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Analysis of Inventory Calculation Between the Just In Time Method and the Economic Order Quantity Method at PT. Ohtomi Indonesia

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Abstract

Purpose – *This research discusses Cost Efficiency. The objective is to assess which method is more efficient in reducing inventory costs. The study employs the Just In Time method and the Economic Order Quantity method.*

Design/methodology/approach – *This research was conducted at PT. Ohtomi Indonesia. The type of research is qualitative. The data sources used in this study include raw material purchases, ordering costs, and storage costs in 2024. The analysis method applied is a comparison between the Just In Time method and the Economic Order Quantity method.*

Findings – *At company PT. Ohtomi, there is a discrepancy between theory and practice in the application of inventory control methods. Theoretically, the Just In Time (JIT) method should be able to reduce storage costs since the company does not need to maintain large stock. However, field data shows that inventory costs under the JIT method are actually higher compared to the Economic Order Quantity (EOQ) method.*

Research limitations/implications – *1. This research was conducted only at PT. Ohtomi Indonesia and does not cover other manufacturing companies.*
2. The study focuses on inventory management for cost efficiency.
3. The data used in this research are internal company data, such as raw material purchase reports and raw material usage for production from January to December 2024.

INTRODUCTION

The Economic Order Quantity (EOQ) method is utilized to determine the optimal quantity of goods to be ordered in a single procurement cycle in order to optimize inventory costs. In contrast, the Just In Time (JIT) method is an approach that aims to minimize inventory levels by aligning the timing of production or procurement with customer demand.

PT. Ohtomi Indonesia applies inventory control for its raw materials using the Just In Time (JIT) method, whereby raw materials are purchased according to production requirements or customer demand in order to avoid storage costs. However, the Just In Time (JIT) method tends to be less efficient when implemented in companies that still need to process raw materials into finished products. During the production process, a considerable portion of

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raw materials is subject to damage, thereby slowing down production activities.

The research phenomenon lies in the discrepancy between theoretical concepts and practical implementation of inventory control methods. Theoretically, the Just In Time (JIT) method should reduce storage costs, as companies are not required to maintain large stock levels. Nevertheless, empirical findings indicate that inventory costs under the JIT method are higher compared to those under the Economic Order Quantity (EOQ) method.

Research conducted by Suratman and Sutrisno (2023) revealed that by applying the EOQ method, companies are able to reduce raw material costs by IDR 3,237,500, equivalent to 32.38%. Furthermore, Gunawan Onsu The et al. (2024) found that the implementation of the EOQ method allows companies to achieve cost savings of IDR 22,813,186, or approximately 56.7%. Consistent with these findings, Arya Pramandeva Putra et al. (2023) asserted that the application of EOQ-based raw material control results in cost savings of IDR 817,591, equivalent to 84%.

Therefore, the author is motivated to examine cost efficiency by employing the Economic Order Quantity (EOQ) method, particularly in PT. Ohtomi Indonesia, using purchase raw material data from 2024. Consequently, the author is interested in conducting a study entitled "Comparative Analysis of Inventory Control Management Using the Just In Time (JIT) and Economic Order Quantity (EOQ) Methods for Cost Efficiency (Case Study at PT. Ohtomi Indonesia)".

LITERATUR REVIEW

Just In Time (JIT)

According to I Made Darsana et al. (2023:180), Just In Time (JIT) is a concept as well as a strategy designed to optimize a product within a short time frame while producing high quality with minimal waste. Just In Time (JIT) is a production system applied to meet customer needs precisely on time and in accordance with the required quantity.

Furthermore, I Made Darsana et al. (2023:181) state that the objective of Just In Time (JIT) is to reduce the total cycle time, as the only time that adds value to a product is the processing time. In contrast, moving time, waiting time, and inspection time do not contribute added value; rather, they only increase costs, unlike process time which provides actual added value.

Economic Order Quantity (EOQ)

According to Purbudi Wahyuni et al. (2024:121), Economic Order Quantity (EOQ) is a model related to the procurement or inventory of raw materials within a company. Economic Order Quantity (EOQ) is a method used to optimize the purchase of raw materials in order to minimize inventory costs, thereby enabling efficient inventory management within the company.

Cost Efficiency

Cost efficiency refers to a condition in which an organization or company is able to achieve a certain outcome or output at the lowest possible cost, without reducing the quality

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or quantity of that outcome. Cost efficiency indicates the extent to which resources (such as raw materials, labor, time, and money) are utilized optimally in the production or operational process.

Economic Order Quantity (EOQ) Effect For Cost Efficiency

Temporary Assumption: The application of the Economic Order Quantity (EOQ) method in inventory control is suspected to be able to increase cost efficiency at PT. Ohtomi Indonesia.

RESEARCH METHOD

This study aims to analyze which method—Just in Time (JIT) and Economic Order Quantity (EOQ)—is more suitable for the company in achieving cost efficiency, with the ultimate goal of enhancing corporate profitability. The types of data employed in this study consist of both secondary and primary data. According to Dr. Yusuf Tojiri (2024:49), secondary data refers to information collected by other individuals or organizations for different purposes, which is subsequently utilized in further research. Meanwhile, Qadriani Arifuddin et al. (2025:71) define primary data as information obtained directly from the source or the research field through observation, questionnaires, experimental interviews, and case studies.

The sources of data used in this research are literature review and documentation methods. In establishing the theoretical foundation, literature review assists in building a strong conceptual basis for the study. It further guides the research problem by enabling the researcher to identify relevant issues and determine an appropriate direction for the study. A thorough review of the literature also allows the researcher to understand the broader context of the research topic and to formulate suitable research questions. The documentation method, as stated by I Wayan Terimajaya et al. (2024:39–40), is a data collection technique conducted indirectly from research subjects or respondents. This approach relies on the systematic study and analysis of documents as a means of gathering data.

This research adopts a qualitative approach. Qualitative research is an academic methodology that emphasizes in-depth understanding of social phenomena and human behavior through the collection and analysis of non-numerical data. The main characteristics of qualitative research include the use of data collection techniques such as in-depth interviews, participatory observation, and document analysis. The data collection techniques applied in this study include observation and documentation. Observation is defined as a systematic process of recording actual behavior patterns of individuals, objects, and events as they occur. In conducting observations, the researcher carefully examines the research setting while noting and recording all aspects surrounding the research object that are relevant to the information being sought.

The background of this research is that PT. Ohtomi currently implements inventory control using the Just in Time (JIT) method, whereby raw materials are purchased according to production requirements or customer demand in order to avoid storage costs. However, the JIT

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method tends to be less efficient for companies that must process raw materials into finished goods. During the production process, a significant portion of raw materials often becomes damaged, thereby slowing down production. When raw materials are prepared in accordance with customer demand but subsequently experience damage—whether 1%, 10%, 50%, or even 100%—new materials must be procured to replace them. This disruption in raw materials causes production delays, leading the company to fail in delivering products to customers on schedule, which in turn may negatively affect its corporate image. Furthermore, the need to reorder raw materials to restart production generates additional costs, thereby reducing cost efficiency and impacting corporate profitability.

Given this background, research on the company is necessary by applying an alternative method, namely the Economic Order Quantity (EOQ). This study is conducted at the researcher's workplace, PT. Ohtomi Indonesia, located in the MM2100 Industrial Estate, Jl. Kalimantan Blok F.8, Cibitung, Gandamekar, Cikarang Barat District. The research period is scheduled from April 14, 2025, to July 14, 2025.

Table 1. Measuring Instruments and Sources of Variable Measurement

Concept	Variable	Dimensi	Sumber
Dependent	Cost Efficiency	Cost-Effective but Without Compromising on Quality.	
Independent	Just In Time (JIT)	Optimizing a Product In a Short Period of Time. Produce Good Quality with Minimum Waste. Order Frequency (More often, small quantities).	(I Made Darsana et al, 2023:180)
	Economic Order Quantity (EOQ)	Optimize Purchasing of Raw Materials. Reduce Inventory Costs. Less Ordering Costs.	(Purbudi Wahyuni et al, 2024:121)

RESULTS AND DISCUSSIONS

Characteristics of Source

- Name of source : Donny M Magenda
- Position : Procurement Manager
- Length of service : 15 years
- Company founded : 1971
- Business type : Label printing

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Questions to the Resource Person :

1. When was PT. Ohtomi established, and how has the company developed from its inception until today?
Answer:
PT. Ohtomi was established in 1971 with only one production machine located in Central Jakarta. In 1998, the company relocated to a larger facility in Sunter, North Jakarta. Subsequently, in 2009, PT. Ohtomi moved to the MM2100 Industrial Estate in Cibitung to enhance service quality for its customers. At present, the company operates more than 40 label machines and continues to demonstrate positive business growth.

2. What does the current organizational structure of the company look like?
Answer:
Within the organizational structure, the President Director, Mrs. Popolida Setiawan, retains full authority over strategic decision-making in the company.

3. Are the company's vision and mission still consistent with those established at the time of its founding?
Answer:
Since its inception, PT. Ohtomi has consistently upheld its vision and mission, namely to position the company as a manufacturing enterprise specializing in label production with competitiveness at both the national and international levels.

4. What type of inventory control system is currently implemented at PT. Ohtomi?
Answer:
PT. Ohtomi currently applies an inventory control system that is fully based on customer demand (Purchase Order/PO Based), without maintaining buffer stock.

5. What are the main raw materials used in the production process at PT. Ohtomi?
Answer:
The two primary raw materials used in PT. Ohtomi's production process are Synthetic Paper and Semicoat Paper.

6. What is the main reason PT. Ohtomi has chosen to apply the Just In Time method instead of other approaches?
Answer:
The main reason for implementing the Just In Time method is to avoid excessive accumulation of raw materials in the warehouse, which would otherwise occur if buffer stock were maintained for every customer order.

7. Has the application of the Just In Time method helped the company reduce raw material storage costs?
Answer:
The application of the Just In Time method has not directly reduced storage costs, as PT. Ohtomi's storage expenses are fixed in nature. These include warehouse electricity costs, annual warehouse insurance fees, and annual maintenance expenses.

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8. Has the company ever experienced raw material shortages due to the Just In Time system? What has been the impact on production?
Answer:
Yes, the company has occasionally faced raw material shortages, particularly when production failures occurred, necessitating re-orders of raw materials. This situation led to production delays and required rescheduling of the production timeline once replacement materials arrived.

9. In your view, is the Just In Time method currently applied by the company effective and efficient?
Answer:
The Just In Time method is considered less effective and efficient for the company, as it often results in delivery delays to customers in cases of production failures. In such instances, reordering raw materials becomes necessary, which consequently requires rescheduling of production activities.

10. Has the company ever considered adopting alternative methods for comparison purposes, such as an ordering cost efficiency system based on specific calculations?
Answer:
Yes, the company has expressed interest in exploring alternative methods. This consideration arises because the current method often causes delivery delays to customers, which could potentially damage the company's reputation. Therefore, adopting a more efficient method is seen as a viable solution.

No	Bulan	Semicoat Paper (M2)	Synthetic Paper (M2)
1	Januari	12.240	28.600
2	Februari	6.630	33.000
3	Maret	9.690	29.150
4	April	3.570	13.200
5	Mei	6.630	22.000
6	Juni	10.200	31.350
7	Juli	5.100	44.550
8	Agustus	17.850	36.300
9	September	5.610	15.373
10	Oktober	9.180	39.050
11	November	5.100	29.150
12	Desember	13.260	20.350
Total		**105.060**	**342.073**
Rata - Rata		**1.347**	**2.534**
Frekuensi Pembelian		**78 Kali**	**135 Kali**

Figure 1. Raw Material Purchase the Data for 2024

Based on the table above, raw material purchases in 2024 for semicoat paper amounted to 105,060 m2, with an average total purchase of 1,347 m2, with a purchase frequency of 78 times, with the largest purchase in August at 17,850 m2.

Meanwhile, synthetic paper was purchased at 342,073 m2, with an average total monthly purchase of 2,534 m2, with a purchase frequency of 135 times, with the largest purchase in July at 44,550 m2.

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Jenis Biaya	Biaya	Total
Biaya Administrasi (Biaya ATK)	Rp2.532.000	Rp2.532.000
Biaya Lain - Lain (Biaya telepon, Biaya ongkir dan Biaya bongkar muat barang dll)	Rp24.702.316	Rp24.702.316
Total		**Rp27.234.316**
Biaya Per Pemesanan	**213 Kali**	**Rp127.861**

Figure 2. Cost Ordering the Data 2024

The order cost includes administration fees and other costs of Rp24,702,316, such as telephone costs, shipping costs, and loading and unloading costs. The total order cost is Rp27,234,316, with 213 orders placed, resulting in a cost per order of Rp127,861.

Jenis Biaya	Biaya	Total
Biaya Listrik Gudang	Rp134.295.363	Rp134.295.363
Biaya *Maintenance*	Rp6.000.000	Rp6.000.000
Biaya Forklif	Rp10.800.000	Rp10.800.000
Biaya Pemeliharaan Gudang	Rp1.068.000	Rp1.068.000
Biaya Asuransi Gudang	Rp75.000.000	Rp75.000.000
Total		**Rp227.163.363**

Figure 3. Storage Costs the Data 2024

The storage cost table above lists the costs the company must incur. These costs include warehouse electricity costs of Rp134,295,363, maintenance costs of Rp6,000,000, forklift costs of Rp10,800,000, warehouse maintenance costs of Rp1,068,000, and warehouse insurance costs of Rp75,000,000. The total storage costs are Rp227,163,363.

Economic Order Quantity Method Calculation

a. Economic Order Quantity (EOQ)

$$EOQ = \sqrt{\frac{2xDxS}{H}}$$

Description:

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EOQ : Economic Order Quantity (EOQ)
D : Demand, the annual demand for the product (the number of units needed in a year)
S : Ordering Cost, the cost per order or the cost each time an order is placed (administrative costs, transportation, etc.)
H : Holding Cost, the storage cost per unit per year (electricity, insurance, and other costs)

EOQ	Jenis Bahan Baku	Kebutuhan Bahan Baku Tahun 2024	Biaya Penyimpanan Per M2	Biaya Per Pesanan	Jumlah Pesanan EOQ	Frekuensi Order	Pembulatan EOQ
		D	H	S	$\sqrt{\frac{2xDxS}{H}}$	$\frac{D}{EOQ}$	
	Semicoat Paper	105.060	Rp508,04	Rp127.861	7.272	14,4472	14
	Synthetic Paper	342.073	Rp508,04	Rp127.861	13.122	26,0690	26
Total		447.133					

Figure 4. Calculation Method EOQ

Calculations using the Economic Order Quantity (EOQ) method above show that column (D) shows the total raw material requirements for 2024 for the two raw materials mentioned above are 447,133 m2. Column (H) shows the storage cost at Rp508.04/m2, and column (S) shows the cost per order at Rp127,861. Using the EOQ formula, the "EOQ order quantity" column shows that the order quantity for each order of semicoat paper is 7,272 m2, and for each order of synthetic paper is 13,122 m2.

b. Raw Material Order Frequency

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

F : Order Frequency
D : Demand, annual demand for the product (number of units needed in one year)
EOQ : Economic Order Quantity (optimal ordering technique for cost efficiency)

• Semicoat Paper
In Table 4 above, for semicoat paper using the EOQ calculation method, (105,060/7,272), the ordering frequency is only 14.4472 ≈ 14 orders.
• Synthetic Paper
In Table 4 above, for synthetic paper using the EOQ calculation method, (342,073/13,122), the ordering frequency is only 26.0690 ≈ 26 orders.

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TIC	Jenis Bahan Baku	Biaya Pemesanan $\frac{D}{EOQ} x S$	Biaya Penyimpanan $\frac{EOQ}{2} x H$	Total Inventory Cost $(\frac{D}{EOQ} x S) + (\frac{EOQ}{2} x H)$
	Semicoat Paper	Rp1.790.054	Rp1.847.233	Rp3.637.287
	Synthetic Paper	Rp3.324.386	Rp3.333.208	Rp6.657.594
	Total Biaya Persediaan EOQ	Rp5.114.440	Rp5.180.441	Rp10.294.881

Figure 5. TIC Calculation Using EOQ Method

Table 5 above shows that the total cost incurred for ordering costs, calculated using the EOQ method, is Rp5,114,440, and holding costs calculated using the EOQ method only cost Rp5,180,441. Therefore, the company's total inventory costs using the EOQ method can be calculated as Rp10,294,881.

Perbandingan Persediaan Bahan Baku *Semicoat Paper*			
No	Keterangan	Kebijakan Perusahaan (Metode JIT)	Metode EOQ
1	Kuantitas Pemesanan	1.347	7.272
2	Frekuensi Pemesanan	78 Kali	14 Kali
3	Total Biaya Persediaan	Rp53.375.132	Rp3.637.287

Figure 6. Semicoat Paper Inventory Comparison

Table 6 above shows that for semi-coat paper, the order quantity using Just In Time (JIT) is 1,347 m2 with an order frequency of 78 times, resulting in inventory costs of Rp53,375,132 for the company. However, using the Economic Order Quantity (EOQ) method, the order quantity is 7,272 m2 with an order frequency of only 14 times, and storage costs of only Rp3,637,287.

Perbandingan Persediaan Bahan Baku *Synthetic Paper*			
No	Keterangan	Kebijakan Perusahaan (Metode JIT)	Metode EOQ
1	Kuantitas Pemesanan	2.534	13.122
2	Frekuensi Pemesanan	135 Kali	26 Kali
3	Total Biaya Persediaan	Rp173.788.231	Rp6.657.594

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Figure 7. Synthetic Paper Inventory Comparison

Table 7 above shows that for synthetic paper raw materials, the order quantity according to Just In Time (JIT) is 2,534 m2 with an order frequency of 135 times, resulting in inventory costs of Rp173,788,231 for the company. However, using the Economic Order Quantity (EOQ) method, the order quantity is 13,122 m2 with an order frequency of only 26 times, and storage costs of only Rp6,657,594.

Perbandingan *Total Inventory Cost* (TIC) Menurut Kebijakan Perusahaan (JIT) dengan Metode (EOQ)			
Bahan Baku	**TIC Metode JIT**	**TIC Metode EOQ**	**Total Selisih**
Semicoat Paper	Rp63.348.262	Rp3.637.287	Rp59.710.975
Synthetic Paper	Rp191.049.417	Rp6.657.594	Rp184.391.823
Total	**Rp254.397.679**	**Rp10.294.881**	**Rp244.102.798**

Figure 8. Total Inventory Cost Comparison

Table 7 above shows the company's storage costs are significant. Using the JIT calculation, the company incurs Rp227,163,363 in inventory costs. However, using the Economic Order Quantity (EOQ) method, the company only incurs Rp10,294,881. The total cost savings between the JIC and EOQ methods is Rp216,868,482. From the data above, it can be concluded that the company will be more efficient in its inventory costs if it uses the Economic Order Quantity (EOQ) method.

Perbandingan Biaya Pemesanan					
Bahan Baku	**Metode JIT**		**Metode EOQ**		**Total Selisih**
	Frekuensi Pembelian	**Total Rupiah**	**Frekuensi Pembelian**	**Metode EOQ**	
Semicoat Paper	78	Rp9.973.130	14	Rp1.790.054	Rp8.183.076
Synthetic Paper	135	Rp17.261.186	26	Rp3.324.386	Rp13.936.800
Total	**213**	**Rp27.234.316**	**40**	**Rp5.114.440**	**Rp22.119.876**

Figure 9. Ordering Cost Comparison

Table 9 shows that the company's costs for ordering raw materials are significantly different compared to those using the EOQ calculation. Using the JIT calculation, with an ordering frequency of 213 times for the two raw materials mentioned above, the company incurs costs of Rp27,234,316. However, using the Economic Order Quantity method, with an ordering frequency of 40 times, the company only incurs costs of Rp5,114,440. The total difference in ordering costs saved between the JIC and EOQ calculations is Rp22,119,876. From the data above, it can be concluded that the company will be more efficient in its ordering costs

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if it uses the Economic Order Quantity (EOQ) method.

CONCLUSIONS

Based on the research results, the Economic Order Quantity (EOQ) method has proven to be more effective and able to optimize inventory costs and lower ordering costs than Just-In-Time (JIT) calculations. Based on the research and discussion in the previous chapter, the following conclusions are drawn:

1. From the previous calculation using the Economic Order Quantity (EOQ) method, the total inventory cost was found to be more efficient and economical compared to the Just-In-Time (JIT) method used by the company. Using the JIT calculation, the company incurred inventory costs for all raw materials of Rp227,163,363, while using the EOQ method, the company only incurred costs of Rp10,294,881.
   The difference in comparative costs between the two methods, JIT and EOQ, is Rp216,868,462, a savings for the company. It can be concluded that PT. Ohtomi is better off using the Economic Order Quantity (EOQ) method because it is more efficient in managing its raw material inventory costs compared to the Just-In-Time (JIT) method.

2. From previous calculations using the Economic Order Quantity (EOQ) method, the total "ordering cost" was found to be more efficient and economical compared to the method used by the Just-In-Time (JIT) company. Using the JIT calculation, the company incurred ordering costs for all raw materials. With an ordering frequency of 213 orders and a cost per order of Rp127,861, the total cost was Rp27,234,316. Whereas using the EOQ method, the company placed 40 orders and a cost per order of Rp127,861, the total cost was only Rp5,114,440. The difference in the comparative costs between the two methods, between the JIT and EOQ calculations, was Rp22,119,876, a savings for the company. It can be concluded that PT. Ohtomi is better off using the Economic Order Quantity (EOQ) method because it is more efficient in incurring raw material ordering costs compared to the Just-In-Time (JIT) method.

IMPLICATIONS AND LIMITATIONS

From this research, it is necessary to consider that the management can continue to consider reviewing the company's management needs to periodically evaluate the ordering and inventory policies, especially paying attention to the frequency and quantity of orders to be in accordance with the EOQ calculation which can minimize total inventory costs.

Further research is expected to consider other factors that affect storage costs, such as fixed warehouse costs, labor costs, and other external factors that have the potential to affect the effectiveness of inventory control methods. The limitations of this research are that it only examines the purchase of raw materials in 2024, and only involves the procurement division, not all divisions in the company PT. Ohtomi.

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