ABSTRACT

PT. XYZ is a retail company that operates a chain of convenience stores. The company has a warehouse used to distribute goods to various convenience stores spread across several locations. The warehouse functions as a center for storage and stock management to ensure that each demand from the convenience stores is met promptly. PT. XYZ faces a high total inventory cost issue, exceeding the budget by 91% in 2023. The high inventory cost is due to a high shortage cost of 85% and an expiration cost of 10%. This inventory shortage occurs because of unmet demand, with an average monthly shortage of 21.88%. This percentage exceeds the maximum limit set by the company, which is 18%. The shortage is partly due to the lack of a clear policy in determining order quantities. The inventory system that does not account for expiration factors also contributes to high inventory costs, as expired goods average 0.77% each month, leading to unsellable products that cannot meet the demand. Additionally, discount factors contribute to inventory shortages. The company often chases discounts without considering the depleting inventory, neglecting what should be prioritized for replenishment, causing inventory shortages. The discount capacity factor also needs attention in this issue to avoid new problems such as overstock.

This study aims to solve the inventory problems at PT. XYZ by determining an optimal inventory policy. The method used is a probabilistic multi-item inventory model, considering expiration factors, all-unit discounts, and warehouse capacity. The objective of using this model is to minimize inventory costs and ensure the availability of PT. XYZ's inventory. The decision variable in this research model is the optimal order time (T^*). There are two types of optimal order times to be sought: the combined order time based on warehouse capacity (T_{max}) and the joint order time (T_{joint}). These two order times will be compared to determine which is more optimal for PT. XYZ's inventory operations, using the constraint function in the proposed final project model. Thus, this research not only provides a solution to reduce inventory costs but also increases efficiency in stock management to meet demand.

The final project results using the probabilistic multi-item method, considering expiration factors, all-unit discounts, and warehouse capacity constraints, show that the optimal order time, (T_{max}), can be achieved. This method provides a company policy consisting of optimal order time, optimal order quantity, and safety stock. The resulting inventory policy can significantly reduce costs, including ordering costs, holding costs, expiration costs, and shortage costs. By implementing this method, total inventory costs have been successfully reduced by an average of 77.62% each month from the budget set by the company. This significant cost reduction demonstrates the effectiveness of the probabilistic multi-item method in managing inventory, ensuring that every aspect of inventory costs is minimized without sacrificing the availability of products needed by PT. XYZ's convenience stores. Through the implementation of this policy, the company can be more efficient in managing its inventory, reduce the risk of overstocking, have rules in decision-making for discounts, have a policy in determining order quantities, and avoid stock shortages that can affect PT. XYZ's inventory costs.

Keywords: ***Inventory, probabilistic multi-item, all-unit discount, warehouse capacity***