

Discuss the economic order quantity model

[Economics](#)



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Lead time is certainty and constant, therefore, when the stock down to zero, the stock could be added at a precise time. Quantity discounts are impossible. The stock is immediate and complete. It ordered goods are in appropriate time, shortages can be prevent. Setup cost and holding or carrying cost are belong to variable costs. . 2 The Objective of EX. Model " The objective of the EX. model is to determine the optimal quantity of inventory to order and the best time to place the order" (Dactylic et al. 1990, p. 630). In fact, the EX. is balancing two inventory management costs: carrying cost and ordering costs.

Dactylic et al. Argue (1990): Carrying costs include out-of-pocket costs such as storage, insurance, taxes and so on. Opportunity costs is related to the cost of investing capital in inventory rather than in other income-producing assets. Ordering costs include out-if-pocket expenditures incurred every time an order is placed, such s handling, shipping, and so on. Dactylic et al. (1990) make a further statement: Carrying costs and ordering costs demonstrate different cost behaviors relative to the level of inventory maintained.

Carrying costs increase with the quantity of inventory maintained; ordering costs decrease with the quantity of inventory maintained. The more inventory kept on hand, the more storage, handling, and other such carrying costs are incurred. The larger the amount of inventory, the fewer number of orders needed to replenish the inventory and the smaller the amount of ordering costs. 3. Validity of the assumptions and model robustness Although the assumption of EX. model shows highly restrictive, one advantage of EX. model is that it is quite robust.

As mentioned onwards, there are some assumptions will be dropped, like no quantity discounts, no shortages, no uncertainty in demand and lead time. On the other hand, " such as a constant demand rate and a constant holding cost per unit, can be violated somewhat without substantially reducing the accuracy of the solution" (Martini 1997, p. 671). When the demand face seasonal changes, model can be changed to adapt to this situation. Martini (1997) stated clearly: The important feature of EX. model is that the function of total stocking cost is flat around the optimal order quantity.

Estimating ordering cost per unit time and holding cost per unit time are very crucial, because they are not often very accurate. Therefore, the value computed for EX. cannot equal the true optimal value. " However, because of the flatness of the total stocking cost function, even if the computed EX. is 20%-30% different from the true optimal, the cost penalty is relatively small"(Martini 1997, p. 671). Robust is defined as " a model that gives satisfactory answers even with substantial aeration in its parameters" (Higher and Render 2001, p. 486).

As we mentioned above, it is difficult to decide accurate ordering costs and holding costs tort inventory management. Thus, a robust model is very favorable and some errors do not cost us very much. This is because that the EX. model is most convenient and it can accurately forecast demand, holding cost, and ordering cost is limited. 3. 4 Fixed Order Point versus Fixed Order Interval Policy EX. model is an approach of the fixed order point policy.

According to Alarm et al. (1998, p. 128): Throughout the ordering process, as long as the EX. model was identified, a fixed quantity will be ordered every time. An order is placed when inventory on hand reaches a predetermined

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minimum level necessary to satisfy demand during the order cycle. " An order will be generated through the automated inventory management system. Another reorder policy is the fixed order interval method. Use this method, we may set time interval, maybe every week. Under this method, many projects are bought by the same supplier. " A weekly order may be placed to reduce ordering costs and take advantages of purchase volume discounts and freight consolidation. " 4. JUST-IN-TIME PRODUCTION SYSTEM

As we all know, the most effective stock management approach is JIT production control system over the past 50 years. The system is currently being used by many industries. 4. 1 JIT Logic For the purpose of JIT system, it intend to use minimum inventories of raw materials, process of production, and finished goods to achieve high output. Need is based on the occurrence of product's actual demand, otherwise nothing will be produced.

Theoretically, if an item is sold, the market will pull a substitute in the system. This triggers an order to the factory production line, where a worker then pulls another unit from an upstream station in the flow to replace the unit taken" (Aquiline et al. 2004, p. 427). Then this upstream station pulls to further upstream and back to release of raw materials. To make this pull process more smoothly, JIT need high quality in every procedure, strong supplier relationships, and a very clearly demand for the final product. 4. 2 Feature of JIT production system In JIT production system, Black et al. (1996, p. 842) argue that it include three key features: 1).

Operation of production line is based on demand-pull, as a result, each workstation's activity is subject to the approval of the demand of downstream at ones There are many approaches to use demand-pull control,

but the most common method is Kanata system which is the Japanese term for a visual record or card. Under Kanata system, use a Kanata card to operate to authorized another operation to produce a given part of the special quantity. Black et al. (1996) provide an example: " suppose the assembly department of a muffler manufacture receives an order for 10 mufflers.

The assembly department triggers productions of the 10 metal pipes it needs to make the 10 mufflers by sending a Kanata card to the machining department, which then begins producing the pipes. When production is completed, the machining department attaches the Kanata card to the box containing the mental pipes and ships the package downstream to the assembly department, which starts the cycle over again when it receives the next customer order. " 2). Each unit including the setup time and manufacturing lead time are minimized.

When a product is prepare to begin in production line, then turned into finished products, the process of the elapse of the time is known as manufacturing lead time. Production of demand normally produced relatively small quantities, however, as Eng as setup times are small, it is cost-effective to produce product in small quantities. 3). If parts have defective and insufficient, the production line will cease operation. Each staff should attach great importance to reducing the occurrence of such problems like defective material parts.

Conversely, under the traditional inventory management system, workers can ignore defective parts and continue to work because the inventory parts

and work in process are huge. Hirsch et al. (1989, p. 746) take a similar view, they have also added an important argument that total quality control (ETC) is often combined with SIT system. All the staff have become quality control inspection personnel, meanwhile, if products and materials are found to be not meeting quality standard, the production line should suspend operation. As long as this situation happened, it must be resolved as soon as possible.

It means that workers have not impetus to ignore the fault in the early of production process stage, they had to stop their work process.

4. 3 SIT costing

The fundamental difference between SIT method and other traditional methods is the treatment of the costs. According to Hirsch et al. (1989, p. 746), under the traditional approach of costing, raw materials or reserves firstly get into an asset account, when they are transported. After these amounts are transferred into a work-in process account, they will be put into operation as raw materials. Then, as the materials move from process to process they pass through a series of work-in-process accounts for each operation. " Eventually, when the product inventory through work-in-process account transfer to finished product inventory account. " With SIT the incoming materials are entered at cost directly into a material and work-in-process inventory account. " There is no series of work-in-process accounts for ACH process because there is very little work-in-process to account for. The value of material is diverted to finished product inventory account because the product has been completed.

4. Purchasing In SIT

purchasing, suppliers use the replacement principle of Kanata by using small, standard-size containers and make several shipments daily to each customer. SIT not only reduces in-process inventories by using Kanata, but

also raw materials inventories are reduced by applying the same principles to suppliers as well. According to Frazier and Gather (2001): the elements of SIT purchasing are as following: 1). Supplier development and supplier relations undergo fundamental changes. The nature of the relationships between customers and suppliers shifts from being adversarial to being cooperative.

The Japanese call these relationships subcontractor networks and refer to suppliers as co-producers. 2). Purchasing departments develop long-term relationships with suppliers. The result is long-term supply contracts with a few suppliers rather than short-term supply contracts with many suppliers. 3). Although price is very important, delivery schedules, product quality, and mutual trust and cooperation become the primary basis of supplier selection. 4). Suppliers are encouraged to extend SIT approach to their own suppliers. 5).

Suppliers are ordinarily located near the buying firm's factory, or if they are some distance from the factory, they are often clustered together. This causes lead times to be shorter and more reliable. 6). Shipments are delivered to the customer's production line directly. Because suppliers are encouraged to produce and supply parts at a steady rate that matches the use rate of the buying firm, company-owned hauling equipment tends to be preferred. 7). Parts are delivered in small, standard-size containers with a minimum of paperwork and in exact quantities.

Delivered material is to near-perfect quality Because suppliers have a long-term relationship with the buying firms and because parts are delivered in small lot sizes, the quality of purchased materials tends to be higher.