



Analysis of Raw Material Supply in Sadamalun Caramel Potato Donut Msmes in Karawang

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ABSTRACT

This study aims to determine the most effective inventory management at UMKM Caramel Potato Donut Sadamalun Karawang. Using a descriptive qualitative approach, researchers analyzed inventory management in the UMKM Caramel Potato Donut Sadamalun Karawang. Data from observations, interviews and documentation shows that inventory management at UMKM Caramel Potato Donut Sadamalun Karawang is not optimal. This is indicated by the minimal inventory available and high storage costs and also high inventory costs, due to limitations in managing inventory. For this reason, researchers use the EOQ technique to analyze inventory which can support inventory management effectively and efficiently

INTRODUCTION

In the midst of the era of globalization which has particularly changed the face of industry, business has accelerated rapidly along with the surge in advances in science and technology. This change not only creates increasingly heated competition between companies, but also encourages them to compete to provide the best products to consumers.

Consumers' desire for high quality products at affordable prices has become a common expectation. To create products that are superior in quality but still maintain production cost efficiency, companies must develop appropriate plans regarding raw material inventory management. Raw materials have a crucial role in maintaining the smooth flow of production in a company. Adequate availability is the main core for every business entity in supporting its production activities. Disruptions in the supply of raw materials will result in disruptions in the production process, resulting in a decrease in output which in turn will have a direct impact on company sales. This impact has the potential to reduce profits and reduce consumer trust in the company. Although demand is difficult to predict, careful planning is needed to ensure that raw material supplies are not excessive or too low. Excessive inventory carries the risk of loss due to potential damage or reduction in the quality of materials, which will ultimately affect the company's profit potential. Continuous control of raw material supplies is very important to avoid excesses or shortages in the company. This aims to adjust the amount of raw material inventory to production needs and the predetermined budget. With proper management, companies can carry out production optimally and achieve maximum profits from the production process (Astuti et al., 2021).

Potatoes are a type of tuber that is very popular in Indonesia and are often used as an alternative source of carbohydrates to replace rice. According to the Central Statistics Agency (BPS), potato consumption by households in Indonesia will reach 874,250 tonnes in 2020, an increase of 13.32% from the previous year which reached 771,460 tonnes. In the last eight years, there has been a trend of increasing potato consumption by domestic households. In the previous year, potato consumption reached a record high. Meanwhile, potato production in Indonesia will reach 1.50 million tonnes in 2021, an increase of 10.29% compared to production in the previous year which reached 1.36 million tonnes (Mustajad, 2021).



Figure 1. Graph of Potato Consumption Data in Indonesia (2015-2021)

Source: [Https://DataIndonesia.Id](https://DataIndonesia.Id)

The increase in potato consumption from year to year has opened up wide opportunities for people to use potatoes in a variety of consumption. One of them, potatoes have become the main element in donut innovation, as can be seen from the achievements of the Sadamalum Caramel Potato Donut MSME in Karawang City. This business, which was founded by Mr. Atik, has succeeded in turning potatoes, a common source of carbohydrates, into a cake product that is highly sought after by consumers. This success is reflected in the resilience of this business since it was founded in 2013 and continues to grow until 2021, with the opening of 2 new branches. This development indicates that donut cakes with potatoes as the main ingredient have succeeded in capturing the hearts of consumers consistently over the years. This is not just a temporary trend, but a sign that the adaptation of potatoes in consumer products continues to be a sustainable attraction for the market. However, in the production process he faced difficulties in managing production because the inventory control system for potato raw materials was less structured. This condition has the potential to hamper production, increase inventory costs, and increase the risk of damage to raw materials. Currently, the use of conventional methods without effective planning or control of raw material stocks is an obstacle, especially considering the fluctuations in demand that occur in each period.

The Economic Order Quantity (EOQ) method is a stock management model that aims to find the most efficient order quantity for goods based on the company's needs. This method addresses two crucial aspects: how many products should be ordered and when is the right time to place an order. The use of the EOQ method also aims to minimize the possibility of shortages of raw materials so that the production process is maintained smoothly. More than that, using the EOQ method allows companies to focus on storage costs, efficient use of warehouse space, and reduce the impact of excess stock which can pose risks. By finding the right amount of inventory and optimal ordering intervals, companies can achieve optimal stock management (Cahyani & Rizal, 2021).

Previous research (Cahyani & Rizal, 2021), namely research shows that the Alhamdulillah Skin Cracker Business should apply the EOQ method to manage raw material supplies. Based on calculations using the EOQ method, the total inventory costs are lower than those currently used by the Alhamdulillah Skin Crackers Business. Therefore, it can be concluded that the EOQ method is a more optimal approach in managing raw material inventories. Then research (Astuti et al., 2020) according to research, revealed that the optimal amount of raw material inventory can be achieved using EOQ calculations. The difference between the results of calculations using the manual method used by the company and the EOQ calculation is quite significant. Therefore, it is important for companies to control raw material inventories to prevent surpluses or stock shortages which can have an impact on inventory costs. Research from (Mahendra et al., 2021) results from research using the EOQ method to manage orders for cassava raw materials by UMKM Kuncoro, the results of the EOQ analysis show that reducing expenditure on raw materials can save the budget

that must be spent by UMKM Kuncoro. The application of the EOQ method also supports Kuncoro MSMEs in achieving the most effective total orders.

Based on the description above, action is needed to control raw material supplies. Therefore, this research is entitled "Analysis of Raw Material Supplies in Sadamalun Caramel Potato Donut MSMEs in Karawang".

LITERATURE REVIEW

Economical Order Quantity (EOQ)

Raw material inventory control is carried out using 3 methods, namely simple probabilistic EOQ, probabilistic EOQ P Back Order, and probabilistic EOQ Q Back Order. The minimum total inventory value is obtained using the EOQ P Back Order mode. In the finance function, inventory represents the largest asset because its value is high, so it consumes a large portion of capital (Farmaciawaty et al., 2020). By using the P back order model policy, the company can save inventory costs because raw materials can be controlled by controlling the time between orders (T) and the maximum inventory limit (R). By controlling inventory based on the time between orders, the raw material control process can run more regularly, because the ordering time is structured and has a maximum inventory capacity. Having a maximum inventory capacity can prevent companies from experiencing excess raw materials. In this case, the company must pay attention to the size of the warehouse layout and warehouse capacity so that the use of this method is appropriate to existing conditions. Improper inventory planning will have an impact on factory operational costs, development costs, and product defect costs due to products being stored for too long, which will ultimately cause losses (Nurprihatin et al., 2021). The raw material inventory control process for Snack Food MSMEs uses the P back order model because controlling the time between orders can make the company pay more attention to the needs and condition of raw materials.

The raw materials from MSME Ganep are food ingredients so attention is needed, based on research results, the ordering period is approximately once a month so that types of food raw materials which have different shelf life can be paid more attention and can minimize the occurrence of shortages of raw materials and damage to raw materials.

Sjahrial and Purba (2012) in (Mayasari & Supriyanto, 2021) explain that Economic Order Quantity (EOQ) is the optimal quantity for orders or production in order to minimize inventory costs, which consist of ordering costs and storage costs. In the EOQ application, according to Fahmi in (Astuti et al., 2021), EOQ (Economical Order Quantity) is a mathematical model that calculates the number of orders for goods that must be placed to meet estimated demand, with the aim of achieving inventory costs that are as minimal as possible. . This calculation can be calculated using the following formula:

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

According to Haming and Nurnajamuddin in (Mayasari & Supriyanto, 2021), there are several basic assumptions, including:

1. Fixed and stable demand throughout one year (D),
2. Fixed and consistent inventory prices (C),
3. Continuous availability of supplies that can be obtained when needed, as well
4. Stable and unchanged inventory costs. With these assumptions (*ceteris paribus*), the factor that can vary is the order quantity (Q), which depends on the values of factors such as D, C, and inventory costs.

a. Total Cost (TC)

According to Fahmi in 2016 in (Astuti et al., 2021), this term refers to cash or the equivalent value of cash which is used as a sacrifice to obtain goods or services that are expected to provide benefits both now and in the future for an organization. This calculation can be calculated using the following formula:

$$TC = \frac{H \times Q}{2} + \frac{S \times D}{Q}$$

b. Reorder Point (ROP)

According to Fahmi in 2016 in (Astuti et al., 2021), Reorder Point (ROP) is a specific point at which a company or business entity must order certain goods or materials to ensure the creation of adequate inventory conditions for goods that need to be reordered. . This calculation can be calculated using the following formula:

$$ROP = (d \times L) \times SS$$

c. Safety Stock

Uncertainty in the use of raw materials has the potential to cause inventory shortages. Therefore, establishing additional inventory levels called safety stock is crucial. Safety stock is needed to maintain the smooth production process and prevent stock runs out which could disrupt production. Freddy Rangkuti (2004:10), explains that safety stock is additional inventory held to protect or guard against the possibility of a shortage of materials (stock out). Potato donut MSMEs need reserve raw materials to avoid shortages of raw materials while waiting for orders to arrive or as a safeguard when demand is increasing while orders for raw materials have not yet arrived. The safety stock calculation in this research uses a service level approach. According to Astuti (2018), service level is a significant demand that will not exceed or exceed inventory during lead time in a business. The safety stock calculation in this research is based on service levels and a risk level of inventory shortages of 5%. According to Sjahrial and Purba (2012) in (Mayasari & Supriyanto, 2021), in order to overcome uncertainty, companies need to have additional inventory called safety stock. Safety stock is extra inventory that is kept to guarantee against variations in demand with the following formula: Safety Stock = (Maximum usage - Average usage) x Lead time (waiting time). Fahmi (2016) in (Astuti et al., 2021) also describes safety stock as extra inventory that plays a role in

anticipating demand uncertainty and preventing stock shortages of raw materials. This calculation can be calculated using the following formula:

$$SD \frac{\sqrt{(X - X)}}{N}$$

METHODOLOGY

The type of data used in this research involves primary data and secondary data. The data analysis method applied is a quantitative method with the application of analysis in numerical or numerical form. The analysis stages used consist of:

1. Make the assumption that the demand or amount of inventory required in a period, usually within one year, of raw materials is the result of requests from the company to wood suppliers (raw materials). The inventory required in a certain period is based on data on the company's use of wood raw materials. Assuming: D = Demand or supply needed in a certain period, generally within one year.
2. Next, assume that ordering costs, in this case the costs that arise when the company orders raw materials from wood providers (raw materials), with the assumption that OC = Ordering Cost.
3. Assuming that storage costs are costs that arise due to the inventory of raw materials stored in the warehouse, causing raw material storage costs to arise, assuming CC = Carrying Costs.

RESULT AND DISCUSSION

Inventory is one of the most important parts in maintaining the stability of the Donut Potato UMKM, because the potatoes and flour made by the Potato Donut UMKM are raw materials of good quality. Therefore, raw material supplies are the key to the production process so that consumer demand is met. Apart from that, the company must also have a good inventory system so that the products produced remain of high quality, especially the products produced regarding food which must definitely have products of adequate quality. There are many methods for inventory control systems in a company, but the researcher decided to use the Just in Time method in this final assignment. The implementation of Just in Time aims to ensure that raw material supplies have been determined and are in accordance with company policy and requests from customers or consumers. The Just in Time method is a method that helps companies be more efficient in managing their inventory regarding the right amount and time, it is also a method that is relevant to use today compared to other methods related to inventory and the quality of the products produced. The JIT principle is to reduce holding costs. The number of kanbans used in this method varies each month depending on how many potatoes are needed each month which can provide the minimum cost. In order to find empirical evidence regarding the Just in Time method which can minimize holding costs to increase productivity and profits obtained by the company, researchers conducted research using a qualitative approach.

UKM Potato Donuts has data on raw material requirements in the form of wheat flour as follows.

Table 1. Wheat Flour Orders Per Year

Month	Order Frequency	Quantity ordered (kg)	Price
January	6	786	Rp 7.074.000
February	7	445	Rp 4.005.000
March	7	244	Rp 2.196.000
April	8	226	Rp 2.034.000
May	8	550	Rp 4.950.000
June	8	510	Rp 4.590.000
July	9	575	Rp 5.175.000
August	6	811	Rp 7.299.000
September	9	620	Rp 5.580.000
Oktober	9	208	Rp 1.872.000
November	10	830	Rp 7.470.000
December	10	730	Rp 6.570.000
Total	97	6.535	Rp. 58.815.000
Rate	8,083	544,583	Rp 4.901.250

The highest demand for raw materials is in November with an order volume of 830 kg, the lowest demand for raw materials is in October, namely 208 kg. The total need for raw materials for 1 year is 6,535 kg with an order frequency of 97 times. The average monthly order is 544,583 with an average order frequency of 8,083 times

SME Donut Potatoes incur costs related to inventory which consist of ordering costs and storage costs. Ordering costs consist of telephone costs of IDR 2,500 and purchase transportation costs of IDR 20,000. The total order cost for one order is IDR 22,500. So it is known that the ordering cost for 1 year is IDR 22,500 X 97 = IDR 2,182,500. Meanwhile, Raw Material Storage Costs are costs borne by UKM Potato Donuts related to Raw Material storage activities. Potato Donut UKM determines raw material storage costs of 6% of the raw material price, namely IDR 9,000 x 6% = IDR 540 per kg or IDR 3,528,900 per year.

Based on these two tables, a comparison can be obtained between the calculation of inventory control for wheat flour raw materials using the SME method and using the Economic Order Quantity (EOQ) method. In calculations using the SME method, the frequency of orders in one period is 97 times, with an ordering cost of IDR 2,182,500 and a storage cost of IDR 3,528,900. Total inventory costs are IDR 5,711,400 and average orders per month are 544,583kg

Meanwhile, calculations using the Economic Order Quantity (EOQ) method show that EOQ is 737.96 kg, safety stock is 36,306 kg, reorder point is 72,611 kg, order frequency is 9 times in one year, ordering costs are IDR 199,249, storage costs in one year amounting to IDR 1,793,243 and inventory costs in one year are IDR 1,992,492

Inventory calculations using the Economic Order Quantity (EOQ) method have a lower frequency of orders so that they affect the size of ordering costs and storage costs which have less value than ordering costs and storage costs using the SME method. This can save SMEs' expenses in allocating their funds to inventory costs. So that the funds can be allocated to other activities. The difference in inventory costs using the SME calculation method and using the Economic Order Quantity (EOQ) method is IDR 3,718,908. This number is quite large for SMEs so that with savings in raw material control it is hoped that SMEs

can continue to increase SME profits and improve the quality of the products produced and be able to compete with other products.

CONCLUSION AND RECOMMENDATION

In calculations using the SME method, the frequency of orders in one period is 97 times, with an ordering cost of IDR 2,182,500 and a storage cost of IDR 3,528,900. Total inventory costs are IDR 5,711,400 and average orders per month are 544,583kg. Meanwhile, calculations using the Economic Order Quantity (EOQ) method show that EOQ is 737.96 kg, safety stock is 36,306 kg, reorder point is 72,611 kg, ordering frequency is 9 times in one year, ordering costs are IDR 199,249, storage costs in one year are IDR 1,793,243 and inventory costs in one year are IDR 1,992,492

From the conclusions above, the author provides advice to the Sadamalun caramel potato donut MSMEs, suggesting that the industry should use the EOQ method in managing the supply of raw materials for caramel potato donuts by paying attention to storage conditions. The EOQ method has been proven to show that total inventory costs are more efficient and provide safety stock and apply appropriate numbers of reorder points or Reorder Points when using the EOQ method, this is to anticipate shortages of raw materials and avoid delays in ordering raw materials

FURTHER STUDY

This research still has limitations, so it is necessary to carry out further research related to the topic of Analysis of Raw Material Supply in Sadamalun Caramel Potato Donut Msmes in order to improve this research and add insight to readers.

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