Unizik Journal of Technology, Production and Mechanical Systems (UJTPMS)

Journal homepage: https://journals.unizik.edu.ng/index.php/ujtpms/about

Evaluation and Optimization of Economic Production Quantity (EPQ) for Inventory Control System Analysis in a Manufacturing Industries

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ARTICLE INFO

Article history:
Received Jan. 6, 2023
Revised Mar. 23, 2023
Accepted April 28, 2023
Available Online April 28, 2023

Keywords:
Inventory control, Production Planning, Inventory management, Economic production quantity, Safety stock inventory, Production bottleneck.

ABSTRACT

This work attempts to evaluate and optimize the economic production quantity (EPQ) for inventory control system with the intention of using decision model to analyze inventory in small and medium scale industries. Economic production quantity inventory management plays a vital role in enhancing customers' satisfaction among the manufacturing firms. Customers' satisfaction is crucial since manufacturing firms contribute greatly to the economic development of a country In this study, relevant articles were reviewed on inventory management. From the data collected from the case study company (Evepon Nigeria limited), inventory control models were used to obtain the economic production quantity values of inventory control system of the company. The following results were obtained for the manufacturing industry's production analysis and inventory control system for product 1 (plastic pipe product). The analysis gave an economic production quantity of 3318.56 units, reordering point of 812.17 units, lead time of 4.62 hours and production rate of 4221.59 units. The results reveal a standard system for inventory control and production planning of the case study company. They also provide company standard for similar case studies in order to eliminate and/or reduce the problems associated with inventory control and production planning. The techniques applied will help manufacturing industries in general and the case study company to reduce running cost (operating costs and inventory costs), and enhance effective utilization of inventory control system and in appraisal of their production planning system.

1. INTRODUCTION

Inventory refers to the goods and materials that an organization, company, or business enterprise holds to support production activities and for sale or customer service. In an effective and efficient business organization, good inventory management is very important for the successful operations. It is vital in the control of materials and goods that have to be held (or stored) for later use in the case of production [1] or later exchange activities in the case of services. Inventory control is the supervision of supply, storage and accessibility of items in order to ensure an adequate supply without excessive oversupply [2]. The principal goal of inventory management is to balance the conflicting economic activities of neither under-stocking nor holding too much stock, thereby tying up capital. Safety stock inventory is kept to guide against incurring costs associated with under storage, spoilage, pilferage and obsolescence, and the desire to make items or goods available when and where required (quality and quantity wise) thereby averting the problem of cost of not meeting up with demands [3]. Inventory problems of having too much or too small quantities on hand can cause business failures. If an item is not stocked when the customer thinks it should be, the retailer loses a customer not only on that item but also on many other items in the future. The conclusion one might draw is that effective inventory management can make a significant contribution to business profit sustainability as well as increase its return on total assets. It is thus the management of this economics of stockholding that is appropriately referred to as inventory management.

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Essentially, inventory management, within the context of the foregoing feature involves planning and control. The planning aspect involves looking ahead in terms of determination in advance: (i) What quantity of items to order; and (ii) How often (periodicity) do we order for them to maintain the overall stock coordination in an economically efficient way? The control aspect, which is often described as stock control involves following the procedure set up at the planning stage to achieve the above objectives. This may include monitoring stock levels periodically or continuously and deciding what to do on the basis of information that is gathered and adequately processed. Effort must be made by the management of any organization to strike an optimum investment in inventory since it costs much money to tie down capital in excess inventory. Financial analysts have sounded enough warning on the danger exposed to the long run profitability as well as continuity of business concern when its inventories are left unmanaged [3]. First, a company, which neglects its management of inventory, runs the risk of production bottlenecks and subsequently unable to maintain the minimum inventory it requires for maximizing profit. Secondly, inventories that are inefficiently managed may apart from affecting sales create an irreparable loss in market for companies operating in highly competitive industry. Invariably, a company must neither keep excess inventories to avoid an unnecessary tying down of funds as well as loss in fund due to pilferage, spoilage and obsolescence nor maintain too low inventories so as to meet production and sales demand as at when needed. However, in lead time, attention was focused on the development of suitable mathematical tools and approaches designed to aid the decision-maker in setting optimum inventory levels [4]. The Economic order quantity model (EOQ) and Reorder Point (ROP) has thus been developed to take care of the weaknesses emanating from the traditional methods of inventory control and valuation, which to some extent has proved useful in optimizing resources, and thus minimizing associated cost [5]. The summary of the literature review shows that inventory system and inventory control methods are essential to manufacturing companies, but so many companies like Evepon manufacturing industries ltd have not evaluate and analyze their inventory control system to understand the appropriate technique(s) to handle inventory control system and the economic production quantity. Analysis of an economic production quantity could assist in manufacturing industries decision making system. It helps to decide on what would be the best optimal order quantity at the company’s lowest price and the reorder point which provides guidance to when to place an order for specific products based on their historical demand. The reorder point also allows sufficient stock at hand to satisfy demand while the next order arrives due to the lead time, understanding demand and the ability to accurately predict. The reorder point is imperative among big retailer companies. However, the aim of this research work is the application of inventory control models to evaluate and optimize the economic production quantity for inventory control system in the case study company.

1.2 Types of Inventory Control.

Companies use various inventory control techniques to manage one of their largest investments. Various inventory control methods exist. For the small business, the inventory control method used has a major impact on the business cash flow and operational cost. Whatever inventory control method a company uses, the goals for managing inventory hold true regardless of industry or product [7]. These goals include maximizing customer service, lowering operational cost and minimizing inventory investment. Some inventory control methods are discussed below:

1.3 Aggregate Control:

This is an inventory control method that involves grouping. Using this method, a business classifies its inventories into separate groups, each receiving a different level of inventory control. For example, a bake-shop might use three different classifications and ingredients such as flour, sugar and cream comprise one classification, work-in-process or partially finished items comprise the second classification and finished goods or items ready to sell make up the third classification. The way the bake-shop controls each class of inventory depends on the rules established for that class. For example, all ingredient inventories might use a minimum/maximum policy--whenever the inventory reaches a minimum level, the bake-shop orders more inventory to reach its maximum inventory level.

1.4 Safety Stock (also called buffer stock):

This is a term used by logisticians to describe a level of extra stock that is maintained to mitigate risk of stock-outs (shortfall in raw material or packaging) due to uncertainties in supply and demand. Safety stock level must be high enough to cover vendor’s delivery times, and sufficient enough to cover customers’ demand [9]. Safety stock is held when there is uncertainty in demand, supply, or manufacturing yield; it serves as an insurance against stock-outs. With a new product, safety stock can be utilized as a strategic tool until the company can judge how accurate their forecast is after the first few years, especially when used with a material requirement planning worksheet. The less accurate the forecast, the more safety stock is required to ensure a given level of service. With material requirements planning (MRP) worksheet a company can judge how much they will need to produce to meet their forecasted sales demand without relying on safety stock [8]. However, a common strategy is to reduce the level of safety stock to help keep inventory costs low once the product demand becomes more predictable [4]. This can be extremely important for companies with a smaller financial cushion or those trying to run on lean manufacturing, which is aimed towards eliminating waste throughout the production process [10]. The amount of safety stock an organization chooses to keep on hand can dramatically affect their business. Too much safety stock can result in high holding costs of inventory. In addition, products which are stored for too long a time can spoil, expire or break during the warehousing process. Too little safety stock can result in lost sales, and thus a higher rate of customer turnover.

Therefore, finding the right balance between too much and too little safety stock is essential. Some companies use a very basic method of inventory control called safety stock. Companies use safety stock because of the uncertainty of consumer demand, uncertainty of supplier performance or uncertainty of product availability. Safety stock represents an amount over and above the average use or demand of a product [8]. Because the bake-shop uses a special process to procure flour, it always keeps additional money on hand to cover the uncertainty of supply. Using safety stock to control inventory increases a company cash outlay, plus it increases the carrying cost associated with owning inventory [11].

1.5 The Benefits of Inventory Planning and Control.

Inventory planning and control are functions relating to inventory management. Business owners pay close attention to inventory as it usually represents the second largest expenses in their businesses. Inventory planning includes creating forecasts to determine how much inventory should be on hand to meet consumer demand [1]. Inventory control is the process by which managers count and maintain inventory items in the business [12]. Business owners usually create internal policies and procedures for inventory planning and control [13]. Managers and employees must follow these policies and procedures when handling the company's inventory. Policies and procedures outline who can order inventory, how inventory flows through the company and accounting policies for valuing inventory and procedures to deal with obsolete goods. Inventory planning and control has several benefits for companies who derive the majority of their revenue in sales from inventory. Inventory planning and control helps to achieve the following:

(i) Better Cash Flow:

Inventory planning and control can help companies manage cash flow. Small businesses do not have large capital balances for purchasing copious amounts of inventory. Business owners implement policies and procedures to limit the amount of money spent on inventory. Cash flow improvements also come from purchasing the lowest cost inventory available in the business environment. Not only does low-cost inventory save the company money, but it also allows companies to develop a cost advantage in the economic market [2].

(ii) Higher Profits:

Business owners can use inventory planning and control to generate higher profits. Purchasing the right type of inventory to meet consumer demand often leads to higher business profits [1]. Companies who sell through their entire inventory multiple times each year also increases business profits. Inventory planning and control procedures can also limit the amount of obsolete inventory in the company. Obsolete inventory must be disposed of and written off by the company. Writing off obsolete inventory creates a loss on the income statement [4].

(iii) Limits Abuse:

Inventory policies and procedures prevent employee abuse of inventory. Loose work environments can allow employees to steal inventory items for personal use. Stolen inventory results in a financial loss for the company. Employees can also use a company's inventory items in the workplace for personal reasons. Previously used inventory may be unsellable depending on the company's operating industry. Proper employee behavior is a significant factor relating to inventory cash flow and profitability [14].

1.6 Keeping and maintaining inventory accuracy.

High inventory accuracy is mandatory for optimal operation of production and automated systems. The inventory physically located in distribution must be reflected accurately in the system. Due to the automation and integration of enterprise resources planning (ERP) systems, inventory is linked to other functions within a company, such as the tracking of Naira in accounting for inventory receipts and shipments. ERP implementation demands inventory accuracies as high as 99% per kobo [15]. Keeping and / maintaining inventory accuracy can be achieved through:

(i) Auditing:

Along with maintaining peak operational functionality, another reason distribution inventories must be kept accurate is to satisfy accounting and government reporting requirements. In order to comply with these strict practices, some companies choose to audit their inventories. In an audit, stocks of a particular item are counted and compared to a system balance. If an inaccuracy is found, the system is adjusted.

(ii) Cycle counting:

Cycle counting takes the audit concept one step further. In cycle counting, after an audit is performed, the cycle counting process will search for a root cause for the inaccuracy. Once resolved, inventory accuracy is increased, because the problem will not reoccur for that item, and other items affected by the improvement [2].

1.7 Pooling inventory.

In multiple warehouse distribution architecture (design), decisions as to where items are warehoused are of particular importance. Stocking every item in every warehouse often is not required. Pooling strategies are employed when items having highly variable demand are kept in certain warehouses. If inventory can be consolidated in a categorized warehouse rather than stocked in all warehouses, the variability of customer demand will be reduced. However, this strategy may result in longer delivery lead times and increased expediting shipping costs [14].

2. Empirical Review.

According to Panigrahi, [16] the research work is to examine the relationship between inventory conversion period and firms' profitability. The dependent variable, gross operating profit is used as a measure of profitability and the relation between inventory management and profitability is investigated for a sample of five top Indian cement companies over a period of ten years from 2001-2012. This study employs regression analysis to determine the impact of inventory conversion period over gross operating profit taking current ratio, size of the firm, financial debt ratio as control variables. The results indicate that there is a significant negative linear relationship between inventory conversion period and profitability. Huang and Van-mieghem [17] consider the firms that feature their products on the Internet but take orders offline. Click and order data are disjoint on such non-transactional websites, and their matching is error-prone. Yet, their time separation may allow the firm to react and improve its tactical planning. A dynamic decision support model that augments the classic inventory planning model with additional click stream state variables was introduced. Using a novel data set of matched online click stream and offline purchasing data, we identify statistically significant click stream variables and empirically investigate the value of click stream tracking on non-transactional websites to improve inventory management. They show that the noisy click stream data is statistically significant to predict the propensity, amount, and timing of offline orders. A counterfactual analysis shows that using the demand information extracted from the click stream data can reduce the inventory holding and backordering cost by 3% to 5% in their data set. According to Rosalan [18], inventory control is a planned approach of determining what and when to order and how much to order and how much to stock so that costs associated with buying and storing are optimal without interrupting production and sales. The manufacturing sector holds large inventories with quite complicated process and policy related to inventory control, especially when involving external party whether they are supplier or customer. The manufacturing companies are always confronting with issues related to inventory management, which includes bullwhip effect on demand, increase of inventory cost, late delivery, and inventory shortage. Therefore, a key challenge for manufacturing company is to determine how to control the inventory flows effectively as to get the best overall inventory performance. Since inventory control manages to cover a wide range of aspects, it is chosen to focus on specific element such as inventory monitoring and ordering; control limits; and replenishment decisions. Lacking in an inventory control practices that normally occurred among manufacturing companies had led this paper to propose a framework on inventory control practices to acquire that knowledge.

3. Research Method

Generally, the search and gathering of facts/data and information for the advancement of knowledge is regarded as research. Research methodology therefore means the overall strategy designed to achieve the aims and objectives of the research. It includes the procedures and techniques of investigation for effective and reliable representation of the research. This chapter describes the procedures used in gathering the data needed to carry out this research work and the subsequent technique for processing and analyzing the collected data, using inventory control models [19; 13].

3.1 The Use of Decision Models.

The basis of the approach given here is the formulation and manipulation of symbolic and numerical models as an aid to real decision process. It is important at the outset to make clear what is meant by an abstract model of an inventory problem. Some serious misconceptions have occasionally been observed in such applications. It is often, for example, assumed that a given formula will result in optimal decision simply because it is labeled an "economic lot size" formula. Actually, the formula may be deficient in many respects as a description of the real problem for which it was used. It is not the formula that is necessarily at fault in such a case, rather it may be that the person applying it does not understand its uses and limitations. A formula in this case is nothing more than a symbolic model of the situation in which a decision is required. It should be obvious that if the model is a poor description of the situation, one should expect poor results from using solutions of the model as solutions to the problem. The marginal principle of economics applies here, that is, one can afford to spend Naira in refining a model up till the last Naira spent on formulation and computation returns at least a Naira in cost savings. Beyond this point it is uneconomical to proceed. Although model building is an art, one's proficiency in it can certainly be enhanced by the experience of others. Advice in this art is available, and the reader is referred to a few of the interesting and informative writings on this subject. An important and often overlooked property of any decision model is sensitivity to parameter change. If one has constructed a model that appears to give reasonably reliable results in trial applications and that is relatively economical to solve, a whole new dimension has been added to the decision-making process. There may be, for example, uncertainty about the value of a particular parameter. With a model one may explore various possible values of this parameter and observe the effect of parameter change on decisions and economic outcome (e.g., costs or profits). Thus, one could establish the sensitivity (or lack of it) of costs and decisions to error in parameter estimates. If a given model required a forecast of future expected demand as an input, two questions would be of immediate interest. First for what future period is a demand relevant to current decisions? Second, what would be the effect on costs and decisions of error in the forecast? It would be quite difficult, expensive, and perhaps impossible to answer these questions by experimentation in the real situation. However, a model, if soundly formulated, may allow such experimentation at a cost in time and Naira which is worthwhile in view of expected results. With the answers to such questions, the real decision process may be more surely directed toward optimal conclusions, even though the model itself is not a part of everyday decisions. Experimentation with a model may also reveal insensitivities that make the use of refined methods unnecessary. Through model construction and manipulation, one may discover new insights into the decision process and be enabled to formulate more useful models for actual decision making. Except in the most routine of applications, a model should never be looked on as a decision maker, but rather as an aid to the judgment of the decision maker. One hopes, of course, to come up with useful answers as a result of model solutions. However, insofar as the model is an imperfect representation of the actual situation, the model solutions will contain defects. Any decision model will be in some sense imperfect. It is the job of the analyst to make certain that the formulation and manipulation of the model are not at variance with the end use of the model solutions. These model solutions must always be interpreted into real decisions through an understanding of the assumptions and limitations of the model. It is a continual challenge to the model builder to strike a reasonable compromise between the desire for analytical simplicity and realism. If the results predicted by the model are significantly at variance with the results obtained in the real situation, it is assuredly the model and/or the analyst that is at fault, not reality. In practicing the model-building art in any situation one should always construct a model which is descriptive of the situation at hand and not bow to the dictates of simplification, data limitations, or the like at this stage. One must strive for realism even at the expense of analytical complexity. By such a process and the understanding of the situation gained thereby, hopefully, simplicity in the statement and use of the model will result eventually. This goal of simplicity is attained only through real understanding, and one should never sacrifice realism in the first stages of problem formulation even though it almost certainly will result in initial complexity [20].

3.2 Sources of Data

Sources of data are very important in research work [21]. According to them, if the data is faulty, the result of the research will equally be faulty. Therefore, there is need to take utmost care in sourcing data for the study. In this work, relevant data for this study will be obtained from the company's software database. Two years-worth of historical data were obtained in other to see the products sales behavior due to their demands, to help with establishing a forecasting trend for each product. Along with the products historical data, the products ordering cost, purchasing cost and unit cost were collected to calculate the products total annual cost. The data also was used to establish the Economic Order Quantity and Reorder Point (EOQ and ROP) of each product. Once the data is collected, analyzing it becomes the first initial step [20; 21].

3.3 Analyzing Data

In the analysis portion of the project, several methods were used in conjunction with the EOQ, EPQ and ROP model. Furthermore, the annual trend was used in the EOQ model as the annual demand in order to compute the fix order cost or the holding cost of each product [13].

3.4 Models Applied in Inventory Control System.

The models applied are traditional artificial intelligent models used for inventory analysis.
If the demand is constant and the lead time is known, then the reorder point is written as follows:

$$\text{Reorder Point} = \text{Daily usage} \times \text{Lead time (in days)} \quad (1)$$

When a safety stock is maintained, then the reorder point is written as follows:

$$\text{Reorder Point} = [\text{Daily usage} \times \text{Lead time (in days)}] + \text{safety stock} \quad (2)$$

Optimal (economic) order quantity $Q_O = \sqrt{\frac{2PD}{C}}$ (3)

The length of an order cycle (i.e. the time between orders).

Length of order cycle, $T = Q_o/D$ (4)

Total ordering cost = $(D/Q) * Co$ (5)

Co = Ordering cost per order

Economic Production Quantity (EPQ) Model

Holding Cost per Year = $\frac{Q}{2}F\left(1-x\right)$ (6)

Where $\frac{Q}{2}$ is the average inventory level and F (1 - x) is the average holding cost, therefore multiplying these two results in the Holding cost per Year.

Ordering Cost per year = $\frac{D}{Q}K$ (7)

Where $\frac{D}{Q}$ are the orders placed in a year, multiplied by K results in the ordering cost per year. We can notice from the equations above that the total ordering cost decreases as the production quantity increases. Inversely, the total holding cost increases as the production quantity increases. Therefore, in order to get the optimal production quantity, we need to set holding cost per year equal to ordering cost per year and solve for quantity (Q), which is the EPQ formula shown in equation 8. Ordering this quantity will result in the lowest total inventory cost per year.

EPQ Model

$$EPQ = Q = \sqrt{\frac{2KD}{F\left(1-x\right)}} \qquad (8)$$

Where variables:
K = ordering/setup cost; D = demand rate; F = holding cost; T = cycle length; P = production rate; Q = order quantity; C = Annual inventory carrying cost / item.

$$x = \frac{D}{P} \qquad (9)$$

4. Analyses and Results of the Experimental Data for Inventory Control System.
The result of the experimental observation which was carried out on the inventory control system at Evepon Industries limited Enugu State, Nigeria is presented in Table 1. The data were presented on the monthly record of the inventory control system over the years. As stated earlier, inventory control system is the process for managing and locating objects or materials. In common usage, the term may also refer to just the software components. Inventory control is the forms and models of Inventory Management. Inventories refer to those products or goods a firm is manufacturing for sale and the components that make up the product.

4.1 Analysis and Result
Historical Inventory Data for one (1) finished plastic pipe products in monthly period of production is presented in Table 1. Having in mind that product 1 is the finished products of plastic pipe production quantity. However, the essence of analyzing product 1 is to develop the economic production quantity so as to minimize over production or underproduction of the finished product to avoid excess inventory.

Table 1: Monthly Inventory Data in Plastic Pipe Company for 2019 to 2021

Item Description	Product 1 (1 unit =1kg)		
Date (MM/YY)	**Units (2019)**	**Units (2020)**	**Units (2021)**
January	128047	60103	160944
February	214392	47816	103584
March	196203	170542	112909
April	347008	163722	112913
May	141773	131343	171305
June	151660	142455	215858
July	198743	71699	146227
August	137973	102887	147808
September	28162	78700	72697
October	51432	61028	172304
November	112578	109894	32896
December	18353	153491	89872

Source: Evepon industries limited (Product 1 = finished Plastic Pipes).

4.2 Modeling and Analysis of Data.

Data of the Inventory System in the Case study is presented in Table 2.

Table 2: Data of Economic Production Quantity (EPQ) Inventory.

Inventory Data and Results	Plastic Production
Unit Holding Cost	15
Unit Cost	250
Unit Setup Cost	62.5
Yearly Average	1266477
Annual Holding Cost	24365.16
Annual Setup Cost	24365.16
Length of Order Cycle per Year	0.0026
Length of Order Cycle within Days	0.77
Hrs it takes to achieve EPQ	18.47
Number of orders placed in a year (n)	5065.91
Number of items per order	389.84
Lead Time	4.62
Reordering point	812.17
Production Rate	4221.59
Usage Rate	175.9
X = (D/P)	0.04
EOQ in hrs	18.47
Economic Production Quantity(EPQ)	3318.56
Average Economic Order Quantity per Year	1659.28
Cycle time of product	3.14
Run time	0.79
Maximum Inventory (I_{max})	3180.29
Average Inventory ($I_{average}$)	1590.14

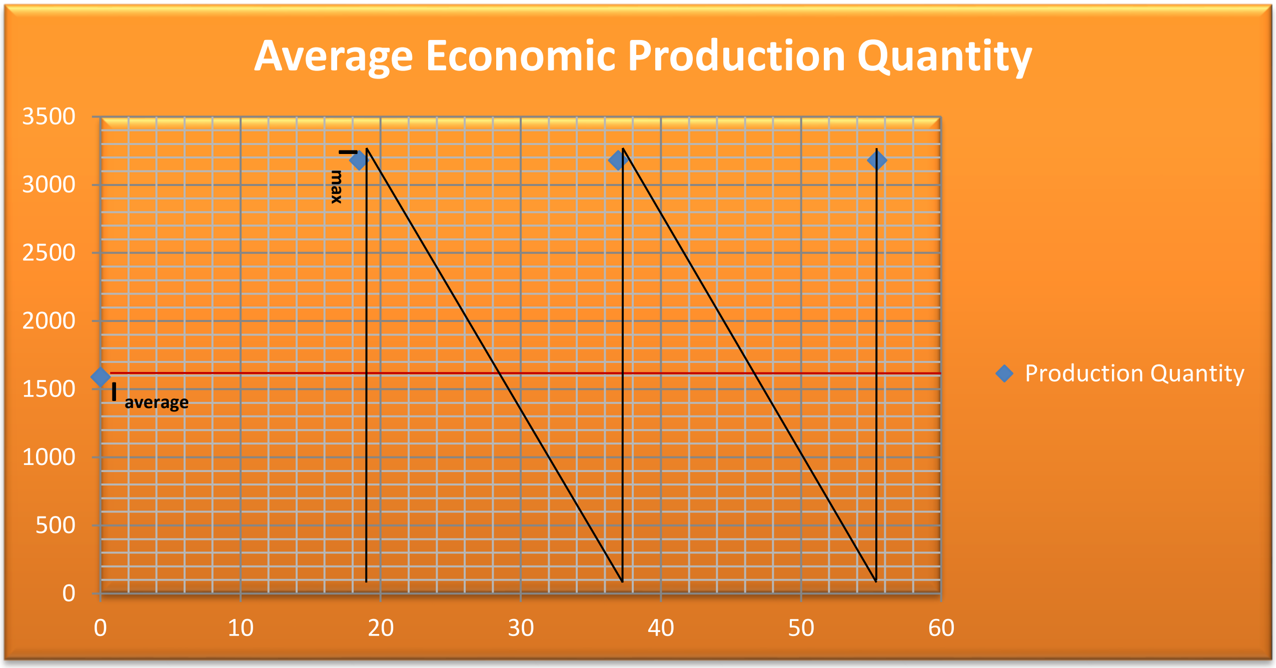

Figure 1: The Average Inventory Level for Plastic Pipe Products.

Figure 1 shows the average economic production quantity of 1659.28 in plastic pipe finished product for the case company production planning.

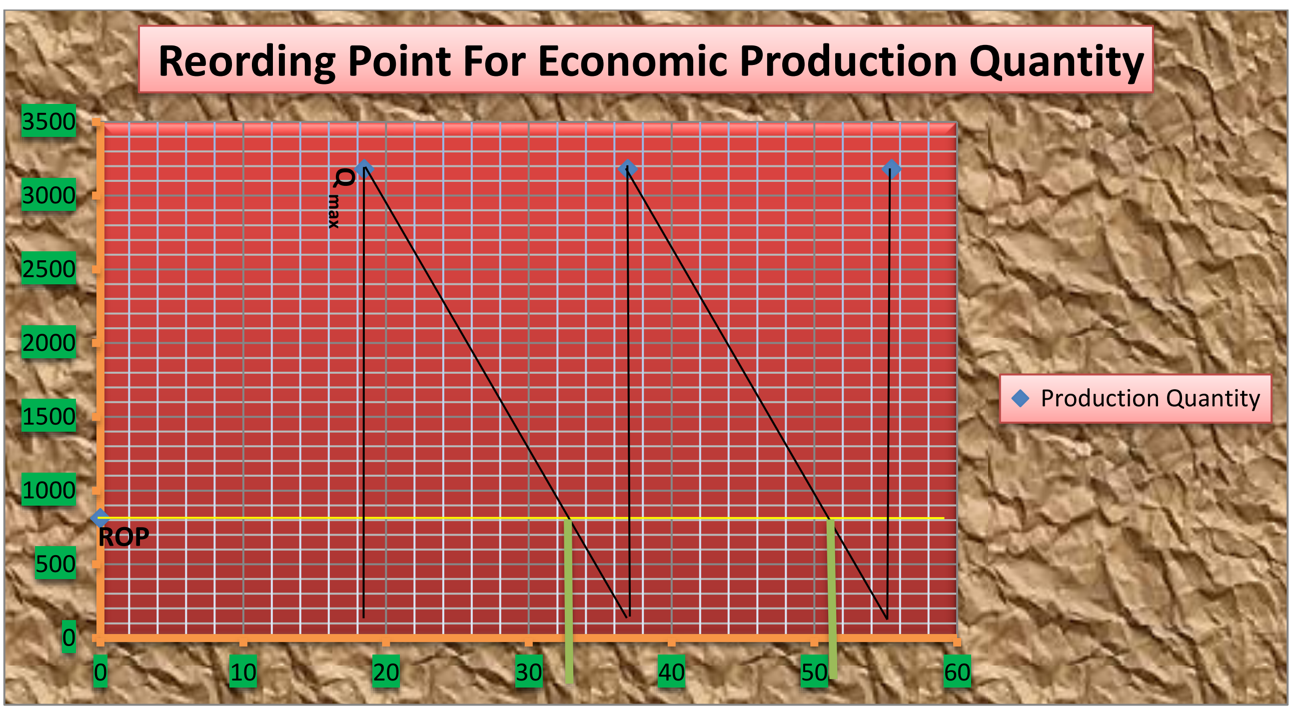

Figure 2: The profile of Reordering Point and Lead Time in inventory cycle of Plastics.

Figure 2 shows that the reordering point for economic production quantity is 812.17 in the case company production planning and inventory control system. The lead time in inventory control system is 4.62.

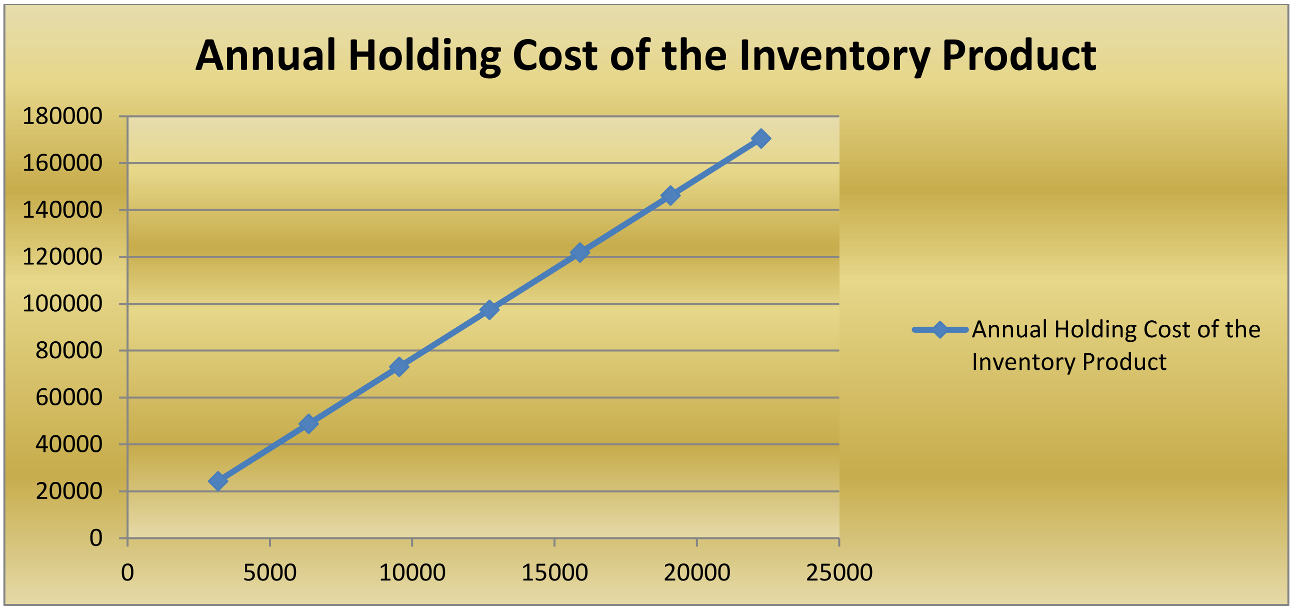

Figure 3: The Annual Holding Cost in inventory cycle for Plastic Pipe Products

Figure 3 shows that increase in annual holding cost will increase the economic production quantity (EPQ) of the finished product (i.e. product 1) in the case study.

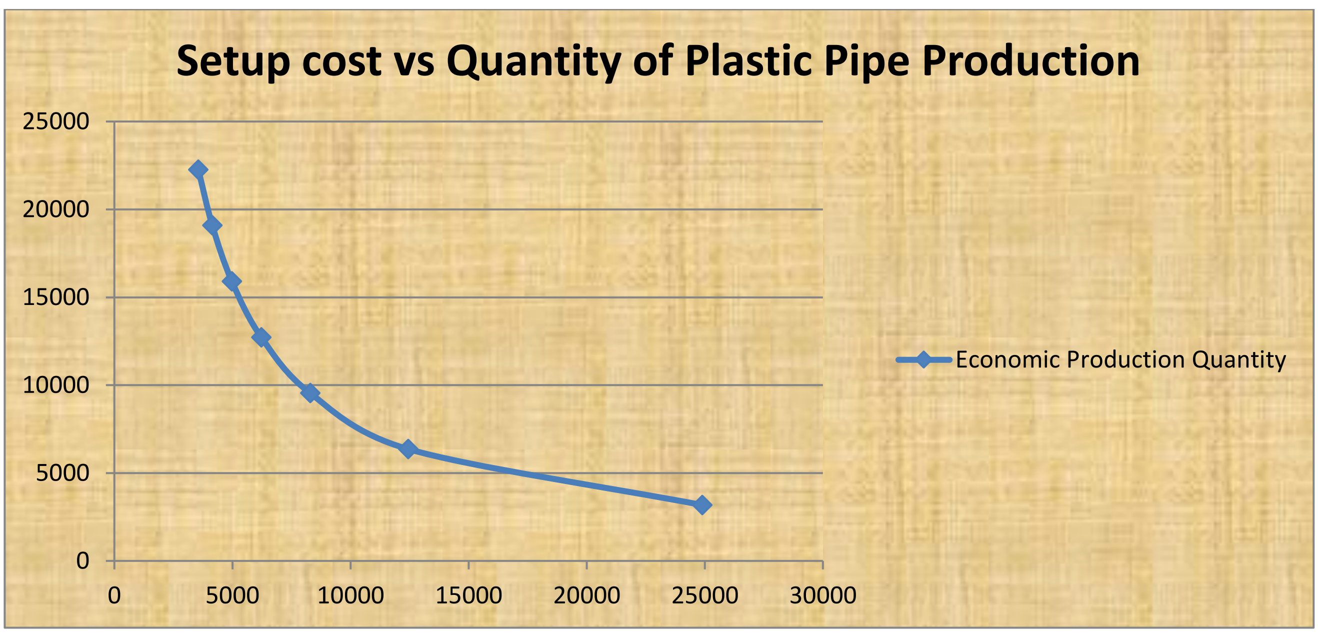

Figure 4: The Profile of Setup Cost for Plastic Pipe Products

Figure 4 reveals that increase in setup cost decreases the Economic Production Quantity of the plastic pipe finished product.

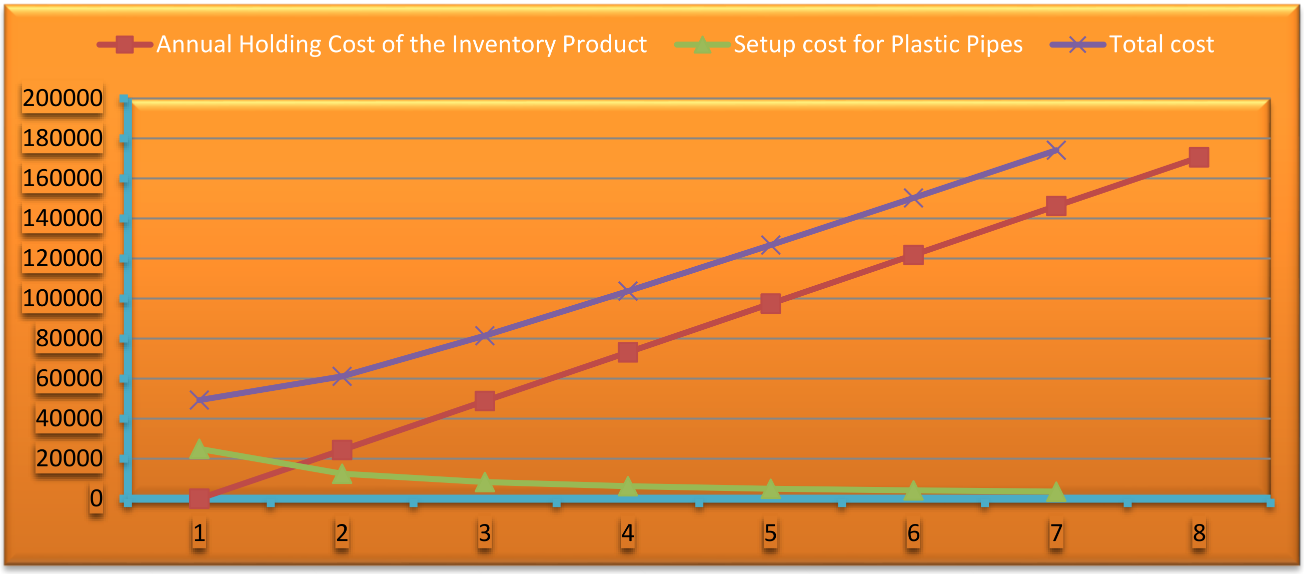

Figure 5: The total cost of inventory level for Plastic Pipe Product

Figure 5 shows the analysis of inventory control cost of the finished plastic pipe product in the case company. It shows that the increase in annual cost and the total cost gradually decreases the setup cost of the finished plastic pipe product.

4.3 Discussion of the Results

Discussions of the results were based on the charts tables developed and also for the modeling and analysis on this research work. Existing inventory control models were applied to evaluate the inventory control system and the economic production quantity of the case study company. In the aforementioned company, the researchers studied the inventory control system of their extrusion plastic production and the inventory of the plastic raw materials. Furthermore, the researchers also studied the economic production of the extrusion plastic pipe product. However, the inventory control system models were applied in each of the raw materials and the results were explained as follows. The study of the production quantity of plastic pipe product which shows that one unit of plastic pipe material in production is equivalent to one kilogram (1kg) of plastic pipe product. The application of the inventory control models show that the economic production quantity of the plastic pipe product is 3318.56 units, also the average economic order quantity of the plastic pipe product is 1659.28 units, while the Length of production cycle within days or days it takes to achieve economic production quantity (EPQ) is 0.77 days (i.e. eighteen (18) hours, twenty eight (28) minutes and 48 seconds). However, the annual holding cost or annual carrying cost of the product is N24365.16, while the annual production cost or setup cost of the product is N24365.16. The unit cost (i.e. 1kg) of the product is N250, while the unit setup cost and the unit holding cost of the plastic pipe product are N62.5 and N15 respectively. However, the reordering point of the product is at 812.17 units while the lead time of the product is 4.62hours (4 hours 37 minutes 12 seconds). Furthermore, the production rate of the plastic pipe product is 4221.59 units per day while the usage rate of the plastic pipe product is 175.9. In plastic pipe production, the cycle of the product is 3.14 hours (i.e. 3 hours, 8 minutes, 24 seconds) while the running time of the product is 0.79 hours (i.e. 47 minutes, 24 seconds). The inventory control system also shows the maximum inventory of the plastic pipe product to be 3180.29 and the average inventory of the plastic pipe product to be 1590.14. However, the results have created standards to the case study company in particular and to other companies that adopt the inventory control system.

5. Conclusion

In conclusion, the researcher studied the inventory control system of plastic pipes and its raw materials in the case study company. The application of the existing inventory control models was adopted to establish the economic ordering quantity for the raw material and economic production quantity for the produced plastic pipes. The Length of production cycle within days is 0.77 days (i.e. 18 hours, 28 minutes 48 seconds per day). Furthermore, the lead time for plastic pipe production is 4.62hrs (4 hours, 37 minutes 12 seconds) per day. The application of this inventory control models and tools help the researcher to achieve the following: (i) to analyzing the lead time and re-order point system, thereby aiding Evepon industries limited to determine the lead time and re-order point for their products; (ii) The application of the economic production quantity was achieved and was used to analyze the inventory control system; (iii) To minimizing inventory cost as well as stock-out issues, which is the major problem most companies are facing today; (iv) To establish a standard for the case study company in particular and any manufacturing company that has inventory system. This system will help to resolve the inventory control problems in the establishment.

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