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Efficiency Analysis Of Raw Material Inventory Using The Economic Order Quantity (EOQ) Method At Kanoko Coffee Dago

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ABSTRACT

This research aims to determine and analyze the inventory control of raw materials and measure the cost efficiency of production carried out by Kanoko Coffee Dago from September 2023 to December 2023. The research methodology is qualitative, utilizing data collection techniques involving primary and secondary data through observation, interviews, documentation, and literature review. The analysis focuses on the production reports of the four months by comparing the Economic Order Quantity (EOQ) method with the conventional method already applied by the company. The results of the analysis using Economic Order Quantity (EOQ) indicate that the total cost of raw material inventory incurred by the company is higher compared to the total inventory cost calculated using the EOQ method. Therefore, the researcher recommends that the company use the calculation from the EOQ method to save costs on raw material inventory, thereby enhancing production cost efficiency.

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1. INTRODUCTION

Tourism has now become a sector that can make a significant contribution to state income and economic growth (Kumail et al., 2023; Manzoor et al., 2019; Su et al., 2021; Vuković et al., 2023). During a tourist trip, tourists have several needs that must be met, and one of them is food. The diversity of food offered by culinary businesses makes culinary tourism increasingly popular. Both small- and large-scale businesses in this industry need to have good control over the supply of raw materials. This control involves regular record keeping by performing periodic calculations, known as "Cycle Counting". The purpose of this process is to detect inaccuracies in inventory so that corrective action can be taken to ensure inventory integrity (Sulaiman & Nanda, 2015).

Raw material inventory is considered an asset in the culinary business (Huynh & Pan, 2015; Tang, 2015). If assets are overordered and the goods that need to be sold are damaged, which leads to asset replacement due to a decrease in selling power, then the cost of purchasing wasted assets will arise, affecting the costs of other raw materials (Tang, 2015; Tse & Poon, 2017). Therefore, raw material inventory control must be carried out in a balanced manner, neither too much nor too little, to avoid excessive inventory costs (Benegusenga & Mbonimana, 2021; Huynh & Pan, 2015), even with inventory control, a business can avoid wasteful production costs and avoid food waste (Mallidis et al., 2022; Salsabila et al., 2023). Kanoko Coffee Dago has been in the culinary business since 2019. The problem experienced by Kanoko Coffee Dago is high storage and production costs. The purchasing, planning and control system implemented is a conventional system, namely using manual recording without theory. What companies can do is manage raw material supplies to be more efficient so that production costs can be reduced through the application of calculation methods Economic Order Quantity (EOQ).

Applying the EOQ method in business planning has the potential to reduce the risk of running out of raw materials or excess inventory which might hinder the smooth production process. Companies can optimize profits by controlling production costs effectively through the use of this method. Researchers refer to previous research conducted by Ahmad & Sholeh, (2019), that the EOQ method has more optimal and economical results than the method applied. Likewise research by Apriyani & Muhsin (2017) which explains that there is optimization of order quantity given by the EOQ method compared to the Kanban method. Several studies have been carried out using economic order quantities, including in coffee shops and hotels, to provide cost efficiency so that production costs can be optimized (Fadhyl et al., 2018; Fajri I & Maima A, 2020; Putri, 2017). This research was conducted to analyze and determine the raw material inventory system and raw material inventory costs at Kanoko Coffee Dago and the application of the method Economic Order Quantity (EOQ) as a comparison with conventional methods in an effort to optimize profits by emphasizing storage and production costs.

2. LITERATUR REVIEW

2.1. Food Tourism

Tourism as an economic sector makes a significant contribution to the country's foreign exchange reserves and provides direct and indirect employment for a large part of the population (Thommandru et al., 2023). In the tourism industry, there is a recent trend where tourists are spending more time and money to enjoy unique culinary and alcoholic experiences through food tours, food and drink-focused events, and marketing efforts

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(Okumus, 2021). Food tourism offers tourists tastes, flavors, textures, culture, heritage, local culinary culture, customs and new food and drink experiences (Altintzoglou et al., 2016; Buczkowska, 2014; Okumus, 2021).

2.2. Raw Material Control

Inventory management pays special attention to the storage and use of stock so that it is always available in appropriate quantities when needed, with the aim of achieving optimal profit value (Soeltanong & Sasongko, 2021). The aim of inventory control is to minimize the possibility of disruption in the production schedule and ensure that capital investment in the form of inventory is not excessive. Inventory control can be carried out using several different methods for each company, adjusted to the company's conditions in a certain period (Wild, 2017). Commonly used methods are, for example, determining levels Economic Order Quantity (EOQ), Safety Stock, and Reorder Point (Apriyani & Muhsin, 2017; Fajri I & Maima A, 2020; Soeltanong & Sasongko, 2021; Sulaiman & Nanda, 2015).

2.3. Economic Order Quantity (EOQ)

Econommic Order Quantity (EOQ) is an inventory management system used by companies to make decisions regarding orders or purchases with the aim of obtaining goods optimally and at the same time reducing costs related to inventory (Ahmad & Sholeh, 2019; Fajri I & Maima A, 2020). Calculations using the EOQ method are influenced by ordering costs, storage costs and purchasing costs. Order fees are obtained directly from the company for a total of one year. Storage costs are estimated based on the average storage of goods for one year (Fajri I & Maima A, 2020).

3. METHODS

This research utilizes qualitative research methods with the aim of solving problems, describing events based on facts, and presenting observational evidence (Creswell & Creswell, 2018). This research applies a total inventory cost efficiency test to evaluate the level of effectiveness of the methods used in the supervision carried out by researchers. This is done by comparing the differences between the EOQ approach and conventional methods applied by the company. Apart from that, this research also evaluates the sustainability of using the EOQ method which is generally used in large-scale industries to be applied on smaller industrial scales.

The data sources in this research use primary data and secondary data. Primary data will be obtained directly from interviews with the leadership and employees of Kanoko Coffee Dago, and secondary data will be obtained from documentation of inventory reports, prices of raw materials, quantity of purchases groceries and perishable at Kanoko Coffee Dago, and other data obtained from literature studies from books and journals. Data analysis was carried out using the EOQ method, calculating raw material inventory at Kanoko Coffee Dago, and total inventory cost efficiency testing to analyze comparisons.

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4. RESULTS AND DISCUSSION

4.1. Control of Kanoko Coffee Dago Raw Materials for the September-December 2023 Period

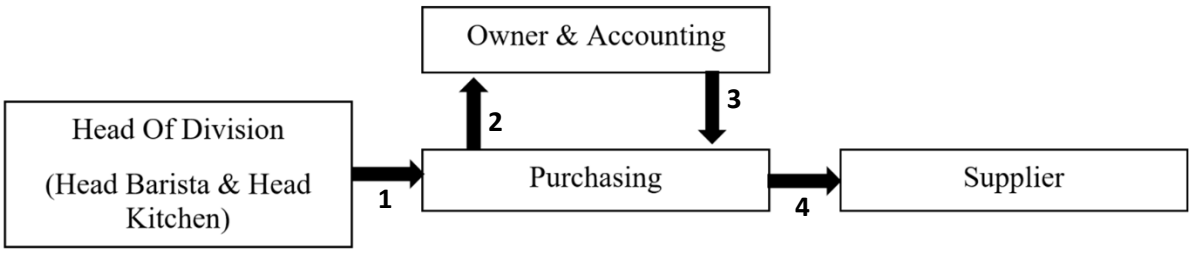

Figure 1. Flowchart of Raw Material Inventory Control

Source: Processed Data from Kanoko Coffee Dago by Researcher, 2023

The flow of raw material procurement at Kanoko Coffee Dago begins with the division head providing a list of needed items to be purchased. The purchasing department double check the items and the costs then provide data on the goods to the owner and acoounting which will later disburse funds to purchase raw materials. The purchasing department then makes purchases from suppliers, who deliver the ordered raw materials. The purchasing department receives and checks the order before storing it.

4.2. Purchase of Raw Materials

Based on the research results, the quantity of raw material purchases for groceries at Kanoko Coffee Dago during the period from September to December 2023 was determined based on production needs. According to data taken from purchasing records, the items included:

Table 1. Number of Purchases of Groceries Raw Materials for the Period September-December 2023

No	Item	Unit	Period			
			Sep	Oct	Nov	Of the
1	Rice flour	Kg	12,5	5	13	11,5
2	Flour	Kg	10	10	15	25
3	Shoyu	L	10	10	10	5
4	All over	L	6	2	2	5
5	Sesame oil	L	1,7	3,4	3,4	3,4
6	Cheese powder	Kg	3	2	0	3
7	Bon nori	25 Gr	8	6	8	12
8	Konbutsuyu	Box	2	5	5	2
9	Salt	Kg	3	3	2	2
10	Pepper	Kg	1	2	1	2
11	Ball bbq	Box	2	5	6	5
12	Granulated sugar	Kg	45	47	47	45,5
13	Frying oil	L	60	40	40	70
14	Oyster sauce	770 Gr	1	0	1	0
15	Cornstarch	750 Gr	10	10	5	10
16	Rice	25 Kg	3	4	3	3
17	agar-agar	Box	8	8	8	16
18	Bonito flakes	500 Gr	1	1	0	0

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19	Honey	750 Ml	1	2	0	1
20	Mayonnaise	Kg	8	10	9	5
21	Gherkin	Kg	4	4	2	6
22	Bread flour	200 Gr	8	10	10	15
23	Chicken powder	Kg	1	2	1	0
24	Bbq sauce hickory	500 Gr	5	2	2	5
25	Canola oil	L	1	1	0	1
26	Brown sugar	Kg	18	18	18,5	20
27	Tonic Water	L	12	10	12	12
28	Coffee	Kg	25	25	25	25
29	French fries	2,5 Kg	40	45	20	55
30	Creamer	700 Ml	10	5	5	6
31	Evaporation	400 Ml	21	19	21	20
32	Fresh Milk	L	30	25	28	30
33	UHT milk	L	20	19	19	20

Source: Kanoko Coffee Dago data processed by researchers, 2023.

Purchases of raw materials in the table above are based on the number of requests based on needs. The quantity of raw materials can be purchased if demand is high to avoid shortages of raw material inventory during operations. Meanwhile, the amount of perishable raw materials needed in Kanoko Coffee Dago consists of:

Table 2. Number of Perishable Raw Material Purchases for the Period September-December 2023

No	Item	Unit	Period			
			Sep	Oct	Nov	Of the
1	Minced beef	650 gr	12	12	5	6.6
2	fillet of chicken	Kg	30	65	48	77
3	Lemon	Kg	5	10	8	6
4	garlic	Kg	5	10	5	3
5	Onions	Kg	15	18	12	10
6	Onions	Kg	6	6	5	3
7	Ginger	Kg	6	7	4	2
8	Counts	Kg	45	60	30	50
9	Bok choy	Kg	5	3	6	3.75
10	Eggplant	Kg	5	6	4	2
11	Dory	Kg	13	7	8	11
12	Silken tofu	300 gr	13	15	18	22

Source: Kanoko Coffee data processed by researchers, 2023

4.3. Raw Material Ordering Costs

Table 3. Components of Raw Material Ordering Costs

No	Cost component	Order Fee (Rp)
1	Shipping cost	155.000
2	VAT (Value Added Tax)	101.000
	Total per month	256.000

Source: Kanoko Coffee data processed by researchers, 2023.

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Table 3 shows that the ordering costs consist of shipping costs and value added tax costs each month reaching IDR 256,000.

4.4. Storage Fees

Table 4. Components of Raw Material Storage Costs

No	Cost component	Storage Fees (%)
1	Damage costs	0,28%
2	Facility fees	0,02%
	Total	0,30%

Source: Kanoko Coffee Dago data processed by researchers, 2023.

The details in the table above show that the storage costs for each raw material item are 0.30% of the unit price per raw material item. Raw material damage costs of 0.28% are taken from each raw material item, and facility costs in the form of electricity are taken at 0.02% of the price of each raw material item.

4.5. Raw Material Inventory

Table 5. Example of Calculating Perishable Raw Material Inventory Costs at Kanoko Coffee Dago from September-December 2023

No	Item	Price	Unit	Period	Message Frequency	Raw Material Ordering Costs (Rp)	Total Order Cost Per Order (Rp)	Average Inventory	Storage Fee Per Month 0.30% (Rp)	Total Storage Costs Per Month (Rp)	Total Inventory Costs per Month
1	Onions	27000	Kg	Sep	6	2.000	12.000	3	810,00	2,430	12.002,43
				Oct	6	2.000	12.000	3	810,00	2,430	12.002,43
				Nov	5	2.000	10.000	2,5	810,00	2,025	10.002,02
				~~Of the~~ Dec	3	2.000	6.000	1,5	810,00	1,215	6.001,21
						Total				8.100,00	40.008,09
2	Eggplant	11000	Kg	Sep	5	2.000	10.000	2,5	330,00	825,00	10.825,00
				Oct	6	2.000	12.000	3	330,00	990,00	12.990,00
				Nov	4	2.000	8.000	2	330,00	660,00	8.660,00
				~~Of the~~ Dec	2	2.000	4.000	1	330,00	330,00	4.330,00
						Total				2.805,00	36.805,00

Source: Kanoko Coffee Dago data processed by researchers, 2023.

Determining the average inventory value of raw materials in storage requires initial inventory data and ending inventory data. Total inventory costs are calculated by adding up ordering costs and storage costs during a predetermined period.

Total Order Cost = Order Frequency × Order Cost
= 6 × 2.000
= Rp. 12,000.00
= Rp. 2,430.00

Total Storage Costs = Average monthly inventory × monthly storage costs
= 3 × 810,00
= Rp. 2,430.00

Total Inventory Cost = Total Order Cost + Total Storage Cost
= IDR 12,000.00 + IDR 2,430.00
= Rp. 14,430.00

Based on the data above processed by the author, the total cost of perishable raw material inventory which consists of leeks and eggplant during the September-December 2023

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period, the costs incurred by Kanoko Coffee Dago, the total storage costs for these two raw materials are IDR 10,905.00 and the total inventory costs for the two raw materials above are IDR 76,813.09. Procurement of raw material requirements and order frequency based on the EOQ method in more detail for leek and eggplant items as follows:

Table 6. Example of Calculating Raw Material Inventory CostsPerishable Kanoko Coffee Dago Period September-December 2023 Based on the EOQ Method

No	Item	Price	Unit	Period	Monthly Needs	Raw Material Ordering Costs (Rp)	Storage Fee Per Month 0.30% (Rp)	EOQ Per Month	Order Frequency	Order Frequency Rounded	Order Time Period (Days)
1	Onions	27000	Kg	Sep	4	2000	810	4,44	0,9	0,9	27
				Oct	5	2000	810	4,97	1,01	1	33
				Nov	6	2000	810	5,44	1,1	1,1	4
				Dec	5	2000	810	4,97	1,01	1	33
2	Eggplant	11000	Kg	Sep	3	2000	330	6,03	0,5	0,5	0,1
				Oct	3	2000	330	6,03	0,5	0,5	0,1
				Nov	3	2000	330	6,03	0,5	0,5	0,1
				Dec	3	2000	330	6,03	0,5	0,5	0,1

Source: Kanoko Coffee Dago data processed by researchers, 2023.

4.6. Total Inventory Efficiency Test

The total inventory cost efficiency test is a test carried out to see the effectiveness of the method used for the control process which has been carried out by the author by testing the difference between the conventional Kanoko Coffee Dago method and the Economic Order Quantity (EOQ) method. The following is a comparison Table:

Table 7. Comparison of Total Inventory Costs Based on the Conventional Kanoko Coffee Dago Method with the Economic Order Quanitity (EOQ)

Material	Total Inventory Cost		Difference in EOQ Method Results (Rp)	The Most Economical System
	Conventional Calculation (Rp)	EOQ Calculation (Rp)		
Groceries	5,788,156.89	2,615,877.12	3,172,279.77	EOQ
Perishable	3,789,456.88	1,989,334.99	1,800,121.89	EOQ

Source: Kanoko Coffee Dago data processed by researchers, 2023.

After comparing the total inventory costs, it can be seen that the EOQ method has been proven to be more economical compared to the conventional method used by Kanoko Coffee Dago. The EOQ method provides total inventory cost efficiency for groceries and perishable raw materials. Economic Order Quantity (EOQ) is the level of inventory costs that can be minimized by ordering and storage costs.

5. CONCLUSION

Based on the research results, it can be seen that the total cost of raw material inventory that the company must incur is IDR 5,788,156.89 for groceries and Rp3,789,456.88 for perishable where this cost is greater than the total inventory cost calculated according to the EOQ method, namely IDR 2,615,877.12 for groceries and Rp. 1,989,334.99 for perishable. From this comparison, it can be seen that production cost efficiency can be obtained by the company if it follows the EOQ method calculation. Where the company can save far from the

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costs currently incurred by the company with a difference of IDR 4,972,401.66 for the total cost of raw material inventory alone.

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