



Toward a sustainable pawnshop sector: A five-year roadmap for technology-driven resilience and financial inclusion amid gold price fluctuations

Muhammad Yusuf Pratama^{1,*}, Siti Nur Aisyah²

¹ Department of Qur'anic Studies and Exegesis, Faculty of Ushuluddin and Humanities, Universitas Islam Negeri Walisongo, Semarang, Central Java 50185, Indonesia;

² Department of Sharia Banking, Faculty of Economics and Islamic Business, Universitas Islam Negeri Walisongo, Semarang, Central Java 50185, Indonesia.

*Correspondence: yusufutama1@gmail.com

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ABSTRACT

Background: Gold price volatility poses a significant risk to Indonesia's pawnshop sector (Pegadaian), a financial institution that serves as a critical source of accessible credit for underbanked communities, including micro, small, and medium-sized enterprises (MSMEs) and low-income households. Beyond its economic function, the pawnshop sector plays a role in community financial resilience and poverty alleviation, making its stability a matter of sustainable development. **Methods:** This study uses a literature review methodology, synthesizing prior research on gold price volatility, financial technology adoption, and inclusive finance to formulate a five-year innovation roadmap. **Findings:** The findings show that real-time gold price monitoring, blockchain-based transparency, diversified (non-gold) collateral products, and hedging instruments can strengthen pawnshop resilience, while also expanding equitable access to credit for underserved populations, particularly in remote areas. **Conclusion:** Technological innovation paired with supportive policy can simultaneously stabilize the pawnshop sector and advance financial inclusion as a pathway to sustainable, community-centered economic development. **Novelty/Originality of this article:** This study contributes a structured roadmap linking financial risk management in the pawnshop sector to broader sustainability and inclusive-growth goals, an intersection largely unexplored in existing literature.

KEYWORDS: financial stability; gold price fluctuations; Pegadaian; risk management; technological innovations.

1. Introduction

Fluctuations in gold prices present a significant challenge for the pawnbroking industry, especially in countries like Indonesia, where gold is commonly used as collateral for loans. The value of gold, as both an asset and a guarantee, is highly sensitive to market fluctuations, and this instability can have far-reaching consequences for both borrowers and pawnbrokers. For pawnbrokers, changes in the price of gold can directly affect the value of the collateral and, consequently, the size of loans granted. If the price of gold rises, pawnbrokers (Pegadaian) may face risks of over-valuation, leading to potential losses if gold prices fall. Conversely, a sudden drop in gold prices can result in undervaluing collateral, leaving pawnbrokers exposed to credit risk. This problem is exacerbated by the

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increased use of gold as a hedge against economic uncertainty, making pawnbrokers more reliant on the fluctuating market value of gold. According to a study by Jayeoye & Muangsin, the volatility in gold prices is often influenced by external factors such as inflation, geopolitical risks, and central bank policies, which directly affect the gold market (Jayeoye & Muangsin, 2024).

In addition to this, the broader financial market's instability, including exchange rate fluctuations and global economic policies, also impacts gold prices. Research by Zhao indicates that the exchange rate volatility and inflation targeting mechanisms play a critical role in determining gold's price stability. As global financial systems become more interconnected, the price of gold is increasingly affected by international markets, making it harder for local pawnbroking services to maintain stable operations (Zhao, 2024). Furthermore, Yang highlight the role of digital technologies and financial innovations in managing the risks associated with gold price volatility (Yang, 2024). The need for more advanced risk management systems in pawnbroking is more critical than ever, as gold's position as a safe-haven asset during times of economic crisis increases the demand for gold-backed loans and enhances the risks associated with market fluctuations.

The relationship between gold price fluctuations and pawnbroking services has not been widely studied, particularly in the context of how external factors, such as global financial instability and market dynamics, impact the valuation of collateral in pawn transactions. Research on financial market volatility, such as the studies by Buis et al. (2024) and Yang (2024), highlights the significant role that market liquidity and financial stability play in asset valuation. These studies suggest that dynamic hedging strategies can stabilize market quality, which, in turn, can be applied to understanding how pawnbroking services might mitigate risks associated with gold price volatility. In a similar vein, Haryadi & Dara (2024) offer insights into how market anomalies influence stock returns, which may be extrapolated to understand how gold, as a commodity, is subject to similar market psychology, affecting pawnbroking services that depend on its value.

Additionally, understanding the broader impact of macroeconomic policies on asset pricing is critical for managing risks in pawnbroking. Buis et al. (2024) further underscores that market positioning and liquidity can either enhance or deplete the stability of commodities like gold. This is especially pertinent to pawnbroking, where gold is used as collateral, and rapid shifts in gold prices can destabilize loan portfolios. Furthermore, Burriel et al. (2024) provides a deeper understanding of how financial stability measures can reduce the downside risk of volatile assets. Although studies like these have addressed stock and financial asset price volatility, little attention has been paid to pawnbroking services, where commodity-backed loans are commonly utilized and subject to similar risks.

In study by Özer et al. (2024), it was found that Bitcoin plays an important role in market volatility, with a hidden relationship between negative Bitcoin shocks and their impact on the prices of other financial instruments. Using the Implicit Asymmetric Combined Cointegration Test (IACC), this study highlights the asymmetric nature of Bitcoin's relationship with commodity markets and other financial instruments, as well as how its impact can vary depending on market conditions and timing. This suggests that Bitcoin not only serves as a speculative tool, but also has the capacity to be a source of market volatility, creating new challenges for global monetary and economic policy.

Meanwhile, in a study by Özer et al. (2024), volatility dynamics and variance swaps were introduced as instruments for managing increased market risk. In the model introduced, volatility calculated through the Ornstein-Uhlenbeck fractional model shows that an accurate volatility model is important for predicting more accurate market movements, especially in derivative instruments that depend on variance and volatility. This research offers a perspective on how stochastic models can improve the accuracy of predictions and assessments of volatility instruments. However, although volatility and existing options provide solutions to some risks, addressing the impact of market shocks remains an area that requires further approaches, especially those related to price instability caused by external factors such as monetary policy and market turmoil.

In addition, research by Huang & Wang (2024) shows that the use of methods such as Supremum Augmented Dickey-Fuller (SADF), Generalized Supremum Augmented Dickey-Fuller (GSADF), and Log-Periodic Power Law Singularity (LPPLS) to detect price bubbles highlights the challenges faced by carbon markets in countering the effects of speculation and policies that influence carbon prices. This study shows that despite the implementation of price control mechanisms, there is still a high potential risk associated with unexpected price volatility in the carbon market. The gap identified from these various studies is the lack of application of advanced modeling methods that consider long-term market variability, as well as the absence of policies that can directly reduce the adverse effects of excessive volatility, especially in vulnerable sectors such as energy and commodities that are highly influenced by changes in Bitcoin prices and carbon market policies.

This study aims to design a 5-year roadmap for the pawnshop sector in Indonesia to overcome the challenges of gold price fluctuations. The main focus of the study is to identify technology-based and policy-based solutions that can be applied to improve the operational stability of pawnshops amid global gold market uncertainty. Additionally, this study aims to explore the development of more flexible pawn products, such as loans with collateral other than gold, and the use of financial instruments such as volatility swaps to mitigate gold price risks. The assumption in this study is that gold price fluctuations will continue to occur, driven by external factors such as global monetary policy and geopolitical tensions, and that technology and product innovation can be key to maintaining the sustainability of the pawnshop sector in the future.

The proposed roadmap is expected to provide a structured framework for strengthening the resilience of the Indonesian pawnbroking sector through the integration of technological innovation, risk management, product diversification, and supportive policy measures. Rather than focusing solely on responding to gold price movements, the roadmap emphasizes the development of adaptive institutional capabilities that enable pawnshops to anticipate and manage market uncertainty over time. In this way, the study contributes a practical framework for linking gold price risk with technological and strategic transformation in the Indonesian pawnbroking sector.

2. Methods

2.1 Research design and data sources

This study employed a descriptive qualitative research design using a literature review and theoretical analysis approach (Stanley, 2023). This approach was selected to develop an in-depth understanding of the effects of gold price fluctuations on the pawnbroking sector in Indonesia and to formulate technology-based and policy-oriented solutions that can be implemented over the long term. The study relied on secondary data obtained from scientific journals, research reports, policy documents, and relevant industry publications addressing gold price fluctuations, pawnbroking operations, risk management, monetary policy, and financial technology.

The literature search focused on publications addressing gold price dynamics, global monetary developments, financial sector digitalization, risk management, and the sustainability of pawnbroking services. Relevant literature was identified using combinations of keywords such as gold price fluctuations, gold price volatility, gold investment, pawnbroking, pawnshop, risk management, financial technology, digitalization, and gold collateral valuation. The search prioritized recent literature while retaining earlier seminal studies when they provided important theoretical foundations or historical context. Sources were selected based on their relevance to the research objectives, conceptual contribution, empirical evidence, and applicability to the Indonesian financial and pawnbroking context.

The selection process involved screening the identified literature based on its title, abstract, and substantive relevance to the research topic. Publications that did not directly address gold price dynamics, pawnbroking, financial risk, technological innovation, or

related policy issues were excluded from the analysis. The selected sources were subsequently examined to identify theoretical arguments, empirical findings, technological developments, and policy considerations that could inform the analysis of the Indonesian pawnbroking sector.

2.2 Data analysis and roadmap development

The collected literature was analyzed using content analysis and comparative analysis. Content analysis was employed to identify recurring themes, concepts, and factors associated with gold price fluctuations and their effects on pawnbroking operations. Comparative analysis was used to examine similarities and differences across previous studies, particularly regarding risk management, technological adoption, institutional adaptation, and policy responses. The findings were then synthesized qualitatively through descriptive narratives that integrated relevant theoretical and empirical insights from the reviewed literature.

Based on the synthesized findings, the study developed a five-year innovation roadmap for the Indonesian pawnbroking sector. The roadmap development process involved mapping the major challenges identified in the literature to corresponding strategic responses in four areas: technological innovation, risk management, institutional adaptation, and policy support. These strategic responses were then organized into sequential stages by implementation priority, beginning with foundational technological and data infrastructure, followed by integrating digital valuation and monitoring systems, strengthening risk management mechanisms, institutional adaptation, and broader ecosystem and policy integration. This staged approach was intended to ensure that the proposed roadmap reflects a logical progression from immediate operational improvements toward longer-term institutional resilience and sustainability.

The final synthesis was presented through narrative explanations, conceptual diagrams, and a five-year innovation roadmap illustrating the proposed implementation stages and strategic priorities. The roadmap represents an analytical synthesis of the reviewed literature rather than a prediction of future market conditions. It provides a structured framework for understanding how technological and institutional measures may be progressively implemented to strengthen the resilience of the Indonesian pawnbroking sector amid gold price uncertainty.

3. Results and Discussion

3.1 Gold stability in the context of global economic uncertainty: A theoretical analysis

Gold is often considered a safe-haven asset, especially in times of economic uncertainty. This statement is supported by statistical data showing that the price of gold tends to increase steadily and gradually (see Figure 1). As explained in the article by Jayeoye and Muangsin, gold prices fluctuate due to several macroeconomic factors, including global monetary policy, inflation, and geopolitical tensions that can influence global investment decisions (Jayeoye & Muangsin, 2024). Gold price fluctuations are not only caused by high market demand during financial crises but also by the policies of major countries that affect currency exchange rates and global interest rates. For example, low interest rates implemented by the United States federal government Reserve often drive up gold prices as investors turn to gold as a safer asset (Arayssi, 2012).

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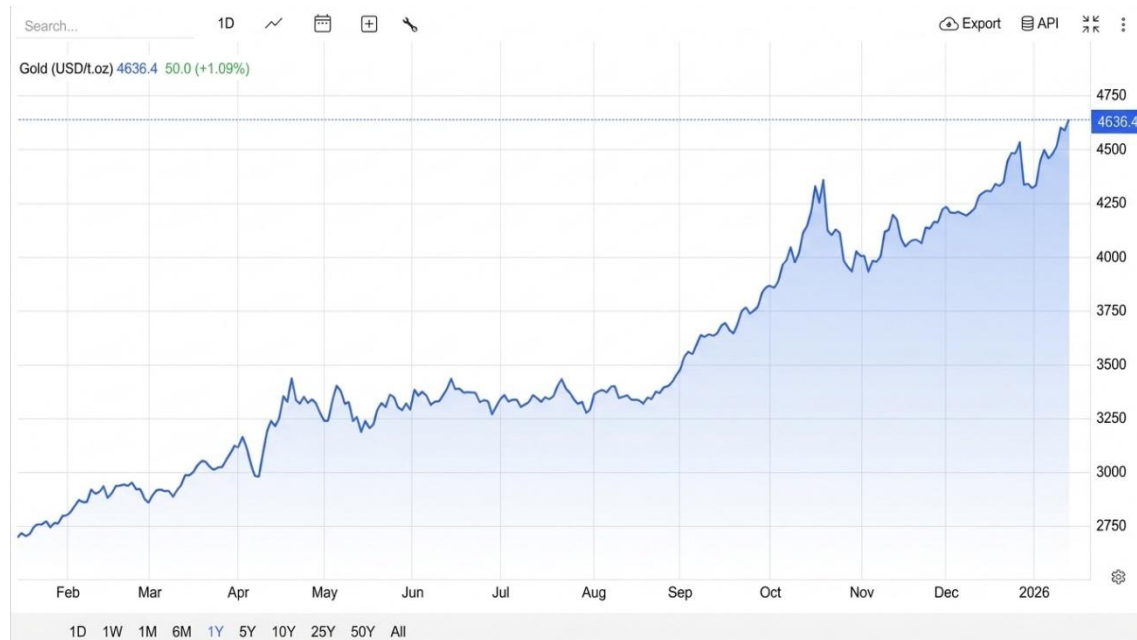


Fig. 1. Gold price January 2025-January 2026
(Economics, 2026)

Fluctuations in global gold prices affect the pawnshop sector (Pegadaian) in Indonesia, which relies on gold as collateral for loan transactions. Unstable gold prices create uncertainty for pawnshops, as they must adjust collateral value to the constantly changing market price of gold. Analysis by Khotijah et al. indicates that a sharp decline in gold prices can reduce the value of gold collateral deposited with pawnshops, potentially leading to losses for both borrowers and pawnshops. On the other hand, a surge in gold prices can increase risks for borrowers, as loan interest rates will also be higher to adjust for the increased value of the collateral (Khotijah et al., 2024).

To address the uncertainty caused by gold price fluctuations, the application of advanced technology is one solution that can be used. Blockchain-based technology and big data analytics can help pawnshops monitor gold prices in real-time and respond to changes more quickly and accurately. Research by Yang indicates that using digital platforms to monitor gold prices can help pawnshops minimize the risk of gold price fluctuations (Yang, 2024). This technology also allows pawnshops to offer more flexible products to customers, such as loans with dynamic interest rates that adjust according to the price of gold.

Global uncertainty triggered by geopolitical tensions or economic crises, such as those that occurred during the COVID-19 pandemic, has a significant impact on gold prices. These sharp fluctuations can affect many sectors, including pawnshops. According to a study by Purnomo & Ramadhan (2024), when geopolitical tensions increase, gold prices usually surge in response to financial market uncertainty. Pawnshops must be prepared to face a surge in demand from customers who want to use gold as collateral for loans when gold prices are high, but they must also be cautious of the risk of sudden price declines (Zhao, 2024).

To ensure the stability of the pawnshop sector amid gold price fluctuations, several measures can be taken. Hedging, or the use of financial instruments to protect pawnshops from the risk of unstable gold prices, is one solution. In addition, diversifying pawnshop products that do not rely solely on gold, such as pawning other valuable items (e.g., vehicles or electronics), can be an option to reduce dependence on gold price fluctuations. This

approach can help pawnshops in Indonesia to remain resilient even when gold prices experience significant instability (Jayeoye & Muangsin, 2024).

Appropriate regulations can help pawnshops remain stable amid fluctuations in gold prices. The Indonesian government needs to introduce policies that can stabilize the domestic gold market and protect pawnshops from the negative effects of price fluctuations. One step that can be taken is to introduce a gold tax or a benchmark price system for gold used as collateral for loans. With clear and supportive policies, pawnshops can better manage risk and provide fairer services to the public (Khotijah et al., 2024).

With technological developments and appropriate policies, the pawnshop sector in Indonesia can adapt to gold price stability. In the future, this sector is expected to develop more flexible and inclusive products, as well as play a role in promoting financial inclusion for communities that are underserved by banks. The digitization of pawnbroking services can also play an important role in improving transparency and operational efficiency in this sector, which in turn can support gold price stability and pawnbroking operations in the future (Yang, 2024).

3.2 Literature review analysis on gold price stability and its impact

Gold has long been regarded as a safe hedge asset, especially amid global economic uncertainty, as evidenced by research by Salsabila et al. (see Figure 2). The stability of gold prices often reflects the state of the global economy, which is influenced by factors such as monetary policy, inflation, and geopolitical tensions (Aji et al., 2023). Similar findings were also found in research by Khotijah et al., where fluctuations in gold prices were mainly influenced by global interest rates and central bank policy decisions. Low interest rate policies tend to drive demand for gold as a safer investment alternative. In addition, global crises such as the 2008 financial crisis and the COVID-19 pandemic show that gold prices can rise sharply in response to uncertainty in the global economy (Khotijah et al., 2024).

Jayeoye & Muangsin also note that fluctuations in gold prices can reflect broader economic stability, with gold prices often surging during times of crisis or market uncertainty (Jayeoye & Muangsin, 2024). Taken together, these findings indicate that gold prices are not determined solely by market-specific factors but are also closely connected to broader macroeconomic and geopolitical conditions. This relationship highlights the importance of considering gold as an indicator of economic uncertainty and as an asset whose demand may change substantially in response to shifts in the global economic environment. Therefore, understanding the factors underlying gold price movements is essential for interpreting changes in gold investment behavior and its broader economic implications.

Sentiment

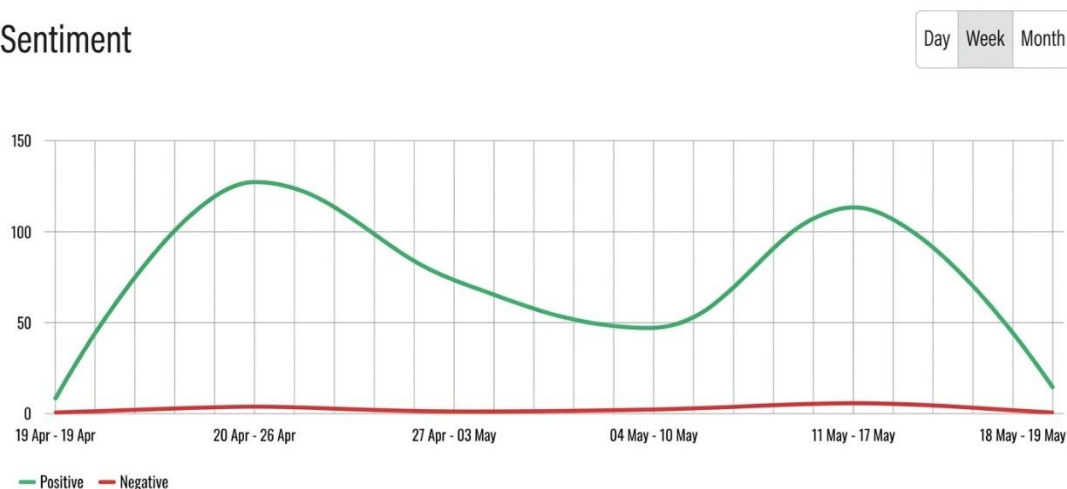


Fig. 2. Analysis of Indonesian public sentiment towards gold investment (April-May 2025) (Salsabila et al., 2025)

Gold price fluctuations are influenced by a number of factors, both micro and macro. According to Zhao, gold prices are greatly influenced by monetary policies adopted by major countries such as the United States. Low interest rate policies or quantitative easing policies can drive up gold prices, as investors seek safer assets amid uncertainty. In addition, Yang emphasizes that currency exchange rates, especially the US dollar, are often inversely proportional to gold prices (Yang, 2024). Geopolitical tensions, as seen in a study by Zhao, also exacerbate gold price instability, as political uncertainty or war often drives gold prices up (Zhao, 2024). Gómez Erazo also confirms that global political and economic uncertainty increases the volatility of commodity prices, including gold (Gómez Erazo, 2024).

In the Indonesian financial system, the pawnshop sector is highly dependent on gold prices as collateral in loan transactions. Khotijah et al. note that fluctuations in gold prices affect the stability of the pawnshop sector, as they can increase the risk of losses for pawnshops and customers (Khotijah et al., 2024). This is in line with Zhao's research, which shows that fluctuations in gold prices can cause uncertainty in collateral valuation (Zhao, 2024). In addition, Tsimeki et al. highlight how uncertainty in the system can affect greater outcomes, which is also relevant to the stability of the pawnshop sector facing drastic price changes (Tsimeki et al., 2023).

Fluctuations in gold prices have a major impact on the pawnshop sector and the Indonesian economy as a whole. When gold prices rise, many people use their gold as collateral for loans at pawnshops. Conversely, a decline in gold prices can lead to a decline in demand for pawnshop services. In Zhao's research, they noted that gold price fluctuations have a significant impact on people's purchasing power and the broader economic sector, such as the MSME sector, which often uses pawnshop services to obtain financing (Zhao, 2024). Therefore, changes in gold prices need to be monitored by economic policymakers in Indonesia. Evans et al. also emphasize the importance of using accurate instruments in assessing collateral value to avoid high uncertainty (Evans et al., 2024).

Technological advances provide a great opportunity for the pawnshop sector to reduce the impact of gold price fluctuations. Yang notes that with the implementation of digital platforms and blockchain technology, pawnshops can monitor gold prices more accurately and efficiently. This technology also enables pawnshops to provide more transparent and secure services to customers (Yang, 2024). As technology develops, the pawnshop sector can offer more flexible products to customers, such as loans with dynamic interest rates based on the prevailing gold price at the time. Samul provides a perspective on how technological developments can be integrated into the financial sector to create greater stability (Samul, 2024).

In facing sharp fluctuations in gold prices, pawnshops can use hedging strategies to reduce risk. Khotijah et al. suggest that pawnshops can use financial instruments such as futures contracts to protect themselves from significant declines in gold prices (Khotijah et al., 2024). By using this strategy, pawnshops can maintain the stability of their collateral value, even if gold prices fluctuate. Jayeoye & Muangsin reveal that although hedging can protect against risk, implementing this strategy requires a deep understanding of the gold market and the costs associated with using these instruments (Jayeoye & Muangsin, 2024). Ruiz Urbón provides a perspective on the use of quantitative analysis to manage greater risks (Ruiz Urbón, 2023).

To maintain gold price stability and support the pawnshop sector, the Indonesian government needs to introduce appropriate policies to regulate the gold market. Zhao notes that establishing a domestic gold benchmark price will help reduce sharp price fluctuations, providing certainty to the pawnshop sector in managing risk. In addition, clear regulations regarding taxes or gold trading tariffs will increase transparency and make it easier for pawnshops to plan and manage gold-backed loans (Zhao, 2024). The future stability of gold prices is highly dependent on external factors, including global monetary policy and technological developments. Yang argues that with the application of technology and good risk management, the pawnshop sector can be more adaptive to gold price fluctuations (Yang, 2024). In the future, the pawnshop sector in Indonesia can develop more varied products, such as pawnshops with collateral other than gold, which can help reduce

dependence on gold prices. In addition, cooperation between the government, financial institutions, and the community is very important to create an ecosystem that supports gold price stability and the stability of the pawnshop sector in the long term (Negi & Jaiswal, 2024).

3.3 Five-year roadmap for gold stability solutions and Pegadaian's innovation

Faced with increasingly unstable gold price fluctuations, the pawnshop sector (*Pegadaian*) in Indonesia needs to develop a long-term roadmap that can ensure its operational resilience and sustainability. One of the first steps that must be taken is to introduce a deeper understanding of the factors that influence global gold prices and their impact on the domestic pawnshop sector. Over the next five years, the pawnbroking sector needs to prepare by adopting technology that enables faster, more accurate, and more transparent gold collateral valuation (see Figure 3). The first step is to invest in technological infrastructure that can monitor gold price fluctuations in real time. This will enable pawnshops to respond quickly to price changes and reduce potential losses arising from sharp fluctuations in gold prices. This technology will not only speed up the collateral appraisal process but also expand customer access to more efficient and transparent pawnshop services.

Beyond real-time price monitoring, the long-term development of the pawnbroking sector should focus on strengthening data-driven risk management and operational decision-making. Integrating historical gold price data, market indicators, and customer transaction patterns could help pawnshops identify potential risks and adjust collateral valuation and lending strategies more appropriately. This approach would also support more consistent valuation standards across branches while improving transaction transparency. Over time, integrating digital valuation systems with customer-facing platforms could create a more responsive and sustainable pawnbroking ecosystem, enabling *Pegadaian* (pawnshop) to adapt to changing market conditions while maintaining service accessibility and institutional resilience.

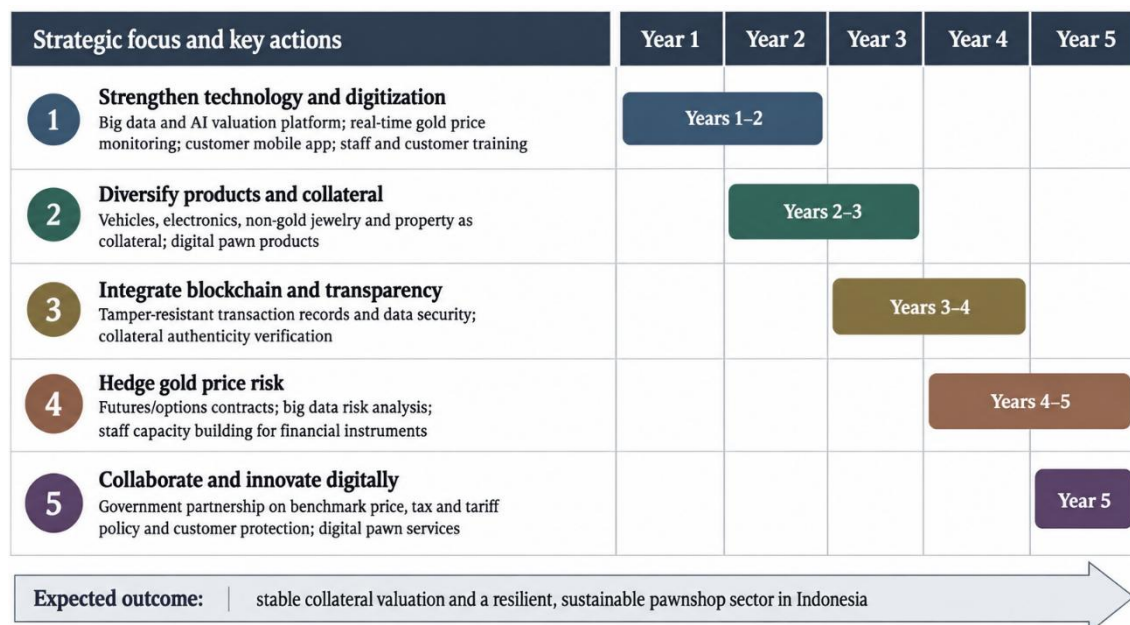


Fig. 3. Roadmap for 5 years of sustainable innovation
(Generated by Author)

In the first year, this roadmap will focus on strengthening technological infrastructure. Pawnshops must begin investing in big data and artificial intelligence-based digital platforms that can analyze gold price data more accurately, as stated by Yang, that big data and blockchain-based digital platforms can facilitate transparency and efficiency in gold

collateral valuation (Yang, 2024). Through this platform, pawnshops can monitor gold prices directly from the global market and quickly adjust collateral values. In addition, a mobile application that allows customers to access gold price information and check estimated collateral values directly can be introduced. This system will increase transparency and customer trust, reduce the risk of human error, and shorten the time needed for collateral evaluation. Furthermore, it is important to educate and train employees and customers in using this digital system, which in turn can strengthen technology acceptance in the pawnshop sector.

In the coming year, the pawnshop sector must focus on product and collateral diversification. Pawnshops that have relied on gold as collateral for loans need to introduce other types of collateral to reduce dependence on gold price fluctuations. This diversification could include accepting vehicles, electronic goods, jewelry other than gold, or even property as collateral. Loan products based on collateral other than gold will open up more opportunities for people who may not have gold but have other valuable items (Jack et al., 2023). This step could also provide flexibility for the pawnshop sector in offering products that suit market needs. On the other hand, innovations in digital-based pawn products will also continue to develop, enabling faster pawn processes and wider access for the public, especially in areas that are difficult to reach by physical pawnshops.

In the third year, a sustainable solution that needs to be included in this roadmap is the application of blockchain technology in pawnshop transaction processes. Blockchain can increase transparency and customer trust in pawnshop services by providing a recording system that cannot be manipulated and is guaranteed to be secure. This technology can be used to store pawn transaction data, including customer data and collateral value, securely and transparently. Blockchain also enables faster and more accurate verification of the authenticity of collateral, especially gold, which can prevent fraud and improve operational efficiency (Saranyah & Suganthi, 2023). With this technology, the pawnshop sector can provide customers with greater security and speed up the service process without compromising data quality or security. In the future, the implementation of blockchain will become the new standard in the digital-based pawnshop sector, which will drive the modernization and growth of the industry.

Entering its fourth year, the pawnshop sector needs to develop a more sophisticated risk management system to deal with extreme fluctuations in gold prices. One important step is the application of hedging techniques using financial instruments, such as futures or options contracts, to protect the value of loans secured by gold. This system will help pawnshops reduce the negative impact of unexpected changes in gold prices, maintain their operational stability, and reduce the risk of losses arising from market fluctuations. In addition, big data-based risk analysis can also be used to predict gold price movements more accurately and design more adaptive strategies. At this stage, pawnshops must also increase their human resource capacity to understand and manage the financial instruments used in hedging, as well as prepare employees to manage risk with a more data- and technology-based approach (Saputra, 2023).

In the fifth year, it is important for the pawnshop sector to collaborate with the government in formulating policies that support gold price stability and the sustainability of the pawnshop sector. The government can play an important role in creating clear and transparent gold benchmark price regulations for the domestic market, which will help pawnshops adjust their collateral values more easily and accurately (Hoan, 2024). In addition, appropriate regulations on gold taxes or trade tariffs can provide further stability to domestic gold prices, which in turn will help pawnshops reduce uncertainty in running their businesses. This cooperation also includes policies to strengthen supervision and protection for customers who use pawnshop services, creating a safer and more trustworthy ecosystem for all parties involved in pawn transactions.

To conclude this five-year roadmap, the pawnshop sector needs to focus on digital-based pawn product innovation to increase financial inclusion in Indonesia. In the next five years, pawnshops can develop digital platforms that enable people, especially those in remote areas, to access pawn services without having to visit a pawnshop office.

Technologies such as secure and easy-to-use mobile applications and online portals will help people who are not reached by the banking system to access loans secured by valuable items, including gold. Flexible loan products with dynamic interest rates that follow gold price movements can be an innovative solution to ensure the stability of the pawnshop sector. With these digital services, pawnshops will be able to reach a wider and more inclusive market and improve the overall welfare of the community.

4. Conclusions

This study found that fluctuations in gold prices have a significant impact on the pawnshop sector in Indonesia, which relies on gold as collateral in loan transactions. The instability of gold prices causes uncertainty in collateral valuation, which in turn increases the risk of loss for borrowers and pawnshops. These findings also show that over-reliance on gold as the sole collateral exacerbates the impact of price fluctuations, especially amid global uncertainty triggered by monetary policy and geopolitical tensions. In addition, this study identifies the importance of implementing technologies such as digital platforms and blockchain to monitor gold prices in real time, as well as the importance of diversifying collateral products to reduce dependence on gold.

The main contribution of this study is to offer a five-year roadmap for the pawnshop sector in overcoming gold price fluctuations. This roadmap includes technological innovations, such as the use of big data and blockchain for transparency and efficiency in collateral valuation, as well as diversification of collateral products that do not solely depend on gold. This study also suggests the application of financial instruments such as hedging to manage the risk of gold price volatility. Another contribution is to provide insights for the Indonesian government's policy to create regulations that can support domestic gold price stability, including the introduction of a gold benchmark price and clear tax policies.

However, this study has several shortcomings, particularly in the limitations of the data used, which is mostly sourced from previous studies. Therefore, this study does not include primary data that directly measures perceptions and practices in the field, particularly in the pawnshop sector in Indonesia. In addition, although the proposed roadmap provides concrete steps, the implementation of these technologies and policies requires broader support from relevant parties, such as the government and financial institutions. Further research could focus on empirical studies involving interviews with stakeholders in the pawnshop sector, as well as experiments to test the effectiveness of technology and financial instruments in reducing the risk of gold price fluctuations.

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Author Contribution

Conceptualization, M.Y.P.; Methodology, M.Y.P. and S.N.A.; Formal Analysis, M.Y.P. and S.N.A.; Investigation, M.Y.P.; Data Curation, S.N.A.; Writing – Original Draft Preparation, M.Y.P.; Writing – Review & Editing, M.Y.P. and S.N.A.; Validation, M.Y.P. and S.N.A.; Supervision, M.Y.P.; and Project Administration, M.Y.P. and S.N.A.

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Not available.

Informed Consent Statement

Not available.

Data Availability Statement

The data in this study were obtained entirely through digital media, from scientific articles and websites whose sources are included, and the author states that all sources used are authentic and accessible.

Conflicts of Interest

The authors declare no conflict of interest.

Declaration of Generative AI Use

The authors conducted this research entirely, from data selection to writing. However, during the preparation of this manuscript, the authors used ChatGPT Plus (OpenAI) and Claude Pro (Anthropic) to assist in drafting and refining the text, and to discuss the article critically in order to identify its initial weaknesses and areas for improvement, so that the manuscript could be strengthened. Figure 3 is a diagram that was constructed manually as a vector graphic and was not produced by a generative image model; Claude Pro was used only to assist with its layout. The authors reviewed and edited all AI-assisted output and take full responsibility for the content, analysis, and conclusions of this publication.

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Biographies of Authors

Muhammad Yusuf Pratama, Department of Qur'anic Studies and Exegesis, Faculty of Ushuluddin and Humanities, Universitas Islam Negeri Walisongo, Semarang, Central Java 50185, Indonesia.

- Email: yusufutama1@gmail.com
- ORCID: 0009-0007-9800-0584
- Web of Science ResearcherID: PEV-1410-2025
- Scopus Author ID: 60341187500
- Homepage: <https://scholar.google.com/citations?user=iV9LbagAAAAI>

Siti Nur Aisyah, Department of Sharia Banking, Faculty of Economics and Islamic Business, Universitas Islam Negeri Walisongo, Semarang, Central Java 50185, Indonesia.

- Email: 2204026171@student.walisongo.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A