

## Implementation of the Order Process Using the EOQ Method in Distribution Companies in Indonesia

Farsya Saffanah Zahrani<sup>1</sup>, Utari Nurdiyah<sup>2</sup>, Lubis Fatimah Malini<sup>3</sup>

<sup>1</sup>LP3I JAKARTA KAMPUS PASAR MINGGU; [saffanahzahra20@gmail.com](mailto:saffanahzahra20@gmail.com)

<sup>2</sup>LP3I JAKARTA KAMPUS PASAR MINGGU; [nurdiyahutari@gmail.com](mailto:nurdiyahutari@gmail.com)

<sup>3</sup>LP3I JAKARTA KAMPUS PASAR MINGGU; [lubisfm@gmail.com](mailto:lubisfm@gmail.com)

### Info Artikel

#### Article history:

Received Januari, 2025

Revised Januari, 2025

Accepted Januari, 2025

#### Kata Kunci:

Metode EOQ, Safety Stock, Reorder Point.

#### Keywords:

EOQ Method, Safety Stock, Reorder Point.

### ABSTRACT

Penelitian ini mencoba untuk menjelaskan perbandingan metode *Economic Order Quantity* (EOQ) di beberapa Perusahaan yang bergerak dalam bidang distribusi di Indonesia. Metode yang digunakan dalam penelitian ini adalah metode kajian literatur dengan melakukan *review* terhadap beberapa jurnal yang ada di Indonesia. Penulis meninjau dan membandingkan jurnal-jurnal yang sebelumnya telah diteliti oleh peneliti lain pada perusahaan-perusahaan di Indonesia khususnya penerapan EOQ di bidang distribusi. Hasil penelitian ini menunjukkan perhitungan metode EOQ, *safety stock*, *reorder point*, serta menampilkan tabel hasil perbandingan dari tahun ke tahun dan membandingkan dengan kajian teori EOQ yang ada. Hasil penelitian ditemukan bahwa penggunaan metode EOQ mampu menghemat biaya persediaan dan pengeluaran perusahaan terhadap biaya produksi lebih efisien sehingga dapat disimpulkan bahwa metode EOQ mampu membantu perusahaan untuk mengurangi biaya operasional secara keseluruhan dan meminimalisir kekurangan material persediaan

### ABSTRACT

*This research tries to explain the comparison of the Economic Order Quantity (EOQ) method in several companies operating in the distribution sector in Indonesia. The method used in this research is a literature review method by reviewing several journals in Indonesia. The author reviews and compares journals that have previously been researched by other researchers on companies in Indonesia, especially the application of EOQ in the distribution sector. The results of this research show the calculation of the EOQ method, safety stock, reorder point, as well as displaying a table of comparison results from year to year and comparing with existing EOQ theory studies. The research results found that the use of the EOQ method was able to save inventory costs and the company's expenditure on production costs more efficiently so it can be concluded that the EOQ method was able to help the company to reduce overall operational costs and minimize shortages of inventory materials.*

*This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.*



*Corresponding Author:*

Name: PengaturanNurdiyah Utari

Institution: LP3I JAKARTA KAMPUS PASAR MINGGU

Email: [nurdiyahutari@gmail.com](mailto:nurdiyahutari@gmail.com)

## 1. PENDAHULUAN

The inventory of goods stored in a company's warehouse has the aim of meeting needs in the company's activity processes. In the process of achieving company goals, factors will influence the smoothness of production. One of the factors in the smooth production process is inventory control that is carried out appropriately. In order for inventory management to be balanced, it must be carried out smoothly. Costs for storing and maintaining inventory will be high and result in waste if the inventory in the warehouse is too large (over stock).

Every company, whether large or small, must have inventory in varying amounts. Without inventory, the company will face a risk where the company will experience obstacles because it cannot meet customer demand. Customer demand is not met if the inventory provided or available is small, but if the inventory available or provided is too much, it can also result in losses because the storage time is too long, it can cause inventory from minor damage to damage that is not suitable for use and the accumulation of inventory in the warehouse which results in a full warehouse. In a company, inventory functions to prevent the occurrence of detrimental situations, namely excess and shortage of stock. Excess inventory can be detrimental to the company because it can incur warehouse costs, while a shortage of inventory can cause the company to lose sales because customer orders cannot be fulfilled. In inventory activities like this, it is likely that the inventory section will experience delays in making inventory reports, so that errors often occur in recording item mutations because the types of drugs in the company are thousands.

This manual management of stock data sometimes results in differences in item calculations. To run the distribution process smoothly, more efficient inventory management and control is needed. One method of managing and controlling inventory that is widely applied is by using the Economic Order Quantity method. Economic Order Quantity (EOQ) is a technique for procuring raw material inventory in a company that determines the economic order quantity for each order with a predetermined frequency and when to order again.

## 2. TINJAUAN PUSTAKA

### 2.1 Order Process

According to Yudizwara, 2024 The Cambridge Dictionary defines order as a request to make, furnish, or convey food or products. According to KBBI, order is an order to do something or an order. The meaning of this term is an order, which may also be interpreted as a request or order to do something. This term is frequently used in a variety of activities, including chatting, ordering at a restaurant, and even shopping online.

### 2.2 EOQ Method

According to Langke, Palandeng and karuntu, 2018 The Economic Order Quantity (EOQ) approach is one of the most popular inventory control models. The EOQ approach aims to achieve low inventory levels, lower costs, and higher quality. According to Heizer and Render (2012:68), economic order quantity (EOQ) is one of the oldest and most well-known inventory control methods. This inventory control system answers two key questions: when to order and how much to order. And according to Mubarak, Nabil Mubarak, 2019 Storage is the action and business of receiving, storing, organizing, accounting, maintaining Spare Parts, and retrieving Spare Parts from storage.

**3. METODE PENELITIAN**

The methodology used is a literature study by looking for theoretical reflections that are relevant to the cases or problems found using several journals as references related to the Order Process using the EOQ method in Manufacturing Companies in Indonesia. All journals and data sources that we get come from Google Scholar.

**4. HASIL DAN PEMBAHASAN**

This research discusses the implementation of the Order Process using the EOQ Method in Distribution Companies in Indonesia which was obtained by three companies as a comparison. The data obtained were obtained from different journals that had previously been researched by other researchers. The three companies are:

- 1) PT. Aneka Usaha is a company operating in the distribution sector. Products distributed by PT. Various Businesses are Baby Diapers and Adult Diapers, Bath Soap, Face Masks and others.
- 2) PT. Mulia Prima Sentosa is a branch of the company PT. Mulia Knighting Factory operates in the distribution sector whose main activity is selling products such as riders, doormats, towels, swallows, sun swallows, hansa hotlines, scorlines.
- 3) 3. PT Setiajaya Mobilindo Bogor is a Toyota Astra Company in Bogor, Indonesia which operates in the automotive industry, engaged in the distribution of vehicle sales, maintenance or related products.

The following is a table of several similarities from the three companies' journals regarding the EOQ method:

Tabel 4.1 Mapping Company

Name of company	Field	Method	Study focus
PT Aneka Usaha	Distribusi	Purchase of Goods	1. Calculation Method EOQ 2. Safety Stock 3. Reorder Point
PT Srikaya Makmur	Distribusi	Purchase of Goods	1. Calculation Method EOQ 2. Safety Stock 3. Reorder Point
PT Mulia Prima Sentosa	Distribusi	Purchase of Goods	1. Calculation Method EOQ 2. Safety Stock 3. Reorder Point

**4.1 EOQ Calculation**

There are two types of expenditures associated with running a sales business: storage and ordering. The corporation clearly wants to keep these two costs to a minimum. The goal of this model is to provide a model that can be used to make judgments. This model is called EOQ (Economic Order Quantity). This model was created with the idea that orders are placed and received instantly, ensuring that no shortages arise. The EOQ approach then seeks to establish the most optimal purchasing frequency. The ideal quantity and frequency of purchases can be determined in order to achieve effective inventory control. The total ordering and storage expenses can be computed by using the variables below, which are:

- $C_c$  = Maintenance charge per order
- $C_0$  = Ordering fee per order

- D = Represents raw material demand per time period
- Q = Quantity of items per order / inventory
- Q\* = Indicates the economic amount of products per order (EOQ)
- F = Frequency of purchasing raw materials
- TS = Total yearly ordering costs
- TC = Represents total annual inventory costs
- TH = Total annual storage and maintenance expenditures.

Heizer and Render (2010:94) make the following calculation :

$$EOQ \text{ atau } Q^* = \sqrt{\frac{2DS}{H}}$$

Notes :

- Q = Represents the number of units per order.
- Q\* = Represents optimum number of units/order.
- D = Indicates annual usage or demand in units.
- S = Represents ordering costs for each order
- H = Storage expenses per unit/year

Meanwhile, the company corporation purchases items based on orders recorded by marketing sales staff plus 20-30% of the minimum order quantity

**4.1.1 EOQ Method Calculation Based on the EOQ Formula from PT Mulia Prima Sentosa data**

Tabel 4.1.1 Merchandise Purchases

NO	MONTH SALE	TIME				
		2013	2014	2015	2016	2017
1	Januari	10.253,00	11.663,00	12.567,00	12.525,00	13.765,00
2	Februari	11.402,00	10.389,00	10.164,00	10.968,00	12.984,00
3	Maret	9.779,00	9.937,00	9.078,00	9.655,00	11.663,00
4	April	10.009,00	10.320,00	11.167,00	10.669,00	13.669,00
5	Mei	17.275,00	18.275,00	18.193,00	20.163,00	18.283,00
6	Juni	19.458,00	19.978,00	21.146,00	22.893,00	15.709,00
7	Juli	12.110,00	12.820,00	14.893,00	14.198,00	12.102,00
8	Agustus	11.698,00	12.198,00	11.197,00	10.282,00	11.382,00
9	September	8.879,00	9.358,00	9.871,00	9.887,00	10.980,00
10	Oktober	10.164,00	10.274,00	10.956,00	10.002,00	10.706,00
11	November	11.379,00	10.467,00	9.723,00	9.600,00	9.355,00
12	Desember	12.294,00	12.659,00	11.320,00	12.319,00	10.858,00
<b>AMOUNT</b>		<b>144.425,00</b>	<b>144.700,00</b>	<b>148.336,00</b>	<b>150.275,00</b>	<b>153.159,00</b>
<b>AVERAGE</b>		<b>12.035,42</b>	<b>12.058,33</b>	<b>12.361,33</b>	<b>12.522,92</b>	<b>12.763,25</b>

**4.1.2 Order Fee Details**

Table 4.1.2 Order fee Details

NO	TYPE OF FEES	TIME				
		2013	2014	2015	2016	2017
1	Shipping cost	Rp 72.350.000,00	Rp 74.160.000,00	Rp 75.137.500,00	Rp 76.579.500,00	Rp 75.728.000,00

2	Unloading Fees	Rp 18.000.000,00	Rp 21.000.000,00	Rp 24.000.000,00	Rp 27.000.000,00	Rp 24.000.000,00
<b>AMOUNT</b>		<b>Rp 90.350.000,00</b>	<b>Rp 95.160.000,00</b>	<b>Rp 99.137.500,00</b>	<b>Rp 103.579.500,00</b>	<b>Rp 99.728.000,00</b>

**4.1.3 Storage Fee Percentage, Price Per Dozen, and Storage Fee**

Table 4.1.3 Storage Fee Percentage, Price Per Dozen, and Storage Fee

TIME	%COST KEEP	PRICE (RP) PER DOZEN	COST STORAGE
2013	5%	Rp 160.000,00	Rp 8.000,00
2014	5%	Rp 170.000,00	Rp 8.500,00
2015	5%	Rp 180.000,00	Rp 9.000,00
2016	5%	Rp 190.000,00	Rp 9.500,00
2017	5%	Rp 210.000,00	Rp 10.500,00

**4.1.4 Details of Storage Fee's**

Table 4.1.4 Details of Storage Fee's

NO	TYPE OF FEES STORAGE	TIME				
		2013	2014	2015	2016	2017
1	Administrative costs warehouse	Rp 18.000.000	Rp 19.500.000	Rp 20.000.000	Rp 21.500.000	Rp 22.500.000
2	Emergency expenses Damaged goods in stock	Rp 8.000.000	Rp 8.500.000	Rp 9.000.000	Rp 14.250.000	Rp10.500.000
<b>JUMLAH</b>		<b>Rp 26.000.000</b>	<b>Rp 28.000.000</b>	<b>Rp 29.000.000</b>	<b>Rp 35.750.000</b>	<b>Rp 33.000.000</b>

**4.1.5 EOQ Method Calculation**

Table 4.1.5 EOQ Method Calculation

TIME	SELLING			BOOKING FEE	STORAGE COSTS
	Amount	Price per dozen	Cost amount		
2013	Rp 144.425	Rp 160.000	Rp 23.108.000.000	Rp 90.350.000	Rp 26.000.000
2014	Rp 148.311	Rp 170.000	Rp 25.212.870.000	Rp 95.168.000	Rp 28.000.000
2015	Rp 150.155	Rp 180.000	Rp 27.027.900.000	Rp 99.137.000	Rp 29.000.000
2016	Rp 153.007	Rp 190.000	Rp 29.071.330.000	Rp 103.579.500	Rp 35.750.000
2017	Rp 151.456	Rp 210.000	Rp 31.805.760.000	Rp 99.728.000	Rp 33.000.000

$$2013 \text{ EOQ} = \sqrt{\frac{2 \times Rp.90.350.000 \times 144.425}{8000}} = 57.115,669 \text{ dozen/year}$$

$$2014 \text{ EOQ} = \sqrt{\frac{2 \times Rp.95.168.000 \times 148.311}{8500}} = 57.628,549 \text{ dozen/year}$$

$$2015 \text{ EOQ} = \sqrt{\frac{2 \times Rp.99.137.000 \times 150.155}{9000}} = 57.515,053 \text{ dozen/year}$$

$$2016 \text{ EOQ} = \sqrt{\frac{2 \times Rp.103.579.500 \times 153.007}{8500}} = 57.762,469 \text{ dozen/year}$$

$$2017 \text{ EOQ} = \sqrt{\frac{2 \times Rp.99.728.000 \times 151.456}{8500}} = 53.637,947 \text{ dozen/year}$$

**4.2 Advantages and Disadvantages of the Economic Order Quantity (EOQ) Method.**

**4.2.1 Economic Order Quantity (EOQ) Advantages:**

As noted by Syamsuddin (2009:294), "States that in its application, this EOQ model considers operational costs and financial costs and determines the order quantity that will minimize overall

inventory costs." Thus, this EOQ model not only predicts the best number of orders but, more crucially, addresses the financial elements in making decisions about order amounts.

**4.2.2 Weaknesses of Economic Order Quantity.**

According to Syamsuddin (2009: 294), because EOQ assumes constant data, the results are frequently unreliable.

- a. Safety stock is not taken into consideration.
- b. Each item's EOQ must be determined individually.
- c. The system only utilizes historical data.
- d. Price changes are not taken into consideration.

As a result, when applying the EOQ method, we must be critical, recognizing and addressing these flaws. The application of economic orders in conjunction with safety stock makes a lot of sense.

**4.3 Safety Stock & Reorder Point**

**4.3.1 Safety Stock**

Safety stock serves to defend against inaccuracies in forecasting demand during the lead time. If real demand exceeds the average value, safety stock will be effective. The safety stock formula is as follows.

$$SS = (\text{maximum usage} - \text{average usage}) \times \text{Lead time}$$

In 2013 ; Safety Stock = (19.458,00 - 12.058,33) x 3 = 22.199,01 dozen.

In 2014 ; Safety Stock = (19.978 - 12.361,33) x 3 = 22.850,01 dozen.

in 2015 ; Safety Stock = (21.146 - 12.522,92) x 3 = 25.869,24 dozen.

In 2016 ; Safety Stock = (22.893 - 12.763,25) x 3 = 30.389,25 dozen.

In 2017 ; Safety Stock = (18.283 - 12.621,33) x 3 = 16.985,01 dozen.

**4.3.2 Reorder Point**

Reorder Point is an order that is placed again so that the ordered materials are received on time. the time when the order must be placed again. In short, the reorder point is the point at which the company must place a reorder which has the following formula:

$$ROP = d \times L$$

ROP ; Reorder point.

D ; Daily demand.

L: The time it takes to receive items after placing an order.

In 2013: ROP = (3 x 12.058,33) + 22.199 = 58.374,99 dozen.

In 2014: ROP = (3 x 12.361,33) + 22.850 = 59.933,99 dozen.

In 2015: ROP = (3 x 12.522,92) + 25.869 = 63.437,76 dozen.

In 2016: ROP = (3 x 12.763,25) + 30.389 = 68,678,75 dozen.

In 2017: ROP = (3 x 12.621,33) + 16.985 = 54.848,99 dozen.

To clarify, PT. Mulia Prima Sentosa's calculations for the 2013-2017 period are as follows:

Table 4.3.2.1 calcuation of Reorder Point

TIME	EOQ	SAFETY STOCK	REORDER POINT
2013	57.115.669,00	22.199,00	58.374,00
2014	57.628.549,00	22.850,00	59.933,00
2015	57.515.053,00	25.869,00	63.438,00
2016	57.762.469,00	30.389,00	68.679,00
2017	53.637.947,00	16.985,00	54.849,00

**4.4 TIC (Total Inventory Cost) Calculation of Merchandise Inventory: Using the EOQ Method Formula Calculation and PT Mulia Prima Sentosa Company Calculation**

**4.4.1 Calculating the Total Inventory Cost (TIC) of Goods Inventory Using Company Calculations**

2013 = [12.058,33 x 8.000,00] + [90.350.000,00 x 5] = Rp. 548.216.640,00  
 2014 = [12.361,33 x 8.500,00] + [95.168.000,00 x 5] = Rp. 580.911.305,00  
 2015 = [12.522,92 x 9.000,00] + [99.137.000,00 x 5] = Rp. 608.391.280,00  
 2016 = [12.763,25 x 9.500,00] + [103.579.500,00 x 5] = Rp. 639.148.375,00  
 2017 = [12.621,33 x 10.500,00] + [99.728.000,00 x 5] = Rp. 631.163.965,00

**4.4.2 Calculating the Total Inventory Cost (TIC) of Goods Inventory Using Company Calculations**

Table 4.4.2 Calculation of TIC (Total Inventory Cost)

TIME	TIC BY COMPANY	TIC BY EOQ	SAVING'S
2013	548.216.640,00	456.925.354,95	91.291.285,05
2014	580.911.305,00	489.842.669,86	91.068.635,14
2015	608.391.280,00	517.635.482,00	90.755.798,00
2016	639.148.375,00	548.743.457,89	90.404.917,11
2017	631.163.965,00	563.198.440,45	67.965.524,55

**5. CONCLUSION**

From the research of the literature method journal, it can be concluded that PT Aneka Usaha, PT Mulia Prima Sentosa, and PT Setiajaya Mobilindo, if applying the EOQ method respectively from the Company, can find out how many economical orders for each inventory item and find out the frequency of ordering for a period and when the order of goods is made again so that the demand for goods can be fulfilled optimally.

The data used for this Journal uses data from the PT Mulia Prima Sentosa Journal, for 2 (two) other companies the data can be seen directly on the Bibliography.

Based on the conclusion above, the EOQ method is very beneficial for the Company. This EOQ method can not only be used by companies in the field of distribution, but other companies can also use this EOQ method so that companies do not need to place orders too often and there is no excess inventory and can minimize inventory storage costs such as storage, handling, and depreciation and at the same time reduce the frequency of orders and order costs.

**REFERENCES**

Viona Afrilia & Jemakmun (2020) Analisis Optimalisasi Persediaan Barang Dengan Menggunakan Metode Economic Order Quantity Pada PT. Aneka usaha Journal of Computer and Information Systems Ampera.  
 Akbar Muhammad. (2018) Analisis Persediaan Barang Dagang Menggunakan Metode Eoq (Economic Order Quantity) Pada Pt. Mulia Prima Sentosa. Universitas medan area.  
 Chandra Herawan, Udi Pramiudi dan Edison (2013) Penerapan Metode Economic Order Quantity Dalam Mewujudkan Efisiensi Biaya Persediaan Studi Kasus Pada Pt. Setiajaya Mobilindo Bogor. Jurnal Ilmiah Akutansi Kesatuan.  
 Palupi, P. M., Korawijayanti, L., & Handoyono, R. (2018). Penerapan Metode Economic Order Quantity (EOQ) Untuk Meningkatkan Efisiensi Biaya Persediaan Bahan Baku (Studi Kasus pada PT Nusamulti). *Prosiding Seminar Nasional Unimus*.  
 Sutrisna, A., Ginanjar, R., & Lestari, S. P. (2021). Analisis Pengendalian Persediaan Bahan Baku dengan Menerapkan Metode EOQ (Economic Order Quantity) pada PT. Jatisari Furniture Work. *Ekonomis: Journal of Economics and Business*.