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Enhancing Operational Efficiency in XYZ Coop: A Six Sigma Approach

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Abstract

XYZ Coop, a cooperative-owned Islamic pawnbroking business in Johor, provides gold pawning services to members and non-members as an alternative source of short-term financing. While the operation has achieved stable revenue and high customer repayment rates, it faces operational challenges in accurately authenticating gold items, exposing the cooperative to risks of counterfeit gold, financial loss, and diminished customer trust. This article examines how the Six Sigma methodology, particularly the DMAIC (Define, Measure, Analyze, Improve, Control) framework, can enhance operational efficiency and gold authentication accuracy at XYZ Coop. Using root cause analysis tools such as the Fishbone diagram and data-driven performance baselines, the study identifies key inefficiencies stemming from a lack of staff training, outdated testing methods, and inconsistent procedures. A structured implementation plan is proposed, incorporating staff training, process optimization, and continuous monitoring. Expected outcomes include improved gold authentication accuracy exceeding 99%, reduced process cycle times, and enhanced customer satisfaction. The findings highlight how service-oriented cooperatives can leverage quality management techniques traditionally used in manufacturing to improve operational performance, reduce risk, and sustain member trust. This case study provides practical insights for similar cooperatives seeking to strengthen governance and efficiency through structured improvement methodologies.

1. Introduction

XYZ, as an Islamic pawnbroking service, has emerged as a key mechanism to provide Shariah-compliant, short-term financial facilities to individuals, especially those underserved by conventional banking. It offers loans secured by gold collateral, ensuring both accessibility and fairness aligned with Islamic principles. In Malaysia, cooperatives are among the main institutions delivering XYZ services to their members and the public, thereby enhancing financial inclusion and community welfare.

XYZ Coop, fully owned by a cooperative that is located in Johor, exemplifies this role. Established in 1999, it operates from the cooperative's premises in Batu Pahat, Johor, offering gold pawning and sales services. Despite a modest scale, with only three employees managing operations in a 1,200 square-foot office , XYZ Coop has maintained a steady average daily capital turnover of RM50,000 and generated RM223,247.68 in revenue in 2023. However, in line with the board's Key Performance Indicator (KPI) target of at least 5% annual growth, operational challenges have become more apparent. Among these challenges, ensuring the authenticity and purity of pledged gold has been identified as the most complex and error-prone process. Issues such as insufficient staff training, outdated testing methods, equipment limitations, and environmental factors contribute to the risk of

accepting counterfeit gold. These risks threaten the financial integrity, customer trust, and long-term sustainability of the cooperative.

In this context, the application of a structured process improvement methodology becomes imperative. Six Sigma, with its systematic Define-Measure-Analyze-Improve-Control (DMAIC) framework, has been widely recognized as an effective approach to enhance quality, minimize defects, and improve operational efficiency. This article examines how the Six Sigma methodology can be applied to address the operational inefficiencies at XYZ Coop, particularly in the gold authentication process. By proposing and evaluating targeted improvements, the study aims to demonstrate how a cooperative can leverage Six Sigma principles to strengthen its operations, reduce risks, and enhance customer satisfaction in the increasingly competitive Islamic finance landscape.

1.2 Problem Statement

Despite its stable financial performance and low default rates in recent years, XYZ Coop faces persistent operational challenges in accurately determining the authenticity and purity of pledged gold items. This observation is consistent with findings by Mohd Thas Thaker et al. (2021), who identified trust in the reliability and transparency of operational processes, particularly gold appraisal, as a key determinant of customers' willingness to use XYZservices. Similarly, Baharudin et al. (2023) highlighted that cooperative banks offering XYZ often encounter inefficiencies stemming from outdated procedures, insufficient staff training, and inadequate testing infrastructure, which can undermine service credibility and sustainability. Interviews with staff at XYZ Coop revealed that the current authentication process is often cumbersome and vulnerable to error, relying on subjective visual inspections, outdated testing methods, and inadequate training. These weaknesses expose the cooperative to the risk of accepting counterfeit or misrepresented gold, which could result in financial losses, erosion of customer confidence, reputational harm, and potential regulatory issues. This is further supported by Nik Azman et al. (2022), whose study of Malaysian XYZ cooperatives demonstrated that human capital, including staff knowledge, skills, and training, is the most significant factor influencing financial performance, while external institutional support and member participation had no significant effect. However, there is limited empirical evidence on how structured, data-driven methodologies, such as Six Sigma, can be applied to improve operational efficiency and reliability in cooperative-run XYZ services. Addressing this gap is critical to enhancing process reliability, improving customer trust, and ensuring the cooperative's long-term sustainability.

1.3 Research Objectives

This study aims to identify the root causes of operational inefficiencies in gold authentication at XYZ Coop through systematic analysis. It also aims to propose and introduce Six Sigma–based solutions that can improve process accuracy, strengthen operational efficiency, and support better customer satisfaction.

2. Literature Review

XYZhas become an integral component of Malaysia's Islamic financial system, providing Shariah-compliant pawnbroking services that enhance financial inclusion and offer an ethical alternative to conventional credit options. As an Islamic financial product, XYZenables individuals to obtain short-term loans by pledging gold or other valuables as collateral, thereby avoiding the interest (riba) prohibited in Islam. Its operations are grounded in principles of transparency, fair valuation of collateral, and the charging of a service fee (ujrah) rather than interest. At XYZ Coop, a cooperative-owned XYZprovider in Johor, gold items of 916 purity are accepted, with loans of up to 70 percent of the appraised gold value for cooperative members and 65 percent for non-members. This model underscores the cooperative's role in supporting members' financial needs while upholding Islamic ethical standards.

The role of XYZin promoting financial inclusion and supporting the socio-economic well-being of Muslim consumers has been widely documented. Azman et al. (2024) emphasize that customers perceive XYZas a secure and ethical financing mechanism that aligns with religious obligations while fulfilling practical financial needs. Their study further highlights that customer trust in XYZservices is heavily influenced by the credibility and transparency of gold authentication and safekeeping processes. Operational weaknesses in these areas risk eroding customer confidence and damaging institutional reputation. Similarly, Baharudin et al. (2023) observed that cooperatives offering XYZoften experience inefficiencies due to outdated appraisal procedures, insufficient staff training, and inadequate testing infrastructure, all of which threaten the sustainability of such services. These findings underscore the critical importance of maintaining accuracy and consistency in gold appraisal practices to sustain customer loyalty and competitiveness in the Islamic finance sector. Accurately authenticating gold remains a persistent operational challenge in Islamic pawnbroking. Sophisticated fraudulent practices such as plating, filling, alloy blending, counterfeit stamping, and density manipulation can evade conventional detection methods in XYZ Coop. At XYZ Coop, the current process heavily relies on weighing, acid testing, and visual inspection, often performed under suboptimal environmental conditions. Interviews with staff further revealed

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that outdated procedures, lack of formal training, subjective judgment, and inadequate equipment contribute to vulnerabilities in detecting counterfeit or misrepresented gold. Such challenges are not unique to XYZ Coop but are indicative of broader systemic weaknesses in cooperative-based Islamic financial services, highlighting the need for systematic improvement strategies. One promising approach to addressing these challenges is the implementation of Six Sigma, a structured quality management methodology designed to reduce process variability and defects. Six Sigma employs the DMAIC (Define, Measure, Analyze, Improve, Control) framework to guide organizations through problem identification, root cause analysis, solution development, and control measures to sustain gains. Singh and Rathi (2019) conducted a structured review of Lean Six Sigma applications across various industries, concluding that Six Sigma significantly improves process quality, reduces defects, lowers operational costs, and enhances customer satisfaction. However, they also noted common barriers, including employee resistance, inadequate training, and limited resources challenges particularly relevant to small, cooperative-based institutions. More recently, Mittal et al. (2023) provided empirical evidence of Six Sigma's effectiveness, demonstrating that DMAIC implementation in an Indian manufacturing firm reduced defect rates by over 40% and improved sigma levels within three months. These findings reinforce the potential adaptability of Six Sigma beyond manufacturing into service-oriented, resource-constrained environments, such as Islamic financial cooperatives. Although empirical examples of Six Sigma application in Islamic financial cooperatives remain limited, the broader evidence base demonstrates its relevance and potential benefits. For institutions like XYZ Coop, embedding Six Sigma principles can support operational excellence, enhance customer trust, and ensure long-term sustainability in alignment with Shariah-compliant and cooperative values.

3. Methodology

This study uses a qualitative case study approach and applies the Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) framework to improve the gold authentication process at XYZ Coop. The qualitative design allows deeper understanding of staff experiences, operational routines, and the challenges they face during daily appraisal activities. The DMAIC structure guides the study through a systematic process of identifying problems, analysing root causes, proposing improvements, and planning for long-term control.

Several tools were used across the DMAIC phases:

- Fishbone Diagram: The Fishbone (Ishikawa) diagram was used during the Analyze phase to organize potential causes of errors in gold authentication. The causes were grouped into man, methods, machines, materials, measurements, and environment.
- Data Collection: Semi-structured interviews were conducted with two XYZ Coop staff members, each with more than ten years of experience. These individuals were selected because they manage daily operations and have direct involvement in gold appraisal. Their long operational experience provides rich and detailed insights needed for a qualitative case study. In qualitative research, small samples are acceptable when the objective is depth rather than breadth, especially when participants have strong contextual knowledge.
  The interviews explored current procedures, daily challenges, and opportunities for improvement.

4. Analysis and Finding

This section presents the analysis and findings of the study. It begins with an examination of the root causes of operational inefficiencies in the gold authentication process, identified through qualitative assessments and represented using a Fishbone diagram. Subsequently, it outlines the proposed improvement framework using the Six Sigma DMAIC methodology to address the identified weaknesses systematically.

4.1 Root Cause Analysis –Fishbone Diagram

Although XYZ Coop has maintained stable financial performance and low rates of loan default in recent years, several operational inefficiencies persist. The board has set a Key Performance Indicator (KPI) for the XYZ unit, targeting an annual revenue growth of at least 5 per cent. While the primary objective of XYZ Coop remains to provide accessible, Shariah-compliant financing to members, achieving the KPI target necessitates improvements in operational efficiency and process reliability. A review of operational procedures and interviews with staff revealed that the most challenging and error-prone aspect of the service lies in the authentication and valuation of pledged gold items. Although the incidence of loan defaults and auctioning of pledged items has remained minimal since 2019, indicating good repayment behaviour among customers, staff reported significant weaknesses in accurately determining the authenticity and purity of gold. In particular, staff identified recurring challenges such as manipulation of gold items by customers through techniques including gold plating, filling, alloy blending, counterfeit stamping, and density manipulation, which complicate detection using current methods. Furthermore, the lack of sufficient training and expertise among staff has led to inconsistencies and errors in gold appraisal. The continued reliance on outdated testing procedures and equipment, including subjective visual inspections and single-method testing, coupled with the absence of standardized operating criteria, further

exacerbates the problem. Concerns were also raised regarding the reliability of testing chemicals and weighing scales, given inadequate calibration and maintenance. In addition, suboptimal working conditions, such as poor lighting and ambient noise, were noted as contributing to reduced accuracy and concentration during the appraisal process. To systematically analyze these weaknesses, a root cause analysis was conducted using a Fishbone (Ishikawa) diagram. This analysis categorized the contributing factors into six dimensions Man, Method, Machines, Material, Measurement, and Environment and identified specific deficiencies under each category. The Fishbone diagram summarizing the root causes of difficulties in authenticating gold at XYZ Coop is presented in Figure 1.

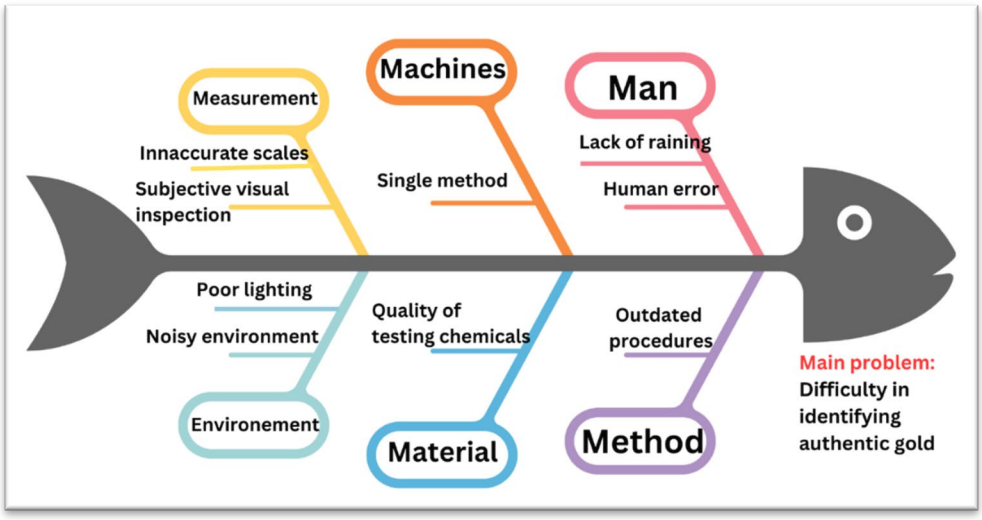

Fig. 1 *Fishbone diagram illustrating root causes of authentication challenges at XYZ Coop*

These identified weaknesses, if left unaddressed, expose the cooperative to risks of accepting counterfeit or misrepresented gold, potentially resulting in financial losses, erosion of customer confidence, reputational damage, and regulatory non-compliance. The findings thus underscore the necessity of adopting a systematic, data-driven improvement approach to enhance the reliability of the gold authentication process, strengthen staff competencies, and optimize overall operational efficiency, thereby ensuring the cooperative's long-term sustainability and its ability to meet established performance targets.

4.2 Six Sigma's DMAIC method

In addressing the operational inefficiencies identified in the gold authentication process at XYZ Coop, a structured and data-driven methodology is essential to ensure effective and sustainable improvement. Six Sigma, a well-established quality management approach, provides a systematic framework for process improvement by focusing on reducing variability, eliminating defects, and enhancing customer satisfaction (Pyzdek & Keller, 2014). Specifically, the DMAIC methodology comprising the phases of Define, Measure, Analyze, Improve, and Control offers a logical sequence of steps to diagnose, rectify, and institutionalize process improvements.

The Define phase involves clearly articulating the problem, identifying the objectives of the improvement initiative, and outlining the project scope. In this case, the problem is defined as the difficulty in accurately determining the authenticity and purity of pledged gold, which poses risks to financial performance and customer trust. The project goal is to improve the accuracy and reliability of the gold authentication process, thereby reducing errors and operational risks while supporting the cooperative's revenue growth target.

The Measure phase focuses on establishing baseline performance metrics and collecting relevant data to quantify the current state of the process. This includes documenting the error rate in gold appraisals, measuring processing time per transaction, and identifying the frequency of re-testing due to inconsistent results. Such metrics provide a factual basis for understanding the magnitude of the problem and serve as benchmarks for evaluating subsequent improvements.

In the Analyze phase, the collected data are examined to identify the root causes of inefficiencies and errors in the process. Building on the Fishbone analysis presented earlier, this phase involves validating which factors, such as inadequate staff training, outdated equipment, or suboptimal environmental conditions, have the most significant impact on process performance. Statistical tools and techniques, such as cause-and-effect analysis, process mapping, and hypothesis testing, may be applied to establish causal relationships.

The Improve phase entails designing and implementing targeted interventions to address the root causes identified. For XYZ Coop, potential improvements include upgrading testing equipment, implementing

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standardized operating procedures, enhancing staff training programs, and improving the physical work environment to support accuracy and efficiency. Pilot testing and iterative refinement of these interventions ensure that they effectively mitigate the identified weaknesses without introducing unintended consequences.

Finally, the Control phase establishes mechanisms to sustain the improvements over time. This involves developing monitoring systems, such as key performance indicators (KPIs) and control charts, to track the process and detect deviations from desired performance levels. Regular audits, refresher training, and feedback mechanisms are also crucial in embedding the improved practices into the cooperative's standard operating procedures and organizational culture. By systematically applying the DMAIC methodology, XYZ Coop can not only enhance the reliability and efficiency of its gold authentication process but also strengthen customer confidence, improve financial sustainability, and achieve its performance targets. This structured approach aligns with best practices in quality management and is particularly well-suited to addressing the complex, multifactorial challenges observed in cooperative-run financial services.

5. Recommendations, Practical Implications and Limitations

This section presents the recommendations derived from the study's findings, discusses their practical implications for the cooperative sector, and acknowledges the limitations inherent in the research. The aim is to provide actionable guidance for enhancing operational efficiency in XYZ Coop and to inform future initiatives in similar Islamic financial cooperatives.

5.1 Recommendations

The findings show several weaknesses in XYZ Coop's gold authentication process, mainly related to staff training, outdated testing methods, and inconsistent procedures. These findings align with Baharudin et al. (2023), who reported similar challenges among cooperatives offering XYZ services. Based on this alignment, the first recommendation is for cooperatives to adopt structured improvement frameworks such as Six Sigma across other operational areas. This supports Mohd Thas Thaker et al. (2021), who highlighted that operational transparency has a direct influence on customer trust in XYZ services. The second recommendation is to invest in more reliable and modern testing equipment. This reflects the view of Azman et al. (2024), who emphasised that customers place strong importance on the credibility of appraisal and safekeeping processes. Upgrading equipment strengthens credibility and reduces the risk of human error. The third recommendation focuses on internal capacity building. The findings confirm the observation of Nik Azman et al. (2022), who demonstrated that human capital, knowledge, experience, and training are the most significant factors influencing cooperative performance. Strengthening staff skills through continuous training supports long-term operational stability.

5.2 Practical Implications

The study demonstrates that a structured approach, such as DMAIC, can help a small cooperative enhance its operational reliability, even with limited resources. This supports Singh and Rathi (2019), who found that Six Sigma strengthens service quality and reduces process variability across various industries. The improved accuracy and consistency in gold authentication help build customer trust. This aligns with the findings of Mohd Thas Thaker et al. (2021), who reported that customers are more confident in XYZ services when operational processes are clear and reliable. For XYZ Coop, strengthening appraisal practices helps maintain fairness, transparency, and Shariah-compliant values. The experience from this study also shows that small cooperatives can adopt improvement tools usually used in manufacturing. This is consistent with Mittal et al. (2023), who demonstrated that DMAIC can be adapted for different operational settings, including service-based organisations.

5.3 Limitations

The study is based on qualitative data from two experienced staff members. While this provides deep insights, it limits the ability to generalise the findings. The same limitation was highlighted in other qualitative studies on XYZ operations, as noted by Baharudin et al. (2023). Limited resources also influenced the scope of solutions that could be tested. Future studies should incorporate a combination of qualitative and quantitative data, including error rate measurements and customer satisfaction scores. This would allow clearer benchmarking and help assess long-term improvements more accurately.

6. Conclusion

This study examined the operational weaknesses in XYZ Coop's gold authentication process and applied the Six Sigma DMAIC approach to identify root causes and propose practical improvements. The findings show that staff training gaps, outdated testing methods, equipment limitations, and poor working conditions contribute to

appraisal errors and operational risks. Using the DMAIC framework, the study outlined clear steps to strengthen accuracy, improve process consistency, and support better decision-making at the counter. The recommended actions, upgrading equipment, standardising procedures, and building staff competency, provide a practical pathway for XYZ Coop to improve daily operations and safeguard customer trust. The results also show that quality improvement methods commonly used in larger industries can be adapted to small, cooperative-run services. Future work should include quantitative data, such as error rates and customer satisfaction scores, to measure long-term improvements more precisely.

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Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The author confirms sole responsibility for the following: ***study conception and design, data collection, analysis*** *and* ***interpretation of results, and manuscript preparation****.*

References

Azman Ong, M. H., Mohd Yasin, N., & Ibrahim, N. S. (2024). The purchase intention of XYZ Islamic financing contract in Malaysia: perception of Muslim consumers. Journal of Islamic Marketing, 15(10), 2594-2613.

Baharudin, Z. N., Mohd Zailani, N. N., Abd Latif, N. A., Yahaya, M. H., & Md Ismail, M. A. (2023). Analysis of XYZ Financing Implementation in Cooperative Banking. *International Journal of Academic Research in Business and Social Sciences*, *13*(7), 47-57.

Mohd Thas Thaker, H., Khaliq, A., Mohd Thas Thaker, M. A. B., Allah Pitchay, A. B., & Sakaran, K. C. (2021). Drivers of XYZ (pawn) acceptance: Malaysian evidence. Journal of Islamic Marketing, 12(7), 1241-1259.

Mittal, A., Gupta, P., Kumar, V., Al Owad, A., Mahlawat, S., & Singh, S. (2023). The performance improvement analysis using Six Sigma DMAIC methodology: A case study on Indian manufacturing company. *Heliyon*, *9*(3).

Singh, M., & Rathi, R. (2019). A structured review of Lean Six Sigma in various industrial sectors. *International Journal of Lean Six Sigma*, *10*(2), 622-664.