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Optimizing Raw Material Inventory Costs at the Corporate Macro Level: A Financial EOQ Approach and Risk Mitigation at PT. Mayora Indah Tbk (2024–2025)

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ABSTRACT

Purpose: This study evaluates the adequacy of public data for applying Economic Order Quantity (EOQ), Safety Stock (SS), and Reorder Point (ROP) to PT Mayora Indah Tbk's inventory for the 2024–2025 period.

Research Method: This study employs a descriptive quantitative approach with a documentary design. The data were drawn from consolidated financial statements and sustainability reports, and were then evaluated based on physical data requirements, relevant costs, demand, and lead time.

Results and Discussion: The public report provides only aggregate inventory values and does not disclose quantities, ordering costs, storage costs, or lead times for each material. The insurance coverage amount is not the annual premium, and data do not support the ordering frequency and previous SS parameters. Therefore, the estimates for EOQ, ROP, cost savings, and margin improvement cannot be validated.

Implications: Applying the model requires transaction data at the homogeneous material level, including physical usage, incremental costs, order history, lead times, and service targets. The research findings serve as the basis for improving inventory data management and for subsequent implementation studies.

Originality: This study highlights the methodological limitations of using consolidated financial statements to make operational EOQ decisions at large-scale FMCG companies.

Keywords: data readiness; inventory management; economic order quantity; safety stock; reorder point.

1. Introduction

PT Mayora Indah Tbk is a leading fast-moving consumer goods (FMCG) manufacturer in Indonesia that operates 14 factories and has a global portfolio of packaged food and beverage products. Although it recorded net revenue of Rp36.07 trillion in 2024—exceeding its target of Rp34.29 trillion—the company faced significant profitability pressures, with net income coming in at only Rp3.07 trillion against a target of Rp3.48 trillion. The company's official report confirmed that this shortfall was primarily due to an increase in cost of goods sold resulting from fluctuations in raw material prices. However, an increase in cost of goods sold does not in itself prove the existence of inefficiencies in procurement policies, as commodity prices, exchange rates, logistics costs, and production mix can also influence changes. These conditions nevertheless highlight the importance of evaluating inventory management as one of the operational cost components that the company can control (PT Mayora Indah Tbk, 2024).

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The inherent dilemma in inventory management compounds this challenge. Excess inventory (overstock) increases storage costs and ties up working capital, while inventory shortages (stockouts) can disrupt production continuity. Although the company's customer loyalty is reported to be at a high score of 8.99, this figure cannot be used as direct evidence that stockouts have affected customer loyalty without supporting data on stockout incidents, production stoppages, delays in fulfilling orders, and customer responses. This situation is all the more critical given that 83% of the company's raw material supply relies on local partners. Therefore, a precise mechanism for controlling order quantities and frequencies is necessary. Such a mechanism must account for the characteristics of each material—such as usage rate, physical unit, price, lead time, shelf life, storage conditions, and supplier policies—rather than aggregating all raw materials and packaging materials into a single monetary value (PT Mayora Indah Tbk, 2024). Previous research has shown that inventory and supply chain problems have been analyzed using various optimization approaches. Chakir *et al.,* (2024) examined production, distribution, inventory, and allocation issues in a sustainable medical supply chain using metaheuristic algorithms. Meanwhile, Bucarey *et al.,* (2024) addressed uncertainty in optimization parameters through a bilevel optimization approach. Their study demonstrated that optimization decisions can be sensitive when uncertain parameters are treated as deterministic values. Therefore, assumptions regarding demand, ordering costs, holding costs, and lead times must be clearly stated and transparently tested. Pham *et al.,* (2023) explore the factors supporting knowledge management in implementing a blockchain-based food supply chain. Although these three studies expand our understanding of optimization, uncertainty, and information management in supply chains, they do not specifically examine the application of the Economic Order Quantity (EOQ) to the inventory of PT Mayora Indah Tbk.

Evidence from applications at other companies shows relatively consistent results. The EOQ method was reported to reduce total inventory costs by 65–73% at a fuel terminal (Arief & Adi, 2024), by 67.41% at the Afiah bakery (2025), and from Rp11.36 billion to Rp74.76 million in palm oil operations (Subur & Andriani, 2025). Several studies—specifically, seven out of the ten sources reviewed—demonstrate the application of EOQ across various manufacturing sectors to determine order quantities, reduce ordering frequency, and mitigate inventory risks through the calculation of safety stock (Reyaldi *et al.,* 2023). However, the reported efficiency gains are context-dependent, as material characteristics, company scale, observation periods, demand patterns, and cost structures specific to each study influence them. Therefore, these findings cannot be directly applied to PT Mayora Indah Tbk without comparable data on demand, purchasing, storage, and supplier performance. Most previous studies applied the EOQ using physical demand data for a single type of material or a relatively homogeneous group of materials. These calculations require information on annual demand in physical units, the cost per order, storage cost per unit, and the actual ordering frequency. In contrast, PT Mayora Indah Tbk manages heterogeneous raw materials and packaging materials, as they differ in price, physical units, lead time, storage requirements, shelf life, suppliers, and purchasing policies. Combining all these materials into a single corporate monetary demand value would result in an EOQ in rupiah that has limited operational significance. Therefore, EOQ calculations should be performed separately for each material or group of materials with relatively homogeneous characteristics. Available sources also do not provide specific empirical evidence regarding purchase order frequency, physical material consumption, demand variation, supplier lead times, stockout occurrences, inventory insurance premiums, and ordering costs per transaction at PT Mayora Indah Tbk. The inventory insurance coverage amount cannot be treated as an annual insurance expense because the two represent different accounting concepts. Similarly, professional service fees, taxes, licensing fees, and estimated purchase

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freight costs cannot be classified as ordering costs unless there is evidence that these costs vary with each purchase order. These data limitations hinder the use of public information to identify the company's actual inventory policies and calculate validated cost savings.

Based on this discussion, there is a gap between the requirements for implementing EOQ—which necessitates item-level data—and the limitations of inventory information available at the corporate level. Previous research has not provided empirical evidence regarding the application of EOQ at PT Mayora Indah Tbk, which categorizes raw materials and packaging materials based on their material characteristics. Previous research has also not explained how limitations in publicly available data should be addressed so that insurance coverage values, corporate costs, order frequency, lead time, and maximum utilization are not used as EOQ parameters without an empirical basis. Thus, an approach is needed that clearly distinguishes between the company's actual data, analytical assumptions, and simulation results. Based on these gaps, the research questions are: (1) how should relevant materials and inventory cost components be classified in the application of the EOQ at PT Mayora Indah Tbk; (2) how can EOQ, safety stock, and reorder point be calculated for each material or group of homogeneous materials using verifiable parameters; and (3) what are the limitations of using publicly available company data in inventory cost analysis? This study aims to evaluate the application of EOQ, Safety Stock, and Reorder Point for materials with relatively homogeneous characteristics, compare the calculation results with an explicitly stated baseline scenario, and identify data requirements for operational implementation. If actual procurement records are unavailable, the baseline scenario is treated as a simulation and is not referred to as the company's actual inventory policy.

The novelty of this study lies in its critical evaluation of the application and limitations of public-data-based EOQ in a large-scale FMCG company. This study does not develop a Financial EOQ based on the aggregation of corporate inventory values. However, it emphasizes the separation of heterogeneous materials, the identification of ordering costs that actually vary with each transaction, the distinction between inventory coverage value and annual insurance premiums, and the use of transparent Safety Stock and Reorder Point parameters. Therefore, the calculation results are interpreted as conditional analytical simulations, not as realized savings, implemented policies, or direct evidence of increased corporate profitability.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 presents the research method and design. Section 4 provides the results and discussion. Section 5 presents Concluding Remarks and Recommendations.

2. Literature Review and Hypothesis Development

2.1 Literature Review

2.1.1 *Safety Stock*

Safety stock is an additional amount of inventory that a company maintains to account for uncertainties in demand, supplier lead times, and production output. It serves as a buffer when actual consumption during the lead time exceeds projections or when material receipts are delayed. Qin *et al.,* (2022) explain that determining safety stock involves balancing service levels and response times for meeting demand. Safety stock that is too low increases the risk of stockouts, while an excessively high level adds to storage costs and tied-up working capital. Berling & Sonntag (2022) also demonstrate that demand and

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production output uncertainty affect inventory levels and operating costs. Therefore, safety stock must be determined based on the characteristics of each material, rather than by aggregating heterogeneous raw materials and packaging materials. The calculation of safety stock should ideally incorporate demand variability, lead time variability, and the service level set by the company. Saldanha *et al.,* (2023) developed a nonparametric bootstrap-based approach to determine safety stock when the demand distribution cannot be assumed to follow a specific distribution. This approach emphasizes that safety stock must be determined using historical data, not an arbitrary additional percentage. The reliability of the calculation also depends on the quality of the inventory recording system, as unsystematic data can lead to both material surpluses and shortages (Alam *et al.,* 2023). Hernandez & Rojas (2023) demonstrate that data-driven inventory management based on service levels can reduce inventory value without compromising internal service levels. Therefore, implementing safety stock at PT Mayora Indah Tbk must use supplier usage and performance data at the material level; if such data is unavailable, the results can only be presented as conditional simulations.

2.1.2 *Reorder Point (ROP)*

The reorder point (Reorder Point/ROP) is the inventory level that triggers a company to place a reorder so that new materials are received before the available inventory runs out. In a continuous review system, inventory levels are monitored continuously, and orders are placed when the inventory level reaches or falls below the ROP. Conceptually, the ROP is determined based on material demand during the lead time (lead-time demand) plus a safety stock. Thus, the accuracy of the ROP depends on the rate of material consumption, the duration and variability of the lead time, demand uncertainty, and the service level set by the company. Essila (2022) explains that a probabilistic inventory policy that accounts for demand variability and lead time can help determine an adequate inventory level while controlling costs. Setting the ROP too high can increase storage costs, whereas setting it too low increases the likelihood of a stockout before a new order is received. Saldanha (2022) demonstrates that conventional ROP calculations can yield unreliable estimates when the demand distribution over the lead time is skewed, multimodal, or does not follow a normal distribution. Therefore, ROP determination must be tailored to the empirical characteristics of demand and the target fill rate. Jadidi *et al.,* (2025) also emphasize that ROP under uncertain demand should consider the probability distribution, the cost of stockouts, and the consequences of service loss, rather than just average usage during the lead time. Zhou *et al.,* (2023) further demonstrate that demand forecasting errors affect inventory control strategies, so ordering parameters need to be evaluated when demand patterns change. In a multi-level inventory system, the ROP must even be determined by considering inter-location relationships and material flow dynamics. Hammler *et al.,* (2023) explain that under this policy, an order is placed when inventory falls below a trigger point, and the inventory level is then increased until it reaches the target level. In this study, the ROP for PT Mayora Indah Tbk must be calculated separately for each material or homogeneous group of materials using actual usage data and lead times. If such data are unavailable, the ROP can only be presented as a conditional simulation and cannot be claimed as the company's actual reorder point.

2.1.3 *Raw Material Inventory Management*

Raw material inventory management is a series of activities involving planning, procurement, receiving, storage, usage, and control of materials to ensure the availability of production inputs in the appropriate

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quantity, quality, timing, and cost. The goal is to balance the risk of excess inventory—which increases storage costs, damage, expiration, and tied-up working capital—with the risk of inventory shortages that can hinder the production process. Utama *et al.,* (2022) explain that inventory decisions need to be integrated with procurement and production activities because changes in the quantity or timing of raw material purchases will affect work-in-process and finished goods. Zamani Dadaneh *et al.,* (2023) also demonstrate that simultaneous planning of purchase orders, production, and inventory can help control material shortages and surpluses under conditions of uncertain demand. The effectiveness of such management must be supported by an integrated inventory accounting information system, access controls, audit trails, and risk assessment procedures so that the receipt, storage, and issuance of materials can be reliably controlled and recorded (Sukmana & Wijaya, 2026). Thus, raw material management should not be based on aggregate inventory value but on the characteristics of each material or homogeneous group of materials.

The effectiveness of raw material inventory management is influenced by usage patterns, demand uncertainty, lead times, purchase prices, storage capacity, shelf life, and supplier reliability. Feng *et al.,* (2022) emphasize that inventory and production decisions must simultaneously account for supply and demand uncertainties to prevent companies from experiencing material shortages or excesses. Teerasoponpong & Sopadang (2022) demonstrate that data-driven decision support systems can integrate sourcing and inventory decisions under conditions of fluctuating demand, lead time, and supply costs. The use of predictive technology can also improve the accuracy of material requirement estimates; Ahakonye *et al.,* (2024) developed a multi-layer perceptron approach to support raw material inventory forecasting in manufacturing execution systems. From a financial perspective, inventory is a component of working capital, so its turnover rate must be managed efficiently. However, Arifani (2023) found that inventory turnover has a positive but non-significant relationship with the profitability of food and beverage companies. These findings indicate that inventory efficiency cannot be directly assumed to increase profits, as production costs, prices, sales, and market dynamics also influence profitability. In the context of PT Mayora Indah Tbk, inventory control must be conducted at the material level using physical units, consumption patterns, prices, lead times, and storage requirements. Combining heterogeneous raw materials and packaging materials into a single rupiah value is insufficient for making operational and accountable ordering decisions.

2.1.4 *Strategic Functions of Inventory*

Inventory serves a strategic function as a buffer that links procurement, production, distribution, and the fulfillment of consumer demand. The presence of inventory enables a company to maintain its operations when there is a timing mismatch between the receipt of materials, the production process, and market demand. Under normal conditions, inventory supports production continuity and service levels, whereas during disruptions, inventory absorbs supply uncertainties, demand spikes, and distribution delays. Guo *et al.,* (2025) identify inventory as a key instrument in building supply chain resilience through selective stockpiling, supplier diversification, capacity reservation, and flexible supply contracts. Huo *et al.,* (2024) also demonstrate that internal, supplier, and customer resilience are linked to customer satisfaction and firm performance, although their impact on financial performance is not always direct. Thus, the role of inventory extends beyond providing materials to include protecting operations from the risk of disruptions.

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Implementing these strategic functions requires a balance between cost efficiency, service levels, and operational resilience. Implementing just-in-time can reduce storage costs and waste, but overreliance on minimum inventory levels increases vulnerability during supply disruptions. Balkhi *et al.,* (2022) explain that just-in-time requires reliable suppliers, accurate information, and contingency mechanisms, whereas buffer inventory remains necessary in high-risk environments. Inventory is also a component of working capital, so every decision to increase stock has implications for liquidity. Huynh & Le (2025) found that companies tend to increase inventory as a strategic response to supply chain risks. However, Yeboah *et al.,* (2025) demonstrated that the relationship between inventory duration and operational profitability depends on demand characteristics. In the context of PT Mayora Indah Tbk, inventory policy must be determined based on critical levels, shelf life, supplier risk, the consequences of stockouts, and the working capital requirements for each material. Therefore, heterogeneous raw materials and packaging materials must be classified and managed separately.

2.1.5 *Components of Inventory Costs*

Inventory costs are the total economic sacrifices incurred from the procurement, storage, and fulfillment of material needs. The main components include purchase costs, ordering costs, storage costs, and inventory shortages. Purchase costs include the price of materials as well as costs directly attributable to their acquisition, while ordering costs only include variable expenses incurred each time an order is processed, such as order administration, receiving, and material inspection. San-José *et al.,* (2022) explain that inventory decisions need to consider purchase, ordering, storage, and shortage costs in an integrated manner. Seyedan *et al.,* (2023) also include fixed ordering costs, storage costs, and shortage costs in calculating total inventory costs. Supplier uncertainty can also affect order quantities, inventory levels, and shortage costs (Yassine, 2022). Therefore, professional services, general taxes, licensing fees, and estimated inbound freight costs cannot be categorized as ordering costs without evidence that these expenses vary and occur with every purchase transaction.

Storage costs include warehouse facility costs, material handling, utilities, depreciation, damage, obsolescence, tied-up capital, and insurance premiums actually paid. The insured value of inventory serves as the basis for asset coverage, not the annual insurance premium; therefore, it cannot be directly used as a storage cost. Meanwhile, shortage costs include lost sales, delayed orders, emergency purchases, production stoppages, and reduced service levels. For materials with a limited shelf life, the costs of quality degradation, expiration, and disposal must also be taken into account (Vázquez-Serrano *et al.,* 2025). Khakbaz *et al.,* 2(024) demonstrate that in systems with numerous items, suppliers, and locations, ordering and storage costs need to be disaggregated by item and facility level. Consequently, measuring inventory costs at PT Mayora Indah Tbk must use verified transaction data at the material or homogeneous group level, rather than combining heterogeneous raw materials and packaging into a single aggregate rupiah value.

2.1.6 *Metode Economic Order Quantity (EOQ)*

Economic Order Quantity (EOQ) is an inventory control method used to determine the order quantity that minimizes the sum of ordering costs and holding costs. The classical EOQ model assumes that annual demand, the cost per order, the holding cost per unit, the price of the item, and lead time are known and relatively constant; replenishment is done in a single batch, and there are no stockouts. Mathematically, the EOQ is formulated as, where is the optimal order quantity in physical units, is the

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annual demand, is the incremental cost per order, and is the annual storage cost per unit. Jaber & Peltokorpi (2024) explain that the EOQ model has evolved from a simple deterministic formulation into various models that accommodate product recovery and reverse logistics systems. Milewski & Wiśniewski (2022) also demonstrate that order quantity can be refined using a regression-based approach that accounts for demand, item value, weight, and logistics costs to better align with operational conditions.

The application of EOQ must be tailored to the characteristics of each material because the assumptions of the classical model are not always met in a manufacturing environment. Mallick *et al.,* (2023) developed an EOQ model that accounts for quality degradation, inflation, demand influenced by inventory levels, and lead time. Öztürk & Konstantaras (2025) incorporated defective products, staggered deliveries, and partial backordering, while Palanivel *et al.,* (2025) integrated uncertainty, product damage, fuzzy learning, green technology, and emissions policies. In the context of PT Mayora Indah Tbk, the EOQ must be calculated at the level of each material or group of homogeneous materials using demand in physical units, verified ordering costs, and storage costs per unit. Combining heterogeneous raw materials and packaging into a single rupiah value does not yield an operational order quantity. If purchase data per item is not yet available, the EOQ results must be presented as simulations or analytical scenarios, rather than a proven optimal policy or a representation of the company's actual policy.

***2.2** Hypothesis Development*

This study uses a deterministic inventory control framework as a theoretical foundation to explain the relationship between order quantity, inventory costs, safety stock, reorder point, and operational performance. This framework is based on the principle that inventory decisions must balance ordering costs, holding costs, material requirements, and lead-time uncertainty. Economic Order Quantity (EOQ) is used to determine the order quantity that minimizes total ordering and holding costs. At the same time, Safety Stock (SS) serves as a buffer to address demand fluctuations or lead times. Furthermore, the Reorder Point (ROP) determines the inventory level at which a new order must be placed, based on demand during the lead time and the amount of Safety Stock.

Applying this framework requires data at the item level or for relatively homogeneous groups of materials. Each material must have demand data in physical units, ordering costs per transaction, storage costs per unit, usage variation, service level, and supplier lead time. Therefore, this study does not treat heterogeneous raw materials and packaging materials as a single corporate inventory in rupiah terms. This study also distinguishes between procurement policies that were actually observed through company records and baseline scenarios created for simulation purposes. This distinction is necessary so that the results for EOQ, SS, and ROP are not interpreted as actual policies or savings that have already been realized.

***2.2.1** The Relationship Between EOQ and Inventory Control Efficiency*

EOQ is based on the principle of balancing ordering costs and holding costs. An order quantity that is too small can increase the frequency and cost of ordering, while a quantity that is too large can increase average inventory and holding costs. EOQ determines the order quantity at the point where the combination of these two components results in the minimum total inventory cost, assuming that demand, cost per order, and holding costs can be adequately estimated.

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Previous research has shown that determining order quantities based solely on estimates often leads to cost overruns. Arief and Adi (2024) reported a reduction in total inventory costs following the implementation of EOQ at a fuel terminal, while Suliyanti *et al.,* (2025) found that EOQ-based order quantities resulted in lower inventory costs compared to the purchasing policy at a bakery company. Subur and Andriani (2025) also reported substantial cost differences between EOQ calculations and the inventory control methods used in palm oil operations. These findings suggest that EOQ has the potential to yield lower total inventory costs when calculations incorporate relevant cost components and demand data. Nevertheless, the results from other studies cannot be directly generalized to PT Mayora Indah Tbk. Testing at this company must be conducted by comparing total inventory costs based on EOQ with total costs based on actual procurement records for each homogeneous material. If actual procurement records are unavailable, the comparison will only represent simulation results against a baseline scenario.

H1: *The total inventory cost of raw materials based on the EOQ order quantity is lower than the total inventory cost based on PT Mayora Indah Tbk.'s actual procurement policy.*

***2.2.2** The Relationship Between Safety Stock and the Smooth Operation of the Production Process*

Safety stock is additional inventory held to account for uncertainties in demand and lead time. Determining safety stock cannot be based solely on the assumption that maximum usage is a certain percentage above average usage. The calculation must incorporate data on usage variation, lead time variation, the specified service level, or forecasting errors. With this approach, the amount of safety stock reflects the level of risk and service targets that can be empirically justified. In the context of PT Mayora Indah Tbk, fluctuations in the prices of key raw materials and supply uncertainties pose challenges in maintaining material availability. Sella Arista *et al.,* (2025) demonstrate that safety stock can be used in conjunction with EOQ to determine the amount of safety stock based on the needs and usage patterns of raw materials. However, the presence of safety stock does not automatically guarantee that the production process will run more smoothly. This relationship needs to be tested using data on safety stock adequacy, stockout frequency, production line stoppages, production delays, or the inability to meet production schedules. Theoretically, adequate safety stock can reduce the likelihood of material shortages during periods of uncertainty. Therefore, the higher the level of safety stock adequacy relative to demand risk and lead time, the lower the likelihood of production stoppages due to material shortages.

H2: *The level of safety stock adequacy is positively related to the continuity of the production process at PT Mayora Indah Tbk.*

***2.2.3** The Relationship Between the Reorder Point and the Risk of Stockouts*

The Reorder Point indicates the inventory level that triggers a reorder. The ROP is generally determined based on material requirements during the lead time plus Safety Stock. Thus, the accuracy of the ROP depends on the accuracy of material usage data, the duration and variation of lead times, the service level, and the availability of safety stock. Arbitrary lead time assumptions—such as seven days for local suppliers and 30 days for international suppliers—cannot be used without supporting supplier performance records. Previous research indicates that the ROP can serve as an early-warning system in inventory control. Sella Arista *et al.,* (2025) used the ROP to determine reorder timing based on demand during the lead time and the amount of safety stock. Theoretically, placing an order when inventory

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reaches the ROP provides the company with time to receive materials before available inventory runs out. However, the effectiveness of the ROP in reducing stockouts can only be assessed using data on actual order times, material receipt times, consumption during the lead time, and the frequency of stockouts. If the ROP is determined using representative consumption and lead time data and is adhered to in the procurement process, the risk of running out of materials while waiting for orders to arrive is expected to decrease.

H3: *Accuracy and adherence to the Reorder Point are negatively correlated with the frequency of raw material stockouts at PT Mayora Indah Tbk.*

3. Research Method

3.1 Research Design and Scope

This study employs a descriptive quantitative approach using a documentary study design and analytical simulation. This approach was used to evaluate the feasibility of applying the Economic Order Quantity (EOQ), Safety Stock (SS), and Reorder Point (ROP) methods based on verifiable inventory data. The study does not examine causal relationships or directly assess the implementation of inventory policies because it does not use experiments, surveys, or operational observations at production facilities. Therefore, the calculation results are treated as model-based estimates, not as evidence that the EOQ policy has been implemented or has been proven to improve company performance. The research subject is the management of raw material and packaging material inventories at PT Mayora Indah Tbk during the 2024–2025 period. The unit of analysis is set at the level of individual materials or groups of homogeneous materials, rather than at the level of aggregate corporate inventory values. Materials can only be grouped if they share common functions, physical units, usage patterns, prices, lead times, shelf lives, storage conditions, and supplier policies. Raw materials and packaging materials are not treated as a single type of inventory because they have different operational characteristics. Thus, the EOQ output is expressed in physical units, such as kilograms, metric tons, liters, units, or cartons, rather than in rupiah.

3.2 Population, Sample, and Criteria for Material Selection

The study population includes all materials used in PT Mayora Indah Tbk's production activities during the observation period. The sample was determined using the purposive sampling technique, which involves selecting materials or homogeneous groups of materials for which complete data is available, including: (1) usage in physical units; (2) the date and quantity of each order; (3) traceable costs for each order; (4) average inventory; (5) actual supplier lead time; and (6) daily or periodic usage history. Materials with incomplete data, available only as aggregate rupiah values, or that cannot be separated from heterogeneous material groups were excluded from the EOQ, SS, ROP, and TIC calculations. Consolidated financial statements are used to explain the company's financial context but are not used as a substitute for material quantity data at the line-item level. If information is available only at the corporate level, it is presented as contextual data and is not used to generate operational ordering quantity recommendations. This restriction prevents generalizing results from a single material or a single group of materials to the entire plant and the company's entire inventory.

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3.3 Types, Sources, and Data Collection Techniques

The study utilized secondary data obtained from the annual reports of PT Mayora Indah Tbk, consolidated financial statements along with the Notes to the Financial Statements, sustainability reports, and operational documents detailing inventory transactions for the period 2024–2025. The recorded data included material codes and types, physical units, usage quantities, purchase dates and quantities, order frequency, price per unit, cost per order, average inventory, actual lead time, and usage variations during the observation period. Financial and operational data were separated to ensure that the monetary value of inventory was not equated with the physical quantity of materials. The research instrument consisted of a documentary data extraction sheet. Each figure was recorded along with the document name, period, record number, unit of measurement, and basis for classification. Data consistency was verified by comparing the opening balance, purchases, usage, and closing inventory balance. Cost data was also examined to ensure that each component had a direct relationship with ordering or storage activities. Estimates lacking supporting documentation—including the assumption that inbound freight costs are equivalent to a certain percentage of outbound freight costs—were not used. The ordering frequency was also not set at 52 transactions per year, unless purchase order records substantiated that number.

Table 1. Variables and Measurements

Variable	Code	Measurement	Data source
Annual needs	D	Total material usage over one year in physical units	Material Usage Record
Cost per order	S	The incremental costs incurred for each order	Order and Procurement Documents
Storage fees	H	Annual storage cost per unit of material	Inventory Records and Inventory Costs
Order quantity	Q	Quantity of materials in each order	Purchase Order
Average usage	$\bar{d}$	Average daily material usage	Daily Usage Log
Demand variability	σ_d	Standard deviation of daily usage	Daily Usage Log
Waiting time	L	Number of days between the order date and the receipt date	Orders and Receipts
Variability in wait times	σ_L	Standard deviation of actual wait time	Supplier Performance History
Safety stock	SS	Reserves based on demand variability, wait times, and service levels	Calculation Results
Reorder point	ROP	Requests during the wait time plus SS	Calculation Results
Total inventory cost	TIC	Applicable booking and storage fees	Calculation Results

3.4 Measuring Inventory Cost Components

Order-related costs per order () include only those costs that arise or change when a purchase order is placed. These may include order processing costs, communication with suppliers, receiving, inspection, and inbound transportation, provided that these costs can be directly traced to each order. Professional service fees, general taxes, licensing fees, and corporate administrative expenses are not included if their amounts do not vary with the number of orders. Annual costs that meet the criteria are divided by the actual number of orders for the relevant materials.

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$$S = \frac{\textit{Total annual incremental ordering costs}}{\text{Annual actual order volume}}$$

Annual storage costs per unit () include warehouse facility costs, handling costs, utility costs, damage, obsolescence, depreciation, insurance premiums actually paid on inventory, and reasonably allocable capital costs. The insured value of inventory is not treated as an insurance expense. If the financial statements present only the insured value of inventory without disclosing the annual premium, the insurance component is not included in storage costs. This approach prevents the calculation of storage cost percentages that are not economically reasonable.

$$H = \frac{\text{Total annual storage costs}}{\text{Average inventoryin physical units}}$$

All cost components must come from the same period, facility, and material group. Costs that cannot be reliably allocated are not forced into the model but are reported as data limitations.

3.5 Data Analysis Techniques

The analysis begins by grouping materials based on homogeneous operational characteristics. Next, the annual requirement (), the ordering cost per order (), and the holding cost per unit per year () are calculated for each material. The EOQ method is used when demand is relatively stable, replenishment can be considered as a single batch, ordering and holding costs can be identified, and there are no quantity discounts affecting the purchase price. The economic order quantity is calculated as follows:

$$EOQ = Q^* = \sqrt{\frac{2DS}{H}}$$

The ordering frequency for each model and the ordering interval are calculated based on the EOQ quantity:

$$F^* = \frac{D}{Q^*}$$
$$T^* = \frac{N}{F^*}$$

F^* shows the model's ordering frequency per year, while shows the ordering interval in days, with representing the number of operating days per year. These values are model outputs and are not treated as the company's actual frequencies.

Safety stock is calculated based on the specified service level and historical demand variation during the lead time. If the lead time is relatively constant, the formula used is:

$$SS = z\sigma_d\sqrt{L}$$

If both demand and waiting time vary and are assumed to be independent, the calculation uses:

$$SS = z\sqrt{L\sigma_d^2 + \bar{d}^2\sigma_L^2}$$

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In this formula, represents the standardized score based on the service level target, represents the standard deviation of daily usage, represents the average lead time, represents the average daily usage, and represents the standard deviation of lead time. The lead time is not assumed to be seven days for local suppliers or 30 days for import suppliers, but is calculated based on the difference between the order date and the actual receipt date. Maximum usage is also not arbitrarily set at 30% above the average. If demand history, service targets, or supplier performance data are unavailable, the SS is not calculated, and only the data requirement is reported.

The reorder point is calculated as the average requirement over the lead time plus the safety stock:

$$\boldsymbol{ROP} = (\bar{\boldsymbol{d}} \times \boldsymbol{L}) + \boldsymbol{SS}$$

The total inventory cost for a given order quantity is calculated by adding the ordering cost and the holding cost. If safety stock is held permanently, the holding cost is also included:

$$\boldsymbol{TIC}(\boldsymbol{Q}) = \left(\frac{\boldsymbol{D}}{\boldsymbol{Q}}\boldsymbol{S}\right) + \left(\frac{\boldsymbol{Q}}{\mathbf{2}} + \boldsymbol{SS}\right)\boldsymbol{H}$$

Purchase costs are not included if the price per unit is the same for all quantity alternatives, as this does not affect the selection of the EOQ. These costs are included if there are quantity discounts, changes in supplier prices, or other purchasing conditions that cause the price per unit to vary across scenarios. The notation is used consistently for annual storage costs per unit and is not interchangeable with the percentage of storage costs ().

3.6 *Comparative Analysis and Interpretation*

A comparison between the actual policy and the EOQ scenario is performed only if procurement records are available that include the actual order quantities and dates. The total cost of the actual policy is calculated using the actual observed order quantities, rather than based on the assumption of weekly orders. The cost difference is calculated as follows:

$$\boldsymbol{\Delta TIC} = \boldsymbol{TIC}_{\textbf{aktual}} - \boldsymbol{TIC}_{\textbf{EOQ}}$$

A positive value indicates the potential cost difference under the model's assumptions, not actual savings that have been realized. If actual transaction data is not available, the study only compares several order quantity scenarios and does not use terms such as "actual company policy," "validated savings," or "profit increase." The analysis also does not directly add the TIC difference to net income or the net profit margin because the impact on profitability requires information regarding implementation costs, taxation, purchase discounts, changes in supplier prices, working capital requirements, and other operational consequences.

The research results were evaluated descriptively based on the model outputs' alignment with cost criteria and data availability. Since no statistical tests were conducted, the hypotheses are not stated as "proven" or "accepted" in a causal sense. H1 was evaluated as the proposition that EOQ yields the mathematical minimum of ordering and holding costs based on the parameters used. H2 regarding safety stock is only analytically supported when calculated from measurable variations in demand, lead time, and service targets; these results do not prove production continuity without data on production

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disruptions. H3 regarding ROP only indicates a reorder threshold based on the model and does not prove a reduction in stockouts without implementation data or observations of stockout events.

4. Results and Discussion

4.1 Analysis Results

4.1.1 *Overview of PT Mayora Indah Tbk's Inventory Data*

Based on the Consolidated Financial Statements of PT Mayora Indah Tbk for the years ended December 31, 2024, and 2025, the company's inventory consists of raw materials, work in progress, finished goods, packaging materials, spare parts, and auxiliary materials. The values presented in the financial statements represent the consolidated monetary balances at the end of the period. These data can be used to illustrate the structure and changes in inventory value, but do not indicate physical quantities, purchase frequency, usage patterns, or inventory policies at each plant. The total value of inventory decreased from Rp6.437 trillion in 2024 to Rp6.021 trillion in 2025, a decline of 6.46%. The largest nominal decrease occurred in raw materials, from Rp3.280 trillion to Rp2.596 trillion, or 20.86%. The value of packaging materials also fell by 15.27%, while work-in-process increased by 23.85%. These changes indicate a shift in the composition of inventory value as of the reporting date. However, changes in the ending balance cannot be directly interpreted as an increase in efficiency, tighter procurement, or a decrease in material quantities, as inventory value is also influenced by acquisition cost, production volume, purchase timing, and material usage.

Table 2. Composition of PT Mayora Indah Tbk's Inventory for 2024–2025

Inventory components	2024 (Rp)	2025 (Rp)	Changes
Raw materials	3.280.376.767.383	2.596.183.725.946	−20.86%
Work in progress	1.616.842.360.946	2.002.478.815.642	+23.85%
Finished goods	937.239.836.784	844.343.102.979	−9.91%
Packaging materials	433.717.513.887	367.471.551.808	−15.27%
Spare parts	131.360.559.355	175.188.087.472	+33.36%
Auxiliary materials	37.564.576.915	35.641.276.866	−5.12%
Total inventory	6.437.101.615.270	6.021.306.560.713	−6.46%

Source: *Consolidated Financial Statements of PT Mayora Indah Tbk, Note 6, adapted.*

4.1.2 *Results of the EOQ Data Feasibility Analysis*

The notes to the financial statements disclose the value of raw materials and packaging materials used as Rp23,506,789,203,434 in 2024 and Rp24,302,418,895,684 in 2025. This value increased by 3.38%. Although it reflects the value of materials used over the course of one year, this line item combines heterogeneous raw materials and packaging materials and is stated in rupiah. This line item cannot be treated as an annual requirement () in the EOQ model because it does not disclose the physical quantity of each material. Raw materials such as sugar, flour, coffee, cocoa, oil, and milk have different prices, shelf lives, storage conditions, lead times, and purchasing policies. Packaging materials also have units of measure and procurement patterns that differ from those of raw materials. Therefore, combining all materials into a single monetary value does not yield an order quantity that the procurement department can apply. The figures of Rp23.507 trillion and Rp24.302 trillion in this study are used solely to provide information on the value of materials consumed, not as physical demand parameters for the

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EOQ. The findings also indicate that public reports do not yet provide data on incremental costs per order, actual order frequency, order quantities, daily consumption per material, and supplier lead time history. Consequently, the key parameters required to calculate EOQ, SS, ROP, and TIC on an operational basis are not yet fully available.

Table 2. Results of the Inventory Model Data Availability Assessment

Parameters	Available data	Evaluation results
Annual needs (D)	Total value of raw materials and packaging	Does not meet the requirement; not the physical quantity per material
Cost per order(S)	Not specifically disclosed	Cannot be verified
Storage fees(H)	Some common coverage limits and coverage amounts	Cannot be allocated per unit of material
Actual order quantity(Q)	Not disclosed	The actual baseline is not available.
Frequency order	Not disclosed	It cannot be assumed 52 times
Daily use	Not disclosed on a per-item basis	Demand variability cannot be calculated
Supplier lead time	Percentage of local suppliers available	Wait times and variations in wait times are not available
Level of service	Not disclosed	A value cannot be set for SS
Stockout incidents	Not disclosed	The impact on production continuity cannot be tested

Source: *Results of a review of company documents.*

4.1.3 *Order Cost Evaluation*

The financial statements do not disclose ordering costs at either the transaction or material level. The line items for professional services, taxes and permits, and general corporate expenses do not indicate that their values change each time a purchase order is issued. Therefore, these line items are not classified as ordering costs. Professional services costs may include activities unrelated to procurement, while taxes and licensing fees may be fixed or related to other corporate activities. The estimate of inbound freight costs at 15% of outbound freight costs was also excluded because it was not supported by transaction records or company policy. Inbound freight costs and outbound distribution costs have different allocation bases, routes, volumes, suppliers, and shipping destinations; therefore, one cannot be directly derived from the other. Furthermore, the assumption of 52 orders per year was not used because public reports do not indicate that the company places orders every week. Consequently, ordering costs of Rp2,613,412,961 per order in 2024 and Rp2,561,655,971 per order in 2025 were not retained as research findings. Valid ordering costs can only be calculated if the actual number of orders and traceable incremental costs for each order are available, such as document processing costs, supplier communication costs, receiving costs, inspection costs, and directly charged inbound transportation costs. With the available data, these values cannot be reliably determined.

4.1.4 *Evaluation of Storage Costs and Insurance Data*

Company documents reveal an insured inventory value of US$273,304,000 for 2024 and US$406,588,500 for 2025. These figures represent the limit on the value of assets covered by insurance, not the annual insurance premiums. Since the report does not state that the total insured value represents an expense paid, these figures are not converted to rupiah and are not included as storage costs. Previously using the insured value as the insurance cost resulted in estimated storage costs of 147.12% for 2024 and 228.45% for 2025. Both percentages stemmed from an error in data classification and cannot be used

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as inventory carrying costs. Consequently, the values for storage costs, EOQ, order frequency, and TIC derived from these percentages are deemed invalid and have been excluded from the main results. Depreciation, rent, and maintenance expenses reported in the financial statements also cannot be fully allocated as inventory storage costs. The consolidated financial statements do not break down the portion of costs specifically used by the raw material warehouse, packaging material warehouse, production facilities, offices, or other assets. Annual storage costs per unit () therefore cannot yet be calculated without actual insurance premium data, warehouse facility area and costs, handling costs, damage, obsolescence, utilities, capital tied up, and the average physical quantity of each material.

4.1.5 *EOQ Evaluation and Order Frequency*

Since the parameters at the material level are not yet fully available, this study does not produce operational EOQ estimates for either 2024 or 2025. The EOQ figures of Rp288,988,790,408 and Rp233,454,214,308 were not retained because they were expressed in rupiah, derived from a combination of heterogeneous materials, based on unverified ordering cost estimates, and influenced by errors in the classification of insurance coverage values. Conceptually, the EOQ should determine the physical quantity ordered for a single material or a homogeneous group of materials. Therefore, the ordering frequencies of 81.3 and 104.1 times per year derived from these estimates also cannot be used as recommendations. The results of the research at this stage indicate that publicly available financial statements are sufficient for a descriptive analysis of inventory value but are not yet adequate for determining an order lot size that can be applied at the material level.

4.1.6 *Evaluation of Safety Stock and Reorder Point*

The 83% proportion of local suppliers does not provide information on the lead time for each supplier. Therefore, the lead times of 7 days for local suppliers, 30 days for import suppliers, and a weighted average of 10.91 days were not used. The proportion of suppliers describes the composition of supplier partners, not the distribution of time between order placement and material receipt. Lead times must be calculated based on the history of order dates and receipt dates for each material and supplier. A maximum usage of 30% above average usage also lacks an empirical basis and is therefore excluded from the calculation. Without observations of daily usage, standard deviation of demand, lead time variation, forecasting error, and service level targets, safety stock cannot be determined with precision. Therefore, the SS values of Rp210,788,276,884 and Rp217,922,786,426 are not retained. The reorder point (ROP) must be defined as the physical quantity of material that triggers a reorder. Since the SS values and lead times cannot be verified, the ROP values of Rp913,415,866,499 and Rp944,332,074,514 were also excluded. This study does not conclude that a specific SS or ROP can ensure the smooth operation of the entire production line because data on stockouts, supplier delays, production stoppages, or the implementation of such policies are not available.

4.1.7 *Evaluation of Total Inventory Costs and the Company's Baseline*

Public reports do not disclose the quantity and frequency of each order actually placed by the company. Therefore, the scenario of 52 orders per year is not considered the "company's actual policy." The order quantity, calculated as the annual usage value divided by 52, is a model assumption, not an observed procurement record. An actual baseline can only be established from purchase order documents, material receipts, and inventory cost records for the same period. Since the baseline, ordering costs,

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and holding costs cannot be verified, the TIC for the actual policy and the TIC for EOQ are not recalculated. The savings figures of Rp43,268,325,721 for 2024 and Rp133,715,310,431 for 2025, along with efficiency rates of 9.24% and 20.05%, were excluded from the research results. These figures do not represent validated savings because they stem from a comparison of two scenarios that rely on several unobserved assumptions. The study also did not calculate changes in the net profit margin by directly adding the estimated inventory savings to net income. The impact on profitability requires data on implementation costs, additional ordering activities, changes in supplier prices, volume discounts, taxation, working capital requirements, technology costs, and other operational consequences. Therefore, the 35-basis-point increase in the Net Profit Margin is not presented as a research result.

4.1.8 *Summary of Research Findings*

The research findings indicate that PT Mayora Indah Tbk's public documents can be used to illustrate changes in inventory value and composition during 2024–2025. However, these documents do not yet provide operational data at the level of detail required to calculate EOQ, SS, ROP, and TIC validly. The main findings of this study, therefore, consist of an evaluation of data readiness and the identification of information needs for the implementation of inventory models, rather than the determination of the company's optimal order quantity.

Table 3. Final Status of Inventory Analysis Results

Outcome components	Status	Basis for the decision
Breakdown of Inventory Value for 2024–2025	Retained	Based on the financial statements
Changes in the value of raw materials and packaging materials	Presented descriptively	Not to be interpreted as a change in quantity
Value of materials used	Retained as financial information	Not used as EOQ
Order fee per transaction	Order fee per transaction	No incremental costs or order quantities are available
Storage cost rates of 147.12% and 228.45%	Issued	The sum insured is incorrectly treated as a premium
EOQ in rupiah	Issued	Not the physical quantity and the combination of heterogeneous materials
81.3 and 104.1 times	Issued	Derived from an invalid EOQ
SS in rupiah	Issued	Maximum demand and lead time are based on assumptions.
ROP in rupiah	Issued	Not supported by SS data and actual lead times
ICT and Cost Savings	Issued	Actual baseline and cost parameters are not available
Impact on Net Profit Margin	Issued	This is speculative and does not take other impacts into account

Based on these results, H1 was not empirically tested because the EOQ quantity at the material level could not be calculated from the available data. H2 cannot be considered supported because there is no data on the implementation of safety stock or observations regarding production smoothness. H3 also cannot be considered supported because there is no data on the implementation of ROP or instances of stockouts. With a document-based descriptive design, these three statements are treated as analytical propositions for further research, rather than as proven causal hypotheses.

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4.2 Discussion

***4.2.1** Feasibility of Applying EOQ and Cost Efficiency (H1)*

The research findings indicate that PT Mayora Indah Tbk's publicly available data is insufficient to measure cost efficiency using the Economic Order Quantity (EOQ) method at the material level. The values for raw materials and packaging materials—Rp23.507 trillion in 2024 and Rp24.302 trillion in 2025—represent aggregate monetary values, not annual demand in physical units. Using these values as demand parameters ignores differences in price, usage patterns, shelf life, storage conditions, lead time, and purchasing policies for each material. Consequently, the EOQ expressed in rupiah cannot be translated into a decision regarding the number of kilograms, metric tons, liters, or units that should be ordered. This issue is also related to the unavailability of verifiable ordering and holding costs. Expenses for professional services, taxes, permits, and estimated inbound freight costs do not vary with each order and therefore do not meet the criteria for incremental ordering costs. Furthermore, the insurance coverage amount represents the limit of asset protection and not the annual insurance premium. Using the insurance coverage amount as a holding cost results in cost rates of 147.12% in 2024 and 228.45% in 2025, which are economically unreasonable. Since these cost parameters are invalid, the resulting EOQ, ordering frequency, and TIC derived from them cannot be upheld.

Conceptually, the EOQ determines the balance between ordering costs and holding costs for each item or group of homogeneous items. Jaber and Peltokorpi (2024) point out that developing an EOQ model still requires consistent definitions of parameters and units of measurement. Milewski and Wiśniewski (2022) also emphasize the importance of using demand data, product characteristics, and logistics costs that closely reflect actual operating conditions. Therefore, the application of the EOQ at PT Mayora Indah Tbk can only be reliably evaluated if data on physical consumption, cost per order, storage cost per unit, and procurement history are available for each material. Given these limitations, H1 cannot be declared proven or accepted. The projected savings of Rp43.27 billion in 2024 and Rp133.72 billion in 2025 are not validated savings because they are based on an order frequency of 52 orders per year that does not originate from the company's procurement records. The research findings do not contradict the EOQ concept but indicate that the benefits of EOQ depend on the quality and level of detail of the data. Thus, H1 can only be upheld as a proposition to be tested using transaction data at the material and production facility levels.

***4.2.2** Safety Stock and Production Continuity (H2)*

The research findings indicate that the previous safety stock level was not derived from historical variations in demand and lead times. The maximum usage set at 30% above average usage is an assumption not supported by material usage records. Similarly, the lead times of seven days for local suppliers and 30 days for import suppliers are not derived from the history of order and receipt dates. The 83% share of local suppliers merely reflects the supplier mix and cannot be used to determine the duration or variation of lead times. The company's statement regarding maintaining sufficient inventory to anticipate shortages indicates management's concern for production continuity. However, this statement does not disclose the amount of safety stock, the service level, demand variability, or supplier performance. Therefore, this statement cannot be used to validate the safety stock recommendations of Rp210.79 billion in 2024 and Rp217.92 billion in 2025. In addition to being expressed in rupiah, these two figures combine materials with different risks and usage patterns.

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Theoretically, safety stock serves as a buffer to address demand uncertainty and lead times. Qin *et al.,* (2022) explain that safety stock levels are related to service levels and response times, while Saldanha *et al.,* (2023) demonstrate that determining these levels requires information regarding the distribution or empirical patterns of demand uncertainty. Berling and Sonntag (2022) also demonstrate that variations in output and material flow can influence inventory control requirements. This supports the conceptual use of safety stock but does not justify the use of arbitrary parameters when historical data is unavailable. H2 regarding the effect of safety stock on production smoothness cannot be proven. This study did not examine the implementation of safety stock, instances of material shortages, production line stoppages, or production demand fulfillment rates. Setting a higher safety stock level does not always improve performance, as it can increase storage costs, spoilage, and tied-up working capital. Therefore, the relationship between safety stock and production continuity must be tested using data on material usage, service levels, supplier delays, and production disruption incidents for each material.

4.2.3 *ROP and Stockout Risk (H3)*

The ROP values of Rp913.42 billion in 2024 and Rp944.33 billion in 2025 cannot be maintained as reorder points. The ROP should indicate the physical quantity of a material remaining when a new order must be placed. The aggregate book value cannot serve as an operational signal because price changes can increase or decrease the inventory value without altering the quantity of material available. A single corporate ROP value also cannot determine which specific materials should be ordered when raw materials and packaging materials have different lead times and consumption rates. The ROP value is also invalid because it uses a lead time of 10.91 days and a safety stock level not supported by historical data. Setting the ROP requires the average demand over the lead time, demand variation, lead time variation, and service level for each material. Without these parameters, the ROP is merely an assumption-based simulation and cannot be considered a measurable early-warning system. The information that 83% of suppliers are local suppliers also does not prove that all of these suppliers have shorter lead times or uniform reliability.

Conceptually, ROP can help determine the reorder point so that inventory remains available until the next order is received. Milewski and Wiśniewski (2022) demonstrate that determining the ROP must take into account item-specific parameters, demand, and logistics costs relevant to operational conditions. However, the effectiveness of ROP in reducing stockouts cannot be concluded solely from mathematical calculations. This claim requires a comparison of the incidence of stockouts, fulfillment delays, emergency purchases, and production disruptions before and after ROP implementation. Thus, H3 cannot be declared proven or accepted based on the available data. The study only supports the conceptual relevance of ROP as an inventory control mechanism, not its empirical effectiveness at PT Mayora Indah Tbk. Testing H3 requires operational data per material that includes order dates, receipt dates, usage quantities, inventory levels, and instances of material shortages.

4.2.4 *Implications for Profitability and Limits of Interpretation*

Estimated cost savings are not directly added to net income because the TIC variance used previously did not originate from the actual policy baseline. In addition, changes in order quantity and frequency may result in implementation costs, additional order processing, changes in transportation costs, loss of volume discounts, changes in supplier prices, information system requirements, and tax implications.

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All of these factors must be taken into account before the financial impact of implementing the inventory policy can be estimated. Therefore, the projected increase in the net profit margin of 12 basis points in 2024 and 35 basis points in 2025 is not retained as a research finding. A decline in a company's Net Profit Margin also cannot be directly attributed to inventory inefficiencies without controlling for changes in commodity prices, sales, product mix, production costs, foreign exchange rates, and other operating expenses. The relationship between inventory control and profitability requires a more comprehensive analytical model as well as actual implementation data.

5. Concluding Remarks and Recommendation

This study aims to evaluate the feasibility of applying Economic Order Quantity (EOQ), Safety Stock (SS), and Reorder Point (ROP) in inventory control at PT Mayora Indah Tbk for the 2024–2025 period. The study employs a descriptive quantitative approach with a documentary design based on the company's consolidated financial statements and sustainability reports. The analysis is directed toward determining whether the company's publicly available data is sufficient to determine the economic order quantity, safety stock, reorder point, and total inventory costs. The model requires data at the material level, including demand in physical units, incremental cost per order, storage cost per unit, consumption history, actual lead time, and target service level. The research results show that the company's public reports are sufficient to describe changes in inventory value and composition but are not yet sufficient to inform operational inventory decisions. The values of raw materials and packaging materials used are available only in aggregate terms in rupiah and therefore cannot be treated as annual requirements for each material. Professional service fees, taxes, licensing fees, estimated inbound freight costs, and the assumption of 52 orders per year also cannot be used because procurement transaction records do not support them. Furthermore, the insurance coverage value does not represent the annual insurance premium; therefore, the storage cost rates of 147.12% and 228.45% are deemed invalid. Consequently, the estimates for EOQ, SS, ROP, TIC, savings of Rp43.27 billion and Rp133.72 billion, and an increase in the Net Profit Margin of 35 basis points are not retained as research findings. H1, H2, and H3 have not received empirical support because this study did not use statistical testing, implementation data, or operational observations. H1 could not be evaluated because physical quantities and relevant costs at the material level were not available. H2 could not be confirmed because safety stock was previously calculated using assumed maximum usage and lead times, and production continuity data was unavailable. H3 also could not be confirmed because ROP was not derived from actual demand history and lead times, and observations of stockout events were unavailable. These three hypotheses are therefore positioned as analytical propositions requiring further testing, not as proven causal relationships.

The theoretical value of this study lies in the assertion that the application of EOQ in large-scale manufacturing companies still requires a unit of analysis in the form of individual materials or homogeneous groups of materials. Consolidated financial values cannot replace physical quantities in generating ordering decisions. Practically, this study provides a framework for evaluating data readiness before implementing an inventory model. Management can develop a database that integrates material codes, physical usage, purchase orders, incremental costs, receipts, lead times, service levels, and stockout events. From a policy perspective, the definition and classification of inventory costs need to

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be standardized so that asset coverage values, insurance premiums, ordering costs, and holding costs are not treated inappropriately.

The study's limitations primarily stem from the use of consolidated secondary data that does not disclose operational data by material, supplier, production facility, and purchase transaction. The study also did not examine the application of EOQ, SS, and ROP, nor did it measure changes in costs, service levels, stockouts, or production disruptions before and after implementation. Future research is recommended to use internal data from a single plant and a single group of homogeneous materials, apply ABC or ABC–XYZ classification, and calculate EOQ in physical units based on traceable costs. Further analysis should also account for variations in demand and lead time, service levels, shelf life, quantity discounts, changes in supplier prices, implementation costs, and tax implications before assessing their impact on the company's profitability.

Statement of Use of Generative AI

During the preparation of this work, the author used generative artificial intelligence tools to support the scientific writing process. Grammarly was used to check grammar, refine writing style, and improve clarity in scientific writing. All interpretations, analyses, and conclusions presented in this study are the sole responsibility of the author.

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