

# Inventory Control and EOQ Forecasting Tools as Effective Decision-Making Model

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## ABSTRACT

Inventory management is one of the crucial aspects of any business that affects how the company handles the profits and losses. The type of inventory that the management has implemented will either cause problems to the entire supply chain or affect how the overall gains are shared. Through the adoption of inventory controlling technologies, the business will be able to handle the increase in demands and have a transparent, informational infrastructure on the product consumption patterns. One such useful inventory control technology is the Economic Order Quantity (EOQ). Through the adoption and implementation of this technology, the business can enhance its inventory management and the way they handle consumption. More so, this method helps collect information from the various aspects of the business, informing the administration's decisions. Through systematic researching, this paper will tell whether with the use of inventory control systems and, more specifically, the use of Economic Order Quantity will help the business make a stride in reducing the cost associated with inventory managements.

**Keywords:** *Inventory control, EOQ, tools*

## 1. INTRODUCTION

The concept of inventory control and that of inventory management are near similar, insinuating the need to forecast and understand the amount of inventory that one should order[1]. Thus, Inventory control strives to answer the question regarding how much stock a business should order. However, with most cases having the term inventory control and Inventory management being used to insinuate the same thing, their core definition is different. Inventory control deals with warehouse management, entailing integration of barcode scanners, variants, kitting and product bundling, reorder reports and adjustments, comprehensive inventory counts and list, synching the products with purchase order and sales order, and product history, details and their location[2]. This differs from inventory management in that the latter deals with how one obtains and sores raw material and the final products after processing[3].

Thus, inventory management deals with how the business has the right stock at the right place, and the correct cost, costing the company the right amount of money. One importance of gaining control is to ensure

that one can understand what is going on within the business and act accordingly. Economic Order Quantity (EOQ) is a form of gaining control. It ensures that the company can purchase effectively and, thus, be able to control the cost associated with ordering and holding inventory[4]. This concept ensures that the business can understand the annual fixed cost in regard to stock, the quantity demand, and the price associated with the inventory. With this information, the business will make informed decisions regarding the product purchase and further understand its expenditure on the list. To understand the importance of Inventory control and EOM in decision making, we will evaluate the impact that each has on the decision-making proces.

## 2. RESEARCH METHODOLOGY

When conducting research, various methodologies and techniques are used in collecting raw data and transforming it into useful information. In choosing the tools to use, considering the topic, the time, and the nature of the information required at the end of the paper is crucial. Additionally, the type of information that the particular task uses is also a crucial aspect to

consider. The nature of the data required in researching this paper is extensively available in various online journals and publications. Thus, the research made use of these publications and journals in collecting crucial data for the task. Thus, the use of a qualitative research technique was applied in the development of the paper. The need to evaluate the impact that both inventory control and OEM forecasting tools affect the decision-making process, the need to explore and understand the two concepts was called for. This research method is crucial in that it helps to justify the importance of these two concepts in enhancing business decision-making. The materials used were peer-reviewed articles and publications

The research made use of textual analysis in understanding the issue at hand. With the availability of digital form materials, the researchers used the online publication to access research on the topic at hand. Initially, the researcher collected 300 publications and research papers that evaluated the business decision-making process. From the number, 183 research papers were eliminated from their narrowing down on the EOQ and inventory control system. Further, 142 research papers were eliminated from use in the research due to the lack of an appropriate case study to illustrate the application of both EOQ and Inventory Control forecasting tools. Eventually, the paper used 25 research papers and publications in informing the research and justifying the use of these tools in decision making.

### **3. RESULTS**

#### ***3.1 Types of Inventory***

There are four main types of inventory: Raw material, Work-in-progress (WIP), Finished goods and maintenance, Repair, and Overhaul (MRO). Thus, it is essential to understand the type of inventory that the business needs to control. As the name insinuates, raw materials create the finished goods required for creating the list[5]. These differ from one business to the next. Secondly, the work-in-progress implies a combination of the raw materials, the overhead cost, and the labor consumed to turn the raw materials into finished goods. Viewing this type of inventory as part of the bigger picture is crucial for the overall decision making. After processing the raw material, the end product, which is also referred to as the finished goods, is listed on the business website or store. Lastly, the MRO entails the small details in production. In most cases, these are not built into the products itself but have a severe impact on the product[6].

In a standard business, several solutions can be used in the maintenance of inventory. These include the use of a pen and paper, spreadsheets, and inventory software. The use of paper was a practice that was used in the past. However, with the development of

technology, modernized technology to manage inventory has become common since it provides more accurate predictions. Excel sheets are commonly used to develop and manage customized inventory, where the business will build its inventory[7]. With the need to automate tasks, automated software in handling inventory is every day amongst many businesses. The use of these automatic inventory systems helps with scaling the business as it grows[6]. More so, with the capability to store information for long-term use, the company can replicate and understand the trends in inventory management, gaining more control over how they facilitate the control process. With inventory control focusing on the tracking and aiming at either cutting cost, reducing production cost, or ultimately saving on the processing and production cost, it is essential to ensure that the business can collect all the information required to reach a conclusive decision.

#### ***3.2. Goals of an inventory control system***

Various goals influence the need to adopt an inventory control system. To start with, without collecting enough information about the inventory, the business could assume that there is too much or too little done with the inventory. However, with an adequate inventory control system, it will be easier to ensure equal distribution of cost among the various departments, preventing too much value tied up in inventory[8]. Thus, understanding the value related to storage, transportation, and the amount that is locked up in the inventory will help direct the production process and make predictions about the market[9]. For the production and distribution of perishable goods, having an inventory management system will reduce losses associated with dead stock. Secondly, inventory tracking systems help inaccurately record the inventory[10]. With this, gaining insight into the best approach to dealing with the list is crucial for the business's profits and losses. More so, various methods are supplied with the tracking of inventory, such as using the First-in-First-Out and Last-in-first-out (LIFO) method. Through inventory control, a business will be able even to organize its warehousing. Overall, an organized inventory system will ensure that the company makes effective deliveries.

The use of an inventory control system also helps maximize the overall profit that the business will incur from the fact that there are objectives set for the use of such a system[9]. With these systems, it will be business to collect information regarding the gross profits, revenue earned from the sales, understand the value of fixed utilities, and many more. With all this information, the business will tell which product is selling, whether or not there was theft, and, overall, maintain healthy company profits. Another objective that this system has is developing and maintaining a sound replenishment system that allows customers to buy products whenever

they wish[3]. This automation of the process of restocking where an inevitable shortage of goods on the shelves can trigger shipment method from vendors is crucial to the growth of any business since it encapsulates the hand on experience of stock-taking eradicating errors in the process. More so, this is efficient, and with time, the system can be taught how to learn the trends and, thus, help in prediction[10]. The aspect of efficiency in the supply chain is crucial to any business. With inventory being critical to the entire production and product sales, a business needs to ensure that they can track the inventory. This tracking will minimize theft and the probability of losses along the supply chain[11].

## 4. DISCUSSION

### 4.1. *EOQ forecasting tools*

As previously mentioned, inventory management plays a crucial role in the performance of a business. At times, the holding cost, the order cost, and the shortage cost weigh the business down, derailing its growth. Thus, the need to identify the right amount of inventory that will ensure a balance between this cost is what Economic Order Quantity is all about[12]. EOQ ensures that the business makes the right amount of order for the inventory, allowing the business to hold just enough to supply the market. More so, the models ensure that the business does not have idle inventory lying around. To achieve this, EOM assumes that there has to be a tradeoff between the total inventory cost, the inventory setup cost, and the inventory holding cost[13]. Thus, to reduce the total inventory costs, it is plausible to reduce inventory holding and setup costs.

$$EOQ = \sqrt{\frac{2 \times S \times D}{H}}$$

where:

- S = Setup costs (per order, generally including shipping and handling)
- D = Demand rate (quantity sold per year)
- H = Holding costs (per year, per unit)

### 4.2. *EOQ Calculation Assumptions*

When calculating the EOQ, there are various assumptions that the business takes into consideration. First, the consistency in product demand is one of the premises[14]. This assumption helps the business identify with the type of order to implement the raw materials used in production. More so, this assumption helps navigate the deduction when the demand is high, and the inventory is extensive, as well as when there is

an excess inventory on the shelf. Secondly, the calculations assume the warehouses' capacity and the procurement teams to handle the calculations from EOQ. Thirdly, the product's value to the business and the probability of reordering is considered[13]. If the product changes in its importance to the company, there are probable reordering parameters. The calculations also consider the order quantity with the suppliers since they directly affect the business inventory. Another critical assumption is that of the supplier's lead time. With a non-scheduling supplier, the business needs to evaluate the stock and increase the security stock levels.

## 4.3. *Types of Inventory Cost*

### 4.3.1. *Ordering cost*

This is also referred to as the inventory setup cost. In summary, this is the cost that the business has to incur every time they make an order to its suppliers. With the need to keep ideal documentation of all the processes, clerical costs of formulating buying orders are among the expenses that the business will incur[15]. These range from invoice processing, communication cost, and accounting costs[16]. Secondly, there is the cost associated with finding suppliers and the cost associated with expediting orders. With the likelihood that these costs will be inconsistent, it is crucial to keep a stealth record. Thirdly, the price is associated with moving products from the warehouse to the designated stores for sale. With these costs varying from one industry to the other, it is imperative to ensure that they are considered. There is also the consideration of the cost associated with unloading the goods at the warehouses, ensuring that there are no defective ones. Lastly, there is a cost associated with electronic data interchange. With the increased adoption of technology in retail, this type of technology is used for processing orders[17]. Despite this being just a small amount, the cost must be considered since with many sales; these costs are increment.

### 4.3.2. *Holding cost*

Once the goods are received at the store, there is a cost associated with storing them before they are purchased. These costs include inventory financing cost, which is the investment made on the inventory[18]. For instance, the working capital's interest is one of the costs that the business should consider. Opportunity cost is also another cost that should be considered. This type of value is associated with the alternative cot that would have been gained from the money this invested in the inventory. The storage space cost is also another consideration that should be evaluated and associated with inventory holding costs. Since this is variant with the location of the inventory, the lease payment, the storage space cost, and the maintenance costs should be considered. The utility cost, such as the electricity and water bill, and tax should also be considered[19]. The

cost of handling the inventory is also a part of the holding inventory cost. This cost includes that of security, insurance, and information and communication technology infrastructure used. Lastly, the consideration of the business risk cost, which provides for loss of products between the supplier and the sale of the product due to theft, damage shipping errors, or vendor's fraud, should also be incorporated in the inventory control system.

#### 4.3.3. *Shortage cost*

The stock-out costs are experienced when the business runs out of stock. This means that the business is not making any sales at the moment. Various reasons could lead to such a situation, forcing the business to incur the cost associated with disrupted production, emergency shipment of product, and risk in maintaining a health brand image[20]. The business will pay for factory overhead and idle workers with disrupted production since there is no production taking place. With the need to replenish the products within the shortest time possible, the business might be forced to pay extra to get the goods faster to the suppliers or even changing their supplier. Lastly, without stock, the consumers will be forced to seek business from their competitors[21]. Unhappy customers result in loss of business. More so, to regain the consumers, the business will engage other sales and advertising strategies that will consume their profit margin.

#### 4.3.4. *Spoilage cost*

This type of cost is commonly associated with perishable goods. With little control to do when the product goes wrong, the business stands a loss. With a spoiled product, the business loses the inventory and implies that the business does not raise the initial invested capital on a particular product. Product spoilage is a combination of various factors, including poor inventory control[22]. Implementing an adequate inventory control system will improve forecasting, keep an up-to-date inventory of the inventory, and enhance efficiency. More so, an inventory control system will ensure that the goods are sold in the order of age, ensuring that the goods likely to go wrong are sold out first.

Collecting this information is crucial for the business to operate efficiently. These costs play an essential part in influencing the final profit margin that the business will realize. Thus, a business must collect all the information that one can regarding the cost. With the rampant and changing business environment, understanding the product's competitive advantage and consumption cycles and trends among the consumers is crucial. This means that the business requires extensive information regarding both their inventory and customer consumption trends to forecast. This insinuates that the use of information collected from the stock is crucial.

This information is critical for the production process as well as the growth of the business. With the need to forecast the consumption trend affecting the production process, the entire supply chain, and the sales strategy that the business adopts, keeping a record of the inventory appropriately is crucial.

#### 4.4. *Best practices in Inventory control*

To benefit from the inventory control system, there are some aspects that one needs to consider. First, it is vital to consider the use of intelligent demand forecast to help the business anticipate a drop in inventory, increase in consumer demand, and alternatively develop a strategy in the production and supply of the products. To achieve this, there are various factors that the business will need to incorporate into their inventory control system. To start with, creating a monthly process that ensures the continuous collection of data and validation on whether the inventory information was correct or wrong[23]. This cycle should also evaluate the market cycle and record the demand patterns. Secondly, the business should consider the various factors that it should measure and the frequency in measurement. To forecast demand, it is crucial to make use of the correct information. Thus, the various aspects to consider, including data collected from the point of sales, obsolete inventory, and the frequency of the same, will help inform the decision. Additionally, integrating data from the various channels that the business will collect information will allow for future decision-making.

Secondly, the use of an inventory control system helps allow the business to identify the various items that it has and the location where these items are replaced. Thus, it calls for implementing an ideal warehouse management system that allows continuous feed of up to date information regarding logistics and the product quantity[24]. This information will be used in EOQ, enhancing the production process with the supply chain. An ideal Inventory Control system advocates for efficiency in using space in the stores that the business has. This helps improve the flow of the inventory, saving on the cost associated with holding the same. More so, the information collected by this system will help the management develop a strategy to reduce the amount of wastage through modification of the implemented order cycle. Overall, the most crucial part of this system is that it helps create an information collection and storage mechanism, improving the rate of access and analysis on the same. With the need to improve inventory management, the business will have well-organized data to guide them in decision making..

## 5. CONCLUSION

To enhance the decision making in business regarding inventory, considering the adoption of

inventory control tools as well as Economic Order Quantity calculations is crucial. With the two, the business will streamline the business capability in collecting and holding information on the product they are selling. More so, the two will increase the probability of reducing unwanted wastages and dead stock[23]. With decision making, critical elements such as those of costs associated with inventory are at the time assumed from the quantity. However, with large transactions, the business will lose a part of their profits. Using EOQ, the business can incorporate the various cost, analyze the expenditure, and define a goal that they need to achieve. With this in mind, considering the multiple factors that affect the inventory will help in reducing expenses and avoiding unnecessary costs[9]. Thus, using these two items in managing inventory will adequately help with decision making.

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The title "ACKNOWLEDGMENTS" should be in all caps and should be placed above the references. The references should be consistent within the article and follow the same style. List all the references with full details.

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