www.ijarp.com ISSN 2456-9992 Page: 01-09

International Journal Advanced Research Publications

Review Article

Volume: 02
Issue: 01

ANALYZING INVENTORY MANAGEMENT FOR AGRO AND ORGANIC PRODUCTS TO OPTIMIZE CUSTOMER SATISFACTION AND MAXIMIZE PROFIT USING THE ECONOMIC ORDER QUANTITY (EOQ) MODEL

[*1]Kalpana Redhu, [2]Dr Meentu Grover, [3]Dr. Ritu Hooda

[1]Research Scholar, School of Commerce and Management, Om Sterling Global University Hisar, 125001.

[2]Assistant Professor, Faculty of Management and Commerce, Guru Kashi University.

[3]Assistant Professor, School of Commerce and Management, Om Sterling Global University Hisar, 125001.

Article Received: 21 December 2025, Article Revised: 09 January 2026, Published on: 29 January 2026

***Corresponding Author: Kalpana Redhu**

Research Scholar, School of Commerce and Management, Om Sterling Global University Hisar, 125001.

DOI: https://doi-doi.org/101555/ijarp.5034

ABSTRACT:

Managing inventory in the agro-based economy, namely in the dairy product sector, is a significant challenge due to the perishable nature of the products. The EOQ model is significant and plays a crucial role in effectively managing this specific category of inventory. The success of numerous enterprises is contingent upon their capacity to deliver products and services promptly and in appropriate locations. Various organizations employ diverse inventory control systems to effectively manage their inventory and prevent both stock-outs and overstocking. This study examines many aspects of current literature, including concentration, description of characteristics, and the EOQ inventory control model. These parameters have been designed to address and resolve the problem in this field, ultimately leading to customer satisfaction and profit maximization.

KEYWORDS: Agricultural products, Inventory control, Economic Order Quantity (EOQ), holding cost, Ordering cost.

INTRODUCTION

Inventory management is the primary determinant of organization and the ratio of inventories to total assets. The primary considerations of an inventory management system include

ensuring optimal customer service by having the correct goods available in the appropriate location and at the designated time, as well as managing the costs associated with ordering and storing stocks. The inventory management in this market complex, which is located in Odisha and consists of five retail outlets, is inadequate. This report describes the market complex as ABC to preserve its confidentiality. These retail establishments encounter numerous challenges when there is an excess or shortage of merchandise in the market warehouse. To address these challenges, several strategies can be employed, such as Just in Time (JIT), Value Stream Mapping, Economic Order Quantity (EOQ), and Reorder Point (ROP). This paper focuses on the selection of an Economic Order Quantity (EOQ) approach for research purposes.

In his 2005 work titled "Origin of the Economic Order Quantity formula; transcription or transformation?", Bill Roach explores the genesis of the Economic Order Quantity. Roach states that the Economic Order Quantity (EOQ) is a widely recognized formula used to determine the most efficient order quantity from an economic standpoint.

In addition, he highlights the substantial contribution of Ford W. Harris to the EOQ formula. The formula for Economic Order Quantity (EOQ) was authored by him in 1915, during his tenure as an undergraduate student. The EOQ formula is utilized in both business and engineering.

India, being an economy cantered on agriculture, needs to focus on the growth of its agricultural sector by establishing and developing agro-based industries. This can be achieved through successful business operations in the agricultural products market. The success of any business depends on its ability to satisfy customers and maximize product sales. This requires having the necessary goods and services available at the right place and time, which can be achieved through effective inventory management. An efficient inventory management system should ensure that there is an adequate amount of finished goods inventory to support seamless sales operations and provide efficient customer service. It should also aim to minimize the costs and times associated with carrying inventory, control the amount of money invested in inventory, and maintain it at an optimal level. Additionally, it should enable better utilization of available stocks by facilitating interdepartmental transfers within the company. Efficient inventory management for manufactured products can be achieved through the implementation of various models. However, managing the inventory of agricultural products is a significant challenge that requires careful attention. This is due to the unique characteristics of agricultural products, such as their perishable

nature, limited and unpredictable supply, fluctuating prices, and the decision of how much to sell. This is an authentic situation occurring in the Odisha market.

In this scenario, it is necessary to develop a characterization of the best inventory (selling) policies for different cost functions. The author has specifically chosen a linear cost function, which can be modified and applied in practical situations. By using the EOQ model as a tool, closed form expressions for the optimal policies and the resulting profits from discounts can be derived. This approach aids in the implementation of effective inventory management. The product being referred to is Ghee. Historically, ghee has been exclusively derived from the milk of cows due to its revered status. It is considered a sacred necessity in Vedic yajña and homa ceremonies, when offerings are presented to different deities through the means of fire, known as Agni. Fire rituals are employed for ceremonial purposes, such as marriage and funerals. Ghee is necessary for the Vedic worship of mūrtis (divine deities), specifically for the aarti (offering of a ghee lamp) known as diyā or dīpa, as well as for the Pañcāmṛta (Panchamruta) ritual. During Pañcāmṛta, ghee is used along with mishri, honey, milk, and dahi (curd) to bathe the deities on the appearance day of Krishna on Janmashtami and Śiva (Shiva) on Mahā- śivarātrī (Maha Shivaratri). A hymn dedicated to ghee exists. The user's text is "[2]". In the Mahabharata, the Kauravas were conceived through the process of potentiating ghee. The user's text is enclosed in tags. Devout Hindus face a challenge in finding ghee that is sufficiently pure for sacred rituals, as numerous large-scale manufacturers adulterate their product with salt.

The study utilizes the available data to create calculated costs, estimations, and the proposed EOQ model. This model aims to help the firm execute strategies to grow stocks and reduce the need for reordering. Irrespective of other theories, the practical use of the Economic Order Quantity (EOQ) theory allows for informed selling judgments and can greatly impact the existing selling practices. The Economic Order Quantity (EOQ) is a mathematical model used to determine the optimal order size for fixed order size inventory. It aims to minimize the total cost of carrying inventory and placing orders. To calculate the EOQ, accurate demand forecasting for the specific region or the historical data of product usage is required.

Review of Literature

Inventory management is the primary determinant of organization and the ratio of inventories to total assets. The primary considerations of an inventory management system include ensuring optimal customer service by having the correct goods available in the appropriate location and at the designated time, as well as managing the costs associated with ordering

and storing stocks. The inventory management in this market complex, which is located in Odisha and consists of five retail outlets, is inadequate. This report describes the market complex as ABC to preserve its confidentiality. These retail establishments encounter numerous challenges when there is an excess or shortage of merchandise in the market warehouse. To address these challenges, several strategies can be employed, such as Just in Time (JIT), Value Stream Mapping, Economic Order Quantity (EOQ), and Reorder Point (ROP). This paper focuses on the selection of an Economic Order Quantity (EOQ) approach for research purposes.

In his 2005 work titled "Origin of the Economic Order Quantity formula; transcription or transformation?", Bill Roach explores the genesis of the Economic Order Quantity. Roach states that the Economic Order Quantity (EOQ) is a widely recognized formula used to determine the most efficient order quantity from an economic standpoint.

In addition, he highlights the substantial contribution of Ford W. Harris to the EOQ formula. The formula for Economic Order Quantity (EOQ) was authored by him in 1915, during his tenure as an undergraduate student. The EOQ formula is utilized in both business and engineering.

India, being an economy cantered on agriculture, needs to focus on the growth of its agricultural sector by establishing and developing agro-based industries. This can be achieved through successful business operations in the agricultural products market. The success of any business depends on its ability to satisfy customers and maximize product sales. This requires having the necessary goods and services available at the right place and time, which can be achieved through effective inventory management. An efficient inventory management system should ensure that there is an adequate amount of finished goods inventory to support seamless sales operations and provide efficient customer service. It should also aim to minimize the costs and time associated with carrying inventory, control the amount of money invested in inventory, and maintain it at an optimal level. Additionally, it should enable better utilization of available stocks by facilitating interdepartmental transfers within the company. Efficient inventory management for manufactured products can be achieved through the implementation of various models. However, managing the inventory of agricultural products is a significant challenge that requires careful attention. This is due to the unique characteristics of agricultural products, such as their perishable nature, limited and unpredictable supply, fluctuating prices, and the decision of how much to sell. This is an authentic situation occurring in the Odisha market.

In this scenario, it is necessary to develop a characterization of the best inventory (selling) policies for different cost functions. The author has specifically chosen a linear cost function, which can be modified and applied in practical situations. By using the EOQ model as a tool, closed form expressions for the optimal policies and the resulting profits from discounts can be derived. This approach aids in the implementation of effective inventory management. The product being referred to is Ghee. Historically, ghee has been exclusively derived from the milk of cows due to its revered status. It is considered a sacred necessity in Vedic yajña and homa ceremonies, when offerings are presented to different deities through the means of fire, known as Agni. Fire rituals are employed for ceremonial purposes, such as marriage and funerals. Ghee is necessary for the Vedic worship of mūrtis (divine deities), specifically for the aarti (offering of a ghee lamp) known as diyā or dīpa, as well as for the Pañcāmṛta (Panchamruta) ritual. During Pañcāmṛta, ghee is used along with mishri, honey, milk, and dahi (curd) to bathe the deities on the appearance day of Krishna on Janmashtami and Śiva (Shiva) on Mahā- śivarātrī (Maha Shivaratri). A hymn dedicated to ghee exists.The user's text is "[2]". In the Mahabharata, the Kauravas were conceived through the process of potentiating ghee.The user's text is enclosed in tags.Devout Hindus face a challenge in finding ghee that is sufficiently pure for sacred rituals, as numerous large-scale manufacturers adulterate their product with salt.

The study utilizes the available data to create calculated costs, estimations, and the proposed EOQ model. This model aims to help the firm execute strategies to grow stocks and reduce the need for reordering. Irrespective of other theories, the practical use of the Economic Order Quantity (EOQ) theory allows for informed selling judgments and can greatly impact the existing selling practices.The Economic Order Quantity (EOQ) is a mathematical model used to determine the optimal order size for fixed order size inventory. It aims to minimize the total cost of carrying inventory and placing orders. To calculate the EOQ, accurate demand forecasting for the specific region or the historical data of product usage is required.

According to Beamon and Kotleba (2006), the reorder level (ROL) plays a crucial role in enabling human terrain organizations to attain maximum efficiency and effectiveness. There should be two distinct reorder levels: one for regular circumstances and another for emergency situations, such as disasters. This enhances efficiency and enhances client contentment.

In a study conducted by Lai & Chang (2009), it was discovered that maintaining a reasonable level of inventory is beneficial for organizations as it allows them to minimize expenses related to holding and setup costs, as well as reduce lead time by producing goods according

to customer orders. Implementing efficient and effective supply chain management in a firm's value chain enables the organization to achieve overall quality control.

T. Lwiki and P. B Ojera (2013), Effective inventory management is essential for the success of a company, as mishandling goods can jeopardize its survival. Excessive inventory occupies valuable physical space, imposes financial strain, and raises the risk of damage, spoilage, and loss. In their 2018 publication, A. Swain, D. Samal, and A. Kalam discuss the inventory of potatoes in the Odisha market as a means to mitigate losses and prevent farmer suicides.

Assumptions & Notation

1. EOQ model assumes that demand is known and is constantover time.
2. No shortages are allowed.
3. Lead time for the receipt of orders is constant.
4. The order quantity is received all at once.
5. The purchase price of item is constant

$$EOQ = \sqrt{\frac{2C_p}{.A}}$$

Q= The EOQ order quantity .this is the variable we want to optimize. All the other variables are fixed quantities.

A = the annual demand of product in quantity /unit time.

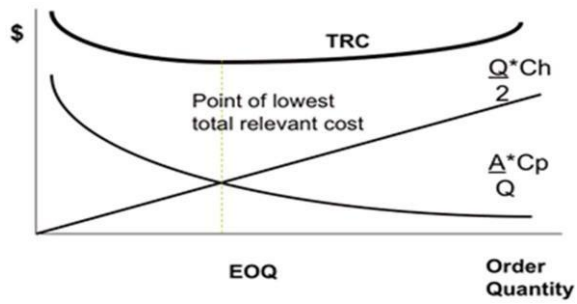
Cp = the product order cost. This is the flat fee charged for making any order is independent of Q.

C= Unit cost

Ch = Holding cost/ Unit as fraction of product cost A = Demand for the year

Cp = Cost to place a single order

Ch = Cost to hold one unit inventory for a year



CALCULATION OF EOQ

It calculates the ideal quantity of costs that are influenced by both the quantity of inventory retained and the number of orders placed. By placing a bulk order, the expenses of ordering will be reduced. Augmenting the quantity of orders diminishes the expenses associated with storing inventory, while concurrently amplifying the expenses incurred for placing orders.The EOQ model aims to minimize the quantity of these expenses. The formula discovered establishes the relationship between the expenses associated with maintenance and ordering, as well as the yearly demand. Substance. In this study, the authors have collected data from the ABC market complex, which consists of five retail establishments that specialize in selling Ghee. Holding costs and ordering costs are the main factors that impact the determination of the most efficient inventory levels. Significant holding costs are exclusively those that vary depending on the amount of inventory. This encompasses the opportunity cost of having funds invested in stocks, which is determined by the desired return on investment in stocks relative to any other available investment option. The firm's mandated return is 25%. Other holding costs encompass expenses such as storage, security, and electricity. Specifically, the electricity cost amounts to $12,000 over a period of 12 months. The ordering costs include transportation charges that are proportional to the quantity of items purchased. The society provides a service on a weekly basis, with a fee of 10000. The Economic Order Quantity (EOQ) can be calculated by considering the overall expenses associated with various order quantities using a specific formula. In order to get the Economic Order Quantity (EOQ), we require the annual demand statistics as well as the costs associated with ordering and storing inventory. This study aims to calculate the Economic Order Quantity (EOQ) for the sale of Ghee through an experiment.

Monthly Demand:

Shop name	Amount of Ghee
S1	0.85 quintal
S2	1.2 quintal
S3	0.8 quintal
S4	0.75 quintal
S5	0.9 quintal
Total	4.5 quintals

The ABC market complex determines the demand for ghee by using the average monthly sales volume. It operates continuously throughout the year, without any breaks. The annual demand for ghee is calculated by multiplying the monthly demand of 4.5 quintals by 12,

resulting in a total of 54 quintals. The holding cost is 0.03 per unit per year. The cost of purchasing 1 kilogram is Rs 600, which is equivalent to a rate of Rs 600 per kilogram. Based on the data, they place an order once a month with a total fee of Rs. 300,000. This cost includes the expenses associated with the ordering process. The cost includes transportation expenses, which consist of a monthly order for a truckload of ghee packets that costs Rs30000 (10% of Rs.300,000/-). The optimal economic quantity for ordering potatoes is around 6.9282 quintals each order in order to reduce costs.

So the price excluding transportation cost is
300000-30000=270000

$$\text{Therefore ghee purchased } \frac{27000}{600} = 450\ k.g$$

$$\text{Ordering cost per k.g} = \frac{30000 \times 12}{450} = 800$$

$$\text{So EOQ} = \sqrt{\frac{2 \times 5400 \times 800}{0.03 \times 600}} = 692.82\ k.g$$

The optimal economic order quantity for potatoes is roughly 6.9282 quintals per order in order to reduce costs. The price, not including shipping costs, amounts to 270,000, calculated by subtracting 30,000 from 300,000.

CONCLUSION

The Economic Order Quantity (EOQ) inventory model is a very effective approach to inventory management. It achieves this by minimizing costs associated with ordering, carrying, and overall inventory. Additionally, it serves as a promotional tool to enhance consumer pleasure and as a pricing strategy to maximize profits for retailers. Here, demand is anticipated by utilizing historical data and determining the price for a specific product over the course of the year. This estimates aids the retailer in selling the product based on their projections, even if production remains consistent. Utilizing inventory order computation and implication aids in mitigating the risk faced by the store. The retailer will receive a fixed price from the customer, which remains consistent throughout the year. Through efficient inventory management, a seller or store can achieve customer pleasure, maximize profits, and fulfil their social obligation.

REFERENCES:

1. Bournee , M.C (1977) ," Post-harvest food losses and their control . second regional the neglected dimension in increasing the world food supply . Cornell University, International agriculture Mimeograph.
2. Wee H M. (1999). Deteriorating Inventory Model with Quantity Discount, Pricing and Partial Back ordering. International Journal of Production Economics, 59(1-3):511-518.
3. Toomy , J.W (2000) ," Inventory Management :Principles,concepts& Techniques, Kluwer Academic Publishers , Norwell, http://du.doi.org/10.1007/928-1- 4615-4363-3
4. Prasad, S. & Tata, J.(2000), " Information Investment In Supply Chain Management" Logistics Information Management , 13(1) 33-38.
5. Wild T. (2002), "Best Practice in inventory Management,Hoboken, John Willey & Sons.
6. Kavalya , J.(2004), University Libraries in Kenya, A Study of their practices & performance. Humber boldt Universityin Berlin, Berlin unpublished MBAProject.
7. Beamen, B.M & Kotleba S.A (2006),"inventory Modelling for complex Energies in humanitarian relief operations, International Journal of Logistics; Research & Applications, Vol-9 ,1- 18 , retrieved March 2006.
8. Lai : K.H & Chang , T.C.E (2009) just in time Logistics, Wey court East ,Union Road Farnham Surray GU 97 PT ,England , Gower Publishing Limited .
9. Lwiki T, & Ojera P.B. (2013) ," The impact of Inventory Management Practices in financial performance of sugar manufacturing firm in Kenya", International Journal of Business, Humanities & Technology , Vol-3, No 5 , May2013.
10. Swain A, Samal & .Kalam A(2018), "EOQ as a Profit Maximised & Customer Satisfied Tool for Agro Industry Inventory Management" International Journal for Research in Applied Science & Engineering Technology (IJRASET**),** Volume 6 Issue VI, June 2018.