MODEL DEVELOPMENT OF JOINT INVENTORY STRATEGY FOR MULTI-TEMPERATURE PERISHABLE PRODUCTS IN VENDOR MANAGED INVENTORY (VMI) SYSTEM

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ABSTRACT

In Vendor Managed Inventory (VMI) system, it is very important for the vendor to determine replenishment cycle time in order to maximize the profit. In this paper, VMI model in which manufacturing vendor determine how to managed inventory from finished product at retailer, finished product at vendor and raw material at vendor will be discussed. There are two kind of subjects which are discussed in this paper, fast deteriorating raw materials and finished product with slower deterioration. Decision variables of the model are cold storage temperature, replenishment cycle of finished product and replenishment frequency of the raw materials. Some assumptions were made, constant quality deterioration rate and retailer demands are deterministic. A model was developed to calculate total inventory and Transportation Cost of the system. Quality deterioration and energy factors were considered as objective function of this research. Convexity of the objective function will be proven, then based on that convexity, storage temperature value will be modified to find the optimum solution. Behavior of several products with different characteristics will also be observed in this research, and strategy of optimum products storage was proposed afterward. Numerical test showed that temperature is proportional with the cost of quality deterioration and inversly proportional with energy cost. The observable products have different optimum storage temperature depends on products characteristic.

Key words : inventory, Vendor Managed Inventory (VMI), perishable products, quality deterioration, energy cost, replenishment cycle.
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