Vygotsky: Jurnal Pendidikan Matematika dan Matematika
7 (2) August 2025, pp. 97 - 110
E-ISSN: 2656-5846 P-ISSN: 2656-2286
Journal Page is available to
https://jurnalpendidikan.unisla.ac.id/index.php/VoJ

Raw Material Inventory Control Using The Period Order Quantity (POQ) Method to Reduce Stockout and Overstock Risks

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ARTICLE INFO

Article History

Received	:	22 Jan 2025
Revised	:	29 Jul 2025
Accepted	:	04 Aug 2025
Available Online	:	31 Aug 2025

Keywords:
Inventory
Period Order Quantity
Economic Order Quantity

Please cite this article APA style as:
Nasution, A. S., Simbolon, O. B., Muliawati, T., Edriani, T. S., Noor, D. M. M., & Fauzi, R. (2025). Raw Material Inventory Control Using The Period Order Quantity (POQ) Method to Reduce Stockout and Overstock Risks. *Vygotsky: Jurnal Pendidikan Matematika dan Matematika*, 7(2), pp. 97-110.

ABSTRACT

The rapid growth of coffee shops in Lampung has increased demand for Robusta Lampung, Arabica Kerinci, and Arabica Aceh Gayo, causing stockouts and overstocking at a coffee roastery. This study uses the Period Order Quantity (POQ) method to optimize inventory by ordering based on predictable demand periods, reducing order frequency and costs. Using demand data from the last six months of the year, POQ outperforms the manual inventory policy. Assuming a 5% holding cost and 90%–99% service levels (ensuring product availability), POQ reduces costs by 0.119%–0.163%, boosting profitability. Adopting POQ with real-time demand tracking can balance inventory and meet rising demand.

1. Introduction

The primary objective of every company is to achieve maximum profit. Profitability is largely influenced by operational costs, one of which is inventory-related expenditure (Zandra, 2016). In this sector, the availability and management of raw materials like coffee beans are essential for sustaining production flow and achieving consistent product quality. Managing raw material inventory, such as coffee beans, is crucial to maintaining smooth operations (Ilyas & Waluyo, 2024). Consequently, effective inventory management is essential to support

E-ISSN: *2656-5846*
P-ISSN: *2656-2286*

uninterrupted production while minimizing operational costs. The inconsistency of market demand remains a critical concern in inventory management, frequently leading to operational inefficiencies such as product shortages or inventory surpluses (Rizqi & Khairunisa, 2020). Stockouts are often caused by insufficient raw material quantities, delays in delivery, and fluctuations (Chopra & Meindl, 2019).

Rubik Coffee Roastery is a small-scale business engaged in coffee processing, utilizing raw materials such as Robusta Lampung, Arabica Kerinci, and Arabica Aceh Gayo. The quality of coffee beans is highly sensitive to storage conditions and duration, poor inventory management can therefore lead to product degradation (Saolan et al., 2020). As such, inventory control not only ensures smooth operations but also safeguards product quality. To address these challenges, this study adopts the Period Order Quantity (POQ) method as an inventory control approach. POQ is a deterministic method that determines order quantities based on total demand over a specific time period, allowing companies to reduce order frequency and optimize inventory costs (Heizer et al., 2016). This method is especially suitable in environments with fluctuating yet predictable demand patterns, as typically encountered by small and medium enterprises (UMKM) in the coffee industry.

Inventory control of raw materials is a widely discussed topic in literature. For instance, (Trisno & Sunarso, 2024) explored inventory control using Material Requirement Planning (MRP) in a bread factory, demonstrating cost efficiency. Building upon this, the current study delves deeper by validating POQ's effectiveness in mitigating stockout and overstock risks for coffee processing SMEs. It compares inventory costs between manual systems and the POQ method, and crucially, analyzes how varying service levels (90% to 100%) impact total inventory costs. This aims to quantify potential savings, unlike the (Trisno & Sunarso, 2024) study which focused on non-perishable raw materials and didn't detail service level impact on cost efficiency.

2. Method

This research systematically outlines the methodology applied to analyze and optimize raw material inventory control at Rubik Coffee Roastery, a Micro, Small, and Medium Enterprise (UMKM). The approach employed in this study is specifically designed to address the complex characteristics of perishable raw materials and demand fluctuations at an SME scale within the coffee industry. This distinguishes it from previous research, such as the study by (Trisno & Sunarso, 2024), which tended to focus on the food industry with different raw material characteristics and did not delve into the sensitivity analysis of *service levels* on inventory costs. This research will comprehensively describe the data analysis procedures, commencing from the collection of historical data regarding raw material usage, ordering costs, and holding costs, up to the calculation of key inventory management parameters such as *safety stock*, *reorder point*, and *Period Order Quantity* (POQ).

This analysis aims to identify the root causes of *stockout* and *overstock* resulting from the UMKM's current manual inventory system. The success of the POQ method implementation will be quantitatively evaluated through a comparison of total inventory costs between the UMKM's existing policy and the results of the POQ method application, as well as an analysis of the range of cost savings

E-ISSN: *2656-5846*
P-ISSN: *2656-2286*

obtained at various *service levels* (90% to 100%). These metrics will serve as the primary benchmarks for success in reducing costs and enhancing operational efficiency.

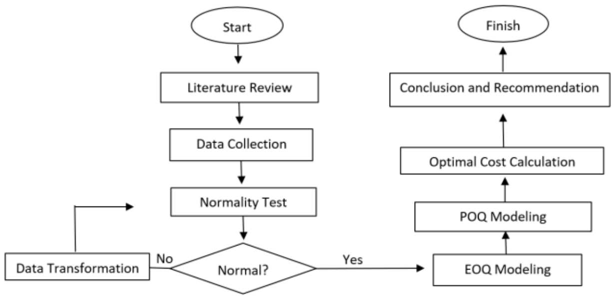

Figure 1. Research Flowchart

2.1. Normality Test

The normality test aims to determine whether the dependent and independent variables in the regression model follow a normal distribution (Irfan, 2019). If the maximum deviation observed is significant, the data are considered not normally distributed (Nasrum, 2018). This study employs the Kolmogorov-Smirnov test to assess normality. The process begins with formulating the hypotheses (Sondakh, 2020), where $H0$ states that the data are normally distributed, and $H1$ states otherwise. The significance level (α) is then determined, followed by calculating $F_o(X)$, which is derived from the z-table based on the cumulative distribution function of the standard normal probability distribution. Next, $S_n(X)$, the proportion of the cumulative frequency distribution of the observed data relative to the sample size, is calculated. The maximum deviation is then determined using the formula,

$$D = maximum\ |F\,(\mathrm{X}\,) - S_n(\mathrm{X}\,)| \tag{1}$$

Finally, hypothesis testing is conducted based on the criteria: if $D < D_{tabel}$, $H0$ is accepted, indicating that the data are normally distributed. Conversely, if $D > D_{tabel}$, $H0$ is rejected, suggesting that the data are not normally distributed (Supriadi, 2021).

2.2. Probabilistic Inventory Problem Model

Inventory is a term used by companies to refer to the goods stored in warehouses intended for future sales. It ensures that companies can optimize their operations in selling products to consumers (Karongkong et al., 2018). In the probabilistic inventory model, one of the issues is uncertainty. Uncertainty can arise from demand variability, lead time fluctuations, and supplier reliability (Simchi-levi et al., 2022). The consumer determines demand fluctuations through variations and standard deviation (S). The supplier, which may involve uncertainty in delivery times or lead times, inventory management in dealing with stockouts, and allowing the determination of the tolerable risk level (z_α). Inventory shortages often occur when market demand exceeds supply, a scenario commonly called the service level. The higher the service level, the less frequent stockouts become

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P-ISSN: *2656-2286*

(Pangestu et al., 2021). The raw material usage data should follow a normal distribution to proceed with the investigation. This step is crucial to determine whether the dependent and independent variables in the regression model exhibit a normal distribution (Irfan, 2019).

2.3. Safety stock

Safety stock is a buffer inventory, where the primary purpose of maintaining this reserve is to protect against variations or fluctuations in demand during the replenishment lead time (L) (Brunaud et al., 2019), it is formulated as follows,

$$SS = Z_\alpha \times S \times \sqrt{L} \tag{2}$$

The safety stock (SS) is calculated based on several parameters, including the standard deviation of demand (S), the lead time (L), and the z-value (Z_α) from the standard normal distribution corresponding to the desired service level α, where α represents the probability of an inventory shortage. The factors determining the safety stock size are the average raw material usage, lead time, and associated costs (Lukmana & Y, 2015).

2.4. Economic Order Quantity (EOQ)

Economic Order Quantity (EOQ) is an inventory management method used to determine the optimal order quantity, with the primary goal of minimizing total inventory costs; it is formulated as follows (Heizer et al., 2016),

$$Q^* = (2KM/H)^{1/2} \tag{3}$$

The parameters used in the model are defined as follows: Q^* represents the optimal order quantity, M denotes the annual demand in units, K is the ordering cost per order, and H refers to the holding cost per unit per year.

2.5. Reorder Point

Reorder point is the minimum inventory level at which a company must place a reorder to avoid stockout and overstock (Pratama et al., 2023),

$$r = (d \times L) + SS \tag{4}$$

Where:
d : Average usage of goods
r : reorder point

2.6. Maximum Stock

Maximum stock is the level at which a maximum quantity of goods can be stored in inventory management,

$$MAX = SS + Q^* \tag{5}$$

Where:
SS : Safety Stock

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Q^* : Optimal order quantity

2.7. Period Order Quantity (POQ)

Period Order Quantity (POQ) is a method used to determine the order quantity over a specific period. In its application, POQ converts the order quantity into an order period, which differs from the EOQ (Aska Nadila Septyani et al., 2024). The method to determine the value of the order interval (T) is based on the EOQ framework and order periodicity principles (Silver et al., 2016):

1. Calculating the Economic Order Quantity (EOQ);
2. Calculate the ordering frequency (f) using the formula,

$$f = \frac{M}{Q^*} \tag{6}$$

3. Calculate the POQ by dividing the number of periods per year(P) by the ordering frequency (f),

$$T = P/f \tag{7}$$

The variables f represents the ordering frequency within a given period, M denotes the demand rate in one period, measured in units of goods, Q^*refers to the optimal order quantity, P indicates the length of the period and T stands for the order interval.

2.8. Total Cost

Total cost is the overall cost required to maintain raw material inventory over a specified period. The minimum total cost includes two components: total purchase and total inventory cost (Septyani et al., 2024). Inventory cost is part of inventory control techniques. Proper inventory control can reduce total inventory costs, thus maximizing profit for the company. Inventory costs include ordering and holding costs (Heizer et al., 2016). In general, the total cost can be expressed as follows,

$$B_T = B_L + T_S + T_P \tag{8}$$

Where,

$$T_S = \left(\frac{Q}{2} + SS\right)H \tag{9}$$

$$T_P = \frac{KD}{Q} \tag{10}$$

The variables used in the total cost calculation are defined as follows: B_T represents the total cost, B_L denotes the purchase cost, T_s is the holding cost, and T_p refers to the ordering cost. The order quantity per order is represented by Q (in units of goods), while K stands for the ordering cost per order, expressed in IDR. The demand rate within a single period is denoted by

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D (in units of goods), H represents the holding cost per period (in IDR), and SS indicates the safety stock level maintained to mitigate stockout risks.

3. Results and Discussion

Findings and in-depth analysis regarding the optimization of raw material inventory control using the *Period Order Quantity* (POQ) method at UMKM Rubik Coffee Roastery are comprehensively presented. Data provided include calculations for *safety stock*, *reorder point*, optimal order quantity, and ordering period for each type of coffee bean. These results are subsequently evaluated comparatively against the UMKM's actual inventory conditions, and their implications for *stockout* and *overstock* risks are analyzed. In contrast to prior studies that typically focus on comparing the general cost efficiency among various methods within conventional manufacturing contexts, this analysis specifically highlights POQ's effectiveness for perishable and fluctuating coffee bean inventory at an UMKM scale.

The discussion of results also encompasses a comprehensive analysis of the percentage of total cost savings achievable by varying the *service level* (90% to 100%). This comparison provides more detailed insights into the cost-service level trade-off, an aspect less specifically quantified in previous literature, thereby enriching the understanding of POQ application in the coffee UMKM context for maximum profitability. The use of the Period Order Quantity (POQ) method has been shown to significantly reduce total inventory costs across various types of raw materials in the food industry (Nasution et al., 2025).

3.1. Normality Test

The results of the Kolmogorov-Smirnov test for Robusta Lampung, Arabica Aceh Gayo, and Arabica Kerinci yielded D values of 0.117298, 0.10239, and 0.102639, respectively. These values are greater than the critical value D_{tabel}, which can be found in the normal distribution table, amounting to 0.100534093. This indicates that the data on the usage of Robusta Lampung, Arabica Aceh Gayo, and Arabica Kerinci do not follow a normal distribution. Therefore, data transformation is required, and the square root transformation was applied.

After performing the normality test again using the transformed data, the resulting D values were 0.04956, 0.049575, and 0.049575, respectively. These values are smaller than the critical value D_{tabel}, which is 0.100534093. This demonstrates that the transformed data for the usage of Robusta Lampung, Arabica Aceh Gayo, and Arabica Kerinci follow a normal distribution. Figure 2 is the raw material usage for Rubik Coffee Roastery.

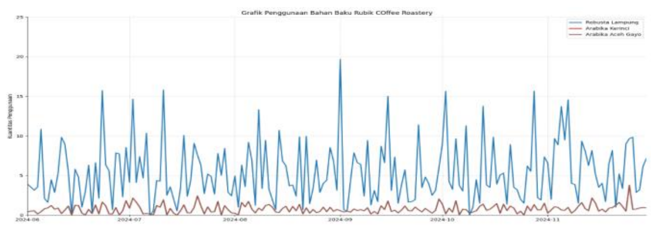

Figure 2. Raw material usage data for Rubik Coffee from June 1 to November 30

Over a six-month period, the total usage of Robusta Lampung raw material amounted to 1,193.6 kilograms, while Arabica Kerinci and Arabica Aceh Gayo

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were each used in quantities of 169.8 kilograms.

3.2. Safety Stock

After it was proven that the usage data for the three raw materials follows a normal distribution, the factors affecting inventory reserves can be determined, namely the lead time and standard deviation, which are calculated using the following formula,

$$S = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} \tag{11}$$

Thus, the results are as Table 1.

Table 1. The Standard Deviation of Raw Materials

Raw Material Names	Lead Time (Days)	Standard Deviation	Standard Deviation (Transformation Scale)
Robusta Lampung	2	4.519805	0.907391647
Arabika Kerinci	5	0.655684	0.367989649
Arabika Aceh Gayo	7	0.655684	0.367989649

In formulating safety stock, it is important to consider the fluctuation level of raw material usage. The greater the fluctuation of a particular raw material, the larger the required safety stock. In mathematics, the fluctuation level of raw material usage can be measured using the standard deviation (σ) of the data. Lead time is also a key factor in determining safety stock. The service level used in the safety stock calculation is 95%, with an alpha (α) of 0.05. Based on the standard normal distribution table, the value of $z\alpha$ for an alpha of 0.05 is 1.645. Once the lead time and the standard deviation in the transformed scale are obtained, the safety stock can be determined. Since the raw material usage data does not follow a normal distribution, the safety stock is initially determined in the transformed scale, as shown in Equation 11,

$$S_{Transform} = Z_{\alpha}\ \sigma_{transform}\ \sqrt{L} \tag{11}$$

Based on the calculations, Table 2 is the results that are as follows Equation 11.

Table 2. The Safety Stock for each Raw Materials

Raw Material Names	Safety Stock (Kg)	Safety Stock Transformation Scale (Kg)
Robusta Lampung	4.46	2.11
Arabika Kerinci	1.83	1.35
Arabika Aceh Gayo	2.57	1.60

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3.3. Reorder Point

This calculation is performed by first calculating the average daily raw material. With an average daily usage of 6.52 kg for Robusta Lampung, and 0.93 kg each for Arabika Kerinci and Arabika Aceh Gayo. Using the previously explained formula, the reorder point for each raw material is calculated as follows:

a. Reorder point for Robusta Lampung:
ROP = (6.52 × 2) + 4.46
= 17.50 kg
b. Reorder point for Arabika Kerinci:
ROP = (0.93 × 5) + 1.83
= 6.48 kg
c. Reorder point for Arabika Aceh Gayo:
ROP = (0.93 × 7) + 2.57
= 9.08 kg

3.4. Maximum Stock

Maximum stock refers to the level at which the quantity of goods can be stored within inventory management. In the Economic Order Quantity (EOQ) method, maximum stock is defined as the sum of safety stock (S) and the EOQ value (Q^*). This relationship is formulated as shown in Equation 12,

$$S_{MAX} = S + Q^* \tag{12}$$

Determining the maximum stock level that can be accommodated in the warehouse is essential to avoid overstocking. Moreover, this practice is intended to minimize inventory-related costs in the context of inventory management. Therefore, the maximum stock is obtained as shown in Table 3 below.

Table 3. Maximum Inventory

Raw Material Names	Maximum Inventory (Kg)
Robusta Lampung	74.62
Arabika Kerinci	23.47
Arabika Aceh Gayo	25.43

3.5. Economic Order Quantity (EOQ)

From the known raw material usage data, the holding cost can then be calculated to determine the optimal order quantity per order (Q). The holding cost in Table 4 can be broken down as follows:

Table 4. Holding Cost

Raw Material Names	Raw Material Price	Holding Cost (%)	Annual Holding Cost
Robusta Lampung	IDR 97.000	5%	IDR 4.850
Arabika Kerinci	IDR 145.000	5%	IDR 7.250
Arabika Aceh Gayo	IDR 130.000	5%	IDR 6.500

After obtaining the holding cost per unit for six months, the value of Q, or the

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optimal order quantity per order, will then be calculated.

Table 5. The Economic Order Quantity (EOQ) Value for Raw Materials

Raw Material Names	Order Cost	Demand Level (Kg)	Holding Cost	EOQ (Kg)
Robusta Lampung	IDR 10.000	1193.6	IDR 4.850	71
Arabika Kerinci	IDR 10.000	169.8	IDR 7.250	22
Arabika Aceh Gayo	IDR 10.000	169.8	IDR 6.500	23

Table 5 shows the value of EOQ (Q^*), which represents the optimal order quantity per ordering cycle. This indicates that when the inventory level reaches the reorder point, Rubik Coffee Roastery should be ready to place a new order for each raw material in the amount of Q^*.

3.6. Period Order Quantity (POQ)

From the obtained raw material order quantities, the ordering frequency or the number of orders made in two months will be calculated to determine the value of T, or the period that a single order can cover. The total frequency and ordering periods obtained are as Table 6.

Table 6. Order Frequency and Period Order Quantity (POQ)

Raw Material Name	Ordering Frequency	T (Days)
Robusta Lampung	17.01	11
Arabika Kerinci	7.84	24
Arabika Aceh Gayo	7.43	25

Based on Table 6, the periods covered in a single order for Robusta Lampung, Arabica Kerinci, and Arabica Aceh Gayo are expressed in decimal numbers. Therefore, these values need to be rounded up to facilitate the determination of the number of days (periods) in each order cycle. As a result, the order periods for each raw material are 11 days, 24 days, and 25 days, respectively. This indicates that Robusta Lampung is ordered more frequently than the other raw materials, while Arabica Aceh Gayo has the longest interval between orders among the three.

3.7. Minimum Total Cost

The results of the calculation using the Period Order Quantity (POQ) method yield expenditure components that represent the minimum total cost in the inventory management system. This minimum total cost refers to the overall expenses that must be incurred by Rubik Coffee Roastery to fulfill raw material inventory needs over a six-month period. The minimum total cost consists of two main components, namely the total purchasing cost and the total inventory cost. The inventory cost includes both ordering and holding costs. The total costs incurred by Rubik Coffee Roastery are presented in the following table 7.

Table 7. Inventory Costs

Raw Material Name	Total Ordering Cost (IDR)	Total Holding Cost (IDR)	Purchase Cost (IDR)
Robusta Lampung	IDR 170.134	IDR 191.746	IDR 115.783.413
Arabika Kerinci	IDR 78.448	IDR 91.732	IDR 24.616.767

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P-ISSN: 2656-2286

Raw Material Name	Total Ordering Cost (IDR)	Total Holding Cost (IDR)	Purchase Cost (IDR)
Arabika Aceh Gayo	IDR 74.280	IDR 90.953	IDR 22.070.204

The inventory costs are then added to the total purchase costs to obtain the total cost. Based on the calculations, the total cost for each raw material can be seen in Table 8.

Table 1. Minimum Total Cost

Raw Material Names	Minimum Cost (IDR)
Robusta Lampung	IDR 116.145.295
Arabika Kerinci	IDR 24.786.947
Arabika Aceh Gayo	IDR 22.235.438

Table 8 shows that the total cost incurred by the company for the inventory of Robusta Lampung, Arabica Kerinci, and Arabica Aceh Gayo over a two-month period is IDR 163,167,680.

3.8. Variation in Service Level Value

After obtaining the values above, the minimum total cost incurred by Rubik Coffee Roastery in managing raw material inventory at each service level variation is as Table 9.

Table 9. Total Cost for each Service Level Variation

Service Level	Minimum Total Cost (IDR)
99%	IDR 163.219.570
98%	IDR 163.196.199
97%	IDR 163.183.467
96%	IDR 163.174.474
95%	IDR 163.167.681
94%	IDR 163.161.602
93%	IDR 163.157.855
92%	IDR 163.153.731
91%	IDR 163.150.331
90%	IDR 163.147.335

Table 9 illustrates the relationship between variations in service level and the minimum total cost incurred by Rubik Coffee Roastery in managing raw material inventory. It can be observed that the higher the targeted service level, the greater the total cost that must be borne.

3.9. Analysis of Total Cost Savings for Each Service Level Variation

Cost savings are obtained by calculating the difference in total costs using the POQ method compared to the total costs using the manual management system. The manual management system assumes that orders are placed once a week, with the order quantity determined by multiplying the average daily usage by 7 days. The results are as Table 10.

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Table 10. Total cost savings at each service level

Service Level	Total Cost with POQ	Total Cost with Manual System	Difference	Percentage of Savings
99%	IDR 163.219.571	IDR 163.413.857	IDR 194.286	0.119%
98%	IDR 163.196.199	IDR 163.413.857	IDR 217.658	0.133%
97%	IDR 163.183.467	IDR 163.413.857	IDR 230.390	0.141%
96%	IDR 163.174.475	IDR 163.413.857	IDR 239.383	0.146%
95%	IDR 163.167.681	IDR 163.413.857	IDR 246.176	0.151%
94%	IDR 163.161.602	IDR 163.413.857	IDR 252.255	0.154%
93%	IDR 163.157.855	IDR 163.413.857	IDR 256.002	0.157%
92%	IDR 163.153.732	IDR 163.413.857	IDR 260.126	0.159%
91%	IDR 163.150.331	IDR 163.413.857	IDR 263.526	0.161%
90%	IDR 163.147.336	IDR 163.413.857	IDR 266.522	0.163%

Table 10 is shown that the consistent application of the Period Order Quantity (POQ) method results in a lower total cost compared to the manual method. The POQ method generates cost savings, with the percentage of savings ranging from 0.119% to 0.163%. Although higher service levels lead to increased total costs, the method still provides overall cost savings and offers the potential for greater profitability.

4. Conclusions

The implementation of the Period Order Quantity (POQ) method at Rubik Coffee Roastery yielded optimal order quantity to average daily usage ratios of 1:10.8 for Robusta Lampung, 1:23.2 for Arabica Kerinci, and 1:24.6 for Arabica Aceh Gayo, at a 95% service level, with respective order intervals of 11, 25, and 24 days. These results confirm the effectiveness of the POQ method in minimizing both overstock and stockout risks. Varying the service level between 90% and 99% demonstrated potential cost savings of 0.119% to 0.163%, thereby supporting greater operational efficiency and profitability. Future studies are encouraged to integrate the POQ method with backorder systems and real-time inventory tracking to enhance decision-making precision and responsiveness.

Author Contributions

The first author was responsible for collecting, processing, and analyzing the data, as well as writing the scientific article. The second and third authors contributed by offering feedback and suggestions to improve the study, its analysis, and the overall manuscript.

Acknowledgment

The authors thank the Faculty of Science, Institut Teknologi Sumatera, who funded the work through the Research Funding Grant 2024 with Contract Number 4698/IT9.3.1/PT.01.03/2024

Declaration of Competing Interest

The author stated that there was no potential conflict of interest in this research.

References

Brunaud, B., Laínez-Aguirre, J. M., Pinto, J. M., & Grossmann, I. E. (2019).

E-ISSN: *2656-5846*
P-ISSN: *2656-2286*

Inventory Policies and Safety Stock Optimization for Supply Chain Planning. *AIChE Journal*, *65*(1), 99–112. https://doi.org/10.1002/aic.16421

Chopra, S., & Meindl, P. (2019). Supply Chain Management. Strategy, Planning & Operation. In *Das Summa Summarum des Management: Die 25 wichtigsten Werke für Strategie, Führung und Veränderung* (pp. 265–275). Springer.

Heizer, J., Render, B., & Munson, C. (2016). *Operations Management: Sustainability and Supply Chain Management*. Pearson Education. https://books.google.co.id/books?id=APLpCwAAQBAJ

Ilyas, K., & Waluyo, D. E. (2024). Penerapan Metode EOQ (Economic Order Quantity) dan RoP (Redorder Point) dalam Pengendalian Persediaan Bahan Baku (Studi Kasus : Cv Sekawan Kopi Maju). *Neraca: Jurnal Ekonomi, Manajemen Dan Akuntansi*, *2*(10 SE-Articles), 141–161. https://jurnal.kolibi.org/index.php/neraca/article/view/2522

Irfan, A. M. (2019). Pengaruh Kualitas Pelayanan, Harga Dan Fasilitas Yang Diberikan Kenari Waterpark Bontang Terhadap Tingkat Kepuasan Pelanggan. *Al-Infaq: Jurnal Ekonomi Islam*, *9*(2), 82. https://doi.org/10.32507/ajei.v9i2.451

Karongkong, K. R., Ilat, V., & Tirayoh, V. Z. (2018). Penerapan Akuntansi Persediaan Barang Dagang Pada Ud. Muda-Mudi Tolitoli. *Going Concern : Jurnal Riset Akuntansi*, *13*(02), 46–56. https://doi.org/10.32400/gc.13.02.19082.2018

Lukmana, T., & Y, D. T. (2015). Penerapan Metode EOQ dan ROP. *Jurnal Teknik Informatika Dan Sistem Informasi*, *1*(3), 271–279. https://doi.org/https://doi.org/10.28932/jutisi.v1i3.597

Nasrum, A. (2018). Uji Normalitas Data untuk Penelitian. *Jayapangus Press Books*, *SE-Articles*, i–117. http://book.penerbit.org/index.php/JPB/article/view/115

Nasution, A. S., Alfiana, A., Fauzi, R., Muliawati, T., Noor, D. M. M., & Edriani, T. S. (2025). Inventory control of raw materials using period order quantity method in preventing the stock-out occurrence. *AIP Conference Proceedings*, *3309*(1), 40001. https://doi.org/10.1063/5.0266438

Pangestu, D. D., Sumartono, B., & Bhirawa, W. T. (2021). Analisis Peramalan Permintaan Produk Kipas Angin Dengan Metode Arima (Autoregressive Integrated Moving Average) Untuk Menentukan Persediaan Safety Stock Dan Service Level Pada Pt. Catur Sukses Internasional. *Jurnal Teknik Industri*, *8*(1), 14–24. https://journal.universitassuryadarma.ac.id/index.php/jtin/article/view/802/783

Pratama, R. K., Karim, A. A., & Hertadi, C. D. P. (2023). Perencanaan Stok Pengaman dan Titik Pemesanan Ulang dengan Metode Time Series pada Perusahaan Furniture di Kalimantan. *Jurnal Teknologi Dan Manajemen Industri Terapan*, *2*(3 SE-Articles), 200–211. https://doi.org/10.55826/tmit.v2i3.256

Rizqi, Z. U., & Khairunisa, A. (2020). Integration of deterministic and probabilistic inventory methods to optimize the balance between overstock and stockout. *IOP Conference Series: Materials Science and Engineering*, *722*(1), 12060. https://doi.org/10.1088/1757-899X/722/1/012060

Saolan, Sukainah, A., & Wijaya, M. (2020). Pengaruh Jenis Kemasan dan Lama Waktu Penyimpanan Terhadap Mutu Bubuk Kopi Robusta (Coffea robusta). *Jurnal Pendidikan Teknologi Pertanian*, *6 Nomor 2*, 337–348.

 E-ISSN: 2656-5846
P-ISSN: 2656-2286

https://doi.org/https://doi.org/10.26858/jptp.v6i2.12021

Septyani, A. N., Purba, A. A., & Hertadi, C. D. P. (2024). Optimalisasi Persediaan Bahan Baku Menggunakan Material Requirement Planning: Strategi Perencanaan Dan Pengendalian Persediaan Industri. *Jurnal Teknologi Dan Manajemen Industri Terapan*, *3*(3 SE-Articles), 271–280. https://doi.org/10.55826/jtmit.v3i3.391

Silver, E. A., Pyke, D. F., & Thomas, D. J. (2016). Inventory and Production Management in Supply Chains, Fourth Edition. In *Inventory and Production Management in Supply Chains, Fourth Edition*. https://doi.org/10.1201/9781315374406

Simchi-levi, D., Kaminsky, P., & Simchi-Levi, E. (2022). *Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, Fourth Edition* (4th Editio). McGraw-Hill Education. https://www.mheducation.com/highered/product/Designing-and-Managing-the-Supply-Chain-Simchi-Levi.html

Sondakh, E. (2020). Salah Kaprah Pengujian Normalitasi Dalam Analisis Persediaan Menggunakan Metode Probabilistik Sederhana. *Jurnal Logistik Bisnis*, *10*(1), 67. https://doi.org/10.46369/logistik.v10i1.699

Supriadi, G. (2021). *Statistik Penelitian Pendidikan*. UNY Press. http://digilib.iain-palangkaraya.ac.id/id/eprint/3702

Trisno, A., & Sunarso. (2024). Analisis Pengendalian Persediaan Bahan Baku dengan Metode Material Requirement Planning pada Pabrik Roti Arum di Kecamatan Kota Waingapu Sumba Timurnusa Tenggara Timur. *PENG: Jurnal Ekonomi Dan Manajemen*, *2*(1 SE-Articles), 204–218. https://doi.org/10.62710/214exd67

Zandra, R. A. P. (2016). Pengaruh Biaya Operasional dan Perputaran Persediaan terhadap Profitabilitas. *Jurnal Akuntansi Dan Investasi*, *1*(1), 93–107. https://doi.org/http://dx.doi.org/10.53712/aktiva.v1i1.149

E-ISSN: *2656-5846*
P-ISSN: *2656-2286*