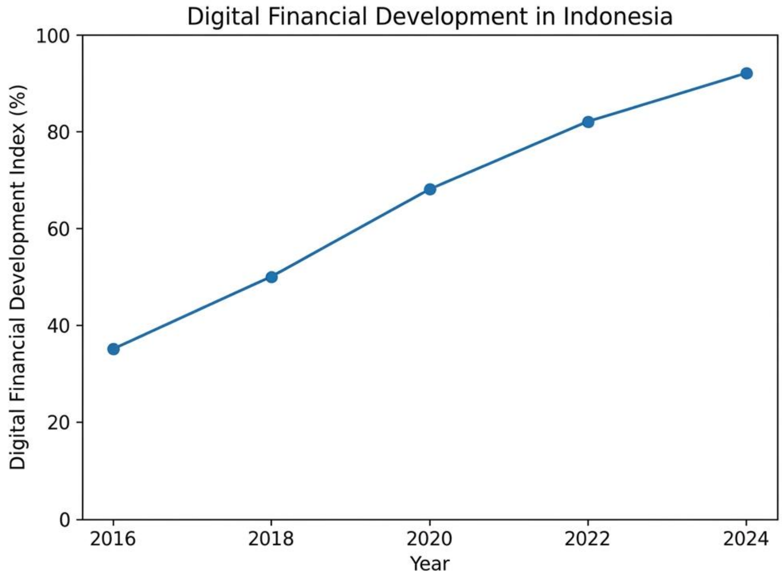

Fig. 1. Digital finance development in Indonesia (Literature Synthesis)
(Author's synthesis from OJK (2019–2024), World Bank (2020–2023), and selected digital finance journals)

Figure 1 illustrates the development of digital finance in Indonesia, compiled from a synthesis of findings across the literature on the digitalization of financial services. The graph depicts a significant increase in the adoption of digital financial services in recent years, alongside rising internet penetration, smartphone usage, and financial technology innovations. This development reflects changes in consumer behavior in accessing financial services, shifting from conventional models to faster, more flexible, and efficient digital-based services. Such trends provide a critical foundation for the emergence of innovations in digital financial services, including the digitalization of gold pawn services as a strategy to expand financial inclusion.

This digital transformation is also evident in Sharia-compliant gold pawn services, where digitalization facilitates access and transaction efficiency while also serving as a form of digital financial service innovation that can reduce barriers to accessing microfinance for the public. These gold pawn services also present challenges in applying the principles of *fiqh muamalah* in digital transactions (Frizi et al., 2024). A study by (Khairi, 2025) indicated that digitalization in gold pawn services can be effective if it meets the requirements of contract validity (*akad*) and information transparency, although Sharia supervision remains necessary.

Despite the rapid development of financial technology, financial inclusion in many developing countries, including Indonesia, still faces various structural challenges. The main challenges to financial inclusion in Indonesia include limited physical access to formal financial institutions, low financial literacy and understanding among the population, as well as geographical barriers due to the country's vast and archipelagic nature, such as the limited number of banks near residential areas and the long distances from formal financial institution branches, ultimately resulting in low access to financial services (Juniyar et al., 2023; Saputra et al., 2025).

Inclusive finance is generally defined as a condition in which all segments of society have access to and the ability to use formal financial products and services that are affordable, secure, and sustainable. The main objectives of financial inclusion are to enhance economic welfare, reduce poverty, and narrow social and economic inequalities (Handayani & Soeparan, 2025). A literature study by (Rolando, 2024) emphasizes that financial technology (fintech) plays a crucial role as a driver in expanding financial inclusion, particularly for unbanked and underbanked groups who are not reached by conventional banking services.

Microfinance plays a strategic role within the framework of financial inclusion, as it serves as a primary instrument in supporting the economic activities of low-income communities and micro-entrepreneurs. One form of microfinance that has long been recognized and widely used is gold pawning. This mechanism is particularly relevant for unbanked and underbanked groups who lack adequate access to formal banking. Gold pawning is defined as a short-term loan mechanism secured by gold, offering advantages such as a fast process, relatively low risk, and collateral with liquid and stable value (Syahputra et al., 2025). (Sapitri & Nuraswin, 2024) stated that pawn financing products (*rahn*) also play a significant role in the provision of microeconomic financing, where fluctuations in gold prices influence the level of service distribution and reinforce its role as an effective financing alternative for both short-term consumptive and productive needs.

In the Indonesian context, the concept of *rahn* (gold pawning) has developed from a normative Islamic financial contract into a structured financial instrument implemented within Islamic financial institutions. *Rahn* is defined as a secured transaction in which valuable assets are pledged as collateral to guarantee debt repayment, ensuring transaction security and protecting the rights of both parties (Dwi et al., 2025) In its contemporary application, *rahn* has been widely implemented in institutions such as sharia pawnshops and Islamic financial institutions, where it is applied through a combination of contracts and regulated mechanisms. The implementation of *rahn* in these institutions demonstrates its role as a formal financial instrument that supports access to financing while maintaining compliance with Islamic principles (Agustin et al., 2025).

This development reflects a transition of *rahn* from a conceptual and traditionally practiced contract into an institutionalized financial service within the formal financial system. In line with the advancement of financial technology, financial institutions including pawn services have increasingly incorporated digital systems to improve efficiency, accessibility, and service delivery (Amos & Mali, 2025) This indicates a shift from fully physical transactions toward hybrid and digital-based financial services, where digital platforms play a crucial role in expanding financial access and enhancing customer experience (Sun & Zhang, 2024).

Building upon this role, Socially, gold pawning holds strong relevance as it serves as a liquidity buffer for households and micro-enterprises, particularly in situations of economic uncertainty. For unbanked and underbanked groups, gold pawning often becomes a primary alternative to access formal financing without relying on high-cost informal financial institutions (Faiqoh & Mugiyati, 2025). Thus, gold pawning not only serves as an economic instrument but also holds an important social dimension in maintaining the economic resilience of vulnerable communities. Its strategic position makes gold pawning a potential instrument to support financial inclusion agendas, particularly in developing countries with varying levels of financial literacy (Syam et al., 2025).

Along with technological advancements, gold pawn services have also undergone a transformation through digitalization. However, digitalization in the context of financial services cannot be understood merely as a technical modernization, such as the use of digital applications or technology-based information systems (Khairi, 2025). Superficial and technically-oriented digitalization has the potential to improve only internal efficiency without significantly expanding service access. Therefore, digitalization should be understood as a comprehensive financial innovation strategy, encompassing changes in business models, service processes, and interaction patterns between financial institutions and clients. In this context, digitalization functions as an enabler of institutional transformation, rather than merely a technological tool (Amos & Mali, 2025).

The concept of financial innovation emphasizes that technology adoption must be accompanied by changes in institutional and organizational strategies to create sustainable added value. For instance, digital inclusive finance not only utilizes digital technology to deliver financial services but also aims to reduce financial exclusion through product design, distribution mechanisms, and more inclusive institutional policies. Empirical evidence indicates that digital inclusive finance significantly drives innovation by lowering financing barriers, improving operational efficiency, and expanding the reach of financial services to previously underserved segments (Zhang et al., 2023). Khairi & Julina (2025) stated that the digitalization of gold pawn services holds great potential to expand service access, enhance transparency, and improve customer experience. Research by Safitri & Wati, (2023) indicated that the digitalization of gold pawn processes at Sharia Pawnshops accelerates transactions, improves collateral assessment efficiency, and reaches communities in areas not served by physical offices.

The implementation of digital platforms has also been shown to enhance information transparency and customer service quality through integrated systems. However, the inclusive impact of digitalization will only be realized if digital transformation is designed as part of an institutional innovation strategy oriented toward financial inclusion, rather than merely technological modernization (Nurhayati, 2025). Although the role of gold pawning and the digitalization of financial services has been widely discussed in the literature, academic studies on gold pawning are still predominantly focused on operational aspects, risk management, and regulatory compliance. Most studies treat digitalization merely as a tool to enhance efficiency, without examining its implications for expanding financial inclusion. In contrast, the literature on fintech and microfinance indicates that digitalization in microfinance institutions has the potential to improve institutional efficiency, enhance customer experience, and expand financial service access for vulnerable groups. The limited studies positioning gold pawn digitalization as an inclusive financial strategy highlight a significant research gap.

Based on the discussion above, this study aims to analyze the digitalization of gold pawn services as an inclusive financial innovation strategy in Indonesia. The study is expected to contribute academically to the development of literature on digital finance and microfinance by providing an institutional and inclusive perspective on gold pawn digitalization. Furthermore, it is also expected to offer practical contributions for policymakers and financial institutions in designing digital strategies that are not only oriented toward technological efficiency but also toward expanding financial inclusion and enhancing sustainable community welfare.

2. Methods

2.1 Research design and literature selection

This study employs a descriptive qualitative approach with a literature review method to analyze the digitalization of gold pawn services as an inclusive financial innovation strategy in Indonesia. A qualitative approach was chosen because this research aims to gain an in-depth understanding of the phenomenon of gold pawn digitalization, explore relevant theoretical concepts, and identify patterns and meanings from various available literature sources (Creswell, 2018).

To ensure the rigor and systematic nature of the literature synthesis process illustrated in Figure 1, this study establishes explicit inclusion and exclusion criteria to guide the selection of all sources used. These criteria serve as the methodological foundation for deriving an institutional perspective from the available data and for ensuring that only high-quality, relevant literature informs the analytical framework of this study.

Inclusion Criteria. Literature was included in this study if it met the following criteria: (1) Thematic relevance—sources must directly address at least one of the core themes of this study, namely digital finance, gold pawn services (*rahn*), microfinance, financial inclusion, financial technology (fintech) innovation, or institutional transformation in financial services; (2) Publication period—in order to reflect the most current state of knowledge, priority was given to literature published between 2019 and 2025, with a small number of foundational works published prior to this period considered only where their theoretical or conceptual contribution was deemed essential; (3) Source credibility—academic sources were required to be published in peer-reviewed national or international journals indexed in recognized databases such as Sinta, Scopus, or Google Scholar; regulatory and policy documents were accepted exclusively from official government bodies including Financial Services Authority/*Otoritas Jasa Keuangan* (OJK) and Bank Indonesia; and institutional publications were accepted from formally recognized pawn and financial service institutions; (4) Language accessibility—sources were included if written in Indonesian or English, as these are the primary languages used in the relevant academic and policy literature; and (5) Methodological transparency—empirical studies were required to clearly describe their research design, data sources, and analytical procedures to allow for critical evaluation of their findings within this review (Snyder, 2019).

Exclusion Criteria. Conversely, sources were excluded from this study if they met any of the following conditions: (1) Thematic irrelevance—literature that did not directly relate to the intersection of digitalization, gold pawn services, microfinance, or financial inclusion was excluded, including studies whose primary focus was on unrelated financial instruments or sectors; (2) Lack of scientific rigor—sources published in non-indexed journals, blogs, opinion pieces, or popular media without editorial review were excluded due to insufficient methodological accountability; (3) Outdated content—literature published before 2015 was generally excluded unless it provided indispensable theoretical grounding, as earlier publications were deemed unlikely to capture the contemporary dynamics of digital financial transformation; (4) Inaccessibility—sources that could not be accessed in full text through academic repositories, institutional portals, or open-access databases were excluded to ensure adequate quality verification; and (5) Duplication—where multiple publications reported on the same dataset or study, only the most comprehensive or most recently updated version was retained to avoid redundancy in the synthesis process.

The application of these criteria resulted in a curated body of literature that forms the empirical and theoretical basis for the Literature Synthesis depicted in Figure 1. By making the selection process explicit and systematic, this sub-section clarifies how the institutional perspective central to this study's analytical framework was derived: sources were not selected arbitrarily, but were filtered to ensure that only literature directly addressing the institutional dimensions of gold pawn digitalization, including governance, regulatory frameworks, service model transformation, and inclusive access, informed the final synthesis. This approach strengthens the validity and reproducibility of the qualitative analysis carried out in subsequent sections of the study.

2.2 Data collection and data analysis

Data collection was conducted through documentation, by identifying, gathering, and reviewing documents and literature relevant to the research topic. The documentation process was carried out systematically through searches of scientific journal databases, official government regulation portals, and institutional publications accessible either publicly or through academic repositories. Literature selection was based on criteria such as thematic relevance, methodological quality, and conceptual contribution to the discussion on gold pawn digitalization and financial inclusion.

The data analysis in this study was conducted through three main stages. The first stage was theme identification, in which all collected literature was reviewed to identify the main themes related to gold pawn service digitalization, financial innovation, and financial inclusion. The second stage was concept categorization, involving the systematic grouping of findings from various literature into conceptual categories, such as digitalization strategies, contributions to financial inclusion, implementation challenges, and future directions of innovation. The third stage was narrative-critical analysis, where the researcher interpreted the categorized data by integrating various theoretical and empirical perspectives, identifying literature gaps, and formulating analytical arguments regarding the position of gold pawn digitalization as an inclusive financial innovation strategy (Pahleviannur, 2022). Narrative-critical analysis enabled the researcher not only to describe the phenomenon but also to critically evaluate the theoretical and practical implications of digitalizing gold pawn services in the context of financial inclusion in Indonesia.

3. Results and Discussion

3.1 Digitalization of gold pawn services as an innovation strategy

The research findings indicate that gold pawn services have undergone a significant transformation from conventional face-to-face service models toward integrated digital services. The digitalization of gold pawn services constitutes an essential part of the innovation strategy adopted by financial service institutions such as pawnshops, in which fully offline traditional service models have evolved into hybrid services and subsequently into integrated digital services. Under the conventional service model, customers were required to visit physical outlets to conduct all gold pawn transactions and related services; however, digital applications now enable transactions to be carried out directly via smartphones without the need to visit physical offices (Sari et al., 2025).

At the initial stage, gold pawn services were conducted entirely offline, in which all processes ranging from application submission and gold appraisal to fund disbursement required customers to visit Pegadaian outlets in person (Frizi et al., 2024). As information technology developed, the service model gradually shifted toward a hybrid approach, integrating face-to-face services with digital services delivered through mobile applications, thereby providing customers with greater flexibility to choose service channels according to their needs (Putri et al., 2025). As information technology developed, the service model gradually shifted toward a hybrid approach, integrating face-to-face services with digital services delivered through mobile applications, thereby providing customers with greater flexibility to choose service channels according to their needs (Khairi, 2025). This transformation of service models indicates that digitalization not only alters service delivery channels but also reconstructs operational systems and the interactions between pawn institutions and their customers (Nasution, 2025).

Table 1. Transformation of gold pawn services through digitalization

Aspect	Conventional model	Hybrid model	Digital model
Service Access	Physical branch visits required	Combination of branch and digital channels	Fully accessible through mobile applications
Transaction Process	Manual and paper-based	Partial digital processing	Integrated digital transactions
Time Efficiency	Relatively slower	Moderate efficiency	Faster and real-time processing
Geographical Reach	Limited to branch locations	Expanded service coverage	Accessible regardless of location
Information Transparency	Limited information availability	Improved information access	Real-time access to gold prices, transaction history, and collateral status
Customer Interaction	Face-to-face only	Physical and digital interaction	Primarily digital interaction

Table 1 summarizes the transformation of gold pawn services from conventional to digital models. The comparison shows that digitalization has not only improved operational efficiency but has also expanded service accessibility, increased transparency, and strengthened customer engagement. These changes indicate that digital transformation functions as a strategic institutional innovation rather than merely a technological upgrade.

The findings also indicate that digitalization has transformed the way customers access gold pawn services. Service access, which was previously constrained by location and operating hours, can now be conducted anytime and anywhere through digital applications. Transaction processes such as pawn applications, installment payments, loan settlements, and collateral status monitoring have become faster and more efficient. In addition, customers gain direct access to real-time information on gold prices, transaction histories, and collateral status (Purwanto et al., 2025). A concrete manifestation of this transformation can be observed in the implementation of the digital pawnshop (*Pegadaian Digital*) application, which offers a range of digitally enabled services, including remote pawn applications, collateral pick-up and delivery, outlet appointment booking, and gold savings pawn transactions without direct face-to-face interaction.

The digitalization of these processes has substantially improved transactional efficiency, as customers are able to submit pawn applications, settle outstanding balances, make installment payments, and monitor the status of pledged assets in real time through the application. As a result, dependence on manual procedures and physical queues has been significantly reduced. Furthermore, digital platforms enhance transparency and information accessibility by providing real-time updates on gold prices, transaction histories, and collateral status. This increased access to information enables customers to make more informed and rational financial decisions, thereby strengthening the overall effectiveness of digital pawn services (Nurhayati, 2025). The ability of digital applications to be directly integrated with central office systems further enhances data transparency and significantly reduces the risk of manual input errors compared to traditional face-to-face service models.

The digitalization of gold pawn services has emerged as a strategic response to evolving societal demands for financial services that are faster, more flexible, and readily accessible through digital technologies (Nurhayati, 2025). Changes in lifestyle driven by technological advancement and the increasing penetration of smartphone usage have encouraged pawn institutions to adopt digital service solutions in order to enhance customer convenience and transactional efficiency (Frizi et al., 2024). In addition, digitalization aims to address financial inclusion objectives by enabling communities across diverse regions, including those in remote areas, to access pawn and financial services without significant geographical constraints or high transaction costs (Putri et al., 2025).

This digitalization strategy has also been proven to have a positive impact on the growth of pawnshop businesses, as evidenced by a significant increase in digital transactions in recent years, including gold-based transactions such as gold savings and gold installment plans through digital applications (Nasution, 2025). In line with this innovation strategy, the institution continues to develop new features within the application, including the integration of broader service channels such as bill payments, digital wallet top-ups, and gold investment planning. Consequently, the application functions not only as a tool for accessing pawn services but also as a comprehensive digital financial ecosystem. Digitalization also enables the institution to respond to increasingly digital-oriented consumer behaviors, particularly among younger generations, transforming gold pawn services from being associated with lengthy and traditional procedures into a modern financial service that meets contemporary needs.

3.2 The contribution of gold pawn digitalization to financial inclusion

The research findings indicate that the digitalization of gold pawn services creates opportunities for microfinance access among communities that were previously difficult to reach by formal financial institutions through processes that are fast, simple, and free from complex requirements. This is consistent with findings showing that financial digitalization facilitates access to business capital for small and micro enterprises, reduces traditional financing barriers, and expands the inclusion of financial services among underserved populations. The digitalization of services also promotes microeconomic empowerment through the expansion of digital financing channels, thereby making financial services more inclusive in supporting the economic activities of small-scale communities (Tandilino et al., 2025).

Digital gold pawn services enable customers to conduct pawn transactions online without the need to visit physical offices, thereby significantly reducing geographical barriers for customers in remote areas or outside urban centers. Digitalization also simplifies administrative processes, allowing complex and traditional requirements and documentation to be reduced through integrated digital interfaces. This is consistent with studies indicating that the digitalization of financial services can reduce physical and administrative barriers and expand service access to populations that were previously underserve (Johri et al., 2024).

The digitalization of gold pawn services also contributes to improving financial literacy and service transparency. Digital platforms are typically equipped with educational features, cost information, financing simulations, and transaction monitoring tools that can be accessed by users at any time, enabling customers to better understand the products and service fees they engage with. Moreover, enhanced digital and financial literacy contributes to customers' ability to manage their finances independently and to understand the risks and benefits of digital services, which in turn strengthens overall financial inclusion. The digitalization of gold pawn services further expands the user segments of financial services, reaching not only traditional customers but also micro, small, and medium enterprises (MSMEs) and younger generations who are more attracted to digital solutions. Through digital channels, MSMEs can access microfinance, collateral-based savings, and other financial services without relying on traditional institutions that often impose access limitations on small business actors. In addition, digitalization has been shown to be a key driver of financial inclusion for micro-enterprises, increasing their participation in the formal financial system and expanding the market reach of digital financial services (Tandilino et al., 2025).

3.3 Challenges in implementing the digitalization strategy of gold pawn services

The research findings identify several key challenges in the implementation of digitalization strategies for gold pawn services. The digital literacy gap is a primary challenge, as public capacity to understand and use digital technology remains uneven across many developing countries, directly affecting the adoption of inclusive digital financial services. Low levels of digital literacy constitute a structural barrier that slows the adoption of digital services, as users who lack adequate understanding of digital platform features and mechanisms tend to experience fear, uncertainty, or reluctance in utilizing such services (Jalal et al., 2025). This is further evidenced by studies showing that low levels of digital literacy often hinder the success of digital financial inclusion, particularly among older populations, remote communities, and individuals with limited access to education (Lye et al., 2025).

In addition to digital literacy, data security and technological risks also constitute significant challenges in the digitalization strategy of gold pawn services. The increasing use of digital platforms has led to a growing volume of customers' personal and financial data being processed electronically, thereby heightening the risks of data breaches, cyberattacks, and the misuse of information by unauthorized parties. Technological risks, such as system disruptions, algorithmic errors, and weak security systems, may directly result in customer losses and undermine public trust in digital services (Nauli et al., 2025). In this context, public trust in digital services becomes a key determinant of the success of digitalization. Studies indicate that the adoption of digital financial services is strongly influenced by perceptions of security, transparency, and system reliability, where negative experiences such as transaction failures or unclear cost information can reduce public willingness to continuously use digital services (Lye et al., 2025). This low level of trust is often reinforced by the public's limited understanding of consumer protection mechanisms and risk management practices within digital financial systems.

Another challenge relates to regulatory readiness and supervisory capacity, as the pace of digital technological development often exceeds the speed of regulatory updates. Legal and supervisory frameworks that are not yet fully adaptive may create risk gaps, including weak personal data protection, unclear accountability of service providers, and the potential for digital practices that are detrimental to consumers (Jalal et al., 2025). Therefore, strengthening regulatory frameworks and supervisory systems becomes a crucial prerequisite to ensure that digital innovation develops in balance with consumer protection and financial system stability. Furthermore, the digitalization of gold pawn services also has the potential to generate risks of digital exclusion, a condition in which certain segments of society become increasingly marginalized due to limited access to digital devices, internet connectivity, or technological capabilities. Studies indicate that without inclusive infrastructure and policy support, digitalization may widen socio-economic gaps between digitally literate groups and those lacking adequate digital access (Trotta et al., 2026).

Table 2. Opportunities and challenges of gold pawn service digitalization for financial inclusion

Dimension	Opportunities	Challenges
Financial Access	Expands access to microfinance and underserved communities	Digital divide among vulnerable groups
Operational Efficiency	Faster transactions and reduced administrative burden	Dependence on technological infrastructure
Transparency	Real-time monitoring and information availability	Public concerns regarding data security
Customer Experience	Flexible and convenient service access	Low digital literacy among some users
Institutional Development	Integration with fintech ecosystem and broader financial services	Regulatory readiness and supervisory capacity
Financial Inclusion	Increased participation of MSMEs and younger users	Risk of digital exclusion

Table 2 summarizes the major opportunities and challenges associated with the digitalization of gold pawn services. While digitalization contributes significantly to financial inclusion through improved accessibility, efficiency, and transparency, its long-term success depends on addressing challenges related to digital literacy, cybersecurity, regulatory readiness, and the risk of digital exclusion. Therefore, the inclusive impact of digital transformation requires not only technological advancement but also institutional support and adaptive governance frameworks.

3.4 Future directions of innovation in gold pawn services

As digital transformation accelerates in the financial services sector, innovation in gold pawn services requires a sustainable strategy that not only preserves current technological advantages but also addresses the dynamic needs of customers and future challenges. One key innovation focus that should continue to be developed is the strengthening of hybrid services, namely an integrated model that combines digital services with traditional face-to-face interactions, allowing customers to choose service channels according to their preferences and needs. This hybrid approach is essential because there remains a segment of society that requires direct interaction at certain stages of transactions, as well as to maintain personal relationships between institutions and customers amid service digitalization. In addition to hybrid services, integration with the fintech ecosystem represents a strategic direction for the future of gold pawn services, as collaboration with other financial technology providers, including open APIs and digital payment platforms, can expand service outreach and enhance operational efficiency. Such integration also enables gold pawn institutions to offer a broader range of solutions, such as digital loans, microfinance, and other interconnected digital financial services (Sihotang et al., 2025).

The next direction of innovation emphasizes a needs-based approach, in which services should be designed based on a deep understanding of customers' needs, preferences, and behavioral patterns. This needs-based approach can be implemented through user surveys, monitoring of digital transaction patterns, and the development of service features that are responsive to specific groups, such as micro, small, and medium enterprises (MSMEs), informal workers, and younger generations who are increasingly digital-oriented. This perspective is consistent with findings that effective financial technology innovation is one that addresses traditional barriers to financial access and responds to the diverse and specific needs of different segments of society (El-Islamy & Salsabila, 2025). Furthermore, future innovation in gold pawn services needs to be supported by strengthened governance and consumer protection, as service digitalization increases the complexity of risks, including data security, cost transparency, and dispute resolution mechanisms.

Comprehensive consumer protection measures, robust data security policies, and adaptive regulatory frameworks are expected to enhance public trust in digital services, while also providing legal and operational certainty for service providers. Strong consumer protection is also considered a critical factor in ensuring the sustainability of digital service adoption across broader segments of society (Mutiara et al., 2020). Thus, the future direction of innovation in gold pawn services does not rely solely on technological elements, but also integrates broader strategic aspects, including adaptive hybrid service models, collaboration with the fintech ecosystem, innovation based on the real needs of the community, as well as strong governance and comprehensive consumer protection. Synergy among financial institutions, regulators, and technology providers will serve as a foundation for developing gold pawn services that are more inclusive, effective, and sustainable in the future.

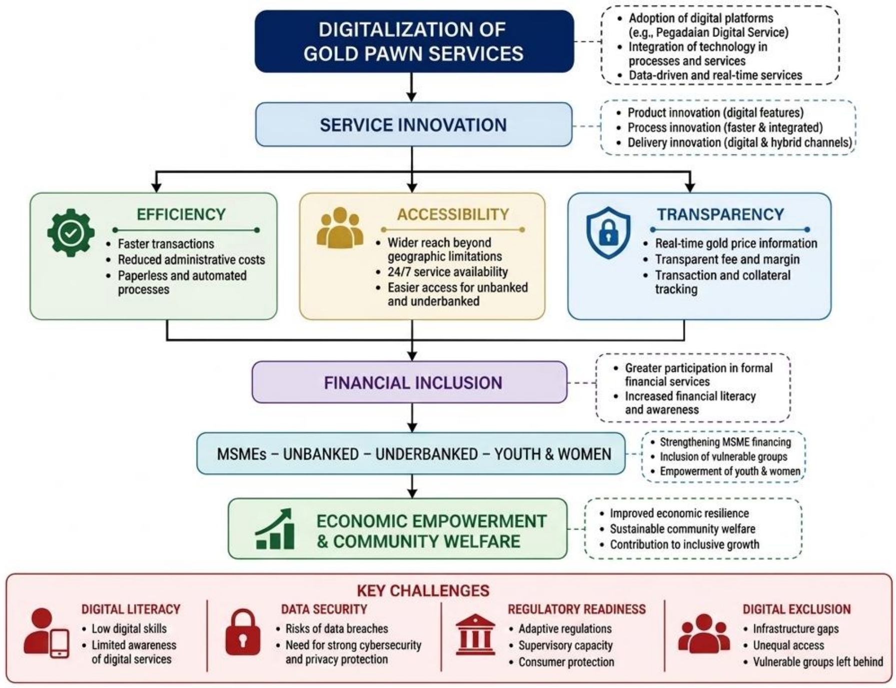

Fig. 2. Digitalization of gold pawn services as an inclusive financial innovation strategy

Figure 2 presents the conceptual framework derived from the literature synthesis conducted in this study. The framework illustrates that the digitalization of gold pawn services constitutes a strategic form of financial innovation that goes beyond mere technological adoption. Through service innovation, digitalization enhances operational efficiency, service accessibility, and transaction transparency. These improvements collectively contribute to broader financial inclusion by enabling greater participation by micro, small, and medium enterprises (MSMEs), unbanked and underbanked populations, and digitally oriented users within the formal financial system.

Furthermore, the framework highlights that the ultimate objective of digital gold pawn services is not merely operational modernization but the promotion of economic empowerment and community welfare. However, realizing these benefits is hindered by several challenges, including digital literacy gaps, data security risks, regulatory readiness, and the risk of digital exclusion. Therefore, the effectiveness of digital gold pawn services as an inclusive financial innovation strategy depends on the ability of financial institutions, regulators, and technology providers to address these challenges while ensuring accessibility, consumer protection, and sustainable service development.

3.5 Discussion

This study finds that the digitalization of gold pawn services has reshaped the microfinance landscape in Indonesia through an institutional transformation rather than mere technological adoption. These findings confirm and extend the argument of Sun & Zhang (2024) that digital inclusive finance can lower access thresholds and expand financial outreach to previously marginalized segments. However, this study goes further by demonstrating that reducing access barriers does not occur automatically through the implementation of technology alone but requires a deliberate reorientation of institutional strategies to expand inclusion. The transformation of service models from offline to hybrid and fully digital, as highlighted by Putri et al. (2025) and Khairi (2025), indicates that digitalization functions as a catalyst for structural change in the way financial institutions interact with customers, particularly unbanked and underbanked groups that have long been underserved by conventional banking systems. This study also enriches the perspective of Khairi & Julina (2025) regarding the importance of transparency and contract validity in the digitalization of Islamic gold pawn services. The findings reveal that transparency is not only related to Sharia compliance but also contributes to enhancing customers' financial literacy through real-time, comprehensive access to information. As identified by Purwanto et al. (2025) and Nurhayati (2025), digital platforms that provide financing simulations, up-to-date gold price information, transaction histories, and collateral status monitoring enable customers to make more informed financial decisions. This expands the discussion by Safitri & Wati (2023), who emphasize efficiency in collateral valuation and transaction acceleration, by demonstrating that such efficiency will generate inclusive impacts only when accompanied by efforts to strengthen customers' capacity to understand and optimally utilize digital financial services.

The significant contribution of this study lies in addressing a gap in the existing literature, which has largely been dominated by operational and risk management perspectives on gold pawn services. Unlike previous studies that tend to position digitalization primarily as an instrument for improving internal efficiency, this study frames digitalization as an inclusive financial innovation strategy oriented toward expanding access to financing for vulnerable groups. This perspective aligns with Zhang et al. (2023) 's argument that digital financial innovation should address structural financing constraints and is further supported by Nasution (2025), which demonstrates that digitalization reconstructs operational systems and interaction patterns between pawn institutions and customers. Moreover, this study adds a practical dimension by illustrating how digital gold pawn services concretely reduce geographical and administrative barriers that have long hindered financial inclusion in Indonesia, as also highlighted by Johri et al. (2024).

The findings of this study also extend the discourse on the role of microfinance within the inclusive financial ecosystem. Rolando (2024) emphasizes that fintech drives inclusion for unbanked and underbanked populations, while this study demonstrates that digital gold pawn services can serve as a more socially acceptable bridge to access for communities than formal banking products, which often involve complex requirements. The social relevance of gold pawn services as a liquidity buffer for households and micro-enterprises, as highlighted by Al Faiqoh and Mugiyati (2025) and Syam et al. (2025), is further strengthened by digitalization, which expands access to services without diminishing their social function. These findings also confirm the argument of Slamet Abdul Azis et al. (2025) regarding the contribution of financial technology to MSME financial inclusion and are further extended by Tandilino et al. (2025), who show that the digitalization of gold pawn services not only addresses short-term consumptive needs but also supports microeconomic empowerment through the expansion of digital financing channels.

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Another challenge identified concerns regulatory readiness and supervisory capacity, as the pace of digital technological development often outstrips the evolution of the regulatory frameworks governing it. Jalal et al. (2025) emphasize that legal and supervisory frameworks that are not yet fully adaptive may create risk gaps, including weak personal data protection and unclear accountability of service providers. Furthermore, Trotta et al. (2026) warn that without inclusive infrastructure and policy support, digitalization may widen socio-economic disparities between digitally literate groups and those lacking adequate digital access, thereby increasing the risk of digital exclusion.

To deepen the analysis of regulatory readiness, it is important to examine the policy framework implemented by the Financial Services Authority (OJK) in regulating digital financial innovation. The OJK has developed a regulatory framework through OJK Regulations relating to technological innovation in the financial sector, including a regulatory sandbox mechanism as a testing ground for digital financial business models prior to their widespread implementation (OJK, 2024). The regulation represents an improvement over the previous policy, as the OJK considered that the old rules were no longer aligned with industry developments, necessitating an update to accommodate the increasingly complex dynamics of financial technology.

Through the sandbox mechanism, the OJK assesses the business models, operational processes and governance of fintech operators to ensure their suitability and to mitigate risks before they are granted a full licence (Aji, 2024). However, existing regulations remain general and do not yet specifically address the characteristics of digital gold pawnbroking services, particularly the integration of physical assets (gold) with digital systems. The digital gold pawnbroking industry requires more detailed guidelines on gold valuation based on real-time market prices, collateral storage standards, and custodial mechanisms integrated with digital platforms, which are not yet explicitly regulated within the OJK's regulatory framework. Furthermore, although the OJK has emphasised consumer protection and supervision in its regulations on digital financial innovation, implementation still struggles to keep pace with the pace of technological innovation. This is evident in the need to strengthen technology-based supervisory systems and to enhance the regulator's capacity to monitor digital business models that are becoming increasingly complex and cross-sectoral.

The practical implications for pawn institutions indicate that successful digitalization requires a holistic approach. As suggested by Sari et al. (2025) and Nurhayati (2025), the development of digital platforms should be accompanied by structured digital literacy programs, strengthened data security systems, and expanded infrastructure to support service access in remote areas. The hybrid service model proposed by Putri et al. (2025) represents a relevant strategy for accommodating the diverse levels of digital literacy among Indonesian society, allowing customers the flexibility to choose service channels according to their needs. Furthermore, as Nasution (2025) emphasizes, service innovation should be designed around the community's real needs rather than being solely oriented toward technological efficiency, to be widely accepted and utilized by diverse segments, including groups long marginalized by the formal financial system.

For regulators and policymakers, the findings of this study underscore the importance of adaptive regulatory frameworks that keep pace with the dynamics of digital technology. Strengthening regulations on personal data protection, transaction security, and consumer protection is a prerequisite for building public trust in digital financial services, as emphasized by Jalal et al. (2025). Financial inclusion policies should also incorporate strategies to mitigate the risks of digital exclusion by providing equitable internet access, developing technological infrastructure in remote areas, and implementing digital literacy programs that reach vulnerable groups, as suggested by Trotta et al. (2026). In the context of Islamic gold pawn services, regulatory oversight must ensure that digital transformation does not compromise contract validity and compliance with the principles of *fiqh muamalah*, as highlighted by Khairi & Julina (2025) and Frizi et al. (2024). Regulators should also encourage collaboration between traditional financial institutions and the fintech ecosystem to ensure innovation progresses in tandem with prudential principles and financial system stability, in line with the recommendations of Handayani and Soeparan (2025) on the role of financial technology in enhancing financial inclusion.

This study affirms that the digitalization of gold pawn services holds strategic potential as an instrument of inclusive finance; however, realizing this potential largely depends on institutional commitment to positioning technology as a tool for expanding access rather than merely enhancing efficiency. As noted by Mahdania et al. (2025) and Sapitri & Nuraswin (2024), innovation in pawn products (*rahn*) plays a significant role in channeling microeconomic financing, and digitalization strengthens this role by extending outreach and improving service efficiency. Sustainable digital innovation therefore requires a balance among technological, institutional, and social dimensions to deliver equitable and inclusive benefits across all segments of society, particularly groups that have long been underserved by the formal financial system. This study affirms that the digitalization of gold pawn services holds strategic potential as an instrument of inclusive finance; however, realizing this potential largely depends on institutional commitment to positioning technology as a tool for expanding access rather than merely enhancing efficiency. As noted by Mahdania et al. (2025) and Sapitri & Nuraswin (2024), innovation in pawn products (*rahn*) plays a significant role in channeling microeconomic financing, and digitalization strengthens this role by extending outreach and improving service efficiency. Sustainable digital innovation therefore requires a balance among technological, institutional, and social dimensions to deliver equitable and inclusive benefits across all segments of society, particularly groups that have long been underserved by the formal financial system.

4. Conclusions

The digitalization of gold pawn services has proven to be not merely a process of technological adoption, but a strategic transformation in the provision of more inclusive financial services. The shift from conventional service models to digital and hybrid-based services has changed the way people access microfinance, obtain information, and conduct transactions more efficiently and flexibly. This transformation strengthens the position of gold pawn services as a financial instrument that remains relevant to the needs of modern society, particularly for unbanked and underbanked groups.

The analysis results indicate that the digitalization of gold pawn services makes a tangible contribution to enhancing financial inclusion through expanded access to microfinance, reduced geographical and administrative barriers, and improved transparency and service literacy. Digital innovation also encourages the expansion of user segments, including micro, small, and medium enterprises (MSMEs) and younger generations who are increasingly digital-oriented. Thus, digital gold pawn services function as a bridge between community financing needs and the development of the digital financial ecosystem. Nevertheless, the implementation of digitalization strategies continues to face several challenges, such as gaps in digital literacy, data security risks, public trust in digital services, regulatory readiness, and the potential for digital exclusion among vulnerable groups. These challenges indicate that the success of digitalization depends not only on technological readiness but also on institutional governance, consumer protection, and adaptive policy support. Therefore, the future development of gold pawn services should emphasize sustainable innovation that integrates the strengthening of hybrid services, collaboration with the fintech ecosystem, innovation based on community needs, and robust governance. This holistic approach is expected to ensure that the digitalization of gold pawn services not only drives efficiency and business growth but also contributes sustainably to achieving financial inclusion objectives.

Acknowledgement

The authors thank all parties who contributed to preparing this article. Special appreciation is extended to the second and third authors for their valuable academic contributions, including conceptual refinement, literature enrichment and verification, and critical review and language improvement of the manuscript. The constructive feedback and academic discussions significantly enhanced the article's quality and clarity. The authors also acknowledge the availability of open-access academic journals, institutional reports, and policy documents that supported the literature review process. In accordance with the Call for Papers guidelines issued by Pegadaian, the authors disclose that the artificial intelligence (AI) tool ChatGPT was used to assist in certain aspects of manuscript preparation, including language editing and initial text drafting. The authors thoroughly reviewed, verified, and validated all AI-generated content to ensure accuracy, integrity, and compliance with academic standards. The use of AI does not diminish the authors' full responsibility for the article's originality, quality, and content. Any remaining errors or shortcomings are the sole responsibility of the authors. The authors affirm that AI.

Author Contribution

A.F.A.: Writing – original draft, Writing – review & editing, Visualization. A.W.R.: Methodology, Investigation, Writing – review & editing. R.R.N.: Conceptualization, Writing – original draft, Writing – review & editing. All authors contributed to reviewing the manuscript and approved the final version.

Funding

The authors acknowledge that PT Pegadaian funded this publication. Funding from PT Pegadaian supported the dissemination of the research findings; however, the funder had no role in the study design, data collection and analysis, interpretation of results, or manuscript preparation. The authors retain full responsibility for the article's content, conclusions, and integrity.

Ethical Review Board Statement

Not available.

Informed Consent Statement

Not available.

Conflicts of Interest

The author declares no conflict of interest.

Declaration of Generative AI Use

During the preparation of this work, the author used ChatGPT (OpenAI version 5.2) and Grammarly to help rewrite and improve the academic tone for clarity. After using these tools, the author reviewed and edited the content as needed and took full responsibility for the publication's content.

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