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**Optimal pricing and lot-sizing policy for supply chain system with deteriorating items  
under limited storage capacity**

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**Abstract**

This research work considers a two-echelon supply chain model for deteriorating items in which the retailer's warehouse capacity of display area is limited. Therefore, the retailer stores remaining units in the back room which has unlimited capacity. The demand rate is assumed to be dependent on the retailer's selling price and displayed stock level. The proposed approach explicitly models the interdependence among price of a product, demand for the product and the integration among the retailer and the supplier under four different policies: non-integrated, integrated, supplier-led Stackelberg policy and retailer-led Stackelberg policy. Furthermore, this paper also establishes several theoretical results to show that the solution provides the maximum total relevant profit. By using differential calculus method, it is proved that the optimal solution not only exists but also is unique. In this study the impact of price, inventory level and the integration among retailer and the supplier is explicitly analyzed in the emerging retail scenario with limited shelf space.

**Keywords:** Deteriorating Inventory; Vertical Supply Chain; Price and Displayed Stock-Dependent Demand; Shortage; Stackelberg Policy

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