

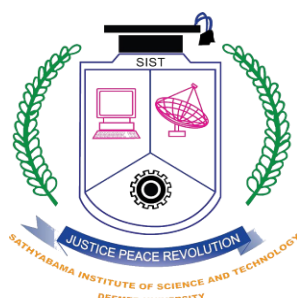
**ANALYSIS ON A SINGLE BUYER-VENDOR PRODUCTION INVENTORY MODEL
FOR FIXED LIFE TIME PRODUCTS WITH CONSTANT DEMAND INVOLVING
SCREENING COST**

Submitted in partial fulfillment of the requirements for the award of

MASTER OF SCIENCE degree in MATHEMATICS

By

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DEPARTMENT OF MATHEMATICS

SCHOOL OF SCIENCE AND HUMANITIES

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work of Menaka P (42630003).who carried out the project entitled **"ANALYSIS ON A SINGLE BUYER-VENDOR PRODUCTION INVENTORY MOEL FOR FIXED LIFE TIME PRODUCTS WITH CONSTANT DEMAND INVOLVING SCREENING COST"** under my supervision from December 2023 to April 2024.

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DECLARATION

I MENAKA P (42630003) hereby declare that the Project Report entitled **“ANALYSIS ON A SINGLE BUYER-VENDOR PRODUCTION INVENTORY MOEL FOR FIXED LIFE TIME PRODUCTS WITH CONSTANT DEMAND INVOLVING SCREENING COST”** done by me under the guidance of Dr..P. MUNIAPPAN, M.Sc.,M.Phil., Ph.D.at **Sathyabama Institute of Science and Technology** is submitted in partial fulfillment of the requirements for the award of Master of science degree in Mathematics

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ABSTRACT

In this project, we develop a single buyer–vendor production inventory model for fixed life time products with constant demand involving screening cost. And also discussed different holding cost, varying screening cost with constant demand for fixed life time products. The aim of the study is to determining the optimum multiples of orders which will minimize the total inventory cost. A numerical example is given to illustrate the solution procedure of the model. Finally, based on this example, we conduct a sensitivity analysis of the model.

KEYWORDS: Constant demand, Ordering quantity, Screening cost, Production rate, Inventory, Optimum inventory cost.

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CHAPTER 1

1 INTRODUCTION:

Inventory is the total stock of goods or materials that a business owns and intends to sell or use in its operations.

Inventory refers to the goods and materials that a business holds for the purpose of resale or for use in its operations. It includes raw materials, work-in-progress items, and finished goods that a company has in stock. Inventory management involves overseeing the acquisition, storage, and tracking of inventory levels to ensure that the right amount of stock is available to meet customer demand without excessive overstocking or shortages. Effective inventory management is crucial for businesses to optimize their operations, minimize costs, and maximize profitability.

1.1 TYPES OF INVENTORY:

1.1.1 Raw Material

1.1.2 Work in progress(WIP)

1.1.3 Finished goods

1.1.1 Raw Materials:

It is refers to the stock of basic materials or substances that a business holds for use in its production or manufacturing processes. Maintaining an adequate inventory of raw materials ensures that production can continue smoothly without delays due to shortages. Efficient management of raw materials inventory is crucial for businesses to meet production demands and minimize disruptions in their operations.

1.1.2 Work-In-Progress(WIP):

It represents the value of partially completed products within the production cycle. It includes the cost of raw materials, labor, and overhead that have been incurred up to the current stage of production.

1.1.3 Finished Goods:

It refers to the stock of completed products that a business holds in its inventory at a given point in time. These products have completed all stages of production, including manufacturing, assembly, quality control, and packaging, and are ready to be sold to customers.

1.2 VARIOUS TYPES OF COSTS:

Inventory procurement, storage and management is associated with huge costs associated with each these functions.

Inventory costs are basically categorized into three headings

- I. Holding cost
- II. Production cost
- III. Setup cost

1.2.1 HOLDING COST:

Holding cost is also known as **Carrying cost**. It refers to the expenses incurred by a business to store and maintain inventory over a certain period. These costs can include:

1. Storage Costs: Expenses related to renting or owning warehouse space, including rent, property taxes, insurance, and utilities such as electricity, water, and heating.

2. Handling Costs: Costs associated with moving, handling, and organizing inventory within the warehouse or storage facility. This includes labor costs for warehouse personnel, equipment maintenance, and the cost of packaging materials.

3. Inventory Shrinkage Costs: These are expenses resulting from loss, theft, damage, or obsolescence of inventory. Shrinkage costs may include inventory write-offs, scrap, or the cost of reworking damaged goods.

4. Insurance Costs: Expenses related to insuring inventory against loss, damage, or theft. Insurance premiums are necessary to protect the value of inventory and mitigate financial risks.

5. Opportunity Costs: The cost of tying up capital in inventory that could have been invested elsewhere to generate returns. Holding inventory requires the allocation of financial resources that could have been used for other business activities or investments.

EXAMPLE FOR HOLDING COST:

Let's consider a small retail store that sells clothing items. The store purchases various types of clothing from suppliers and keeps them in stock to meet customer demand. Here's a simple example of holding costs associated with their inventory:

Storage Costs: The store rents a small storage space to keep their inventory. They pay \$500 per month in rent for the storage unit.

Handling Costs: The store employs one part-time employee to handle inventory management tasks, such as receiving shipments, organizing inventory, and restocking shelves. The monthly labor cost for this employee is \$600.

Inventory Shrinkage Costs: Occasionally, some clothing items may become damaged or stolen while in storage or on display. The store estimates that they incur an average of \$200 per month in shrinkage costs due to inventory losses.

Insurance Costs: The store pays an insurance premium of \$50 per month to insure their inventory against loss, theft, and damage.

In this example, the total holding costs for the store's inventory of clothing items amount to:

Storage Costs: \$500

Handling Costs: \$600

Inventory Shrinkage Costs: \$200

Insurance Costs: \$50

Total Holding Costs: \$1,350 per month

This simple example illustrates how even a small retail business incurs holding costs associated with maintaining inventory. Effective management of these costs is essential for optimizing profitability and ensuring the business's success.

1.2.2 PRODUCTION COST:

Production costs in inventory refer to the expenses incurred during the manufacturing or production process of goods that are held in inventory. These costs are directly related to the creation of inventory items and may include:

1. Raw Materials Cost: The cost of acquiring raw materials needed for production. This includes the purchase price of materials such as metals, plastics, fabrics, chemicals, or any other components used in manufacturing the inventory items.

2. Direct Labor Cost: The wages or salaries paid to workers directly involved in the production process. This includes the cost of assembly line workers, machine operators, and other labor directly contributing to the manufacturing of inventory items.

3. Factory Overhead: The indirect costs associated with the production process. This includes expenses such as utilities, rent for production facilities, equipment depreciation, maintenance costs, and other overhead expenses necessary for production.

4. Manufacturing Supplies: The cost of consumable items used in the production process, such as lubricants, cleaning supplies, packaging materials, and any other supplies required to manufacture the inventory items.

5. Depreciation: The allocation of the cost of capital assets used in the production process, such as machinery and equipment, over their useful life. Depreciation expense is included as part of production costs to reflect the wear and tear of these assets.

6. Quality Control Costs: The expenses associated with ensuring the quality of the manufactured products. This includes the cost of inspection, testing, quality assurance measures, and any rework or scrap resulting from quality issues.

7. Labor Benefits and Overheads: Additional costs associated with labor, such as employee benefits (e.g., health insurance, retirement contributions) and other indirect labor costs (e.g., payroll taxes, employee training).

These production costs contribute to the overall value of the inventory items and are essential for determining the cost of goods sold (COGS) and the profitability of the manufacturing process. Efficient management of production costs is crucial for optimizing manufacturing operations, controlling expenses, and maximizing profitability.

EXAMPLE FOR PRODUCTION COST:

Let's consider a simple example of production costs in inventory for a small bakery that produces and sells bread:

Raw Materials Cost: The bakery purchases flour, yeast, salt, and other ingredients to make bread. Let's say they spend \$200 per week on raw materials.

Direct Labor Cost: The bakery employs bakers who work directly on producing bread. Let's say the total weekly wages for these workers amount to \$300.

Utilities: The bakery incurs expenses for utilities such as electricity and gas used in the baking process. Let's estimate these costs at \$50 per week.

Packaging Materials: The bakery uses bags or boxes to package the bread for sale. Let's say they spend \$50 per week on packaging materials.

Equipment Maintenance: The bakery needs to maintain its baking equipment, such as ovens and mixers, to ensure they are in good working condition. Let's estimate these costs at \$100 per week.

Adding up these costs:

Raw Materials Cost: \$200 per week

Direct Labor Cost: \$300 per week

Utilities: \$50 per week

Packaging Materials: \$50 per week

Equipment Maintenance: \$100 per week

Total Production Costs: \$700 per week

This example illustrates the basic production costs involved in producing bread for the bakery's inventory. Efficient management of these costs is essential for the bakery to maintain profitability and ensure that the cost of goods sold accurately reflects the expenses incurred in the production process.

1.2.3 SETUP COST:

Setup costs, also known as changeover costs or setup time, refer to the expenses incurred when transitioning from producing one product to another within a manufacturing process. These costs are associated with the preparation, adjustment, and reconfiguration of equipment, machinery, and production systems to accommodate the production of a different product or batch. Setup costs are particularly relevant in industries with high product variability or frequent production changeovers, such as manufacturing or food processing.

EXAMPLE FOR SETUP COST:

Let's consider a manufacturing company that produces custom-made furniture. The company has a production line capable of producing different types of furniture, such as chairs, tables, and cabinets. When transitioning from producing one type of furniture to another, the company incurs setup costs. These costs may include:

1. Labor Costs: Expenses associated with the time and wages of workers involved in the setup process. This includes skilled technicians or operators who adjust and

configure machinery, as well as general labor for tasks such as cleaning or preparing materials.

2. Machine Downtime Costs: The lost production time and associated costs while machinery is being set up or adjusted. During setup, the production line is not producing goods, resulting in downtime and potential revenue loss.

3. Material Waste: Some setup processes may require the use of additional materials or consumables, resulting in waste or scrap. For example, adjusting machines to accommodate different product sizes may result in material trimmings or offcuts that are not usable in production.

4. Tooling Costs: Expenses related to the setup and calibration of specialized tools, dies, or fixtures required for the production of specific products. This may include the cost of installing, adjusting, or replacing tooling components.

5. Training Costs: Costs associated with training employees on new setup procedures or techniques. Skilled workers may require additional training to perform setup tasks efficiently and safely.

6. Setup Optimization Costs: Investment in technologies or methodologies aimed at reducing setup times and improving efficiency. This may include implementing lean manufacturing principles, automation solutions, or advanced scheduling techniques.

In summary, setup costs in inventory represent the expenses incurred when transitioning between different production runs or product types. Managing setup costs efficiently is essential for minimizing downtime, reducing waste, and maximizing productivity in manufacturing operations.

Now we are going to introduce the new cost “**SCREENING COST**”.

1.2.4 SCREENING COST:

In the context of inventory management, screening costs refer to the expenses incurred to inspect, examine, or test inventory items to ensure their quality, accuracy,

or compliance with standards before they are accepted into inventory or released for sale. These costs are essential for identifying and preventing defects, errors, or discrepancies in inventory, thus maintaining product quality and customer satisfaction.

EXAMPLE FOR SCREENING COST:

Let's consider a retail clothing store that receives shipments of clothing items from suppliers. Before adding these items to their inventory and displaying them for sale, the store conducts screening processes to ensure that the clothing meets their quality standards. Screening costs for the store may include:

1. Inspection Labor Costs: Expenses associated with employing staff to inspect incoming inventory items. This includes wages, salaries, benefits, and training for personnel involved in quality inspection activities.

2. Quality Control Equipment Costs: Expenses related to acquiring, maintaining, and operating equipment used for quality control inspections. This may include tools such as magnifying glasses, measuring tapes, or colorimeters.

3. Sampling Costs: Expenses for collecting samples from incoming inventory batches for testing or examination. Sampling may involve randomly selecting items from each batch for inspection or conducting batch-wide tests to ensure overall quality.

4. Testing and Analysis Costs: Expenses for conducting specific tests or analyses to assess the quality, durability, or performance of inventory items. This may include laboratory testing for fabric composition, colorfastness, seam strength, or other quality attributes.

5. Documentation and Record-keeping Costs: Expenses for documenting inspection results, maintaining records of quality control activities, and tracking inventory inspection processes. This includes the cost of software systems, databases, or paperwork used to record and manage inspection data.

6. Disposal Costs: Expenses for disposing of defective or non-compliant inventory items that fail to meet quality standards. This may include costs for returning items to suppliers, recycling materials, or disposing of items that cannot be salvaged.

In summary, screening costs in inventory management represent the expenses incurred to ensure that inventory items meet specified quality standards and are suitable for sale or use. Effective management of screening costs is essential for maintaining product quality, reducing waste, and preserving customer satisfaction.

1.3 FACTORS AFFECTING INVENTORY:

Several factors can affect inventory levels and management practices in a business. These factors can vary depending on the industry, business model, and specific circumstances. Here are some common factors that influence inventory:

1. Demand Variability: Fluctuations in customer demand for products can impact inventory levels. Seasonal trends, changes in consumer preferences, economic conditions, and promotional activities can all affect demand variability.

2. Lead Time: The time it takes for inventory to be replenished after an order is placed can influence inventory levels. Longer lead times may require higher safety stock levels to prevent stockouts.

3. Supplier Reliability: The reliability and performance of suppliers can affect inventory levels and procurement strategies. Delays, quality issues, and supply chain disruptions from suppliers can impact inventory availability.

4. Cost of Holding Inventory: Holding inventory incurs costs such as storage, handling, obsolescence, and financing. Businesses must consider the trade-off between holding higher inventory levels to meet demand and minimizing holding costs.

5. Production and Manufacturing Processes: The efficiency and capacity of production processes can influence inventory levels. Bottlenecks, equipment downtime, and production lead times can impact the rate at which inventory is produced.

6. Forecasting Accuracy: The accuracy of demand forecasts plays a crucial role in inventory management. Inaccurate forecasts can lead to stock outs or excess inventory. Improving forecasting methods and data analysis can help mitigate this risk.

7. Economic Order Quantity (EOQ): EOQ is the optimal order quantity that minimizes total inventory costs, including ordering and holding costs. Factors such as order frequency, order size, and inventory carrying costs affect EOQ calculations.

8. Technology and Automation: Advances in technology, such as inventory management software and automation systems, can improve inventory accuracy, visibility, and control. Implementing efficient inventory management systems can streamline operations and reduce inventory costs.

9. Customer Service Levels: Inventory levels often influence customer service levels, including product availability, order fulfillment times, and delivery reliability. Businesses must balance inventory levels to meet customer demand while minimizing stockouts and delays.

10. Regulatory and Compliance Requirements: Industry-specific regulations and compliance standards may influence inventory management practices. Businesses must ensure compliance with regulations related to inventory tracking, storage, and handling.

11. Seasonality: Seasonal fluctuations in demand can affect inventory levels, requiring businesses to adjust stocking levels and inventory strategies accordingly.

12. Market Trends and Competition: Changes in market trends, competitive pressures, and industry dynamics can impact inventory levels. Businesses must monitor market conditions and adjust inventory strategies to remain competitive.

These factors highlight the complexity of inventory management and the need for businesses to adapt their inventory practices to changing conditions and requirements. Effective inventory management involves balancing various factors to optimize inventory levels, minimize costs, and meet customer demand efficiently.

CHAPTER – 2

2. INTRODUCTION

Inventory is also known as goods. It is defined as a economic value of any kind resources or goods to fulfil the present and future needs. The purpose of selling a goods, electronics , materials etc., in a market to earn a profit for the organization. They invest large amount sometimes it may affect the cash flow in the organization. It is a resource held to achieve the income target and also service the customers. It not only depend on the final product it also include raw materials, semi-finished products, MRO goods etc...,.

2.1 LITERATURE SURVEY:

Ali, A. K.[1] developed Inventory management in pharmacy practice: A review of literature. Archives of Pharmacy Practice. Lin Wang,et al., [2] analysed Continuous review inventory models with a mixture of backorders and lost sales under fuzzy demand and different decision situations. Partha Guchhait, et al. [3] developed a production inventory model with fuzzy production and demand using fuzzy differential equation: An interval compared genetic algorithm approach.

S.S. Sanni, et al.,[4] presented an economic order quantity model for items with three-parameter Weibull distribution deterioration, ramp-type demand and shortages. Wanke, P., et al. [5] analyzed inventory management for new products with triangularly distributed demand and lead-time. Computers & Operations Research. Dillon, M., et al., [6] studied a two-stage stochastic programming model for inventory management in the blood supply chain. International Journal of Production Economics.

Rojas, F.. [7] studied a methodology for stochastic inventory modelling with ARMA triangular distribution for new products. Cogent Business & Management. Chandra K. Jaggi, et al.,[8] developed two-warehouse inventory model for deteriorating items with imperfect quality under the conditions of permissible delay in payments. Dipak

Kumar Jana Dipankar Chakraborty, et al. [9] analyzed EOQ model for deteriorating items with inflation and time value of money considering time-dependent deteriorating rate and delay payments.

Malik, A., et al., [10] presented Calibrated model-based deep reinforcement learning. Lennart Büth, et al., [11] developed Life cycle inventory modelling framework for symbiotic and distributed agricultural food production systems. Zhongyuan Lyu, et al., [12] studied Towards zero-warehousing smart manufacturing from zero-inventory just-in-time production.

Robot. Luo, F.-M., et al., [13] analyzed a survey on model based reinforcement learning. Çağrı Sel, [14] presented the use of parametric programming and simulation-optimisation approaches for stochastic inventory control in the food markets under fuzzy deterioration rate. Ali Fallahi, et al., [15] analyzed a constrained multi-item EOQ inventory model for reusable items: Reinforcement learning-based differential evolution and particle swarm optimization.

Davide Castellano, et al., [16] studied Economic production quantity with inventory rationing for a decaying item. Riju Chaudhary, et al., [17] presented a sustainable inventory model for defective items under fuzzy environment, Decis. Yasamin Sadat Babaei, et al., [18] developed a multi-objective multi-criteria decision-making approach for sustainable vaccine distribution, inventory control (R,s,S policy), and waste management considering risk assessment, a case study, Sustainable Cities Soc. Md. Amirul Islam, et al., [19] studied Stochastic optimization of level-dependent perishable inventory system by Jackson network.

CHAPTER – 3

3. AIM & SCOPE

3.1 AIM:

The aim of the study is to determining the optimum multiples of orders which will minimize the total inventory cost.

3.2 SCOPE:

1. Replenishment lead time
2. Carrying costs
3. Asset management
4. Price forecasting
5. Quality management
6. Replenishment
7. Returns and defective goods
8. Demand forecasting.

CHAPTER – 4

4. MODEL DEVELOPEMENT

The developed model deals, with screening cost for manufacturing with no shortage.

4.1 Assumptions:

- (1) Demand and Production rate is constant and production rate is greater than demand rate.
- (2) There is no shortage for manufacturing product with screening cost.
- (3) During the production run the production of the item is continuous and at a constant rate until production of quantity Q is complete.
- (4) Holding cost ,setup cost, screening cost may vary for the same product.

4.2. Notations:

- D Annual demand rate of Manufacturer
 P Annual production rate for Manufacturer
 Q Ordering quantity per order
 H Inventory carrying cost per unit per year
 T Length of the production
 N Number of orders in a year
 C_1 Ordering cost per order (Setup cost)
 S_c Screening cost
 T_c Total cost Manufacturing

4.3 Mathematical model formulation

In this model, we assume that the ordering quantity is received only over the period of the time. Further, we assume that Production rate is greater than the Demand rate. Apart from that there will be no inventory growth and commodities only will occur.

Total production= $Q=PT$

$$T = \frac{Q}{P}$$

The average stock is half the height of the triangle and the height is determined by the rate of replenishment less the demand over the replenishment period:

$$\begin{aligned} &= \frac{PT}{2} - \frac{DT}{2} \\ &= \frac{T}{2}(P - D) \\ &= \frac{Q}{2P}(P - D) \\ &= \frac{Q}{2}\left(1 - \frac{D}{P}\right) \end{aligned}$$

∴ Total amount in inventory carrying cost

$$= \frac{Q}{2}\left(1 - \frac{D}{P}\right)H \quad (4.3.1)$$

$$\text{Total ordering cost} = NC_1 \quad (4.3.2)$$

$$\text{Screening cost} = S_c \frac{Q}{2} \quad (4.3.3)$$

Total cost = Total ordering cost + Total carrying cost + Screening cost

$$\begin{aligned} T_C &= NC_1 + \frac{Q}{2}\left(1 - \frac{D}{P}\right)H + S_c \frac{Q}{2} \\ &= \frac{D}{Q}C_1 + \frac{Q}{2}\left(1 - \frac{D}{P}\right)H + S_c \frac{Q}{2} \end{aligned} \quad (4.3.4)$$

Differentiating with respect to “Q”

$$\frac{dT_C}{dQ} = -\frac{D}{Q^2}C_1 + \frac{1}{2}\left(1 - \frac{D}{P}\right)H + \frac{S_c}{2} \quad (4.3.5)$$

$$\frac{d^2T_C}{dQ^2} = \frac{2D}{Q^3}C_1 > 0 \quad (4.3.6)$$

$$\frac{dT_C(Q)}{dQ} = 0$$

$$-\frac{D}{Q^2}C_1 + \frac{1}{2}\left(1 - \frac{D}{P}\right)H + \frac{S_C}{2} = 0$$

$$\frac{D}{Q^2}C_1 = \frac{1}{2}\left(1 - \frac{D}{P}\right)H + \frac{S_C}{2}$$

$$\frac{D}{Q^2}C_1 = \frac{1}{2}\left(\frac{P-D}{P}\right)H + \frac{S_C}{2}$$

$$\frac{D}{Q^2}C_1 = \frac{1}{2}\left[\left(\frac{P-D}{P}\right)H + S_C\right]$$

$$\frac{1}{Q^2} = \frac{1}{2}\left[\frac{(P-D)H + S_C P}{P}\right] \frac{1}{DC_1}$$

$$\frac{1}{Q^2} = \frac{1}{2}\left[\frac{(P-D)H + S_C P}{PDC_1}\right]$$

$$Q^2 = \frac{2PDC_1}{(P-D)H + S_C P} \quad (4.3.7)$$

$$Q = \sqrt{\frac{2PDC_1}{(P-D)H + S_C P}} \quad (4.3.8)$$

$$T_C(Q) = NC_1 + \frac{Q}{2}\left(1 - \frac{D}{P}\right)H + S_C \frac{Q}{2}$$

$$T_C(Q) = \frac{D}{\sqrt{\frac{2PDC_1}{(P-D)H + S_C P}}}C_1 + \frac{\sqrt{\frac{2PDC_1}{(P-D)H + S_C P}}}{2}\left(1 - \frac{D}{P}\right)H + S_C \frac{\sqrt{\frac{2PDC_1}{(P-D)H + S_C P}}}{2}$$

$$= DC_1 \sqrt{\frac{(P-D)H + S_C P}{2PDC_1}} + \frac{1}{2}\sqrt{\frac{2PDC_1}{(P-D)H + S_C P}} \left[\left(1 - \frac{D}{P}\right)H + S_C\right]$$

$$= \frac{1}{2}\sqrt{\frac{2DC_1[(P-D)H + S_C P]}{P}} + \frac{1}{2}\sqrt{\frac{2PDC_1}{(P-D)H + S_C P}} \left[\frac{(P-D)H + S_C P}{P}\right]$$

$$= \frac{1}{2}\sqrt{\frac{2DC_1[(P-D)H + S_C P]}{P}} + \frac{1}{2}\sqrt{\frac{2DC_1[(P-D)H + S_C P]}{P}}$$

$$T_C(Q) = \sqrt{\frac{2DC_1[(P-D)H + S_C P]}{P}} \quad (4.3.9)$$

The ordering quantity per order is $Q = \sqrt{\frac{2PDC_1}{(P-D)H + S_C P}}$

The total ordering cost is $T_C(Q) = \sqrt{\frac{2DC_1[(P-D)H+S_C P]}{P}}$

Optimize order quantity $Q^* = \sqrt{\frac{2PDC_1}{(P-D)H+S_C P}}$

The optimize total cost to minimize wastage $T_C(Q^*) = \sqrt{\frac{2DC_1[(P-D)H+S_C P]}{P}}$

CHAPTER – 5

5. SENSITIVITY ANALYSIS

Optimize order quantity $Q^* = \sqrt{\frac{2PDC_1}{(P-D)H+S_C P}}$

The optimize total cost to minimize wastage $T_c(Q^*) = \sqrt{\frac{2DC_1[(P-D)H+S_C P]}{P}}$

C_1	H	S_C	D	P	$T_c(Q)$
500	25	10	8000	10000	730.2967
1000	25	15	8000	10000	894.4272
1500	25	20	8000	10000	979.7959
2000	25	25	8000	10000	1032.8000

C_1	H	S_C	D	P	$T_c(Q)$
500	35	10	8000	10000	685.9943
1000	35	15	8000	10000	852.8029
1500	35	20	8000	10000	942.809
2000	35	25	8000	10000	1000.0000

C_1	H	S_C	D	P	$T_c(Q)$
500	45	10	8000	10000	648.8857
1000	45	15	8000	10000	816.4966
1500	45	20	8000	10000	909.7177
2000	45	25	8000	10000	970.1425

C_1	H	S_C	D	P	$T_c(Q)$
500	55	10	8000	10000	617.2134
1000	55	15	8000	10000	784.4645
1500	55	20	8000	10000	879.8827
2000	55	25	8000	10000	942.8090

C_1	H	S_C	D	P	$T_c(Q)$
500	65	10	8000	10000	589.7678
1000	65	15	8000	10000	755.9289
1500	65	20	8000	10000	852.8029
2000	65	25	8000	10000	917.6629

C_1	H	S_c	D	P	$T_c(Q)$
500	75	10	8000	10000	565.6854
1000	75	15	8000	10000	730.2967
1500	75	20	8000	10000	828.0787
2000	75	25	8000	10000	894.4272

By increasing the holding cost the total ordering cost decreases. By changing screening cost and ordering cost, we get different total ordering cost

CHAPTER – 6

6 CONCLLUSION:

In this project, we developed a single buyer–vendor production inventory model for fixed life time products with constant demand involving screening cost. And also discussed different holding cost varying screening cost with constant demand for fixed life time products. A numerical example is given to illustrate the solution procedure of the model. Finally, based on this example, we conducted a sensitivity analysis of the model. The proposed model can be extended by considering factors like multiple products, random discount offering, credit periods etc.,. This model is used for Life time Products to minimize the total ordering cost and gain more profit. This model is also proposed for giving a quality products in affordable price for buyers and profitable for vendor.

6.1 FUTURE WORK

- ⦿ Future of inventory management continues to evolve.
- ⦿ My future work is to develop Screening Cost using in various model in inventory and also develop a new cost.
- ⦿ Inventory management will be characterized by greater automation, enhanced visibility, and more data-driven decision-making processes, ultimately leading to improved efficiency, cost savings, and customer satisfaction.
- ⦿ Future works in screening may focus on leveraging AI for predictive analytics to optimize cost-effective screening protocols, balancing efficacy and affordability, while exploring novel technologies for non-invasive and accessible diagnostic methods.

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