

Analysis and Evaluation of Storage Systems Using the ABC Classification and Periodic Review Method at Supermarket in Semarang City

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ABSTRACT

The warehouse section is one of the parts that must exist in the company, where usually implement a storage system which is a policy to control, supervise, and determine the level of goods that need to be maintained. In addition, companies also use supply chain management to control the number of incoming and outgoing goods more effectively and efficiently. Including one of the supermarket in Semarang City. This research uses a mixed-method approach with interview and documentation studies as data collection methods. The results of the interview that have been conducted prove that Indogrosir has a strong storage system and the results of the documentation study also show that the data successfully obtained are 19,872 with six different types of goods in the period October 2022 to August 2023. The result of data processing is the type of tabbacco which amounts to 274 data selected as a sample and results in the calculation of the total storage cost on one of the product codes with the company's method of IDR 10,888,505,214 and the proposed method of IDR 4,473,946, so that the implementation of the proposed method is more optimal. This is due to one of the variables in the company's method that uses purchase data or can be called capital for cashflow in the company, so it has much greater results.

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1. INTRODUCTION

One of the most important parts of the company is the warehouse, especially for manufacturing or retail companies. Warehouses must be effective and efficient, because the number of incoming and outgoing goods is very large, so it can be controlled properly. Therefore, a storage system is created to support the production process or activities in the warehouse (Pitoy *et al.*, 2020). To achieve this, the warehouse division implements supply chain management with the aim to managing

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the amount of goods in storage. According to Berger *et al.* (2018), supply chain management can be seen as a chain connecting all activities that proceed in the warehouse. However, implementing supply chain management in a company is not easy, depending on the type of company, company product, production flow, the company's consumers, the raw materials needed, and other factors that can affect the amount of goods needed in supply chain management.

However, this can be helped by current technological developments, such as storage information system. According to Swasono dan Prastowo (2021) storage information system is a system that collects and manages data about commodity inventory, determines when to order goods again and the amount of goods to be purchased, so that they are always available at all times. So this system can be used to monitor the availability of goods and make reports based on that. Therefore, the company's effectiveness and efficiency can also increase rather than having to record conventionally. Supermarket is an example of a company that implementing a storage system. The aim of a supermarket is to add value to a product or service to meet an individual and several people needs (Anissa, 2019). Consumers can buy products or services according to the amount of their needs, because supermarkets usually provide all kinds of daily needs. Therefore, supermarkets have a proper understanding of their consumers as the foundation of a comprehensive and strong logistics structure, so it can avoid wastage or shortage of goods (Watanabe *et al.*, 2019).

That was also happened to one of the supermarket in Semarang City named Indogrosir that has been around for more than 30 years and has a lot of research done there, like Hutagalung (2018); Sondak *et al.* (2022) which discuss about customer satisfaction, Ayu (2021); Sipahutar dan Trianasari (2021) which discusses the impact of the Covid-19 Pandemic on companies, Ritonga *et al.* (2021) which discusses about decision support systems, and research related to warehouse storage by Azaria dan Watulangkou (2022); Pratiwi dan Lau (2020). All of this studies proving that indogrosir has a solid company system, including in the warehouse section. However, in contrast to previous research, this study aims to provide some suggestions for procurement based on an evaluation of the storage system at Indogrosir in Semarang City using the ABC (Always Better Control) Classification and Periodic Review.

Research conducted by Hanafi *et al.* (2019) shows that using ABC Classification can increase efficiency in the warehouse by rearranging the layout and placing items with high demand near the entry and exit routes to the warehouse. However, to maximize warehouse storage, it is also necessary to calculate the number of items to be ordered in order to meet consumer demand precisely. In this study, Periodic Review is used to calculate the number of these items. Research from Reka dan Aryanny (2021) using Periodic Review to overcome the problem of overstock and shortage of goods at XYZ company in the garment sector due to fluctuations in

demand. The results of this study are the minimum number of orders, costs, and reorder points rather than the company's method, so the company can precisely determine the amount of goods needed. Another research conducted by Simatupang dan Winarno (2022) uses a combination of ABC Classification and Periodic Review to determine raw material management that can properly meet consumer demand in fragrance and flavor companies, thereby the research obtaining 45% in making raw material savings. Periodic Review can adjust inventory in warehouse storage based on consumer demand and provide a more precise amount of goods, so that it can benefit the company.

Based on the background described above, this study will analyze and evaluate the storage system at Indogrosir Supermarkets in Semarang City, which is focused on adjusting the stock of goods that must be ordered by the company using a combination of ABC Classification as a method of managing goods and Periodic Review as a model for the number of reordered goods.

2. RESEARCH MODEL

Retail companies usually have a large number of goods to sell, it is necessary to group them in order to find out which goods are profitable or detrimental to the company. One of grouping goods method is ABC Classification, where this method is most often used by various companies by dividing goods into three classes, such as class A which is the priority and most important to fulfill because it represents the value of all goods in warehouse storage (Nallusamy et al., 2017). Research that shows various companies in the application of using ABC Classification, such as hospitals (Rizkya et al., 2020), and food companies (Ceballos-Palomares et al., 2021).

The most important part of this research is finding the appropriate inventory model for the research object, because there are many types of industries or products with different handling methods. The first inventory model is Economic Order Quantity (EOQ) which is a very common model that is already used in many industries. Based on research by Riza *et al.* (2018) EOQ is one of the oldest classic production scheduling models developed by Ford W. Harris in 1913. The EOQ model is determined based on ordering costs and holding costs by minimizing the total annual costs incurred by the company. For more details, please see Figure 1. Other research, specifically Siboro dan Nasution (2020); Yulianto dan Alhamdi (2022) who also used EOQ as a storage model found that this model can make cost savings, optimal number of purchases of goods, and more effective purchase frequency.

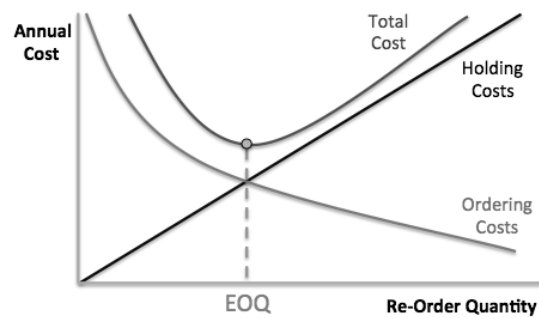


Figure 1. Concept of EOQ Model

The next model is Just In Time (JIT), according to Khadijah et al. (2022) JIT is a principle for companies have low production costs and high productivity levels. In addition, according to Efranti (2014) JIT eliminates costs that do not add value to the company's production process and consistently increases productivity. The results of the two studies are also the same, there are savings from the total cost of inventory when compared to the model from the company. The third model is a model that is also widely used to determine the safe amount of inventory, it is Safety Stock (SS). According to Boulaksil (2016) SS are located more in the downstream stage area, meaning the stage that is closer to consumers, so demand from the customer can be satisfied. If the customer satisfaction value is high, the service level value will also increase. Apart from that, in the research by Korponai et al. (2017) also proves that increasing SS will reduce the possibility of shortages, as can be seen in Figure 2 below.

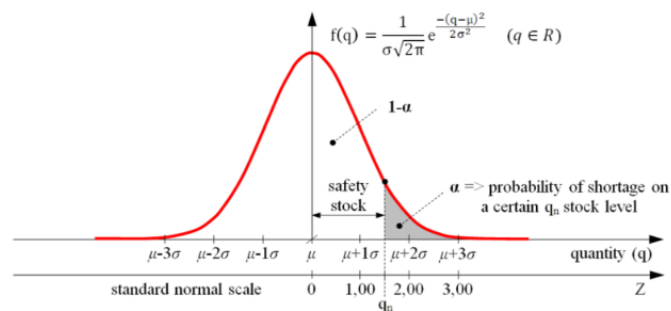


Figure 2. Possibility of stock shortages with the Safety Stock effect

The fourth is a model called Reorder Point (ROP). In the research of Huizen et al. (2021); Jamhur et al. (2020) who use the ROP model to find out how many stock items to reorder and when to reorder. Based on this research, both of them mentioned that the objects of their research used to reorder stock with a predetermined amount, not what was needed by consumers, resulting in the risk of excess or shortage of stock items which was detrimental to them. The last model is the Periodic Review, this model consists of 2 types, it is Continuous Review and Periodic Review. According to Rahayu dan Safirin (2020) Continuous Review checks the stock of goods continuously to determine the time of reordering that needs to be done, while Periodic Review will

check the stock periodically and the time period does not change, but the number of orders for goods will change. Both types have their own advantages and disadvantages, such as if Continuous Review can ensure that the stock of goods will not run out because it is always checked, but this model is inefficient because it takes time to always check the stock of goods, while Periodic Review has a certain time to check the stock of goods with a different number of stock orders, but this is at risk can result in empty stock items because they have to wait for that time to be able to order stock items again. An overview of Continuous Review in Figure 3 and Periodic Review in Figure 4.

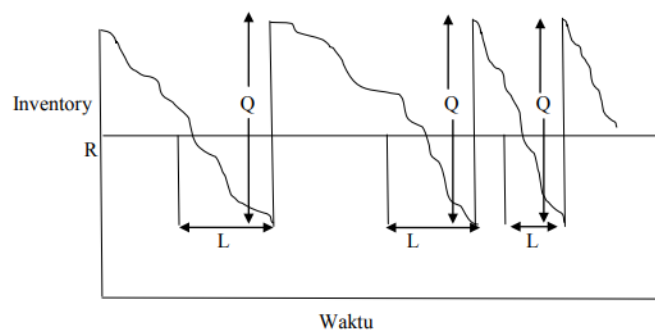


Figure 3. Continuous Review

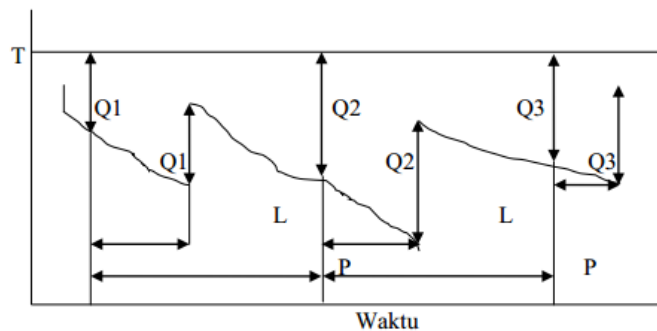


Figure 4. Periodic Review

Based on the explanation of several storage models above, if it is assumed that the supermarket has consumers who shop every day, then a model is needed that can meet the needs of consumers, so that the stock of goods that decreases every day can be immediately replaced by new stock with the model, then Periodic Review is chosen as a model for testing in this study because it fits this assumption. In contrast to other models, such as EOQ which only calculates the amount of stock with ordering costs and storage costs, so these variables are less suitable for supermarkets, as well as JIT which focuses more on low production costs with high productivity.

3. METHODS

This study used mixed-method approach between qualitative and quantitative approaches. According to Donatus (2016) a qualitative approach is refers to research

procedures with results in the form of descriptive data, such as observed behavior, words, or opinions of a person. Meanwhile, quantitative research is the result of calculating data sources that can be measured directly in the form of numbers or numbers as information (Seftiyana & Pentiana, 2019), so a mixed approach is a research that produces descriptive data from observed behavior or opinions of people and calculations made from data sources in the form of numbers by interpreting systematic sentences. In order for the research gets the desired results, a research flowchart was created which is shown in Figure 5.

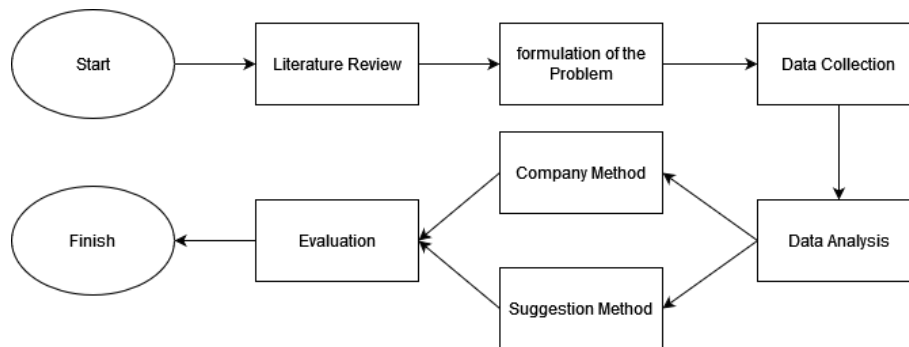


Figure 5. Research Flowchart

The data collection was conducted by using interview with one of the warehouse storage officers who is responsible for the storage information system and also the person who represents the head of the warehouse approximately one hour for background validation and in-depth study of the storage information system used by Indogrosir in Semarang City. This is because according to Denzin (2017) only one interview is needed in order to find out an occurrence that can prove how the system used by a group of people work. Besides that, this research also conducted a documentation study because it is real time data from the storage system, where the total data obtained is 19,872 from October 2022 to August 2023. In addition, documentation studies are all forms and types of documents owned by the object of research to support the process (Piscayanti, 2014).

The data analysis used in this research is ABC Classification, which uses sales data to look for cumulative values and select the highest sales percentage value in class A (0-80%) with a sample of 10 products. After that, the sample will be calculated using a storage model, Periodic Review. Calculations were carried out based on research from Apriliani (2018) using a model developed by Hadley-Within by applying iterations in the sequence as shown in Equation 1 to Equation 8.

- i. Calculate the interval review value as Equation 1.

$$T = \sqrt{\frac{2A}{Dh}} \quad (1)$$

- ii. Calculate α as Equation 2.

$$\alpha = \frac{Th}{Cu} \quad (2)$$

Continue looking for the $Z\alpha$ value in the Z normal distribution table

- iii. Calculate maximum inventory for (T+L) as Equation 3.

$$R = D(T + L) + Z\alpha\sqrt{T + L} \quad (3)$$

- iv. Calculate the possibility of stock shortages as Equation 4.

$$N = SD\sqrt{T + L}(f_{Z\alpha} - (Z\alpha \times \omega_{Z\alpha})) \quad (4)$$

Which mean:

$$f_{Z\alpha} = \text{NORMDIST}(Z\alpha, 0, 1, 0)$$

$$\omega_{Z\alpha} = \text{NORMDIST}(Z\alpha, 0, 1, 0) - Z\alpha(1 - \text{NORMDIST}(Z\alpha, 0, 1, 1))$$

- v. Calculate the total storage costs TC Periodic Review as Equation 5.

$$TC = \frac{A}{T} + \left(R - DL - \frac{DT}{2}\right) \times h + \frac{CuN}{T} \quad (5)$$

- vi. Carry out iterations by adding and subtracting the T value by 0.005 to get the optimal TC.

- vii. Calculate safety stock as Equation 6.

$$ss = Z\alpha SD\sqrt{T + L} \quad (6)$$

- viii. Reorder amounts are as Equation 7.

$$Q = R - r \quad (7)$$

- ix. Calculate the service level as Equation 8.

$$\eta = 1 - \frac{N}{Q} \times 100\% \quad (8)$$

If the data calculation process has been done, the results of the proposed method will be analyzed, so that the evaluation of the implementation proposed method on the storage system becomes more optimal and profitable for the company.

4. RESULTS AND DISCUSSION

4.1 Data Collection

4.1.1 Interview Result

In this interview, there is a research instrument used to provide the necessary questions, so it can be a validation of the background that has been written and deepen knowledge about the storage system at Indogrosir Semarang City. The results of the interview will be explained into two parts, as follows.

1) Storage system used by Indogrosir in Semarang City

According to Dza (2020) the storage system is a policy to control, supervise and determine the level of goods that need to be maintained, therefore, a storage system must be able to manage the stock of goods properly so that the circulation of goods can occur continuously. Therefore, the interviewee gave the following opinion.

"Kondisi dari sistem penyimpanan terbilang baik, karena terdapat pengelompokan barang berdasarkan jenis barang, sehingga seluruh stok

barang tertata rapi di penyimpanan. Selain itu, pengiriman stok barang juga sesuai dengan yang dijadwalkan pada sistem penyimpanan dan pengawasan stok barang juga dilakukan berdasarkan Standar Operasional Perusahaan (SOP) yang berlaku, CCTV, serta bagian inventory control yang bertugas mengawasi dan menjaga seluruh barang di penyimpanan.”

Based on the results of this statement, the storage system at Indogrosir in Semarang City has become a policy that controls, supervises, and determines the level of goods that need to be maintained, so that the rotation of the stock of goods in warehouse storage can occur continuously and is still used today. On the other hand, to support this flow, supply chain management is needed as a link in each manufacturing component and supply process (Berger et al., 2018). In relation to this, the interviewee shared their experiences regarding the supply chain in the companies.

“Terdapat prosedur yang berlaku untuk menerima stok barang yang datang ke penyimpanan gudang, yaitu pemasok datang ke Indogrosir, lalu diterima oleh bagian Purchase Order dan dilakukan validasi dengan data oleh bagian Admin Logistik, kemudian jika data sudah lolos validasi, maka pemasok akan menurunkan barang, jika tidak, maka barang akan langsung di tolak dan masuk ke bagian Merchandising untuk disesuaikan kembali, selanjutnya barang tersebut dicek kembali secara fisik oleh Checker Loading, jika sudah sesuai akan masuk ke penerimaan barang dan sudah termasuk ke dalam stok penyimpanan gudang.”

Based on this, the storage information system at Indogrosir in Semarang City has a function to increase the effectiveness and efficiency of employee performance in accordance from the previous theory. Based on all the results of the interview that have been conducted, it can be ascertained it is true that Indogrosir in Semarang City has a solid company system, especially in warehouse storage, because it has a systematic grouping of stock items, which aims to maintain the quality of goods, maximize performance efficiently, and facilitate the taking of new stock items so that they can be displayed on display shelves for consumers. This also confirms the previous assumption that supermarkets have consumers who shop every day, because Indogrosir is one of the main supermarkets in Semarang, so many consumers come to buy their daily needs there.

2) Obstacles in the implementation of the storage system

Despite having a complex storage system with strict SOPs and involving many other departments, there are still obstacles in this storage system. The obstacle is in the number of stock items that differ from the data in the storage information system with data in the field, such as during the Ramadan season, there are several items that have a higher level of consumer demand than usual, but the storage system cannot detect this because it automatically calculates the number of reorders based on previously

applied methods, so that it has a negative impact on the level of consumer service level for these goods and can harm the company because it cannot meet consumer needs. This was said directly by the officer in the interview that had been conducted as follows.

“Terdapat selisih dari perbedaan jumlah stok barang berdasarkan data dari sistem informasi penyimpanan dengan data yang ada di lapangan, walaupun pengecekan sudah dilakukan dengan teliti, tetapi masih terdapat perbedaan data tersebut yang dapat mempengaruhi jumlah pemesanan kembali dari stok barang yang terkait, sehingga perlu dilakukan penyesuaian kembali agar tidak merugikan perusahaan.”

Meanwhile, according to Watanabe et al. (2019) supermarkets have the right level of understanding of consumers as the foundation of a broad and strong logistics structure in order to avoid waste or shortage of stock. But the constraints faced by the storage system make losses for the company. Therefore, it is necessary to readjust the number of stock orders to meet consumer demand. To overcome this, this research calculates the number of stock orders using more detailed factors based on field data in order to meet consumer demand and benefit the company, so that the results of this calculation are expected to be an option for a more appropriate storage method.

4.1.2 Documentation Study Result

Beside using interview, this research also uses documentation studies to obtain the data needed in the calculation of methods. In the storage information system, the types of goods contained in warehouse storage are divided into six sections, there is food, non-food, general merchandising which contains daily necessities from consumers, tobacco which contains cigarette products, perishable which contains products that are easily expired, and fast food which contains raw material products to be processed.

In this study, one type of item will be taken with a high and well distributed demand for each item in order to be more precise with the field conditions and increase profits for the company. After data processing is carried out to find the type of data that matches the criteria, the type of tobacco goods is obtained with a total amount of data of 274 items. The tobacco type was also chosen because it has the least number of products with zero sales value than other types. After the type of goods is determined, the next step is to categorize the item using ABC Classification to obtain a research sample that can be seen in the Table 1.

Table 1. Result of ABC Classification

No	Product Code	Goods Sales (Rp)	Cumulative Sales	Margin Sales (Rp)	Cumulative Margin
1	357190	570.868	6,94%	361.060.458	10,02%
2	357330	493.972	12,94%	309.647.737	18,62%

No	Product Code	Goods Sales (Rp)	Cumulative Sales	Margin Sales (Rp)	Cumulative Margin
3	357180	484.278	18,82%	250.716.860	25,58%
4	1257590	516.541	25,10%	224.754.425	31,82%
5	357240	521.530	31,44%	182.280.160	36,88%
6	357210	270.633	34,73%	140.967.700	40,80%
7	1444260	365.069	39,16%	111.952.406	43,91%
8	714180	316.406	43,01%	101.127.566	46,72%
9	357410	93.737	44,14%	74.423.464	48,78%
10	1496830	82.101	45,14%	74.053.886	50,84%
11	1386320	152.025	46,99%	61.741.318	52,55%
12	1432090	84.167	48,01%	61.574.828	54,26%
...
274	1394730	85	100,00%	1.825	100,00%

Based on the above results, research samples were selected from products number 1 to 10 and then take the data needed in the calculations in this study, it is sales data, purchase data, inventory data of the stock, lead time data, ordering cost data, storage cost data, shortage cost data (Fauziah et al., 2016; Fikram, 2019; Pratiwi et al., 2020; Rahayu & Safirin, 2020).

4.2 Implementation of the Storage System

4.2.1 Company Method

After collecting data, the next step is to understand the storage information system used by Indogrosir in Semarang City with focusing on the storage methods used by the company. In the storage information system, it turns out that they uses a combination of 2 storage models, namely First in First out (FIFO) as a concept of the flow of stock storage of goods in warehouse storage and Average model as a calculation of the total storage costs. The use of the FIFO concept is also an agreement with each supplier who sends their stock of goods to be sold by Indogrosir.

According to Hapsari et al. (2021) FIFO has the concept that the first stock of goods purchased is the first stock of goods to be sold as well, so that it can keep the flow of goods in storage well maintained. In addition, FIFO also functions to maintain the quality of stock items so that they can be maintained (Nursetiowati & Dewi, 2023), because the first item sold is the first item to arrive. Indogrosir in Semarang City also uses FIFO as the flow of storage of the company's stock of goods, apart from the agreement in maintaining the stock of goods with suppliers, the concept of the FIFO model is also profitable for the company.

For the calculation of total storage costs, Indogrosir in Semarang City uses the Average model, where this model is a mix between the FIFO and Last In First Out (LIFO) models. The Average model provides advantages in calculating more precise storage costs using cost of goods sold (Wijayanto & Parjito, 2022). This model can also minimize the impact arising from fluctuations in the price of goods (Alamsyah et al., 2022).

Therefore, along with the uncertain increase and decrease in the price of goods, Indogrosir can adjust prices to be more in line with profits and consumer demand. By paying attention to the value of this fluctuation, the profit obtained when determining the selling price of the product can also be better maintained.

Then the samples that have been obtained in the classification using the Average model are calculated to determine the total storage cost based on the company's method and get the results on product code 357190 in Table 2.

Month	Purchase Goods			Sales Goods			Inventory Goods		
	Qty	Price (IDR)	Total (IDR)	Qty	Price (IDR)	Total (IDR)	Qty	Price (IDR)	Total (IDR)
January	18.000	27.500	495.000.000				45.085	28.000	1.262.380.000
				63.077	27.865	1.757.617.658	63.085	27.865	1.757.840.575
February	32.416	28.986	939.600.000				8	27.865	222.917
				32.414	29.749	964.291.654	32.424	29.749	964.581.576
March	85.200	30.127	2.566.800.000				10	29.749	297.490
				85.210	30.652	1.560.979.820	85.210	30.652	2.611.850.341
April	75.000	30.600	2.295.000.000				34.284	30.652	1.050.870.521
				109.284	31.406	3.404.923.760	109.284	31.406	3.432.152.598
May	45.000	30.600	1.377.000.000				867	31.406	27.228.838
				45.867	30.972	543.829.171	45.867	30.972	1.420.571.364
June	32.000	30.600	979.200.000				28.308	30.972	876.742.193
				17.559	30.972	543.829.171	28.308	30.972	876.742.193
July	15.000	30.600	459.000.000				60.308	30.954	1.866.791.651
				24.098	30.954	745.936.612	60.308	30.954	1.866.791.651
August	35.000	30.600	1.071.000.000				36.210	30.954	1.120.855.039
				34.300	30.938	1.061.181.990	36.210	30.954	1.120.855.039
Total	337.616		10.182.600.000	34.021	31.107	1.058.294.410	51.210	30.938	1.584.347.805
				34.021	31.107	1.058.294.410	16.910	30.938	523.165.815
							51.910	31.107	1.614.769.196
							17.889	31.107	556.474.786
							17.889		556.474.786

After knowing the total final inventory cost, the total storage costs (TC) can be determined as follows.

Initial Inventory Cost	IDR 1.262.380.000
Total purchase	IDR 10.182.600.000 +
Available to Sale	<u>IDR 11.444.980.000</u>
Total Final Inventory Cost	IDR 556.474.786 -
TC	<u>IDR 10.888.505.214</u>

Thus, in product code 357190, the TC result is IDR 10,888,505,214. Do this calculation for the other samples.

4.2.2 Proposed Method

After calculating the total storage cost using the company's method, the next step is to use the proposed method, which is Periodic Review to the same samples. The following is a complete explanation of the calculation results on product code 357190.

ITERATION 1

- I. $T = 0,0346$
- II. $\alpha = 0,000142$; $Z\alpha = 3,63$
- III. R during (T+L) = 18.632,92 ~ 18.633
- IV. $fz\alpha = 0,0005$ and $\omega Z\alpha = 0,00003$; $N = 2,793$
- V. $TC = 4.559.486$
- VI. Perform iterations by adding and subtracting T values by 0,005.

ITERATION 2

- I. $T = 0,0396$
- II. $\alpha = 0,000162$; $Z\alpha = 3,595$
- III. R during (T+L) = 20.457,01 ~ 20.457
- IV. $fz\alpha = 0,0006$ and $\omega Z\alpha = 0,00004$; $N = 3,314$
- V. $TC = 4.678.415$

ITERATION 3

- I. $T = 0,0296$
- II. $\alpha = 0,000121$; $Z\alpha = 3,67$
- III. R during (T+L) = 16.808,83 ~ 16.809
- IV. $fz\alpha = 0,0005$ and $\omega Z\alpha = 0,00003$; $N = 2,298$
- V. $TC = 4.473.946$

Iterations in the Periodic Review model developed by Hadley-Within based on research from Apriliani (2018) are used to find the optimal total storage cost value in order to reduce the cost burden of the company and further calculations that are more precise based on this value, which from the result is Iteration 3 has the optimal value. Further calculations of product code 357190 can be seen as follows

- I. $ss = 22.993,86 \sim 22.994$
- II. $Q = -1.593$
- III. $\eta = 98\%$

Based on the calculation results, the value of safety stock is 22.994, where this value can cover situations that occur in warehouse storage, such as for example there are some stock items that suddenly increase significantly during the month of Ramadan. In other hand, the product code 357190 is not yet required to place a reorder because there are still 1.593 stock items left in warehouse storage when subtracted from the maximum inventory quantity. With this calculation, the company does not need to worry about the hoarding of stock items in warehouse storage, because the need to reorder stock items has also been calculated through a interval review with an inspection for product code 357190 every 11 days. All of these results will affect the service level of the product, including product code 357190 which has a result of 98%. Do this calculation for the other samples.

4.2.3 Discussion

Managing product is one of the important things in this study, because Indogrosir has a lot of types and products from warehouse storage. ABC Classification is used in order to find product samples that have a positive impact on the company. The results of classification in Table 1 are in accordance with previous research where is divided into three groups based on the number of cumulative sales of stock items and sales margin of stock items, which is class A (0-80%), B (81-90%), and C (91-100%) (Cabrera-Gala et al.,

2021; Hanafi et al., 2019; Rizkya et al., 2020). From these results, the top 10 products in class A were selected to be calculated using the company's method and the proposed method, as they were considered representative of the other products.

Company try to get maximum profit by managing the inventory of the products they sell. In this inventory management process, an appropriate storage model is needed in order to increase profits for the company, as well as to meet consumer needs for these products. Likewise, Indogrosir in Semarang City, where the company uses the Average model for calculating total storage costs, but after calculating using another model called Periodic Review, there are significant differences from the results that have been obtained in the sample. These results can be seen in Table 5.

Table 5. Analysis of Results Total Storage Cost

Product Code	Average (IDR)	Periodic Review (IDR)
357190	10.888.505.214	4.473.946
357330	10.752.046.921	2.974.793
357180	6.762.118.980	2.665.600
1257590	6.831.967.286	2.449.737
357240	7.268.786.704	2.362.894
357210	4.133.209.365	1.815.041
1444260	4.334.750.920	1.747.358
714180	4.632.229.850	2.109.863
357410	1.944.576.015	1.152.261
1496830	2.024.982.005	1.245.032

Based on the results from Table 5, the total storage cost value of the proposed method has a more optimal value. This can be caused by the factors used from the two different calculations, such as the company's method, where only purchase and sales data without other factors related to these final results, instead the proposed method more focuses on detailed factor, such as storage costs, purchase costs, stock shortage costs, and lead time in the calculations performed. In the Table 2, one of the factor is clearly shown in the purchase data variable, which means capital for cash flow in the company's method makes the final result larger. Apart from the total storage cost, there are many stock items left in storage that can cause a buildup of stock items, so the output of the proposed method also overcomes this problem by using an interval review, which is the time required to reorder stock items (Fauziah et al., 2016; Fikram, 2019).

In relation to that, the proposed method also create a maximum inventory quantity that is useful for determining the amount of restock and the time to order the stock. Another result of the proposed method also provides a safety stock, where this stock will be expected to meet consumer needs for goods if there is something undesirable, such as late delivery, poor quality, and a mismatch in the number of shipments. With all these results, the service level of the proposed method gets high results, which means that customer satisfaction is also high. All the results from calculation of the proposed method, which is Periodic Review, are the same as previous research that there are total storage costs that tend to be more optimal and the number of reorders that are more in

line with consumer needs (Agustin, 2020; Apriliani, 2018). Meanwhile, for the implementation of the storage information system, these results are also in line with the understanding that the storage information system is used to determine when and how much stock should be reordered, as well as the total storage cost of the most optimal storage model (Nugroho, 2018; Swasono & Prastowo, 2021). Thus, the proposed method can be applied to the Indogrosir storage system in Semarang City in order to increase profits with more optimal total storage costs and the number of orders, as well as the time to place more precise stock orders.

5. CONCLUSION

According to the results of research has been done, Supermarket Indogrosir in Semarang City have a solid company system. This is because the company has an effective workflow with strict Standar Operasional Perusahaan (SOP), using CCTV for monitoring work, and many parts involved to manage a total of 19,872 products. Also indogrosir use storage methods with two models, namely First in First Out (FIFO) as a storage flow concept and the Average model as a calculation of total storage costs. After grouping goods using ABC Classification to determine the sample, the calculation of implementation using the company's method is carried out with the results on one of the product codes 357190 amounting to IDR 10.888.505.214. The same thing is also done using the proposed method, which is Periodic Review has an implementation result of IDR 4.473.946, so results from the implementation of proposed method are more optimal. There is factor that greatly influence the calculation using the company's method, it is purchase data or capital for cashflow in the company, which is not a factor in the proposed method, so the final result from company's method tends to be greater. The proposed method also has other output results, such as maximum inventory which is used to determine the number of reorders based on the last amount of inventory of the product, knowing the time to place a reorder with a interval review, safety stock that can be a solution when there are seasonal items, such as Ramadan time, where demand for an item suddenly increases, and a high service level indicates costumers also have a high level of satisfaction as well, so that companies can maintain their stock management well.

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