

Abstract

Dependencies over supplier for efficient functioning of firms are evident in academic literature as well as in practice. However, disruption in supplies can hinder the entire manufacturing process. This article applies a mathematical model through modifying the work of Berger et al. (2004) to determine the optimal number of suppliers required under supply disruptions and also used quantity discounts offered by suppliers on volume purchases. The model is demonstrated by means of an Indian locomotive manufacturer as a case study. We consider supply disruptions due to the probability of occurrence of super, semi-super, and unique events in the supply chain. Furthermore, the analysis has been extended to study the semi-super events, in which only a particular region of supplier is affected. Results have shown that the optimal number of suppliers is three for low cost items and two for the costlier ones. This article will be helpful for efficient managerial decision making for materials management and purchasing practitioners, besides academicians for better understanding of such concerns.