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THE ANALYSIS OF INVENTORY COST EFFICIENCY ON LEVERAGE ITEMS: A CASE STUDY ON A MACHINERY AND EQUIPMENT MANUFACTURER

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ABSTRACT

This study aims to determine inventory management for an agricultural machinery and equipment manufacturer. The manufacturer has not yet implemented any inventory management; therefore, it often experiences overstock and understock. The study employed Kraljic's matrix as a classification method and employed a complete aggregation method to find the optimal ordering frequency for leverage raw materials. Due to the fluctuation of demand and supply, the numbers of safety stock and the reorder point were calculated in addition to the ordering frequency and ordering quantities. The inventory model was developed using secondary inventory data analysis of 2019. Data were collected before the pandemic because it was expected that these data would be similar to the current situation. By implementing this method, PD KMU is expected to reduce its inventory costs by IDR6,940,310,00 than those in the past.

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INTRODUCTION

The manufacturing industry is the most common type of business and has existed since the dawn of time. The manufacturing sector is a vital component of high-quality economic development (Yang et al., 2021) because the manufacturing industry has a higher potential for productivity development than other industries do (Haraguchi et al., 2017). With the assistance of machines and human labor, the manufacturing industry transforms raw materials into finished goods. Moreover, the manufacturing sector plays a significant role in the nation's economy. According to the Ministry of Industry, the manufacturing sector contributes 20% to the nation's GDP and is responsible for increasing investment and exports. It is recorded that the total investment value of the manufacturing sector from 2015 to the first semester of 2019 is IDR1,173.5 trillion (Kemenperin, 2019).

PD Karya Mitra Usaha (PD KMU) is a company engaged in manufacturing and was established in 2002. This company can ensure its continued existence by selling as many products as possible to the market. However, every business must have rivals targeting the same market. As a result, a company must develop products with greater value than its competitors to attract consumers to purchase their products. Moreover, every company strives to continually add value to its products so that the products are superior to those of the rivals and the company can survive for a long time.

Each product is created by passing through the input stage, the process stage, and the output stage. The input stage is a part of the raw material entry. Meanwhile, the process stage involves transforming raw materials into finished products. This stage also involves additional values that are clearly apparent. Finally, the output stage consists of a finished product readily sold to consumers. During this phase, consumers are usually provided with services to add value.

The product value is employed by the company to compete. This value can be produced in the form of a product or service, or it can be produced by suppliers by adjusting or changing the product based on the customers' needs (Mbango, 2019). Most companies place greater emphasis on the process and output phases because the added value to the product is clearly apparent to consumers. Even though the input stage is no less important, it is used as a competitive weapon. The input stage is not clearly valuable to consumers, but it is clearly valuable to the company. The quality input stage will influence all subsequent stages. Numerous businesses consider this input stage as unimportant; such a condition prevents them from maximizing the value of their products. Raw materials are among the many factors that can be considered at this stage.

Each raw material has its characteristics, and each will require a distinct approach. The purpose of mapping raw materials is to classify them according to their characteristics. In addition, the mapping process enables the identification of material supply disruptions and system vulnerabilities (Schrijvers et al., 2020). The supply of raw materials is also influenced by geology, technology, geopolitics, economics, environment, and social condition (Mancini et al., 2018). Raw materials can be mapped using the Kraljic matrix—the most popular model for mapping purchasing strategies for various products and services as well as their combinations (Bildsten, 2021). This method classifies suppliers or purchased items into four quadrants and recommends distinct purchasing strategies for each quadrant (Hong et al., 2018). The Kraljic matrix has four quadrants: non-critical items, leverage items, strategic items, and bottleneck items. In this study, we utilize the leverage items quadrant, which has a high impact on the company's strategy but offers a low supply risk. Based on the aforementioned characteristics, the company has great bargaining power that should be used effectively.

The results of the observation and interview with the owner of PD KMU show that the company uses a lot of raw materials. However, the company has neither mapped its raw materials nor had a special inventory management method. The number of raw materials is ordered based on the owner's experience once per month. As a result, PD KMU frequently experiences an accumulation of goods in the warehouse, and some goods are eventually damaged.

The economic order quantity (EOQ) is one of the inventory control models to determine the optimal order and minimize ordering and storage expenses. The EOQ inventory model applies to items whose value and size increase over time (Nobil et al., 2019). Moreover, the model applies to inventory management in multi-item systems, assuming that item demand is correlated (Sebatjane & Adetunji, 2019). If a company orders multiple types of goods in a single order, it can use EOQ's alternative method; such a scenario is known as EOQ for multiple products (Krajewski et al., 2021).

The EOQ for multiple products is an inventory control model that generates an inventory measurement and ordering policy to reduce an organization's total costs. In this model, a company with multiple suppliers will receive a discount offer from a supplier proving that each supplier's capacity is limited (Mohammadivojdan & Joseph, 2018). The EOQ for multiple products consists of two approaches: complete aggregation and tailored aggregation. By using a complete aggregation approach, the company will order all types of products in one delivery. In contrast, with a tailored aggregation strategy, the company will only ship certain types of products together. If the specific order costs owned are a small portion of the total cost of ordering products, the complete aggregation method should be used; in contrast, if the specific order costs owned are a significant portion of the total cost of ordering products, the tailored aggregation method should be used (Chopra & Meindl, 2017).

In addition, it should be emphasized that the supply and demand in daily business operations should be uncertain; such a condition will impact the determination of the company's safety stock. An excessive amount of safety stock will affect holding costs (Heizer et al., 2017), Meanwhile, if the company has insufficient safety stock, its ability to meet demand will be hindered (Krajewski et al., 2021).

This study employed the economic order quantity (EOQ) for multiple products to determine the optimal number and timing of orders for suppliers. Complete aggregation was utilized because PD KMU has made a single order for all of its products. PD KMU was selected as the subject of this case study because it still lacks a special inventory management method to determine the cost-effectiveness of its inventories.

LITERATURE REVIEW

Inventory management is a method used to determine when and how much to order raw materials. Inventory consists of items used to satisfy consumer demands as well as goods and services produced by companies (Krajewski et al., 2021).

Kraljic's matrix divides inventories into four quadrants based on profit impact and supply risk (Kraljic, 1983). Using these criteria, Kraljic's Matrix divides all its purchased items into four categories: strategic (high supply risk and high-profit impact), leverage (low supply risk and high-profit impact), bottleneck (high supply risk and low-profit impact), and noncritical (low supply risk and low-profit impact). Strategy impact can be assessed from the annual monetary value of a product and the limits of the value of money followed by the limits of the value of money for ABC analysis. Products with a high-impact strategy have an inventory cost that comprises 70% to 80% of inventory cost for the year. Several factors are considered when assessing supply risk, including the number of available suppliers, the type of product (seasonal or not), the difficulty of arranging products, the distance, and the delivery time. The preceding explanation denotes that buyers hold the power of negotiation while the company can maximize profits by employing the Economic Order Quantity (EOQ) model as its strategy.

The EOQ is a model to manage inventory when demand is independent. This method allows the business to determine the optimal number of items to order. Moreover, this item is considered optimally ordered because the order is placed after taking into account the costs that will occur, such as setup costs and holding costs, to reduce the total inventory costs incurred by the company.

EOQ for multiple products is a derivative of the basic economic order quantity model of inventory. The EOQ method for multiple products describes how to manage inventory when a business orders multiple types of goods at once to reduce shipping costs (Chopra & Meindl, 2017). In multi-item, the EOQ comprises two types of approaches: complete aggregation and tailored aggregation. By using complete aggregation, the company will order all types of goods at the same time and load them all into a single shipment; in contrast, by using tailored aggregation, the company orders only some types of goods at the same time and load them into a single shipment (Chopra & Meindl, 2017).

This study employed EOQ multi-item of complete aggregation because the goods ordered did not have a specific order cost. Complete aggregation requires the calculation of the combined setup cost, followed by the entry of those results into a formula that determines the optimal number of orders. After determining the optimal number of orders, the required total cost can be calculated.

Companies need inventory reserves in the case of stockouts caused by fluctuating demand and lead times (Krajewski et al., 2021). Safety stock refers to inventories that can be used by companies to prevent stockouts. The reorder point is determined by the quantity of safety stock. Reorder point refers to the point at which a company reorders goods for sale (Krajewski et al., 2021).

In this study, the first model was employed; the demand functioned as the variable, and the lead time functioned as the constant. Therefore, companies should use the EOQ method to minimize the merging inventory costs, calculate safety stock, and reorder points to maintain the level of goods availability.

RESEARCH METHODS

This study was descriptive research with a secondary data analysis method. This study employed secondary data from the company’s documents from July to August 2020. The obtained data were quantitatively analyzed to draw conclusions.

This study was conducted in PD KMU, an agricultural company in Bogor. This company was selected as the subject because it was the largest producer of agricultural machinery in West Java. The author was interested in investigating how PD KMU manages its inventory.

This study employed secondary data on types of raw materials, inventory costs, the quantity of inventory, amount of usage, raw material purchases, and lead time during 2019. After collecting data through interviews, observations, and literature reviews, the research conducted the following steps: (1) formulating research problems, (2) collecting data, (3) dividing inventory using the Kraljic matrix, (4) performing inventory management calculations at PD KMU, (5) performing inventory management calculations at PD KMU using the EOQ method for multiple products, (6) calculating safety stock (SS) and reorder point (ROP), (7) comparing current inventory costs and the EOQ for multiple products, and (8) drawing conclusions and recommendations.

RESULTS AND DISCUSSION

Current Inventory Management at PD KMU

PD KMU relies on a variety of suppliers to meet its needs when operating its business. The company purchases raw materials from suppliers regularly. The ordered raw materials are the goods required to manufacture various machines in accordance with consumer preferences.

Unfortunately, PD KMU lacks a specific inventory management method at this time. The company orders certain raw materials twice within one month, and the ordered raw materials must be received within 4 to 7 days (lead time). The company orders raw materials by considering the estimations of future demand or the response to actual incoming demand. These considerations may result in ineffective and wasteful inventory management. Due to the lack of reorder points and safety stock, PD KMU occasionally experience a shortage or accumulation of raw materials with the current method.

PD KMU currently uses an intranet-based computer system for inventory tracking. If goods continuously leave and enter the warehouse, the inventory quantity will be updated continuously. However, this system has a weakness, namely the absence of a connection between the production division and the inventory. Consequently, each system is required to be entered and updated manually, and it becomes prone to error.

Kraljic Matrix Analysis

PD KMU can apply different control methods to each of its inventory when managing the inventory. The company can divide its inventory into several groups so that the company can more easily develop inventory control methods.

PD KMU can classify its inventory using the Kraljic Matrix, among other methods. The Kraljic Matrix categorizes inventory based on the impact of strategy and supply risk. The Kraljic matrix consists of four quadrants: leverage items, strategic items, bottleneck items, and noncritical items. The leverage items quadrant has a significant impact on strategy but a low supply risk. Meanwhile, the quadrant of strategic items has a significant strategic impact and supply risk. The bottleneck items quadrant has a low strategic impact and a high supply risk. Finally, the noncritical items quadrant has a low strategic impact and supply risk.

The quadrant examined in this study is the leverage items. A high-impact strategy and low supply risk enable PD KMU to negotiate so that the company crucially maximizes its profits in the category of raw materials. The raw materials included in the category of leverage items are presented in Table 1. Previously, there are 29 different types of raw materials sourced from six different suppliers with a total value of IDR3,479,062,681. Due to time constraints, the researcher employed the Pareto principle, which focuses on suppliers with the highest proportion of leverage item purchases. In this case, Supplier A which contributes to 81% of the total leverage items purchased.

Table 1 shows a list of items bought from supplier A, the total units used per year, and the cost per unit.

Table 1. Raw Materials Supplied by Supplier A

No	Raw material	Value of Raw Materials (IDR/year)	Value of Raw Material (%)
1	Plate	1,009,342,307	29
2	Motor	461,875,000	13
3	Blower	291,414,600	8
4	Hollow	169,361,955	5
5	Pipe	167,598,199	5
6	Honda Machine	162,700,000	5
7	Acrylic	120,749,000	3
8	Axle	116,758,862	3
9	Angle	112,113,901	3
10	Pulper Machine	89,000,000	3
11	UNP	67,715,778	2
12	HPL	46,872,880	1
13	Steel	18,651,303	1
	Total	2,834,139,785	81

Cost of Managing the Inventory of PD KMU

There are two types of costs to consider when managing inventory: ordering costs and holding costs. In this study, the ordering cost was calculated based on the costs incurred by the company for each order, regardless of the number of items ordered. Meanwhile, the holding cost will be determined by the deposit interest rate.

Ordering Cost

Ordering costs are expenses incurred when a company orders raw materials from suppliers. PD KMU incurs shipping costs and compensates drivers with tips. Therefore, the inventory management of this company takes into account the cost of driver tips and shipping fees when ordering products.

Each shipping fee of IDR800,000,000.00 must be paid to the supplier. PD KMU currently spends IDR50,000.00 on driver fees. To deliver the raw materials ordered by PD KMU, Supplier A utilizes a truck with an eight-ton capacity.

Holding Cost

Holding costs refer to expenses incurred when a business maintains inventory. The holding costs included in PD KMU are derived from the assumption that the opportunity cost of the company's capital is equivalent to the deposit interest rate. The 2019 deposit interest rate shows the deposit interest rate used by the company is Bank Bukopin's highest annual interest rate of 6%. The cost of holding goods can be calculated by multiplying the average amount of inventory by the deposit interest rate and the average amount of inventory.

Inventory Management System Improvement Plan at PD KMU

In this study, the researchers propose an appropriate inventory management system at PD KMU by considering the current condition of the company. This system was created to enable the company to increase its effectiveness and efficiency in managing inventory.

The raw material inventory management system created for PD KMU includes the optimal number of raw material orders, the number of items compulsorily ordered per order, the level of raw material inventory reserve, and the reorder point.

Determining the Optimum Quantity of Raw Materials Ordered Using the EOQ Method for Multiple Products

Due to the fact that the 13 types of raw materials in Table 1 do not have specific order costs, the calculation of EOQ for multiple products will be based on complete aggregation. The EOQ method for multiple products is a method for managing inventory that allows companies to order and ship multiple types of goods simultaneously.

The first step is to account for inventory management costs. These costs include ordering and holding expenses. The booking fee in question consists of the delivery fee and driver tips. These three expenses will result in the total cost of the order (S*). Meanwhile, the ordering cost is IDR850,000 and the cost of storing raw materials is 6% of the deposit rate.

After knowing the costs that arise in carrying out inventory management, the optimal order frequency is determined. To find the optimal ordering frequency, the accumulated costs ($D_i h_i C_i$) of each item should be calculated.

Table 2. $D_i h_i C_i$ Calculation for 2020 Leverage Items Category Raw Materials

No	Raw Material	Usage (D) (Unit)	Cost (C) (Rp / Unit)	$D_i h_i C_i$ (IDR)
1	Plate	2.657	379,880	60,560,538
2	Motor	198	2,332,702	10,161,717
3	Blower	100	2,914,146	10,055,892
4	Hollow	786	215,473	7,005,532
5	Pipe	1,580	106,075	6,726,834
6	Honda Machine	65	2,503,077	4,062,947
7	Acrylic	39	3,096,128	2,812,373
8	Axle	2,364	49,390	1,119,078
9	Angle	498	225,128	27,712,500
10	Pulper Machine	43	2,069,767	9,762,500
11	UNP	257	263,486	17,484,876
12	HPL	392	119,574	7,244,960
13	Steel	99	188,397	5,340,000
		Total		170,049,227

Source: Processed data of PD KMU

Table 2 shows that the total accumulated cost is Rp. 170,049,227.00. This data is used to calculate the optimum frequency of orders made by PD KMU to Supplier A.

$$n^* = \sqrt{\frac{\sum_{i=1}^{k} D_i\, hC_i}{2S^*}}$$

$$n^* = \sqrt{\frac{170{,}049{,}227}{2\ x\ 850{,}000}}$$

$$n^* = 10\ times$$

The calculation above has revealed that the optimal order frequency for PD KMU is 10 times per year. The following step is to determine the number of items ordered per order. The number of items that must be ordered can be determined by dividing the usage by the optimal ordering frequency.

$$Q^* = \frac{D_i}{n^*}$$

$$Q^* = \frac{2{,}567}{10}$$

Table 3. The Optimal Number of Raw Materials Ordered

No	Raw Material	D_i (Unit)	Q (Unit / Order)
1	Plate	2,567	257
2	Motor	198	20
3	Blower	100	10
4	Hollow	786	79
5	Pipe	1,580	158
6	Honda Machine	65	7
7	Acrylic	39	4
8	Axle	2,364	237
9	Angle	498	50
10	Pulper Machine	43	5
11	UNP	257	26
12	HPL	392	40
13	Steel	99	10
		Total	903

Table 3 displays that the total quantity of raw materials ordered in a single order is 903 units. The order period is done using the following step. From 1 January-31 December 2019, PD KMU opens for 290 days. The number of 290 days is calculated by subtracting the number of national holidays and company-designated holidays from the total number of working days. The order period is calculated by dividing the total number of working days in one year by the optimal order frequency.

$$Order\ period = \frac{total\ of\ working\ days\ in\ 1\ year}{optimal\ order\ frequency}$$

$$Order\ period = \frac{290}{10}$$

$$Order\ period = 29$$

According to the calculations above, PD KMU should place an order every 29 days.

Safety Stock

Since the demand for PD KMU fluctuates, the company should hold safety stock. To determine the safety stock, the company should determine its service levels, which refer to the proportion of demand expected by the firm to fulfill in the replenishment cycle; the greater the company's service level, the greater the safety stock needed and the greater the inventory holding cost.

The owner of PD KMU decides to have a 95% service level for its leverage items. With a service level of 95%, the Z value is 1.645. The company's experiences describes that the required lead time ranges between 4-7 days. Table 4 displays the company's lead time data in 2019.

Table 4. Lead Time During 2019

Months	**Lead Time**
January	5
	4
February	5
	4
March	7
	5
April	5
	4
May	4
	5
June	4
	5
July	6
	7
August	5
	6
September	5
	6
October	5
	4
November	4
	4
December	5
	4

Source: PD KMU

To calculate safety stock, daily demand on average is required. In this study, the average daily demand is derived from data on the use of raw materials in July-August 2019.

The standard deviation of demand during lead time is as follows.

$$\sigma dLT = \sqrt{(Avg. lead\ time. \sigma_d^2 - (Avg. Daily\ Demand^2. \sigma_{LT}^2}$$

$$\sigma dLT = \sqrt{(4.917\ x\ 3.63^2) - (9.208\ x\ 0.954^2)}$$

Safety Stock:

$$SS = Z\sigma dLT \ldots(4.5)$$

$$SS = 1.645\ x\ 7.520$$

$$SS = 12.371\ \approx 13\ unit$$

Table 5. Calculation of Safety Stock for Raw Materials

No	Raw Material	σ_d	σdLT	Safety Stock (SS) (Unit)
1	Plate	3,634	7,511	13
2	Motor	1,178	2,103	4
3	Blower	1,833	3,423	6
4	Hollow	2,306	4,334	8
5	Pipe	1,598	3,315	6
6	Honda Machine	0,856	1,676	3
7	Acrylic	1,011	1,960	4
8	Axle	0,795	1,652	3
9	Angle	1,047	2,120	4
10	Pulper Machine	0,379	0,743	2
11	UNP	0,736	1,529	3
12	HPL	0,483	0,987	2
13	Steel	0,648	1,356	3

Table 5 describes the amount of safety stock that should be owned for each raw material. The calculation above indicates that PD KMU can minimize the possibility of losing sales.

Reorder Point

The reorder point represents the time at which PD KMU must reorder raw materials from supplier A. The company requires a reorder point to maintain the availability of its raw materials. Based on a probabilistic model, the reorder point used in this study is a variable demand with a constant lead time. Reorder points can be calculated using the following formula.

$$ROP = (\underline{d} \ x \ \underline{LT}) + Z\sigma dLT \ldots (4.6)$$
$$ROP = (9{,}208 \ x \ 4{,}917) + 13$$
$$ROP = 58{,}270 \approx 59$$

Table 6. Calculation of Reorder Point for Raw Materials

No	Raw Material	$\underline{d}$	ROP (Unit)
1	Plate	9.208	59
2	Motor	2.642	17
3	Blower	5.283	32
4	Hollow	8.094	48
5	Pipe	1.717	15
6	Honda Machine	0.868	8
7	Acrylic	1.302	11
8	Axle	0.415	6
9	Angle	0.981	9
10	Pulper Machine	0.170	3
11	UNP	0.358	5
12	HPL	0.189	3
13	Steel	0.245	5

Cost Saving Expectations

To ascertain the cost savings, it is necessary to compare the current total cost of PD KMU inventory with the total cost of inventory based on the EOQ method for the complete aggregation of multiple products. Costs associated with the implementation of inventory management are ordering and holding costs.

The total ordering cost (S*) is IDR850,000, and this cost consists of the shipping fee and a driver fee. There is a difference in order frequency (n) between the current method and the EOQ method for multiple products

The current order frequency (n) is 24 times while the n of the EOQ method for multiple products is 10 times. Therefore, the current method has a total of IDR20,400,000 of the ordering cost. The EOQ method reduces 58% of the current method cost to just IDR8,500,000

After comparing the ordering costs, the holding costs are compared. Multiple products are compared to determine the magnitude of the inventory cost difference between the current method and the EOQ method. Based on the deposit interest rate, inventory costs are considered an opportunity cost. In this case, the company loses the chance to invest because the money is used to manage inventory.

The results of comparing holding costs using the annual holding cost formula are summarized in Table 7.

$$Annnual\ Holding\ Cost = \sum \frac{D_i h_i C_i}{2n}$$

Table 7. Comparison of Inventory Cost per Year for Raw Materials Category of Leverage Items from Supplier A

No	Raw Material	$D_i h_i C_i$ (IDR)	EOQ for Multiple Products		Company Method	
			n (Times)	Cost (IDR)	n (Times)	Cost (IDR)
1	Plate	60,560,538	10	3,028,027	24	1.261.678
2	Motor	10,161,717	10	508,086	24	211.702
3	Blower	10,055,892	10	502,795	24	209.498
4	Hollow	7,005,532	10	350,277	24	145.949
5	Pipe	6,726,834	10	336,342	24	140.142
6	Honda Machine	4,062,947	10	203,147	24	84.645
7	Acrylic	2,812,373	10	140,619	24	58.591
8	Axle	1,119,078	10	55,954	24	23.314
9	Angle	27,712,500	10	1,385,625	24	577.344
10	Pulper Machine	9,762,500	10	488,100	24	203.375
11	UNP	17,484,876	10	874,244	24	364,268
12	HPL	7,244,960	10	362,247	24	150,936
13	Steel	5,340,000	10	267,000	24	111,250
Total *Holding Cost*				8,502,461		3,542,494
Total Ordering Cost				8,500,000		20,400,000
Total Inventory Cost				17,002,461		23,942,494

Table 7 describes that the total annual cost with the current method is IDR23,942,494. Meanwhile, the total annual cost with the EOQ method for multiple products is IDR17,002,461. The use of the EOQ method for multiple products has resulted in 29% cost savings. This result concludes that inventory management utilizing the EOQ method for multiple products will be superior because it will reduce the company's current inventory costs.

CONCLUSION

This research has investigated the raw material inventory control of PD KMU. The results of this investigation conclude three major points.

First, PD KMU always maintains a supply of raw materials to carry out its operations. However, the company has not implemented a special method to manage its raw material inventory. The company orders raw materials from the vendor twice per month, and the order is based on its experience. However, the number of goods ordered does not always meet the company’s needs. Such a condition leads to less efficient and effective management of raw material inventory in PD KMU.

Second, the right method for PD KMU to manage its raw materials is the EOQ method for multiple products with complete aggregation. The EOQ method for multiple products will help PD KMU determine the number of items required for each order. The calculations using the EOQ method for multiple products have revealed that the optimal ordering frequency for PD KMU is 10 times per year. The time interval between orders should be 29 days. Even though the company does not actually order every 29 days, this number can be used as a tool to check inventory levels when it has been nearly 29 days since the last order. The implementation of EOQ for multiple products can help PD KMU obtain cost savings of IDR6,940,231.00.

Third, demand fluctuates for PD KMU. As shown in Table 7, PD KMU requires safety stock and reorder points to accommodate fluctuating demand.

Based on the conclusions above, this study proposes several suggestions. First, PD KMU should classify raw materials using the Kraljic matrix. Each classification of raw materials requires a different management strategy. Second, to classify the leverage items, PD KMU should use the EOQ method for multiple products. As a result, inventory costs can be reduced. Third, to classify the critical items, PD KMU should use the EOQ method for multiple products. Consequently, inventory costs are reduced. However, PD KMU must consider safety stock to ensure the availability of raw materials and make accurate production planning. Fourth, the calculations performed in this study can also be applied to raw materials from other categories or suppliers. This calculation can significantly help PD KMU evaluate and negotiate procurement contracts with suppliers. Fifth, PD KMU should be capable of integrating production and inventory information systems. As a result, the inventory data can be managed more effectively and punctually, and record accuracy can be enhanced.

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