



ANALYSIS OF RAW MATERIAL INVENTORY MANAGEMENT IN OTR LAUNDRY BY APPLYING THE ECONOMIC ORDER QUANTITY (EOQ) METHOD

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ABSTRACT

This study aims to determine and analyze the control of the main raw material inventory at OTR Laundry with an inventory management policy using the Economic Order Quantity (EOQ) method. The study focuses on inventory management at OTR Laundry located at Jalan Ciseke, Jatinangor, Sumedang. This study uses a quantitative approach. Primary data in this study were obtained through in-depth interviews with the owner of OTR Laundry and direct observation in the field. Secondary data were obtained from inventory records and the company's financial reports. Data collection techniques used were interviews, observations, and documentation. Data analysis was carried out by calculating optimal inventory requirements using the EOQ method and comparing them with the inventory policy implemented by OTR Laundry. The calculation results show a comparison between the total cost of fragrance inventory calculated based on the OTR Laundry policy and the EOQ calculation method. Savings using the EOQ method compared to the OTR Laundry policy on inventory cost expenditure amounted to Rp313,764. The results of this study are expected to provide recommendations for OTR Laundry in increasing the efficiency of managing the main raw material inventory and reducing operational costs.

1. INTRODUCTION

In the increasingly competitive business world, entrepreneurs must be more efficient in all aspects. One way to achieve this is through inventory management. Inventory management is the process of planning, procuring, storing, and controlling goods or materials owned by a company. The goal is to ensure the availability of the right goods in the right quantity, at the right time, and at an efficient cost. Inventory management is crucial for business actors because, without good inventory management, they will struggle to meet the needs of buyers in terms of the goods and services they produce (Sulaiman and Nanda, 2015). Overall, inventory management helps companies become more efficient, effective, and responsive to changes in market demand and operational conditions.

The laundry business currently has great potential due to the increasing number of people who are busy and have limited time to wash their clothes. Moreover, since the Covid-19 event, awareness of the cleanliness of worn clothing has increased, prompting people to seek professional laundry services that can provide clean and hygienic results. With the growing development and high competition in the laundry industry, it is important to have a thorough calculation strategy, including operational costs, service prices, and expected profits. One important aspect to consider is inventory management in a business.

Inventory management has many objectives, such as anticipating delays in the arrival of goods, anticipating orders for materials that do not meet the company's needs and thus must be returned, anticipating the unavailability of necessary materials in the market to ensure a smooth production process, optimizing the use of machinery, and meeting market needs optimally. Inventory management calculations involve monitoring stock levels, demand forecasting, cost control for storage, and order optimization. This is crucial to maintaining the availability of goods at minimal storage costs. One calculation method that can optimize inventory quantities is the Economic Order Quantity (EOQ) method.

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OTR Laundry is one of the SMEs providing ironing services for clothes, trousers, blankets, bags, and prayer garments in Jatinangor, Sumedang, West Java. Inventory management at OTR Laundry still uses manual methods, and the EOQ calculation method has never been applied. By applying inventory management using the EOQ method, OTR Laundry can optimize inventory quantities more efficiently, reduce costs, and improve overall operational performance.

2. METHODS

This research uses a quantitative method with a descriptive approach. The data used in this study is primary data, obtained through direct interviews with the owner of OTR Laundry. The primary data in this study was obtained through in-depth interviews with the owner of OTR Laundry. The secondary data used in this research was obtained from OTR Laundry's financial report records.

EOQ Method (Economic Order Quantity)

The EOQ method calculates the optimal ordering quantity of an item efficiently and effectively. The EOQ formula is:

$$EOQ = \sqrt{\frac{2 \times D \times S}{H}}$$

Where:

- EOQ = Economic Order Quantity
- S = Ordering cost per order
- D = Total raw material usage per period
- H = Holding cost per unit

Order Frequency (n)

Order frequency is the number of orders placed within a certain time period, such as a year. Order frequency can be calculated by dividing the annual demand (D) by the optimal order quantity (EOQ). The formula is:

$$n = \frac{D}{EOQ}$$

Where:

- n = Order Frequency
- D = Total raw material usage per period
- EOQ = Optimal order quantity

Total Inventory Cost (TIC)

Total inventory cost is the sum of ordering costs and holding costs over a certain period. The general formula used is:

$$TIC = \frac{D}{Q} (S) + \frac{Q}{2} (H)$$

Where:

- D = Total raw material usage per period
- Q = EOQ = Optimal order quantity
- S = Ordering cost per order
- H = Holding cost per unit

3. RESULTS AND DISCUSSIONS

OTR Laundry was established in 2021 in the Kopo area, providing personal clothing washing and ironing services, school uniforms, blankets, and other fabrics using quality materials. With the increasing frequency of consumers, in 2022 OTR Laundry opened its first branch in the Ujung Berung area, and in 2023 opened its second branch in the Ciseke Jatinangor area. OTR Laundry also offers flexible services such as free pickup and delivery of clothing, express service within half a day for clothes that need to be used immediately, and various payment methods to facilitate transactions for customers. The main raw materials used by OTR Laundry are detergents supplied from the Bening store and perfumes supplied from the Kasapi store. The fragrance of the perfumes is a hallmark of OTR Laundry's service, being pleasant and not too strong, which attracts consumers to continue making repeat orders. This study will discuss one of the main raw materials used by OTR Laundry, namely perfume. Below is the monthly purchase frequency of perfume in 2023. Tabel 4.2 Pembelian Pewangi / Parfum OTR Laundry:

Table 1 Perfume Purchases at OTR Laundry

Month	Frequency	Quantity	Price / Liter	Total
January	3	5	25.000	375.000
February	2	5	25.000	250.000
March	3	5	25.000	375.000
April	3	5	25.000	250.000
May	2	5	25.000	375.000
June	2	5	25.000	250.000
July	3	5	25.000	375.000
August	2	5	25.000	250.000
September	3	5	25.000	375.000
October	3	5	25.000	375.000
November	2	5	25.000	250.000
December	2	5	25.000	250.000
Total	30	60	420.000	3.750.000
Average	2,5	5	25.000	312.500

Source: OTR Laundry Perfume Purchase Frequency 2023

The monthly perfume purchase frequency for OTR Laundry ranges from 2 to 3 orders with a maximum of 5 liters per order. In a year, the total expenditure for purchasing detergent with a purchase volume of 30 and a quantity of 60 liters reaches Rp3,750,000. OTR Laundry also incurs several costs related to inventory procurement, such as ordering costs and storage costs. For OTR Laundry, ordering costs include internet quota and shipping costs. OTR Laundry uses an internet quota of Rp25,000 per month, totaling Rp300,000 per year. For shipping costs, OTR Laundry gets free shipping from the store for orders of more than 1 liter per order, so the ordering cost for OTR Laundry is Rp300,000. Storage costs for OTR Laundry include electricity costs and raw material damage costs. The electricity cost incurred by OTR Laundry is Rp200,000 per month or Rp2,400,000 per year. Raw material damage costs are calculated at 5% of the raw material cost set by OTR Laundry, resulting in storage costs of Rp1,250 per liter or Rp75,000

per year. Therefore, the total storage cost for OTR Laundry per year is Rp75,000. From the obtained data, the total inventory cost for OTR Laundry is as follows:

- Ordering cost: Rp300,000
- Storage cost: Rp75,000
- Total inventory cost: Rp375,000

EOQ Calculation Results

Based on the raw material (perfume) requirements data for OTR Laundry and the total inventory procurement costs above, the optimal order quantity calculation is as follows:

$$EOQ = \sqrt{\frac{2 \cdot D \cdot S}{H}}$$

$$EOQ = \sqrt{\frac{2 \times 60 \times 25.000}{1.250}} = \sqrt{\frac{3.000.000}{1.250}}$$

$$EOQ = \sqrt{2.400}$$

$$EOQ = 48.989$$

Order Frequency Calculation (n):

$$D = N / EOQ$$

$$= 60 / 49$$

$$= 1,25$$

Based on the above calculations, the optimal order quantity for raw materials using the EOQ (Economic Order Quantity) method is 48.989 liters with an order frequency of approximately 1 time per year.

Total Inventory Cost (TIC) Calculation:

$$TIC = D/Q \times S + Q/2 \times H$$

$$= 60/48,989 \times 25.000 + 48,989/2 \times 1.250$$

$$= (1,25 \times 25.000) + (24,4 \times 1.250)$$

$$= 30.618 + 30.618 \gg TIC => (S) = (H)$$

$$= 61.236$$

Thus, the total inventory cost is Rp 61,236.

Comparison of OTR Laundry's Total Inventory Cost Calculation and EOQ Method

After calculating the inventory costs using OTR Laundry's policy and the EOQ method, the comparison can be seen as follows:

Table 2. Total Inventory Cost OTR Laundry	
	Total
Inventory for 1 year	60 Liter
Purchase Frequency	30 times
Total Ordering Cost	Rp300.000
Holding Cost	Rp75.000
Total Inventory Cost	Rp375.000

Table 3. Total Inventory Cost using EOQ Model

Information	Total
Inventory for 1 year	48.989 Liter
Purchase Frequency	1 Times
Total Ordering Cost	Rp30.618
Holding Cost	Rp30.618
Total Inventory Cost	Rp61.236

From the results, it is evident that the EOQ method results in fewer orders and lower costs compared to OTR Laundry's policy. The savings amount to Rp313,764, indicating that EOQ can minimize raw material costs and optimize revenue.

4. CONCLUSION

OTR Laundry incurs costs for inventory management, including ordering and storage costs. OTR Laundry's ordering cost includes an internet quota of Rp25,000 per month, totaling Rp300,000 per year, and free shipping for orders over 1 liter. Storage costs include electricity at Rp200,000 per month or Rp2,400,000 per year, and raw material damage at 5% of raw material costs, totaling Rp75,000 per year. Thus, the total inventory cost is Rp375,000 with 30 orders per year. Applying the EOQ method at OTR Laundry results in an optimal and effective raw material order quantity of 49 liters with an annual cost of Rp61,236 and only one order per year, saving Rp313,764. Based on the conclusions and calculations, it is recommended that OTR Laundry apply the EOQ method in inventory management to optimize ordering quantity efficiently.

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