



# Analysis of Production and Inventory Control of Batik Raw Materials According to Islamic Economic Perspective (Case Study at SME Santi Batik)

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## How to Cite :

Fitri, R., Wahyuni, S, E. Sumarni, Y. (2024). Analysis of Production and Inventory Control of Batik Raw Materials According to Islamic Economic Perspective (Case Study at SME Santi Batik). EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis, 12(1). doi: <https://doi.org/10.37676/ekombis.v12i1>

## ARTICLE HISTORY

Received [23 June 2023]

Revised [11 September 2023]

Accepted [01 December 2023]

## KEYWORDS

Production, EOQ, Safety Stock, Reorder Point And Total Cost.

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## ABSTRACT

This study aims to find out how the batik production process and batik raw material inventory control in UKM Santi Batik using the EOQ (economic order quantity) method, safety stock, reorder point and total cost. . In this study, researchers used a descriptive-comparative method with a quantitative approach and used primary data collection techniques in the form of a questionnaire specifically for UKM Santi Batik. The data analysis technique used is the approach formula, namely the method of determining the number of economic orders by reducing them in the formulas. The results of the research and discussion can be concluded that the EOQ (economic order quantity) method is more effectively used in raw material inventory control than the existing policies in UKM Santi Batik. Because UKM Santi Batik has not used optimal raw material inventory control, namely only using estimates in purchasing batik raw materials. In addition, by using safety stocks, UKM Santi Batik can avoid shortages of raw materials in production, reorder points so that UKM Santi Batik knows when to buy raw materials again and obtain them with minimum total inventory costs.

## INTRODUCTION

Production is the process of producing goods and services, or the process of increasing the value of an object. Production activities are a link to consumption and distribution. Production activities that produce goods and services are then consumed by consumers. Without production, economic activity will stop. Production activities require production factors, namely labor, capital, and natural resources. In Islamic economics, production activities are defined as any activity that explores the economic resources provided by Allah SWT, in order to produce benefits and is oriented towards meeting the needs of the community.

The smooth running of production is influenced by several things, one of which is influenced by the presence or absence of raw materials to be processed in the production

process. Often a company experiences problems in controlling raw material inventory. If a company buys too much raw material, the company will incur too much cost both in terms of purchasing raw materials and the cost of storing raw materials. Vice versa, if a company purchases raw materials that are too small, the company will reduce profits because the company will incur stock out costs. So controlling the inventory of raw materials is very important for the smooth production process. Raw material inventory control is a series of control policies to determine the level of inventory to be maintained, when orders to increase inventory should be placed and how large orders should be held. The raw material inventory policy is to reduce inventory costs as little as possible. To determine the economical amount of raw material inventory using the Economic Order Quantity (EOQ) method policy. In using the Economic Order Quantity (EOQ) method, it can consider safety stock, reorder point, and total cost. So that with the safety stock and reorder point, if there is a sudden order the warehouse has inventory and knows when to reorder. The purpose of this Economic Order Quantity (EOQ) method is to determine the economical amount of raw material inventory each time you order.

UKM Santi Batik is a home industry engaged in making written batik which is located in Kampung Batik Betungan, Jl. Air Selagan 4 No.69, Betungan Village. UKM Santi Batik was established in 2018. In the production process, Santi Batik SMEs use quality primisima cotton raw materials and auxiliary raw materials used in the batik process, namely malam (wax) and dyes. As well as equipment used for batik such as canting, stoves. Based on preliminary observations in controlling the inventory of raw materials, Santi Batik SMEs have not used optimal inventory control to meet raw material inventory needs. Santi Batik SMEs only use estimates in purchasing raw materials, namely if the existing inventory of raw materials is deemed exhausted, the new business owner will purchase raw materials. Therefore, the problem that occurs in SME Santi Batik is that there is an unoptimal calculation in the purchase of raw materials. So that causing a shortage of raw materials will make the production process hampered. To handle it, it is necessary to control the inventory of raw materials which aims to make inventory costs efficient, one way is to make the right purchase according to the production plan so that it does not experience shortages and excesses in raw material inventory.

## **LITERATURE REVIEW**

### **Production**

Production is an activity carried out by humans in producing a product, either goods or services which are then utilized by consumers. Production is a process of making an item from the beginning (input) to the end (output) to create a form that is suitable and feasible for sale so that it can meet consumer needs and can get maximum profit. Production in the perspective of Islamic economics is defined as an activity that explores the economic resources provided by Allah SWT, in order to produce benefits and is oriented towards meeting the needs of the community.

Monzer Kahf defines production activities in an Islamic perspective as a human endeavor to improve not only physical material conditions, but also morality, as a means to achieve the goals of life as outlined in Islam, namely happiness in the world and the hereafter. Siddiqi defines production activities as the provision of goods and services by taking into account the value of justice and benefits (mashlahah) for the community.

### **Production Factors**

In the production process, production factors have a very close relationship with the products produced. In the production process, an entrepreneur is required to be able to combine several production factors so as to produce optimal production. The factors of production include:

- a. Capital

Capital is a very important factor in a production, without capital producers cannot produce goods / services. Capital is a certain amount of purchasing power or that can create power that is used for a production process.

b. Labor

According to Murti, labor is an individual who offers skills and abilities to produce goods or services so that the company can make a profit and for that individual will get a salary or wage according to his skills.

c. Raw materials

Raw materials are the first step in a production process, the availability of a sufficient amount of raw materials and easy to obtain will facilitate production activities. This causes the raw material factor to be important in determining production results. With the availability of raw material supplies, it is hoped that industrial companies can carry out the production process according to consumer needs or requests. 3. Principles of Production in Islamic Economic Perspective

The principles of production in Islamic economics include:

1. Principle of Tawhid

The principle of tawhid is a fundamental teaching of Islam. This principle says that producers carry out their activities because of their submission to Allah SWT and are motivated to worship Him. Based on this principle, Allah SWT sets limits, rules and laws on production activities carried out by humans, emphasizing their obligations to Allah SWT. The implementation of the principle of tawhid in production activities is realized from the production produced in the form of products that are halalan toyiban and avoid elements of ribawi, gharar, maisir.

2. Principle of Justice

The principle of justice is the implementation of human relations based on belief in Allah. Because humans are created based on rights, obligations, and responsibilities, the principle of justice seeks justice in all contexts of life, besides that justice or balance is the character of the universe and human character implemented in their lives. Fair behavior has been stated in Surah Al-Maidah verse 8: Meaning: O you who believe, let you be people who always uphold (the truth) for Allah, be witnesses fairly. and never let your hatred of a people encourage you to act unjustly. Be fair, because justice is closer to piety. and fear Allah, surely Allah is All-Knowing of what you do.

3. Principle of Responsibility

Production activities take advantage of, explore and manage economic resources accompanied by the prohibition of destroying them and being responsible for preserving them. Production activities are not binding in nature, requiring humans to do limited things, but humans are free to carry out any production activities as long as they do not harm other people and do not violate Islamic rules and can be held accountable.

### **Control of Raw Material Inventory**

1. Understanding Raw Material Inventory Control

Inventory control is a very important managerial function for companies because physical inventory in a company will involve a large investment. The implementation of functions will be related to all parts with the aim of maximizing product sales and resource use. According to Assauri, inventory control is one of the activities in a sequence of activities that are closely linked to each other in all the company's production operations according to what has been planned in advance, including time, quantity, quantity and cost. Every company needs to hold inventory to ensure the survival of its business. To hold this inventory requires money to be invested in the inventory, therefore every company must be able to control an optimal amount of inventory that can guarantee the survival of its business. To hold this inventory requires money to be invested in the inventory, therefore every company must be able to

control an optimal amount of inventory that can guarantee the needs for the smooth running of the company's activities in the right amount and at minimum costs.

Thus, what is meant by inventory control is the activity of allocating the correct amount of inventory (raw materials or auxiliary materials), with an amount that is not too large and not less or small compared to needs or demand.

## 2. Objectives of Inventory Control

An inventory control carried out by a company certainly has certain objectives. Inventory control is carried out to maintain inventory levels at an optimal level so that savings can be obtained for the inventory. The objectives of inventory management are as follows:

- a. To maintain production continuity or prevent the company from running out of inventory which results in the production process stopping.
- b. To be able to meet consumer needs and demands quickly (satisfy consumers)
- c. Avoid making small purchases, as this can result in large order costs.
- d. To maintain and if possible increase company sales and profits.
- e. Make sure that the storage in the emplacement is not large, because it will result in greater costs.

## 3. Factors that Influence Raw Material Inventory Control

According to Ahyari, factors that influence raw material inventory control include:

### a. Estimated Raw Material Usage

Before a company purchases raw materials, it is appropriate for the company to prepare an estimate of raw materials for the purposes of the production process.

### b. Raw material prices

The nominal amount spent by the company to purchase raw materials.

### c. Costs – Inventory Costs

In organizing raw material inventories, the company will of course not be free from inventory costs that will be borne. Such as purchasing costs, procurement costs, and storage costs.

### d. Use of Raw Materials

The use of raw materials in the previous period for production process purposes can be used as a basis for consideration in purchasing raw materials.

### e. Waiting Time (lead time)

What is meant by waiting time is the time period required between the ordering of raw materials and the arrival of the raw materials being procured.

### f. Raw Material Purchase Model

The selection of the purchasing model that the company will use is adjusted to the situation and conditions of the raw material inventory in question.

### g. Safety Inventory (safety stock)

In general, to overcome shortages or running out of raw materials, companies will hold safety supplies.

### h. Repurchase

In organizing raw material supplies, it is not enough to do it just once, but it will be done repeatedly on a regular basis. . Raw Material Inventory Control Using the Economic Order Quantity (EOQ) Method, Safety Stock, Reorder Point, and Total Cost

## Economic Order Quantity (EOQ)

Is a mathematical model that determines the number of items that must be ordered to meet projected demand, with minimized inventory costs. Based on exposure from Heizer and Render, the calculation of EOQ can be done by formula:

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

**Description:**

D : Annual demand in units for inventory items

S : Ordering cost for each order

H : Storage costs

Basically the Economic Order Quantity (EOQ) method refers to the economic purchase of the same amount each time you place an order. The company can determine how many times to order raw materials in 1 year by dividing the raw material requirements in one year by the number of purchases each time to order. The formula for calculating the frequency of ordering is as follows:

$$\text{Frekuensi pemesanan (f)} = \frac{D}{\text{EOQ}}$$

**Description:**

F : frequency of purchases in one year

D: total raw material requirements for a year

Eoq: optimal purchase quantity

**Safety stock**

To order an item until it arrives requires a period of time that can vary from several hours to several months. The difference in time between when ordering until the goods arrive is known as the lead time. Lead time is strongly influenced by the availability of the goods themselves and the distance between the location of the buyer and the supplier. Due to this grace time, it is necessary to have inventory reserved for the needs while waiting for the goods to arrive, which is referred to as safety stock. Safety stock serves to protect or maintain the possibility of a shortage of goods.

Safety stock, according to achmad slamet, is the minimum amount of inventory that a company must have to maintain the possibility of a shortage of raw materials, so that stagnation does not occur. Safety stock can be formulated as follows:

$$S_s = (\text{maximum usage} - \text{average usage}) I_t$$

**Reorder point**

The amount of inventory that marks when a reorder must be placed is referred to as the reorder point, this point indicates that a purchase must be made immediately to replace the inventory that has been used. If the rop is set too low, inventory will run out as soon as the rop is set.

**Total Cost (Total Cost)**

In the calculation of the total cost of inventory, it aims to prove that with the optimal amount of raw material purchases, calculated by the EOQ method, the minimum total cost of raw supplies will be achieved. Based on exposure from Heizer and Render, the calculation of total cost can be done by formula:

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

**Keterangan:**

TC : total cost

D : the number of requests in a certain period

Q : EOQ

S: ordering cost

H: storage cost

### Raw Material Inventory

In manufacturing companies, raw materials are the main requirement in the production process, because in the production process the company needs raw materials to produce its products. Raw material is something that is used to make finished goods. For this reason, managing raw material inventory is a very important activity for companies in order to maintain a smooth production process.

According to Assauri, raw materials stock is the inventory of tangible goods used in the production process, goods that can be obtained from natural sources or purchased from suppliers or companies that produce raw materials for factory companies that use them. Raw materials are needed by the factory to be processed, which after several processes are expected to become finished goods.

According to Reksohadiprodjo, the factors that affect the raw material inventory of a company are as follows:

- a. The amount of inventory needed to protect the company's production process from running out of raw materials.
- b. The amount of production determined by the company, where the volume of production determined depends on the volume of goods to be sold by the company.
- c. The amount of purchase of raw materials each time you buy to get the best price.

### METHODS

The analysis method used in this research is Formula Approach. Formula Approach is a way of determining the economic order quantity by deriving in mathematical formulas can be done by considering that the minimum amount of inventory costs.

#### 1. Economic Order Quantity (EOQ)

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

Description:

D : Annual demand in units for inventory items

S : Ordering cost for each order

H : Storage costs.

After calculating the optimal amount of inventory, the next step is to determine the frequency of ordering. The ordering frequency formula that can be used is as follows:

$$\text{Frekuensi pemesanan (f)} = \frac{D}{EOQ}$$

Description:

f : Frequency of purchase in one year

D: Total raw material requirements for a year

EOQ: Optimal purchase quantity

## 2.Safety stock

Safety stock, according to Achmad Slamet, is the minimum amount of inventory that a company must have to maintain the possibility of raw materials coming in, so that stagnation does not occur. Safety stock can be formulated as follows:

$$SS = (\text{Maximum usage} - \text{average usage}) \text{ LT}$$

## 3.Reorder point

The reorder point is usually determined by adding usage during the grace period with safety stock or in the form of the following formula:

$$\text{ROP} = \text{D} \times \text{L} + \text{SS}$$

Description:

ROP: reorder point

D: level of demand per unit of time

L: waiting time

SS: Safety Stock

## 4.Total cost (total cost)

In the calculation of the total cost of inventory, it aims to prove that with the optimal amount of raw material purchases, which is calculated by the EOQ method, the minimum total cost of raw supplies will be achieved by the formula:

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

Keterangan:

TC : total cost

D : the number of requests in a certain period

Q : EOQ

S: ordering cost

H: storage cost

## RESULTS

### Batik Production at UKM Santi Batik

Production is an activity carried out to convert input into output or can be understood as an activity to add value to a good or service by involving production factors as input. In economic theory, the entire series of production processes is formulated in terms of production factors, namely the level of production of a good depends on the amount of capital, labor and natural resources (raw materials). Because production factors influence the production process.

UKM Santi batik is a home industry that operates in the batik making business. The batik produced by UKM Santi Batik is Basurek batik. Basurek Batik is a typical Bengkulu batik with Arabic calligraphy motifs. The origin of the name Batik Basurek is because this batik uses motifs bearing Arabic calligraphy. Basurek is a Malay dialect from Bengkulu which means letter or writing. Basurek cloth comes from two words, namely Kain and Basurek. Basurek comes from two words, namely ber which means to have or own, and surek which means letter or writing. So, Basurek Cloth means cloth that has writing or letters. Basurek cloth is a form of traditional craft that has been developing for a long time and is a legacy from the ancestors of the Bengkulu people from generation to generation.

The process of making batik at UKM Santi starts from the fabric preparation process first. The fabric used is quality prime cotton fabric. After that, continue with making the image design pattern. The image design is made on cardboard. Then the resulting design image is placed on the cloth to make it easier to draw the design on the cloth. After drawing the design on the fabric, the next step is cutting. Cantingan is the process of installing wax/wax on fabric according to the image design pattern. After that, it is done by walling or holding back the dye so that it does not seep into the parts covered by wax when dyeing the fabric. Next is melodro or coloring the batik cloth and color fixation is carried out for 6-12 hours so that the color sticks to the cloth. After that, sagging is done, namely removing the wax/wax on the cloth by boiling the cloth. Once finished, the batik cloth is washed until clean and dried in the sun and exposed to gusts of wind. Finally, before the batik is packaged and marketed, the production results will be controlled or checked again.

In the production process, production factors have a very close relationship with the products produced. Production factors are very important in the production process of a business in producing goods. The production factors that exist in UKM Santi Batik include: a. Capital

Capital is a very important factor in production, without capital a business cannot produce goods/services. Santi Batik UKM is categorized into a group of small and medium industries managed by individuals. Where the initial capital for a business comes from the owner's assets.

b. Labor

In labor recruitment, UKM Santi Batik does not create special standards. The main thing needed is someone who has the will or commitment to learn, is active and patient. Most of the Santi Batik UKM workers are housewives who come from around the batik business location. UKM Santi Batik creates good and harmonious cooperative relationships in its operations and has an organizational structure. With the existence of an organizational structure, clear description of duties, responsibilities and authority, it makes it easier to determine, direct and supervise the running of business operations so that they run well and under control.

c. Raw material

Raw materials are the first step in a production process. The availability of raw materials in sufficient quantities and easy to obtain will facilitate production activities. This causes raw material factors to become important in determining production results. With the availability of raw material supplies, it is hoped that industrial companies can carry out production processes according to consumer needs or requests.

### **Batik Production in Santi Batik UKM According to an Islamic Economic Perspective**

Production in Islam is not only profit-oriented, but also contains the value of worship. Islamic production emphasizes aspects of optimizing efficiency and profits (benefits), as well as ethics. Production in an Islamic economic perspective is defined as an activity that explores the economic resources provided by Allah SWT, in order to produce benefits and is oriented towards meeting the needs of society.

The Islamic Economic Principles used by UKM Santi Batik in carrying out batik production are:

a. Principle of Monotheism

Production management carried out by UKM Santi Batik uses the principle of monotheism, namely praying before work and surrendering everything we have and what we need to Allah. In carrying out Santi Batik UKM production, it is not only for profit but also for worship and can provide benefits to consumers. In this principle, Allah SWT has established limits, rules and laws for production activities carried out by humans in order to produce halal goods. The production carried out by UKM Santi produces batik products that are halal and good and avoid the element of usury.



b. Principles of Justice

The principle of justice in Islamic economics is that first, people involved in production activities must receive a proportional portion of welfare according to the input they provide. Second, the rights of the community and consumers as production stakeholders must be fulfilled by producers. The implementation of the principle of justice at UKM Santi Batik in production activities is to fulfill workers' rights, namely by providing equal wages to workers. As well as fulfilling consumer desires, such as making batik according to the model desired by consumers.

c. Principle of Responsibility

In economic activities, namely production, producers or companies are free to run any business as long as the business does not violate Islamic sharia and is able to be responsible for the business they run. The implementation of the principle of responsibility in UKM Santi Batik in production activities is to be responsible for exploring and managing existing natural resources so as not to damage the surrounding environment and to be responsible for all defective goods or goods received by consumers that are not as desired. If there is a defect or the goods received by the consumer do not match what was desired, the consumer has the right to return the goods to get a replacement with the same goods and price as noted as long as the goods have only been purchased and have not been used.

**Application of the EOQ (Economic Order Quantity) Method for Safety Stock, Reorder Point and Total Cost in Controlling Raw Material Inventory at Santi Batik UKM**

EOQ (Economic Order Quantity) is the value of the amount of materials needed during a certain period each time it is purchased using the most economical costs. In determining EOQ, statistical analysis is used by considering raw material usage for 1 period, ordering costs for each order, and raw material storage costs. Meanwhile, according to Achmad Slamet, safety stock is the minimum amount of inventory that a company must have to guard against the possibility of a shortage of raw materials, so that stagnation does not occur. In determining safety stock, statistical analysis is used, namely by considering the maximum use of raw materials, average use of raw materials, and waiting time for raw materials. So you can know what safety supplies must be provided.

The reorder point is the level of inventory at which orders must be reordered to arrive on time. In determining the reorder point, statistical analysis is used by considering the level of demand per unit, waiting time and safety stock. Meanwhile, total cost is determining the optimal cost in purchasing raw materials by considering the large demand for raw materials in a certain period, eoq, ordering costs and storage costs.

Based on research conducted on UKM Santi Batik, UKM Santi Batik purchases raw materials when the raw material supplies in the warehouse run out. So Santi Batik UKM experiences a shortage of raw materials used in the production process. The raw materials used in production are cloth, wax/wax, and dye. The data regarding raw material purchases at UKM Santi Batik in 2022 can be explained as follows:

**Table 1. Purchase of Raw Materials at UKM Santi Batik in 2022**

No.	Month	Raw Materials		
		Fabric (Meter)	Night (Kg)	Dye (Kg)
1	January	220	40	20
2	February	225	25	20
3	March	250	50	30
4	April	225	40	20
5	May	230	55	25
6	June	480	90	40
7	July	-	5	15
8	August	300	50	10
9	September	470	85	40
10	October	230	20	50
11	November	250	50	18
12	December	210	25	15
<b>Total</b>		<b>3090</b>	<b>535</b>	<b>323</b>
<b>Average</b>		<b>280,91</b>	<b>44,58</b>	<b>24,85</b>

Source: Data from the owner of UKM Santi Batik

Based on the data on the purchase of raw materials described above, it can be seen that in 2022 Santi Batik SMEs purchased fabric raw materials 11 times a year with a total purchase of 3090 meters, purchased night raw materials 12 times a year with a total purchase of 535 Kg, and purchased dye raw materials 13 times a year with a total purchase of 323 Kg. Furthermore, for data on the use of batik raw materials in UKM Santi Batik in 2022 as follows:

**Table 2 Raw Material Usage at SME Santi Batik in 2022**

No.	Month	Bahan Baku		
		Fabric (Meter)	Night (Kg)	Dye (Kg)
1	January	200	30	15
2	February	245	35	25
3	March	250	50	30
4	April	200	30	15
5	May	255	65	30
6	June	250	65	30
7	July	200	30	15
8	August	360	60	40
9	September	300	45	35
10	October	345	55	38
11	November	300	50	30
12	December	215	30	20
<b>Total</b>		<b>3120</b>	<b>545</b>	<b>323</b>
<b>Rata-Rata</b>		<b>260</b>	<b>45,42</b>	<b>26,92</b>

Source: Data from the owner of UKM Santi Batik

Based on the data on the use of raw materials described above, it can be seen that in 2022 Santi Batik SMEs purchased 3120 meters of fabric raw materials, 545 Kg of night raw materials, and 323 Kg of dye raw materials.

In addition to the data on the purchase and use of raw materials above, based on the results of interviews conducted with the owners of SMEs Santi Batik also obtained data on ordering costs and storage costs of batik raw materials. The data on ordering costs made by UKM Santi Batik in 2022 are as follows:

**Table 3 Raw Material Ordering Cost Data At SME Santi Batik in 2022**

No.	Material Raw Materials	Frequency (times)	Phone Cost (Rp)	Shipping Cost (Rp)	Total Cost year 2022 (Rp)
1	<i>Fabric</i>	11	10.000	300.000	3.410.000
2	<i>Night</i>	12	10.000	50.000	720.000
3	<i>Dye</i>	13	10.000	30.000	520.000
<b>Total</b>					<b>4.650.000</b>

Source: Data from the owner of UKM Santi Batik

Based on table 1.5, it can be seen that the cost of ordering raw materials in 2022 in UKM Santi Batik consists of 2 types of costs, namely telephone costs and shipping costs. Furthermore, the data on the cost of storing raw materials in UKM Santi Batik in 2022 are as follows:

**Table 4 Storage Cost Data At SME Santi Batik in 2022**

No.	Cost	Total Cost / Year (Rp)
1	Electricity Costs	1.200.000
2	Material Maintenance Cost	3.600.000
3	Warehouse Maintenance Cost	2.000.000
<b>Total</b>		<b>6.800.000</b>

Source: Data from the owner of UKM Santi Batik

Based on table 1.4, it can be seen that the cost of storing raw materials in UKM Santi Batik in 2022, consists of 3 types of costs, namely electricity costs, material maintenance costs, and warehouse maintenance costs. The amount of storage costs has not been applied to each type of raw material. So that storage costs are calculated in the form of a percentage of the inventory value, the cost of storing fabric raw materials is 70%, night raw materials are 20%, and dye raw materials are 10%. The storage costs for each material are as follows:

**Table 5 Raw Material Storage Cost Data At SME Santi Batik in 2022**

No.	Raw Materials	Storage Cost (%)	Total Storage Cost in 2022 (Rp)	Raw Material Storage Cost (Rp)
1	Fabric	70	6.800.000	4.760.000
2	Night/Wax	20	6.800.000	1.360.000
3	Dye	10	6.800.000	680.000

Source: Data from the owner of UKM Santi Batik

Based on table 1.7, it can be seen that the cost of storing fabric raw materials is Rp. 4,760,000, night / wax raw materials are Rp. 1,360,000, and dye raw materials are Rp. 680,000. Santi Batik SMEs have approximately 320 working days a year. The working hours given by SME Santi Batik to employees can be seen in the table as follows:

**Table 6 Number of working hours / day At SME Santi Batik**

No.	Employee Duties	Number of Working Hours / Day
1.	Batik pattern making section	7 hours/day
2.	The batik or dicanting section	7 hours/day
3.	Coloring, dyeing and washing batik cloths	7 hours/day

Source: Data from the owner of UKM Santi Batik

After obtaining the data on UKM Santi Batik in 2022, the next step is to find the optimal raw material inventory with the Economic Order Quantity (EOQ) method, Safety Stock, Reorder Point, and Total Cost.

### Economic Order Quantity (EOQ)

Economic Order Quantity (EOQ) calculations can be done with the following formula:

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

Description:

D : Annual demand in units for inventory items

S : Ordering cost for each order:

H : Storage costs.

After calculating the optimal amount of inventory, the next step is to determine the frequency of ordering. The ordering frequency formula that can be used is as follows:

$$\text{Frekuensi pemesanan (f)} = \frac{D}{EOQ}$$

Description:

f : Frequency of purchase in one year

D: Total raw material requirements for a year

EOQ: Optimal purchase quantity

Furthermore, the calculation of batik raw material inventory at UKM Santi Batik in 2022 is as follows:

a. Calculation of fabric raw material inventory

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

Where:

D = 3120

S = 310.000

H = 1.525

Thus obtained:

$$\begin{aligned} &= \frac{\sqrt{2 \times 310.000 \times 3120}}{1.525} \\ &= \sqrt{1.268.459,0164} \\ &= 1126 \end{aligned}$$

The optimal amount of purchase of fabric raw materials per order in 2022 is 1126 meters, with the required frequency of purchase of fabric raw materials, namely:

$$\begin{aligned}\text{Order frequency (f)} &= 3120 / 1126 \\ &= 2,77 \text{ (rounded to 3)}\end{aligned}$$

The frequency of ordering fabric raw materials based on calculations that have been carried out with the EOQ method is 3 times a year.

b. Calculation of night/wax raw material inventory

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

Where:

$$D = 545$$

$$S = 60.000$$

$$H = 2.495$$

Thus obtained:

$$\begin{aligned}&= \frac{\sqrt{2 \times 60.000 \times 545}}{2.495} \\ &= \frac{\sqrt{26.212,42485}}{2.495} \\ &= 161,9\end{aligned}$$

The optimal amount of purchase of fabric raw materials each time the message in 2022 amounted to 161.9 Kg, with the required frequency of purchase of fabric raw materials, namely:

$$\begin{aligned}\text{Order frequency (f)} &= 545 / 161.9 \\ &= 3.367 \text{ (Rounded to 3)}\end{aligned}$$

The frequency of ordering night raw materials based on calculations that have been carried out with the EOQ method is 3 times a year.

c. Calculation of dye raw material inventory

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

Where:

$$D = 323$$

$$S = 40$$

$$H = 2105$$

So obtained:

$$\begin{aligned}&= \frac{\sqrt{2 \times 40.000 \times 323}}{2105} \\ &= \frac{\sqrt{12.275,534442}}{2105} \\ &= 110,79\end{aligned}$$

The optimal amount of purchase of dye raw materials per message in 2022 is 110.79 Kg, with the required frequency of purchase of fabric raw materials, namely:

$$\begin{aligned}\text{Order frequency (f)} &= 323 / 110,79 \\ &= 2.915 \text{ (Rounded to 3)}\end{aligned}$$

The frequency of ordering dye raw materials based on calculations that have been carried out with the EOQ method is 3 times a year.

### **Safety Inventory (Safety Stock)**

Safety stock can be calculated using the following formula:

$$SS = (\text{Maximum usage} - \text{average usage}) \text{ LT}$$

a. Safety stock for fabric raw materials

$$\begin{aligned} SS &= (\text{Maximum usage} - \text{average usage}) \text{ LT} \\ &= (360 - 260) \times 5 \\ &= 500 \end{aligned}$$

So, the amount of safety stock for fabric raw materials that must be available at UKM Santi Batik in 2022 is 500 meters.

b. Safety stock for night / wax raw materials

$$\begin{aligned} SS &= (\text{Maximum usage} - \text{average usage}) \text{ LT} \\ &= (65 - 45,42) \times 5 \\ &= 97,9 \end{aligned}$$

So, the amount of safety stock for night/wax raw materials that must be available at UKM Santi Batik in 2022 is 97.9 Kg.

c. Safety stock for dye raw materials

$$\begin{aligned} SS &= (\text{Maximum usage} - \text{average usage}) \text{ LT} \\ &= (40 - 26,92) \times 5 \\ &= 65,4 \end{aligned}$$

So, the amount of safety stock for dye raw materials that must be available at UKM Santi Batik in 2022 is 65.4 Kg.

### **Reorder Point**

The reorder point can be calculated using the formula:

$$\mathbf{ROP = D \times L + SS}$$

Information :

ROP: reorder point

D: level of demand per unit of time

L: grace period

SS: safety stock

Next, calculate the reorder point as follows:

a. Calculation of Fabric Raw Materials

$$\begin{aligned} \text{ROP} &= D \times L + SS \\ &= 9.75 \times 5 + 500 \\ &= 548.75 \end{aligned}$$

Based on the calculation above, UKM Santi Batik must reorder when the remaining supply of fabric raw materials in the warehouse is 548.75 meters.

b. Calculation of raw materials for wax/wax

$$\begin{aligned} \text{ROP} &= D \times L + SS \\ &= 1.70 \times 5 + 97.9 \\ &= 106.4 \end{aligned}$$

Based on the calculation above, UKM Santi Batik must reorder when the inventory of wax/wax raw materials in the warehouse remains at 106.4 kg.

c. Calculation of dye raw materials

$$\begin{aligned} \text{ROP} &= D \times L + SS \\ &= 1 \times 5 + 65.4 \\ &= 70.4 \end{aligned}$$

Based on the calculation above, UKM Santi Batik must reorder when the remaining inventory of dye raw materials in the warehouse is 70.4 kg.

**Total Cost (Total Cost)**

Calculation of total costs can be done using the formula:

$$\text{TC} = D S + Q H$$

Range:

TC: total cost

D: the number of requests in a certain period

Q : EOQ

S: ordering costs

H : storage costs

Next, the total cost calculation for raw materials is as follows:

a. Total Cost of Fabric Raw Materials

Calculation of total costs using the Economic Order Quantity (EOQ) method for fabric raw materials is as follows:

$$\begin{aligned} \text{TC} &= D S + Q H \\ &= 3120 \times 310,000 + 1126 \times 1525 \\ &= 858,969.80 + 858,575 \\ &= 1,717,544.8 \end{aligned}$$

Meanwhile, the calculation of the total inventory costs incurred by UKM Santi Batik for fabric raw materials will be calculated using the following formula:

$$\begin{aligned} \text{TIC} &= (\text{Average usage} \times C) + (P \times F) \\ &= (260 \times 1,525) + (310,000 \times 11) \\ &= 3,806,500 \end{aligned}$$

## b. Total Cost of Night Raw Materials (wax)

Calculation of total costs using the Economic Order Quantity (EOQ) method for wax/candle raw materials is as follows:

$$\begin{aligned} TC &= D S + Q H \\ &= 545 \times 60,000 + 161.9 \times 2,495 \\ &= (201,976.53) + (201,970.25) \\ &= 403,946.78 \end{aligned}$$

Meanwhile, the calculation of the total inventory costs incurred by UKM Santi Batik for wax/candle raw materials will be calculated using the following formula:

$$\begin{aligned} TIC &= (\text{Average usage} \times C) + (P \times F) \\ &= (45.42 \times 2,495) + (60,000 \times 12) \\ &= (113,322.9) + (720,000) \\ &= 833,322.9 \end{aligned}$$

## c. Total Cost of Dye Raw Materials

Calculation of total costs using the Economic Order Quantity (EOQ) method for dye raw materials is as follows:

$$\begin{aligned} TC &= D S + Q H \\ &= 323 \times 40,000 + 110.79 \times 2,105 \\ &= (116,617) + (116,606.475) \\ &= 233,223.475 \end{aligned}$$

Meanwhile, the calculation of the total inventory costs incurred by UKM Santi Batik for dye raw materials will be calculated using the following formula:

$$\begin{aligned} TIC &= (\text{Average usage} \times C) + (P \times F) \\ &= (323 \times 2,105) + (40,000 \times 13) \\ &= (679,915) + (520,000) \\ &= 1,199,915 \end{aligned}$$

**CONCLUSION**

1. Every company is very necessary to apply the principles of Islamic economic production. Because Islamic production is not only to gain happiness in the world but also in the hereafter. The principles of production in Islamic Economics applied to UKM Santi Batik are the principle of tawhid, the principle of justice, and the principle of responsibility which are all principles in accordance with Islamic sharia.
2. Production factors used by SMEs Santi Batik in the process of batik production is not contrary to the principles of Islamic economics. The production factors are:
  - a. The main capital of the business comes from the wealth of the owner.
  - b. The labor recruitment system is based on the desire of business owners to improve the welfare of the community around the industrial site.
  - c. The raw materials used are of good quality.
3. The Economic Order Quantity (EOQ) method is more efficiently used to control raw material inventory at SME Santi Batik. Where by using the EOQ method, UKM Santi Batik can save the



total cost of inventory of raw materials for fabrics, nights, and dyes of Rp. 3,485,022. In addition, by setting a safety stock and setting a reorder point, SME Santi Batik can anticipate a shortage of raw materials.

### Suggestion

1. UKM Santi Batik should pay more attention to controlling the supply of raw materials for fabric, wax/wax and dye and is advised to use the Economic Order Quantity (EOQ) method because the company can optimize the supply of raw materials for fabric, wax/wax and dye and can save material inventory costs. the standard. Apart from that, UKM Santi Batik must determine safety stock and determine reorder points. UKM Santi Batik can anticipate shortages of raw materials.
2. Regional governments should pay more attention to the need for raw materials for batik makers.
3. It is recommended that future researchers who take research with the same theme should read other studies in accordance with the theme of this research to minimize the level of error in taking references and as a comparison material between one study and another.

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