Chapter 9

Conclusions

In Goyal and Chang's (2009) [Goyal SK, Chang CT (2009) Optimal ordering and transfer policy for an inventory with stock dependent demand. Euro. J. Oper. Res. 196:177-185] model, demand of products was taken to be only stock-dependent. They do not consider deterioration of products. A random deterioration of products is incorporated in this chapter. According to Goyal and Chang's (2009) model, demand of items depends only on display-stocks over the whole year. Demand of products may vary with time and price. These two factors i.e., time and price both can affect demand of products. Chapter 2 derived four different cases of demand functions such as time-price, time, selling-price, and exponentially time-dependent. This chapter determined retailer's optimal ordering quantity and maximized average profit for the retailer with finite production rate. The global optimal solutions are obtained analytically. Four lemmas are formed to find the global optimum solution. Some numerical examples, sensitivity analysis, and graphical representation were explained the applicability of this research.

An inventory model was extended from extension of Sana and Chaudhuri's (2008) model. Using the concept of model of Sana and Chaudhuri (2008), supplier offers several discount rates

on the purchasing cost of items to the retailer for stimulating their business. Chapter 3 generated an ordering inventory model with deterioration and permissible delay-in-payments. It was assumed that demand of items were dependent on selling-price as well as time. The effect of deterioration is also considered in this study. This chapter presented an optimal profit of retailer, which would help the manufacturing industry to obtain the benefit at the optimum level.

Chapter 4 extended the model of Mahata (2012) by introducing variable time-varying deterioration. Mahata (2012) wrote an exponential deterioration in the title of the model, but used constant deterioration. This chapter introduced the deterioration function as a time-dependent function for fixed lifetime products. Supplier offers the retailer a full trade-credit-period and the retailer provides their consumers a partial trade-credit-period. Customers must pay the purchasing amount instantly, when they have the items from the retailer. Due to that reason, the retailers can hold their payments until the last minute of trade-credit-period, which they received from the supplier. Utilizing this way, the retailer can earn more profit. The industry sector would be more beneficial if they used partial trade-credit policy instead of applying full trade-credit policy. The proposed inventory model provided the practitioners more useful model because it considered variable time-varying deterioration instead of constant deterioration and partial trade-credit policy instead of full trade-credit policy. In addition, the retailer's trade-credit-period was not necessarily longer than customers trade-credit-period. As results are limited only for constant demand, this model can be extended by considering probabilistic demand.

Chapter 5 constructed on the view that supplier provided their retailer a full trade-credit policy and retailer allowed their consumers a partial trade-credit policy. For providing such policies, retailer can delay their rest payment until the last minute of the permissible-period given by the supplier. On the other hand, retailer could receive interest on purchasing amount from their

consumers. Products were decayed exponentially with respect to time. In this chapter, retailer's annual total cost was minimized for finite production rate. The model saved costs from the exiting literature.

Chapter 6 derived an EPQ model, where the production process deteriorated based on production of defective products. To avoid the higher cost of inspection, product inspection policy was performed instead of full-inspection policy, where the product inspection policy was not error free. There are two types of errors, which are Type I error and Type II error in this chapter. After the product inspection, inspected defective items are salvaged at some fixed cost and warranty cost were included for non-inspected defective items. The expected total cost per item was minimized by obtaining the production-run length and non-inspected fraction of batch. Some numerical examples are given to prove more savings from the existing literature. Thus, by using this policy (product inspection policy), this research saved more than the existing model belongs to this field. Therefore, industry sector will be more benefited if they use product inspection policy instead of process inspection. They must consider inspection errors as the inspectors are human and human can make mistakes.

Chapter 7 dealt with an integrated vendor-buyer model, in which setup cost reduction technique for vendor was assumed. The impact of carbon-emission throughout shipment of products for both vendor and buyer was also derived in this chapter. Some logarithmic investment function was introduced to reduce vendor's setup cost. Instead of taking Lot-for-lot (LFL) policy, single-setup-multi-delivery (SSMD) policy was used to reduce the holding cost of vendor. In case of LFL policy, holding cost could be maximum than the SSMD policy. Higher holding cost indicates higher joint total cost. Therefore, for the least joint total cost, it is essential to reduce the holding cost. By keeping this matter, industry sector would be more profitable if they would use SSMD policy rather

than LFL policy. In general, SSMD policy usually described with equal lot sizes. Another extension in this model was the delivery lot sizes, which were unequal. Inspection policy was incorporated to this model such that there was a chance to arise less defective products. This model minimized the joint total cost for vendor-buyer system by reducing the setup cost.

Chapter 8 discussed an integrated-inventory model, in which vendor's setup cost was considered as variable. During transporting of produced items from vendor to buyer, delivery lot sizes was taken as variable and unequal. Fixed and variable transportation cost as well as carbon-emission cost were considered for vendor. Some investment was taken in to this model for setup cost reduction. Two types of inspection procedure were performed by the buyer. Stackelberg approach was applied to this study. Two models one with Stackelberg approach and another without Stackelberg approach were formulated and discussed the comparative study of numerical results between them.