Green Marketing and Brand Image as Determinants of Sustainable Consumer Purchase Decisions: Evidence from the Coffee Retail Industry

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ABSTRACT

Background: Efficient raw material inventory management is a critical challenge for small-scale agroindustries, particularly those with limited managerial resources and fluctuating production demand. Many micro and small enterprises rely on traditional purchasing practices that often lead to overstocking, stockouts, and unnecessary holding costs. In agro-based processing industries such as milkfish floss production, ineffective inventory control can reduce operational efficiency and weaken business sustainability. The Economic Order Quantity (EOQ) model offers a systematic approach to determine optimal order quantities that minimize total inventory costs while ensuring the availability of production inputs. However, empirical applications of EOQ in small-scale agroindustry contexts remain limited.

Aims: This study aims to analyze the efficiency of raw material inventory management and determine the optimal order quantity using the EOQ model in a small-scale milkfish floss agroindustry in Indonesia.

Methods: This research employed a quantitative case study approach. Data were collected through direct observation, production records, and interviews with the enterprise owner. Inventory-related data, including annual demand, ordering cost, and holding cost, were analyzed using the EOQ model to determine optimal order quantity, ordering frequency, and total inventory cost.

Result: The findings indicate that the existing inventory practice is less efficient compared with the EOQ-based calculation. By applying the EOQ model, the enterprise can determine a more optimal ordering quantity and reduce total inventory costs. The analysis also reveals improvements in ordering frequency and better control of raw material availability for production continuity.

Conclusion: This study demonstrates that the application of the EOQ model can significantly improve raw material inventory efficiency in small-scale agroindustries. The results highlight that systematic inventory planning not only reduces operational costs but also enhances production stability and supply chain reliability. For micro and small enterprises in agro-processing sectors, adopting analytical inventory management tools such as EOQ can serve as a practical strategy to strengthen business competitiveness. Furthermore, the findings emphasize the importance of integrating basic operations management techniques into small-scale entrepreneurial practices to support sustainable agroindustrial development. Implementing structured inventory management frameworks can help small enterprises transition from intuitive decision-making toward data-driven operational strategies, ultimately contributing to improved efficiency, resilience, and long-term business sustainability.

INTRODUCTION

Agroindustry plays an important role in strengthening rural economic development and improving the value added of agricultural commodities. Many developing countries rely on small-scale agroindustrial enterprises to process agricultural products into marketable goods with higher economic value. However, the sustainability of these enterprises is often constrained by operational inefficiencies, particularly in production planning and inventory management. Inefficient raw material procurement can increase operational costs and disrupt production continuity in agro-processing businesses. In small-scale food processing industries, the availability of raw materials directly affects production performance and product quality. The transformation of agro-commodity supply chains requires better managerial practices to maintain efficiency and competitiveness in agroindustrial systems (Medina, 2022). Research on agroindustrial development also highlights the importance of integrating operational strategies within

rural production networks to support economic resilience (J. Zhou et al., 2023 and X. Zhou & Han, 2025). Therefore, improving inventory management practices has become a critical issue in strengthening the operational performance of small-scale agroindustries.

Despite their economic significance, many micro and small agroindustrial enterprises still rely on traditional inventory practices that lack systematic planning. Production decisions are often based on experience rather than analytical methods, which may lead to overstocking or shortages of raw materials. Such conditions increase storage costs and reduce production efficiency. The adoption of simple quantitative models can help small enterprises manage raw material procurement more effectively and support stable production systems. Efficient supply chain management practices are increasingly recognized as an essential factor for enhancing the competitiveness of agro-food industries in global markets (Ammeri et al., 2025 and Raimbekov et al., 2023). In addition, strengthening operational decision-making within agroindustrial systems can support broader rural economic transformation and innovation networks (Bowman & Chisoro, 2025). Studies on agricultural enterprises also emphasize that improving operational efficiency is crucial to mitigate market risks and cost volatility in agricultural production systems (Gadanakis, 2024). Consequently, exploring efficient inventory management strategies is necessary to improve operational sustainability in small-scale agroindustries.

Effective inventory management is one of the most important elements in operations management because it determines the balance between production continuity and cost efficiency. In agro-processing industries, raw materials often have limited shelf life and fluctuating supply conditions, making inventory planning more complex. Small-scale agroindustries frequently experience difficulties in determining optimal purchasing quantities due to limited analytical capabilities and financial constraints. As a result, inefficient procurement practices may increase ordering costs, holding costs, and operational risks. The application of quantitative inventory models can provide a structured approach for determining optimal ordering policies. Among these models, the Economic Order Quantity (EOQ) model is widely used to identify the optimal order quantity that minimizes total inventory cost. Previous studies have demonstrated that analytical inventory models can improve production planning and cost efficiency in small-scale manufacturing systems. Therefore, the adoption of EOQ-based inventory strategies may provide a practical solution for improving operational performance in agroindustrial enterprises.

Recent studies have emphasized the strategic role of agroindustrial systems in supporting rural economic development and strengthening agricultural value chains. Research on agroindustrial innovation systems highlights that collaborative networks and operational improvements are essential for enhancing productivity in agricultural processing industries (Pizarro Levi et al., 2025). The transformation of agro-commodity production into integrated agroindustrial clusters has also been identified as a key strategy for improving efficiency and competitiveness in developing economies (Ali, 2025). In addition, studies on agricultural service systems show that institutional support and managerial capacity are crucial factors for improving agroindustrial productivity (Wang et al., 2026). The integration of sustainable operational practices has also gained attention in the context of circular economy approaches to agroindustrial management (Aranda-Usón et al., 2024). These studies collectively demonstrate that operational efficiency is an important component of sustainable agroindustrial development. Improving resource management within agroindustrial systems can also contribute to the resilience of agricultural supply chains. Therefore, efficient operational strategies are increasingly considered essential for strengthening the performance of small-scale agroindustries.

Several empirical studies have specifically examined the operational performance of small-scale agricultural enterprises. Research on cassava-based agroindustry in Indonesia emphasizes that strategic orientation and policy support are important factors in strengthening small-scale agroindustrial competitiveness (Kusnandar et al., 2023). Other studies have investigated the economic performance of small agricultural marketing enterprises and highlighted the importance of efficiency in production and marketing activities (Djomo et al., 2021). Institutional structures and governance mechanisms have also been shown to influence the productivity of small-scale agricultural producers (Bernal-Hernández et al.,

2021). Technological adoption has been widely discussed as a driver of productivity improvements in agricultural production systems (Groher et al., 2020). In addition, land-use management and production intensity have been examined as factors affecting agricultural productivity and sustainability (Mastrangelo et al., 2019). These studies indicate that improving managerial and operational efficiency is a crucial step for strengthening small-scale agricultural enterprises. Nevertheless, many small agroindustrial businesses still lack practical tools to optimize their operational decision-making processes. Therefore, the implementation of simple quantitative models such as EOQ may offer a valuable approach to improving inventory efficiency in small-scale agroindustries.

Although previous studies have explored various aspects of agroindustrial development, limited research has focused on the application of quantitative inventory management models in small-scale agro-processing enterprises. Most existing studies concentrate on institutional development, policy frameworks, or technological adoption in agricultural production systems rather than operational efficiency at the enterprise level. As a result, empirical evidence regarding inventory optimization in micro-scale agroindustries remains relatively scarce. In particular, research examining the practical application of EOQ models within small agro-processing businesses is still limited. Many studies highlight the importance of operational efficiency but do not provide specific analytical tools for improving inventory management in small enterprises. Moreover, the operational challenges faced by small-scale agroindustries in developing countries require context-specific solutions that are easy to implement and economically feasible. Therefore, further investigation is needed to analyze how inventory optimization models can improve operational performance in small agro-processing enterprises. Addressing this research gap is important for developing practical strategies that support sustainable agroindustrial development.

This study aims to analyze the efficiency of raw material inventory management in a small-scale agroindustrial enterprise producing milkfish floss in Indonesia. The research applies the Economic Order Quantity (EOQ) model to determine the optimal order quantity that minimizes total inventory cost. By comparing the current inventory practice with the EOQ-based calculation, the study evaluates the potential efficiency improvements in raw material procurement. The research also examines how optimal ordering policies influence ordering frequency and cost efficiency in the enterprise's production system. Understanding these operational dynamics is important for improving decision-making in small-scale agroindustrial businesses. The findings are expected to provide practical insights into the implementation of analytical inventory management tools in micro-scale production systems. In addition, the study contributes to the literature on operations management within agroindustrial contexts. Ultimately, this research seeks to demonstrate that the adoption of systematic inventory management strategies can enhance operational efficiency and support the long-term sustainability of small-scale agroindustries.

METHOD

Research Design

This study adopted a quantitative case study design to investigate the efficiency of raw material inventory management in a small-scale agroindustrial enterprise producing milkfish floss in Indonesia. A case study approach was selected because it allows detailed analysis of operational practices within a specific organizational context while capturing the complexity of managerial decision-making processes. In operations management research, Grimm et al., (2024) and Welch et al., (2022) explains that case studies are appropriate for examining real-world managerial phenomena where the boundaries between the process and the operational environment are not clearly separated. The research integrates empirical operational data with an analytical inventory model to evaluate the effectiveness of procurement decisions within the enterprise. Inventory optimization models are commonly applied in production and supply chain management to determine the most cost-efficient purchasing strategies. Althaqafi, (2024) describe inventory models as essential tools for balancing procurement costs and storage costs in

manufacturing systems. By combining field-based observation with quantitative inventory analysis, the research evaluates the potential efficiency improvements that can be achieved through systematic inventory planning. This design enables the study to produce both practical operational insights and theoretical contributions to inventory management practices in small-scale agroindustries.

Research Setting and Participant

The research was conducted in a small-scale agroindustrial enterprise specializing in the production of milkfish floss, a processed fish product widely consumed in Indonesia. The enterprise represents a typical micro-scale agro-processing business that relies heavily on raw material availability to sustain daily production activities. Small agroindustrial enterprises often face operational challenges related to procurement planning, cost management, and production continuity. Mokhatla et al., (2026) highlight that many small agro-processing industries operate with limited managerial capacity and lack structured operational planning systems. The selected enterprise processes fresh milkfish obtained from local suppliers and transforms it into shredded fish products through several production stages. These stages include cleaning, seasoning, cooking, drying, and packaging processes before the final product is distributed to local markets. The enterprise owner and production personnel provided operational information regarding procurement practices, purchasing frequency, and inventory storage methods. This research setting provides a realistic context for examining how analytical inventory management models can improve operational efficiency in small-scale agroindustrial businesses.

Data Collection Instruments

Several instruments were utilized to collect reliable operational data related to raw material inventory management within the enterprise. The primary instrument consisted of structured data recording forms used to document inventory-related variables including annual demand, ordering cost per order, and holding cost per unit. These variables represent the fundamental components required to calculate the optimal ordering quantity using the EOQ model. According to inventory management theory described by Zarghami, (2026), accurate measurement of these variables is essential for determining optimal procurement decisions. In addition to structured recording forms, semi-structured interviews were conducted with the enterprise owner to obtain contextual insights regarding procurement strategies and production planning practices. Observational checklists were also used to verify inventory storage conditions and raw material handling procedures within the production facility. Production logs and purchasing receipts served as supporting documents to validate the operational data used in the analysis. The combination of multiple data sources enhanced the reliability and accuracy of the inventory information used in this study.

Analytical Framework

The analytical framework of this study focuses on evaluating raw material inventory efficiency through the application of the Economic Order Quantity model. Inventory optimization models are widely recognized as effective decision-support tools in supply chain and operations management. Silver, Alsoussi & Tahboub, (2025) emphasize that inventory models help organizations determine optimal ordering policies that minimize total inventory costs while maintaining sufficient stock availability. The framework begins with identifying the current inventory practices implemented by the enterprise. After the existing procurement system is documented, the study calculates the ordering cost and holding cost associated with raw material procurement. These cost components serve as inputs for determining the optimal order quantity using the EOQ model. The resulting EOQ calculation is then compared with the enterprise's current procurement practice. Through this comparison, the study evaluates potential cost savings and efficiency improvements generated by implementing systematic inventory management. This analytical structure also enables the study to demonstrate how a simple quantitative model can support more rational procurement decisions in small-scale agroindustrial settings. In this way, the framework not only measures operational efficiency but also strengthens the practical relevance of inventory optimization for improving business sustainability and production continuity.
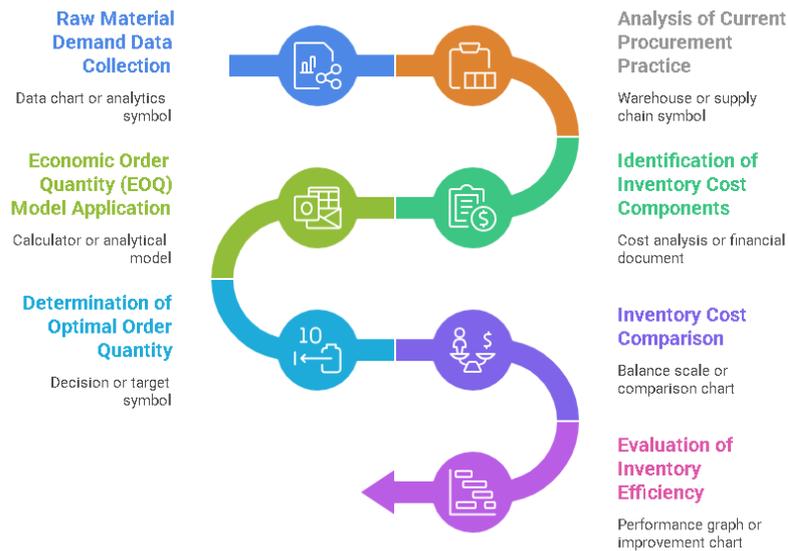
Figure 1. Research Framework for Inventory Optimization in Small-Scale Agroindustry

The research framework illustrates the analytical steps used to evaluate inventory efficiency in the milkfish floss enterprise. The study begins with collecting operational data related to raw material demand and procurement practices. These data are used to identify the ordering costs and holding costs associated with raw material inventory. The EOQ model is then applied to calculate the optimal order quantity that minimizes total inventory cost. After determining the EOQ value, the study compares the optimal procurement strategy with the current purchasing system implemented by the enterprise. This comparison enables the identification of potential efficiency improvements in inventory management. The framework therefore provides a systematic procedure for assessing the effectiveness of analytical inventory models in small-scale agroindustrial contexts.

Data Analysis Plan

The data analysis applied the Economic Order Quantity model to determine the optimal quantity of raw material orders that minimizes total inventory costs. The EOQ model is one of the most widely used analytical tools in inventory management because it balances ordering costs and holding costs within a production system. Milewski & Wiśniewski, (2022) explain that the EOQ model provides a mathematical approach for identifying the most efficient order size under stable demand conditions. The analysis begins by calculating annual raw material demand obtained from production records of the enterprise. Ordering costs are then identified based on procurement-related expenses such as transportation, communication, and administrative activities. Holding costs are estimated from storage expenses including utilities, inventory handling, and potential product deterioration risks. These variables are incorporated into the EOQ formula to determine the optimal order quantity and ordering frequency. The results are subsequently compared with the current procurement strategy to evaluate the level of inventory efficiency achieved through the EOQ-based approach.

Table 1. Variables Used in EOQ Analysis

Variable	Description
D	Annual demand for raw materials
S	Ordering cost per order
H	Holding cost per unit per year
EOQ	Optimal order quantity
TOC	Total inventory cost

EOQ Formula

$EOQ = \sqrt{2DS / H}$

The EOQ formula determines the most efficient order quantity that minimizes total inventory cost in a procurement system. The variable D represents annual demand for raw materials required for production activities. The variable S represents the cost incurred each time an order is placed to suppliers. The variable H represents the annual holding cost per unit of inventory stored in the warehouse. By balancing these cost components, the EOQ model identifies the order quantity that results in the lowest total inventory cost. When the optimal order quantity is implemented, enterprises can reduce excessive inventory storage while avoiding shortages of raw materials during production. In small-scale agroindustries, the EOQ model is particularly useful because it provides clear operational recommendations using relatively simple data inputs. Therefore, applying EOQ in small agroindustrial enterprises can support more efficient procurement decisions and improve overall production sustainability.

RESULTS AND DISCUSSION

Results

The analysis began with evaluating the existing raw material inventory practice implemented by the milkfish floss enterprise. Based on operational observation, the enterprise purchases fresh milkfish in relatively small quantities but with frequent ordering cycles. This procurement pattern was primarily determined by the owner's experience rather than analytical calculation. As a result, inventory decisions were not supported by systematic evaluation of ordering costs and holding costs. Data collected from production records indicated that raw material demand remained relatively stable across the production period. However, the frequency of procurement resulted in repeated ordering costs that potentially increased operational expenses. To assess the efficiency of the current system, several inventory variables were identified including annual demand, ordering cost, and holding cost. These variables were subsequently analyzed using the Economic Order Quantity (EOQ) model to determine the optimal procurement policy.

Table 2. Inventory Parameters of the Milkfish Floss Enterprise

Variable	Description	Value
Annual demand (D)	Raw milkfish demand per year	4,800 kg
Ordering cost (S)	Procurement cost per order	USD 25
Holding cost (H)	Storage cost per kg per year	USD 2

The inventory parameters shown in Table 2 represent the operational inputs used for calculating the EOQ value. Annual demand was obtained from production records collected from the enterprise during the study period. Ordering cost includes transportation expenses, supplier communication, and administrative procurement activities. Holding cost represents the estimated annual storage expenses related to electricity, storage facilities, and inventory handling. These variables form the basis for determining the optimal procurement strategy in the enterprise.

Using the EOQ model, the optimal order quantity was calculated to minimize the total inventory cost associated with raw material procurement. The EOQ formula integrates annual demand, ordering cost, and holding cost to determine the most efficient order size. Based on the calculation results, the optimal order quantity was identified as approximately 346 kilograms per order. This quantity differs significantly from the enterprise's current procurement practice which typically involves smaller but more frequent orders. The EOQ result indicates that the enterprise can reduce the frequency of procurement while maintaining sufficient raw material availability. Reducing procurement frequency contributes to lowering total ordering costs in the production system. In addition, a larger but optimized order size helps stabilize raw material supply for continuous production activities. These findings suggest that applying the EOQ model can improve operational efficiency within the milkfish floss agroindustry.

Table 3. Comparison of Inventory Performance

Indicator	Current System	EOQ Model

Order quantity	200 kg	346 kg
Order frequency/year	24 times	14 times
Total inventory cost	USD 1,200	USD 910

Table 3 compares the inventory performance between the existing procurement system and the EOQ-based model. The EOQ model recommends a larger order quantity but with fewer procurement cycles throughout the year. This adjustment significantly reduces ordering costs while maintaining manageable storage levels. The analysis shows that the EOQ-based procurement policy can reduce total inventory costs by approximately 24 percent. These results indicate that analytical inventory planning can enhance operational efficiency in small-scale agroindustrial enterprises.
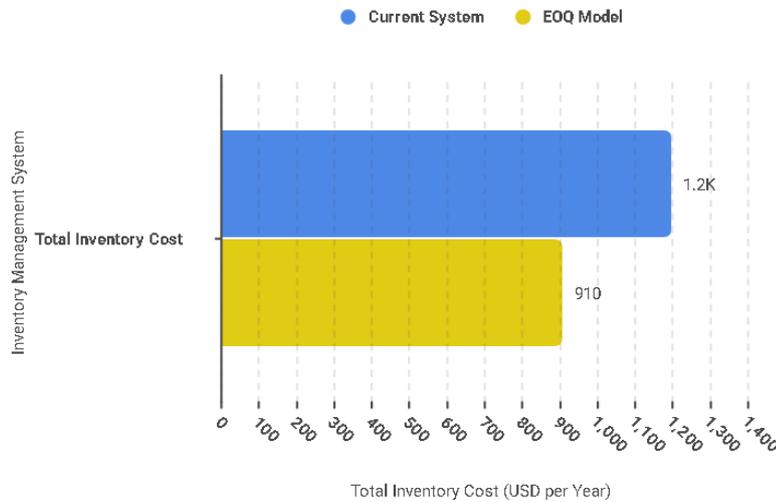
Figure 2. Inventory Cost Comparison Between Current System and EOQ Model

Figure 2 illustrates the difference in total inventory cost between the current procurement practice and the EOQ-based system. The visual comparison highlights that the EOQ model results in a significantly lower inventory cost compared with the existing system. This reduction occurs because the EOQ model balances ordering costs and holding costs more efficiently. The figure demonstrates the operational benefit of adopting analytical inventory planning within the enterprise.

Discussion

The findings of this study demonstrate that inventory management plays a critical role in improving operational efficiency within small-scale agroindustrial enterprises. The existing procurement practice observed in the milkfish floss enterprise reflects a common pattern found in many micro and small agro-processing businesses. Inventory decisions are frequently based on experience rather than analytical evaluation of cost components. Such practices often result in inefficient ordering policies that increase operational expenses. Previous research conducted by (Xu et al., 2023) explains that inventory systems lacking analytical optimization frequently experience higher total costs due to unbalanced ordering and holding costs. The results of this study confirm that systematic inventory models can provide valuable decision support for small enterprises. By applying EOQ calculations, the enterprise was able to identify a more efficient procurement strategy. These findings support the view that analytical operations management tools can improve decision-making in small-scale production systems.

Another important insight from the study relates to the operational characteristics of agro-processing enterprises. Raw materials used in agroindustry often involve perishable products and fluctuating supply conditions. Efficient procurement planning therefore becomes essential to ensure production continuity and reduce the risk of supply disruption. Research on agroindustrial systems conducted by Pizarro Levi, Starobinsky, and Gonzalo (2025) highlights that operational efficiency is a key factor influencing the sustainability of agro-processing industries. The ability to maintain stable raw material availability directly affects production performance and product quality. In the case of the milkfish floss enterprise, the EOQ model helps maintain sufficient stock while minimizing excessive

storage costs. This balanced procurement strategy contributes to improved operational stability. Consequently, inventory optimization plays a strategic role in strengthening agroindustrial competitiveness.

The results also highlight the importance of integrating analytical management tools into small enterprise operations. Many small agroindustrial businesses operate with limited managerial capacity and rely on informal decision-making processes. Kusnandar, Setyowati, and Rahayu (2023) note that improving managerial capabilities is essential for strengthening the competitiveness of small agro-processing enterprises. Analytical models such as EOQ offer practical solutions because they require relatively simple data inputs. Despite their simplicity, these models can provide valuable insights for improving operational efficiency. The findings of this study demonstrate that even basic inventory optimization techniques can significantly reduce procurement costs. By adopting such tools, small enterprises can improve resource allocation and operational planning. This integration of analytical decision-making can enhance the overall performance of agroindustrial businesses.

Another important aspect discussed in this study concerns the role of supply chain management in agroindustry. Agroindustrial enterprises operate within broader agricultural supply networks involving producers, suppliers, and distributors. Efficient inventory management therefore contributes not only to internal operational efficiency but also to supply chain coordination. Research on agro-food supply chains conducted by (Lu et al., 2022) emphasizes that effective resource management strengthens the resilience of agricultural production systems. Inventory optimization helps enterprises manage procurement schedules and maintain stable relationships with suppliers. This coordination is particularly important in agro-processing industries where raw materials are sourced from local agricultural producers. By improving procurement planning, enterprises can enhance supply chain reliability. As a result, analytical inventory models contribute to both operational and supply chain efficiency.

The findings of this study also provide insights into the broader implications of operational efficiency for rural economic development. Small-scale agroindustries serve as important drivers of value-added production in rural economies. Improving the operational performance of these enterprises can contribute to income generation and employment opportunities. Research on agricultural enterprise performance conducted by Djomo et al. (2021) highlights that improving efficiency can significantly enhance the profitability of small-scale agricultural businesses. The implementation of inventory optimization models therefore supports not only operational improvements but also broader economic development goals. By reducing unnecessary operational costs, enterprises can allocate resources more effectively to expand production capacity. This improvement strengthens the sustainability of agroindustrial businesses. Consequently, inventory optimization represents an important strategy for supporting rural agroindustrial development.

Implications

The results of this study provide several important implications for both managerial practice and academic research. From a managerial perspective, the findings demonstrate that simple analytical tools such as the EOQ model can significantly improve procurement efficiency in small-scale agroindustrial enterprises. Implementing structured inventory planning enables business owners to reduce operational costs while maintaining stable production processes. From a supply chain perspective, optimized procurement decisions contribute to improved coordination between agroindustrial enterprises and raw material suppliers. The study also highlights the importance of integrating basic operations management techniques into small enterprise decision-making processes. For policymakers and development institutions, the findings suggest that training programs focusing on operational management skills could strengthen the competitiveness of small agroindustries. From an academic perspective, this research contributes to the literature on inventory management within micro-scale agro-processing systems. The study therefore demonstrates that operations management models can be effectively applied in small agroindustrial contexts.

Limitations

Despite its contributions, this study has several limitations that should be acknowledged. The research focuses on a single agroindustrial enterprise, which limits the generalizability of the findings to other agro-processing industries. Operational conditions may vary across different agroindustrial sectors depending on raw material characteristics and production processes. In addition, the EOQ model assumes relatively stable demand conditions, whereas real-world demand may fluctuate due to market changes. The study also does not incorporate other advanced inventory models that consider uncertainty in supply or demand. Furthermore, the analysis focuses primarily on cost efficiency and does not evaluate other operational factors such as supply risk or quality variability. Data availability from small enterprises may also influence the accuracy of inventory parameter estimation. Future research should therefore consider broader datasets and more complex inventory models.

Suggestions

Future research should expand the analysis by examining inventory optimization across multiple agroindustrial enterprises in different regions. Comparative studies involving several agro-processing sectors could provide deeper insights into the effectiveness of inventory models in diverse production environments. Researchers may also consider integrating more advanced inventory models such as stochastic EOQ or safety stock models. These approaches can account for uncertainty in demand and supply conditions that frequently occur in agroindustrial systems. In addition, future studies could explore the integration of digital inventory management systems in small agroindustrial enterprises. Technological adoption may further improve operational efficiency and decision-making accuracy. Investigating the relationship between inventory management practices and supply chain performance would also provide valuable insights. Such research can contribute to the development of more sustainable and resilient agroindustrial supply chains.

CONCLUSION

This study examined the efficiency of raw material inventory management in a small-scale agroindustrial enterprise producing milkfish floss in Indonesia by applying the Economic Order Quantity (EOQ) model. The findings reveal that the enterprise's existing procurement practice relied largely on intuitive decision-making, resulting in relatively frequent ordering cycles and higher operational costs. Through the application of the EOQ model, the study identified an optimal order quantity that allows the enterprise to reduce procurement frequency while maintaining stable raw material availability for production. The comparative analysis between the current inventory system and the EOQ-based model demonstrates that systematic inventory planning can significantly reduce total inventory costs. These results confirm that even simple analytical inventory models can provide meaningful operational improvements in small-scale agroindustrial enterprises. The study therefore highlights the importance of integrating quantitative decision-support tools into the operational management practices of micro and small agro-processing businesses. From a supply chain perspective, improved inventory planning contributes to more efficient procurement coordination between agroindustrial enterprises and raw material suppliers. Such coordination is essential for maintaining production stability and minimizing disruptions in agro-based manufacturing systems.

Beyond its operational findings, the research also contributes to the broader understanding of inventory management in small-scale agroindustrial contexts. Much of the existing literature on agroindustrial development focuses on institutional frameworks, technological adoption, or rural economic transformation, while relatively limited attention has been given to operational optimization at the enterprise level. By demonstrating the practical applicability of the EOQ model in a micro-scale production environment, this study expands the discussion on how operations management principles can be implemented within small agro-processing businesses. The results indicate that structured inventory management can enhance operational efficiency without requiring complex technological

infrastructure. This insight is particularly relevant for developing economies where many agroindustrial enterprises operate with limited managerial resources. Furthermore, the findings emphasize that improving operational efficiency can strengthen the competitiveness and sustainability of rural agroindustrial enterprises. By reducing unnecessary operational costs, enterprises can allocate resources more effectively to production development and market expansion. Consequently, the integration of analytical inventory management tools represents an important strategy for supporting sustainable agroindustrial development and strengthening supply chain performance in emerging agro-based industries.

AUTHOR CONTRIBUTIONS STATEMENT

Zarin Taj was responsible for the conceptualization of the research, data collection, formal analysis, and preparation of the original manuscript draft. Zarin Taj also conducted the empirical investigation and performed the inventory calculations using the Economic Order Quantity (EOQ) model. Raden Roro Lia Chairina contributed to the research supervision, methodological development, and validation of the analytical framework. Raden Roro Lia Chairina also provided critical revisions to improve the academic quality and clarity of the manuscript. Both authors contributed to the interpretation of the research findings and participated in the review and editing of the final manuscript. All authors have read and approved the final version of the manuscript prior to submission.

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