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Optimal Replenishment Policy for an Inventory Model with Demand Follows Innovation Diffusion Process under Permissible Delay in Payments

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Abstract

In this paper a mathematical model has been developed for obtaining the Economic Order Quantity (EOQ) in which the interaction of EOQ with marketing parameters such as external and internal influences under the condition of permissible delay in payments have been considered. The model assumes that the demand is a function of time follows from the adoption behaviour of Bass's diffusion model [5]. The two different cases of permissible delay in payments have been discussed to know the condition of economic ordering policies in a different situation of credit period offered. The integrated effect of both the factors that is permissible delay in payments as well as the marketing parameters on the economic ordering policies of the products has been considered. A solution procedure is developed to find the optimal order quantity and replenishment time, which minimizes the total cost of an inventory system. A numerical example followed by sensitivity analysis of the optimal solution with respect to different parameters of the system has been performed to illustrate the effectiveness of the model.

Keywords: EOQ, Innovation diffusion, permissible delay in payments, coefficient of innovation, coefficient of imitation, potential market size.