CHAPTER FOUR

Study on the relationship between Profitability and Inventory Management in Iron & Steel Industry in West Bengal

4.1 Introduction

This chapter deals with the various theoretical set of ideas that attempts to link between inventory management and profitability. A solid theoretical foundation is important, as it will help in determining the aspects that are necessary to measure the various constituents of inventory to maximize the organization's profit. This section also provides surmise on inventory management and its control to meet future demand and strengthen the financial performance. This chapter focuses or discusses on inventory concerns i.e., effective management of inventory and getting return from the funds tied up in the inventories.

4.2 Inventory and Inventory Management

Inventory means goods in stock that consist of raw-materials, work-in-process, and finished products.These are considered as parts of business property; finished products component consist of the goods that are ready for sale. In short, inventory is the stock of any item held in an organization for being used in future production or waiting for being sold.

Inventory management is the set of policies to maintain right quantities of stock, in right place, at right time and at the right cost. It involves supervising and directing for holding, continuous supply, and transforming inputs into finished goods by adding value-added process to supply the final products to the customers and consumers.

Inventory management is an important function that determines the financial health of an organization. Every business firm constantly makes every effort to maintain the stock at optimum level to be able to meet the requirement according to time.

Efficient inventory management is an essential process for ensuring business house to have adequate amount of stock on hand to satisfy customer demand. On the contrary, inefficient management of stock leads to affect the flow of demand and supply and consequently the profit of business.

It is very important for every business to maintain optimum amount of stock in warehouse to meet present and near-future customer demand. However, it's not an easy task because it needs serious attention to be given at the various phases of inventory management (i.e., stock planning, control, and balancing). Holding inadequate amount of inventory by a business may result in loss of orders or lost customers. This may put a business at risk because dissatisfied customers can spread the problem of unavailability of stock in market as a result of which the firm may suffer losses. Maintaining too little quantities of stock is a problematic situation. If a business holds less quantity of inventory, more time, energy,and cost may then be needed to overcome the shortage of stock to satisfy the demand of customers.

Inversely, holding of stock more than the required quantity, which is called over-stocking,would not only tie up funds in buying unnecessary stock but also involve more costs in maintaining and holding it. Excessive investment of money in purchasing stock for a longer period would affect profitability, and also sufficient cash may not be available to the firm for buying other necessary items which can't be sacrificed. Another problem of holding excessive stock is that the firm finds it difficult to respond to market fluctuations immediately. Sometimes changes in stores quantity and composition may be required to cope up with an improvement or development in products or with some safety issues or with some change in product design; but such desired changes in products cannot be made through the system quickly. So, it is the most important responsibility

of an inventory manager to ensure that right quantity and type of inventory is held in stock for more valuable use of time, energy, and fund.

4.3 Various types of Inventory

(a) Finished Steel

Finished steel products are the tradable goods in steel industry. The steel industry could make various steel products without changing its chemical form. In fact, they design various forms of products,tailored for specific purposes and to sell them directly sold to the targeted customers as it is common in engineering and construction industries.The different types of finished steel generally produced in this industry are as follows: TMT bars, Angles, Joist or Beams, Channels, and Wheels and Axles of various measurements

(b) Semi-finished Steel

Semi-finished steel items are intermediate solid steel products processed by continuous rolling ingots. It is available in various sizes, grades, and forms; these items need further processing or transformation by hot rolling before converting them into finished steel. An example of semi-finished steel is “Billets”; it is transformed by rolling to get finished products i.e., to make long steel products like bars and angles.The various types of semi-finished steel are concast billets and concast blooms of various dimensions.

(c) By-products

A by-product is an incidental secondary product produced in a joint production process. It has a little value in relation to the main product being produced. It may be produced inadvertently during the process of producing another product. By-products in the steel manufacturing companies come out of solid wastes or co-products generated in the various

production processes.These are the output from the joint production process i.e., lower in quantity and/ or net realizable value when compared to those of the main product. Slags, dusts, and sludges are the co-products produced by the steel companies. By-products can generate revenue if economically used. Examples of by-products are Blast Furnace Granulated Slags,Coal Chemicals, etc.

4.4 Challenges associated with holding inventory

Determining right quantity of inventory is a very challenging task for most of the companies. Both over and under-stock holding have adverse implication to the financial health of the organization. Key challenges identified in holding inventory are discussed below.

Capital Cost

Capital cost includes opportunity cost of an investment and interest earned thereon. These costs arise due to funds borrowed from outsiders or firm's own funds used in buying the inventory. As the amount is blocked in stock held in godown,it becomes unavailable for investment in other profitable opportunities to earn return. Firms have to sacrifice such investment options i.e., other alternatives to the investment in inventory as their financial resources are clogged in holding inventories of the business. To meet the requirement of production, arrangement of funds need to be made by the companies. Such procurement of funds is a tricky challenge to the firms.

Carrying or Holding Cost

Another problem faced by firms in holding the stock is related to the cost of holding or carrying or maintaining the inventories in the godown. This cost is known as the 'carrying' or 'holding' cost. Therefore, it refers to and includes space rent or warehouse charges, cost of insurance for the stock, salaries paid to the maintenance staff working in the store, and cost related to perishability of the goods, if any. There is almost always a time gap between the time of purchasing goods and the time when it is to be supplied to the production or between the times of

completion of production and sale or consumption of produced goods; so stocks are required to be stored for some time in some place,called warehouse,where from the goods are moved out either for production (using raw materials) or for sale (of finished goods) according to the market demand. The inventory cost could have direct impact on cost of capital and future cash flows associated with the firm.

Price decline

A risk of decrease in the price of stock is another challenge faced by the manufacturing companies. When stock price declines, firms may hold its inventories for certain period of time till the price of stock reaches an equilibrium level. In the general market depression situation, business houses do not intend to supply products at a lower price because of low earnings which directly affects sales and revenues. Such a market condition i.e., price fluctuation situation is a serious concern for the business enterprises. Hence, decision related to maintenance of under-stocking or over-stocking by the organization would severely hamper financial performance.

Obsolescence

Obsolescence of goods is one of the significant risks to be tackled by the business with products and services based on technology. It refers to inventory at the end of product life cycle that remains no longer saleable or competitive in the market due to availability of better quality products. The outdated stock that becomes unsalable for the firms would reduce their profitability. Thus, industries must remain alert to new and unimagined technologies that could succeed the current inventories.

To overcome the problem of under-or over-stocking of such inventories that are prone to obsolescence, and to minimize the total cost related to holding inventory, a suitable base of inventory management is required.

4.5 Pillars of Inventory Management

Every organization whether it is engaged in production, manufacturing, or trading have to hold inventories in their warehouse in the form of raw materials, spare parts, work-in-progress, and finished goods. No matter, where it is kept.What matters is that it needs to be maintained very cautiously.There are three-pronged foundation of inventory management as follows:

1. Planning for Inventory,
2. Controlling Inventory, and
3. Matching between demand and supply of inventory i.e., balancing.

Planning for Inventory

Inventory planning refers to deciding in advance the right quantity of inventory to be held to meet the present and future demand of the customers. The main function of inventory planner is to determine the optimum level of inventories which involves analyzing the demand by an in-depth study of demand trends and deciding when and how much quantity of stock should be ordered. The aim of the inventory planning is to match the high level business requirement by continuous supply of goods at right time. In order to meet the expected demand for products, the firm would look into which products and in what volumes,should stocks be maintained.

Inventory planning has a direct impact on the businesses' cash flows. If a firm fails to anticipate right quantity of stock to be sold by it,then its earnings would likely be affected. A firm with limited cash available would surely affect its expenditure-payments if it invests much of its scarce money in inventories. Therefore, to overcome any uncertainties, a proper planning for sourcing inventories would be of utmost importance to increase the profit of the organization.

Controlling Inventory

Inventory control is all about monitoring the stock of goods used for manufacturing, distribution, and consumption. In general sense, it means maintaining stock at the desired level;this desired

level keeps on changing as per demand and supply of goods. The inventory control is concerned with maintaining records of physical stock by proper system transaction to express the place i.e. where and in how much quantities of stock is in process. It is crucial and necessary to keep such records of issue and usage of materials, movement of goods through the factory to the ultimate customers so as to match the record of each finished goods with the stock held in warehouse. Since production involves heavy expenditure in purchasing raw materials,efficiencies should be achieved in such areas as inventory is a major component of a firm's working capital. As it is a property or asset of a business enterprise, such assets in the forms of raw-materials, work-in-progress, and finished goods should be persevered.

The goal of inventory control is not only to derive maximum profits with least or minimum investment in inventories but also to enable a firm to segregate its manufacturing, purchasing, and marketing process, keeping in view the operational requirements and financial resources of the firms.

Inventory balancing

Inventory balancing is the third and crucial pillar of inventory management to make inventory plan successful.It refers to managing the demand and supply relationship in terms of inventory. In order to maintain continuous flow of goods, a firm is required to pay focus on these questions such as: (a) Is the quantity of supply of goods as expected? (b) Is the quantity of demand of goods as expected? (c) Is the goods moved in and out recorded through business system?

These above mentioned questions are to be looked into cautiously to match the demand and supply of goods in order to provide final stock into the hands of ultimate customers without interruptions.

A firm maintains record of inventory balancing through a proper business system which is based on a good inventory planning, recording of accurate data in systems on daily basis, inventory control, and lastly,the measurement of performance.

4.6 Theories on the association between Inventory Management and Profitability

The theoretical assumptions on the inventory holding period and profitability endeavor to justify the reasons of holding inventory by the firms as well as its association with the profitability. A firm operates in the changing and competitive business environment,wherein changes as political, social, technological, and economic have an effect on the operations of business. In such a volatile market,it is not possible to predict exact quantities of stock to meet market demand. Therefore, firms are compelled to hold inventories to overcome future uncertainties. Preserving stock for future sale and to uninterrupt the supply-demand of the same is common activity in business (Afrifa, 2013). Keeping stock in warehouse involves certain cost related to it such as carrying cost, employee cost, insurance, etc. Therefore, several theoretical perspectives have been formulated that provide approaches to cut down or minimize cost related to inventories.**Theories of Keynes (1936)**, concerning the motives of liquid assets could also be applied to manage inventory effectively. Some of these relevant theories have been discussed that answer the causes of keeping inventories in business including transaction motive, precautionary motive, and speculation motive. Each of these motives is discussed and presented below.

4.6.1 Transaction Motive Theory

The transaction motive theory laid down two factors that directly affect the interrelationship between profitability and inventory conversion period. One of the factors presumes that profitability could be increased, if inventory holds for less number of days. This factor also

assumed that organizations could forecast future demand of the stock and accordingly makes the arrangement for production in order to satisfy future demand of goods. So, keeping minimum stock would not only lower other costs associated to inventory but also reduce its holding period. Thus, taking less number of days in stock conversion would lead to increase profitability.

The other factor asserts a positive accord between profitability and inventory holding period by purchasing in huge volumes. Acquiring inventories in huge quantities would increase the inventory level in warehouse that leads to increase inventory holding period. However, purchasing in huge quantities may not only reduce the acquisition cost of production but also may lead to fall down in the cost of production of the product as a result of which profitability increases. This cost savings of lot purchase may emerge for several reasons. First, the firm would be entitled to avail quantity discount from supplier on the large scale purchase. Second, shipment cost falls down as the company makes one time journey instead of two or three. Third, fixed cost of longer inventory holding period such as ordering and placing cost decrease due to buying in lot size. All of the above factors act to reduce the overall price of the stock;however,purchasing in lot size increases the inventory holding period which further leads to rise in inventory holding cost in the form of the risk of goods being damaged, storage, insurance, labour cost,etc. Therefore, it is required for the companies to adopt some mathematical formula to determine the optimum level of stock so that fixed and inventory holding costs could be minimized.

4.6.2 Precautionary Motive Theory

The precautionary motive concept assumes that there is a positive relation between profitability and inventory holding period. The first assumption of this theory is that keeping higher stock in warehouse will avert the problem of stock out situation. An inventory stock-out position arises when the company suffers from lack of stock. Out-of-stock would have disastrous effect on the

firms'revenues. A firm with insufficient stock would be unable or fail to meet the customers'demand as a result of which it will fend off the present buyers to rival i.e., competitors in the market. Losing the market share will drop down the profitability as well as it creates a bad reputation on the firm's name.

The second aspect of precautionary motive suggests that the profitability increases as a consequence of rise in the inventory holding period. The companies keep stock in abundance in order to overcome the stock-out situation and for the normal lead time. Though the firms enter into contract with the suppliers in respect of inventory regarding price, delivery time, etc., but an abrupt or unexpected incident such as labour strike, lockout, etc. could cause lag in the delivery of inventory. A setback or lag in the consignment can result in losing the sales that leads to decline in the revenues of the firms. Also, the firms wait for the stock in between the times of placing an order and receiving the inventory. A longer time gap and unexpected lead time circumstances enforce the firms to reserve a minimum quantity of inventory i.e., buffer stock so that they can meet the market demand even in abnormal conditions. Thus, it concludes that there is a positive linkage between profitability and inventory holding period.

4.6.3 Speculative Motive Theory

The speculative motive theory also asserts that there is a positive association between inventory holding period and profitability. A higher profitability may arise due to higher inventory holding period. One of the reasons of higher inventory holding period is expected change in the price of the goods in the future. The business houses hold inventory in more quantities in expectation of price fluctuation in forthcoming period, thereby increasing the inventory holding period which further leads to raise the profitability. The firms can enjoy or achieve the benefit of abnormal profit if the anticipated future price increase.The product's higher future price should be

sufficient to adjust the cost associated with the holding of inventory such as storage cost,labour cost, obsolescence,insurance, etc. However, the abnormal gain may be attained if there prevails the inflationary conditions in the economy.

The other logical explanation of higher inventory holding period is an anticipated innovation to the product. An anticipated change to the product will boost the firms to pull back their traditional or old goods from the market which results in shortage or unavailability of stock that leads to increase the demand of product over its supply. This increase in demand for product will raise its price. In this way, a firm could enjoy the higher price of product due to its expected change or modification. Therefore, it becomes the frequent practice of the firms to increase the inventory holding period if the products are to be undertaken for modification in anticipation of higher return from the stock. So, following the theory of speculative motive may lead to higher profitability if the future higher price of stock actually happens. Otherwise, the earnings may decline for not realizing the future higher price of inventory in the market. An expected lower future price of stock would not enable a firm to meet the various costs related to inventory holding period.

To earn higher profits by maximization of production and minimization of cost related to stock a proper attention is required on the inventory management. Inventory involves higher amount of investment in it than in any other form of current assets in the business. Inventory cost constitutes about 70 percent to 80 percent of production cost of pig iron, steel, and final products in the steel industry and the investment in it is greater than the investment required in other resources employed such as machine, labour, etc. (Singh and Mondal, 2016). It is the most significant part of current assets and working capital in most of organization (Tom, Jayakumar, and Sijo, 2013). Improper handling of inventory may lead to failure of operational activities,

thereby decline in the sales; the costs associated with holding of larger volume of inventory may go up further causing decrease in the earnings of the firm. Therefore, it is highly necessary to have scientific inventory control techniques to ensure the availability of stock in right quantities as and when required to ensure operational excellence with least investment in inventories.

4.7 Inventory Control Techniques

Inventory control is the method of monitoring inventory at the various phases from procuring raw materials to distribution of final products so as to ensure availability of stock in right quantities at right place and at right time to meet the customer satisfaction or requirement at the lowest possible cost and with least amount of investment in the inventory.Sporta (2018) describes inventory control as the process whereby the investment in materials and parts carried in inventory is monitored within predetermined standards set in accordance with inventory policy framed by management. Inventory control is a vital part of the iron and steel industry's third source of profit which affects the company's profitability and core competitiveness (Wenbo, 2013). It is an integrated approach that assists the organization in reducing material wastages and increases cost-efficiency,thereby the profitability of the enterprise rises.The vital aim of inventory control is to minimize the total cost and maximize the service level by balancing between demand and supply (Ganorkar, Rode, and Godse, 2016). In broad sense, the primary goal of sound inventory control is to reap higher profit from the minimum investment in inventory without affecting customer satisfaction level. Therefore, applying suitable inventory control techniques is necessary for the manufacturing industries in order to avoid holding excess stock and its cost. Some of the relevant inventory control techniques have been discussed below.

Economic Order Quantity

Economic Order Quantity (EOQ) is a mathematical approach of determining an optimum quantity level of an item of stock to be ordered to minimize the total inventory cost i.e., cost of purchasing inventory, storage cost, carrying cost and other fixed costs, if any, of placing an order. According to Victoire, (2015), EOQ determines how much quantity of stock should a firm purchase when the inventory reaches its re-order level. The classic EOQ aims at ascertaining the right quantity of inventory that trades off between cost of acquiring and cost of possessing the items. Bulk buying of stock may reduce the average cost per unit of an item but this average cost savings may not be able to set-off the increase in the cost of storage in the long run. It administers the purchase and storage of inventory in such a manner that it can maintain a continuous flow of production and can simultaneously avoid excessive investment in stocks

(Kumar, 2016). Thus, the basic function of EOQ is to find out the exact quantity of goods to be of ordered at the right point of time so that the management of business enterprise may be able to minimize the cost parameter. Using the EOQ model, there is a possibility of reduction of 20 percent in the total variable cost, as hinted at a recent research study (Kumar and Prajapati, 2015). The fact that total annual inventory cost is reduced to a large extent has been observed by applying the mathematical tool - economic order quantity (Sunhal and Mangal, 2017).This technique holds true or operate under certain assumed conditions; these are: (a) The annual demand for the item is certainly known and the lead time i.e., the time gap between the times of placing an order and of receiving the supplies remains constant; (b) Availing of quantity discount or cash discount on settlement with the supplier is not possible; (c) Depletion of stock is linear and constant; and (d) The purchase price per unit of material remains unaltered irrespective of the size of the orders.

However, the model economic order quantity suffers from certain limitations. In the real world situation, the cost per unit of an item may vary as the quantity ordered in one lot changes. The annual consumption of raw materials may not remain stable throughout the year; the supplier may lag in dispatching the stock that leads to elongate the lead time. Therefore, to obtain a favourable or satisfactory result, the above premises or basic assumptions are required to be taken into account while adopting the right ordering quantity.

Always Better Control (ABC) Analysis

The ABC approach to inventory control segregates the items of stock according to their usage and the money value involved in the inventory . It classifies the stock into three heads or groups: Group "A" - represents a small portion of items that involves a large amount of investment but a small volume of consumption; Group "B" - consists of a moderate level or volume of inventory with relatively lesser investment (than Group A); and the Group "C"– indicating the items with relatively small amount of investment but involving large quantity of stock. More clearly,let us assume, "A" class items constitutes about 5 percent to 20 percent of total inventory that account for 70 to 80 percent of the annual consumption value; "B" class items composes of about 30 percent of the total items that account for 15 percent to 25 percent of sales value; and the items in "C" group contain 50 percent to 70 percent of total inventory that approximately involves 5 percent of annual consumption value. Sharma and Arya, (2016) describe it as dividing the inventory into three categories of priorities that allocate the major managerial efforts on the most significant items. By categorization of total inventory into different groups, it assists the inventory manager to put attention on the few significant items than on many. Gordon and Gupte, (2016) suggest that large company adopts this method to have an efficient control on inventory. One of the advantages of separating the items into few enables the company to

optimal use of funds and eliminates the stock-out situation. Also, a close and tight control on the particular group (Group A) of items of materials or on the basis of relative importance would have an impact on the overall inventory cost because only those items of special category of inventory would have to be purchased or organized under stricter control, which have higher annual demand and on the contrary, there should have been lesser control on items with lesser consumption value. In this way, excessive investment in items of inventory with lesser importance could be avoided; thereby it reduces the storage cost and saves time and energy in making improvement in inventory control.

In spite of the above merits, this control technique has some restrictions such as changes in the value of material, annual consumption, and product-mix should be taken into consideration, failure of which can make this tool ineffective; this technique could, therefore, be better adopted where there is a proper standardization of materials in store.

Just In Time (JIT)

Just in Time approach of inventory control was originated in the 1950's in Japan; it was first implemented within Toyota manufacturing plants. As narrated by Mazanai (2012), Just in time is an widely accepted technique for application in manufacturing firms to increase productivity, improve quality and efficiency through elimination of waste. Patil and Patil, (2015) explained just in time as a manufacturing philosophy which increases the speed of production by producing the products as per the customer's request, actual orders, and not as per the forecast. This tool is also called "Zero Inventory Production System", (Singh and Ahuja, 2012). The objective of JIT is to make inventory available at the required time and in right quantity without any delay in receiving the items and also early delivery so as to maintain a balance between optimum level of inventory and holding cost. In the JIT approach, safety or buffer stock is not maintained like the

traditional inventory management technique. Use of the JIT avoids wastes related to overproduction; this results in keeping the machines and labours not remaining idle during the production process. Inventory cost could be reduced to 24 percent by implementation of JIT system in Essar Steel India Ltd. (Sharma and Gangrade, 2015). Some companies which could be able to save their inventory costs by employing JIT method are: Toyota, Dell, Harley Davidson, and McDonald. According to Franco and Rubha, (2017), Harley Davidson reduced inventory levels by 75 percent after implementing JIT approach. And also, Ashok Leyland gained high productivity and saved annually Rs 8.50 crores by adoption of the JIT system.

Despite the above benefits of JIT concept, it has some constraints; the production process may be affected if the firm does not receive the materials and other parts at the correct time i.e., delay in receiving of materials. Since, it ensures zero level of inventory, it may not be able to meet massive and unexpected orders.

4.8 Conclusion

As stated earlier, the objective of this research work is to examine the working capital management in the selected public sector steel companies in West Bengal, various theoretical concepts have been elucidated to present the relationship between inventory management and profitability. First, this chapter delineates on the meaning of inventory and inventory management, its different categories, and threat related to holding inventory. These deliberations rationalized the requirement of maintaining optimum level of stock to meet both the present and the future demand keeping the cost associated with it at a minimum level. Secondly, the pillars of inventory management support the need for a proper system of recording and reviewing the inventory balances; accessing the past records and figures in an accurate time could enable a firm to deliver the product without affecting the quality. Thirdly, under the various motives for

holding inventories, the three relevant theories that build the relationship between inventory holding and firm's profitability as discussed in this study include transaction motive, precautionary motive, and speculative motive theories. The transaction motive theory upholds the need for keeping inventory in order to facilitate the smooth flow of production and sales. As there is a time lag between demand for and supply of materials, keeping stock in an appropriate quantity is necessary to avoid the interruption in the production process. The precautionary motive describes why the firms keep stock more than the required quantity. It could justify that the firm may like to hold inventory to protect against the risk that may arise out of unpredictable change in the market factors. The speculative motive theory expounded that the firm holds inventories to enjoy higher profits in the future. Finally, this chapter ends with the discussion on the techniques of inventory control. The three major inventory control methods viz. EOQ, ABC analysis, and JIT have been discussed for better management, eliminating unnecessary inventory, and reducing cost associated with inventory holding in order to achieve higher profit and at the same time, to satisfy the customer requirement.