Log501 mod 3 cases assn - optimzing inventory and transportation

Business

LOG501 MOD 3 Cases Assn - Optimizing Inventory & transportation Inventory engrosses all the functional but idle resources in an organization (Pooler & Pooler, 1997). The aim of optimizing inventory in an organization is to minimize the total cost and maximize profits (Swamidass, 2000). In this regard, it is essential to manage inventory. The management of inventory relies on sales since inventory is purchased earlier than sales can be made and poor inventory levels may lead to either lost and low sales or excessive carrying costs (Varley, 2006). Inventory is sometimes held to increase sales and profits. Most of the activities that occur in an organization are expenses incurred and offset by revenue at the final stage to make profits (Hansen et al, 2009). In this regard, since there are costs linked with inventory required to handle them in an economic, efficient, and effective manner (Federal Supply Service, 1957). In optimizing inventory, the question " how much stock should we have?" arises (Anderson, 2012; Anderson, 2008). The new model below will attempt to answer the question. In this new model, the basic assumptions are that the company relies on an outside supplier, that the supplier provides the company with precisely the quantity ordered, that the stock is used up at a constant rate per year (R), and that the stock has variable holding costs (Ch). Using these assumptions, we need to decide the quantity to order (Q) each quarter (Lucey, 2002; Panneerselvam, 2006; DuBrin 2009). With these postulations, the diagram of inventory point over a period acquires the following nature: Q Time When a horizontal line is drawn at Q/2 in the diagram above, the occasions that inventory goes beyond Q/2 are equal to the occasions when inventory goes beneath Q/2. From this, we can conclude that the holding costs per year = (Ch) Q/2 (Anderson, 2012;

Lucey, 2002). Where Q/2 is the standard stock point The total order cost per year = (Co) R/Q Where R/Q is the amount of orders per year Therefore, the total cost per year = (Ch) Q/2 + (Co) R/Q The total cost is what will be minimized by identifying a suitable point of Q. The annual order and holding costs change as the quantity ordered changes. In essence, an increase in Q causes an increase in the holding cost and a decrease in the ordering cost. As a result, we will determine the value of Q that matches up to the least total outlay by distinguishing the total outlay with regard to the quantity ordered and equalizing with nil (Panneerselvam, 2006). d(total cost)/dQ = Ch /2 -(Co) R/Q2 = 0 Which will give Q2 = 2 Co R/ Ch Therefore, the optimal point of Q is given by Q= (2 Co R/ Ch) 0. 5 (Federal Supply service, 1957). The total cost related to the optimal order quantity is shown by Ch ((2R Co/ Ch) 0. 5/2 + Co(R/(2R Co/ Ch) 0. 5) =(R Co Ch/2) 0. 5 +(R Co Ch/2) 0. 5 = (2R Co Ch) 0. 5 Let each of the products ordered be represented by a letter. Let product 7979, 6786, 2389, 5453, 9134, 4276, 5532, 7612, 5583 will be symbolized by a, b, c, d, e, f, g, h, I, j correspondingly. We aim to optimize profits through the stocks available and reduce costs. Then we will derive linear equations. For the 1st quarter = 100a+90b+85c+66d+77e+105f+60g+110h+130i+50j = 209 = 100x+90x+85x+66x+77x+105x+60x+110x+130x+50x= 209 Therefore, 873x= 209 x= 0. 24 The optimal quantity of the products ordered for the first quarter will be given by = 100(0. 24) +90(0. 24) +85(0. 24) +66(0. 24) +77(0. 24) +105(0. 24) +60(0. 24) +110(0. 24) +130(0. 24) +50(0. 24) The minimized cost will be given by: 1069. 98a+1063. 96b+1079. 42c+769. 47d+1059. 50e+1737. 16f+604. 66g+1170. 25h+1628. 33i+802. 23j = 10,

984. 95 The same process should be repeated over the next quarters to determine the optimal order quantities and the cost. References Anderson, D. R. (2008). Quantitative methods for business. Mason, OH: Thomson/SouthWestern. Anderson, D. R. (2012). An introduction to management science: Quantitative approaches to decision making. Mason, Ohio: South-Western/Cengage Learning. DuBrin, A. J. (2009). Essentials of management. Mason, OH: Thomson Business & Economics. Federal Supply Service (US) (1957). Scientific Inventory Management Simplified: The Economic Order Quantity. Michigan: U. S Government Printing Office. Hansen, D. R., Mowen, M. M., & Guan, L. (2009). Cost management: Accounting and control. Mason, Ohio: South-Western. Lucey, T. (2002). Quantitative techniques. London: Thomson. Panneerselvam, R. (2006). Operations research. New Delhi: Prentice-Hall of India. Pooler, V. H., & Pooler, D. J. (1997). Purchasing and supply management: Creating the vision. New York: Chapman & Hall. Swamidass, P. M. (2000). Encyclopedia of production and manufacturing management. Boston: Kluwer Academic. Varley, R. (2006). Retail product management: Buying and merchandising. London: Routledge.