

## MANAGEMENT OF INVENTORIES IN TEXTILE INDUSTRY: A CROSS COUNTRY RESEARCH REVIEW

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### Abstract

Inventory constitutes a major component of working capital. To a large extent, the success and failure of a business depends upon its inventory management performance. The basic objective of inventory management is to optimize the size of inventory in a firm so that smooth performance of production and sales function may be possible at minimum cost. Galloping inventories in recent years, the credit squeeze and the resultant general paucity of funds have attracted the attention of planning elite on this crucial problem of inventories. Mismanagement of inventories and absence of control systems have resulted in deplorable performance for some of the industries in developing economies. Though, an abundance of literature, methods, models and computer analysis have evolved from time to time and are highly availed of in the realms of industrial settings with greater pay-off of quality, precision and non-blockade of working capital. The paper is aimed to study how inventories in textile sector are managed across the globe. An attempt will be made to summarize and present the theories, techniques and important concepts of inventory management especially in textile sector. As Textile industries have been playing an important role for the socio-economic development of any country. The paper will attempt to unravel the research findings on management of Inventories in textile industry across the world. Studying inventory management becomes all the more important in view of the fact that it is the largest employer with a total workforce of 35 million. Moreover, the share of textiles in total exports was 11.04 % during 2010. India is the world's 2<sup>nd</sup> largest producer of textiles and garments after China.

**Keywords:** Inventory, Working capital, Re-order, Liberalization, Socio-economic development

### Introduction

The Study of inventory problems dates back to 1915, when F. N. Harris developed a very simple but nonetheless useful model of an inventory problem (Shore, 1980). Inventory is the total amount of goods or materials contained in a store or factory at any given time. A store owner needs to know the exact number of items on the shelves and storage areas in order to place order

or control losses. Inventory management is a science primarily about specifying the shape and percentage of stocked goods. It is required at different locations within multiple locations of a supply network, to protect the regular and planned course of production against the random disturbance of running out of the materials or goods. Inventory management also concerns fine lines between the replenishment lead time, carrying costs, asset management, inventory forecasting, valuation of inventory, future inventory price forecasting, physical inventory, inventory visibility, available space for inventory, quality management, replenishment, returns ,defective goods and demand forecasting.

Possessing high amount of inventory for long periods of time is not usually good for a business because of inventory storage, obsolescence, and expiry, spoilage costs. On the other hand, the possessing of too little inventory isn't good either, because the business can face the risk of losing out on potential sales and potential market share as well. Undoubtedly more business failures are caused by an overstocked or under stocked condition than any other factor. Inventory management strategies, such as a (J.I.T) just-in-time, is a tool which can help minimize inventory costs because goods are created or received only when needed.

A microeconomic theory of inventory behavior begins by specifying a reason why firms hold inventories. Inventories can be held to improve production scheduling, to smoothen production in the face of fluctuating sales, to minimize stock out costs, to speculate on or hedge against price movements, to reduce purchasing costs by buying in quantity, to shorten delivery lags, and so on. It is evident that no model can explain the rich variety of inventory behavior; an explanation that is plausible for one industry or type of inventory may be implausible for another. Any abstract theory of inventory behavior must simplify and generalize.

Inventory management systems are mostly applied in manufacture settings, where its viability and potential economic value are duly attained. The average business has 30% of its working capital tied up in inventories, while as, about 70% of its investment is in the plant and equipment (Sharma, 1984). It is an admitted fact that the carrying of inventories involves an exorbitant cost. According to the findings of Professor Alford and Bangs, "the annual cost of carrying a production inventory averages approximately 25 percent of the value of the inventory". Everell Welch has also found that, "the annual carrying cost of inventory average somewhat 20 percent of the total inventory value, exhibiting a range of some 10 to 34 percent".

## **Framework for Inventory Models**

General framework for inventory models has five components --- (1) Demand, (2) Order Quantity, (3) Lead Time, (4) Safety Stock and (5) Cost of Possession of Inventories.

### **1. Demand**

Demand is an indispensable component of inventory management. Inventory decisions are always made with reference to the future demand. The decisions are taken when the manager is certain about the requirements in his department and again when the certainty is not ensured. The later state tells nothing about the likelihood of future levels.

### **2. Order Quantity**

After determining the quality to procure, the buyer must decide as how much to buy. Most material requirements are continuing requirements, cumulative or total needs. Such a system of requirements

is a far better guide than the day to day needs. In the procurement function, the term quality has a special meaning and just as there is a need for a most suitable and economical quality of material, there is also a requirement for a most economical ordering quantity. In this connection, to establish an economic order quantity two extreme views are encountered. They are –

- i) The production oriented solution i.e. to procure in very large lots in order to minimize the set-up and procurement costs
- ii) The treasurer, comptroller or accountant oriented solution which believes in production in very small lots to minimize the investment in stock.

In the above two extremes, none holds positively a better foothold, rather the answer is found between the two i.e. a combination of both. The economic order quantity should be established in such a way so as to balance all the variable costs of inventory. The variable costs of inventory are those which vary with the size of the order quantity. The objective of economic order quantity calculations is to determine an order quantity so that the total variable cost of inventory is kept to the minimum.

### **3. Lead Time**

There is always some interval between the time that the need for material is determined and order placed and the time this material is actually manufactured and delivered. This gap period is the lead time. The longer the lead time, the more time is required to get the results of production and vice versa. Inventories rise when lead time increases to maintain plant operations. However, no safety stocks would be required, if lead time is zero, as replenishment of the stock can be done immediately without any problem. In case the lead time is longer, it is more difficult to predict the usage or consumption, while the order is open. If the procurement is zero, it would be necessary to make any predictions. However, variations in lead time can be quite substantial.

### **4. Safety Stock; and**

In practice, the demand or usage is not generally known with certainty. Usually it fluctuates during a given period of time. Typically, the demand for finished goods inventory is subject to the greatest fluctuations. In contrast, the usage of raw materials inventory and in transit inventory, both of which depend upon the production scheduling, is much more predictable. In addition to demand or usage, the lead time required to receive delivery of inventory, once an order is placed is subject to some variation. Owing to these fluctuations, it is not feasible to allow expected inventory to fall to zero before a new order is anticipated, as the firm could easily do when usage and lead time were known with certainty.

Most firms maintain some margin of safety or safety stock to satisfy the demand at a particular time. In this connection, the order point is a predetermined signal which will indicate to the stock controller that he should consider the possibility of reordering the stock item in question. It is expressed in units of material as it is stocked and ordered. Whenever, an issue from stock causes the coverage of an item to drop below this pre determined point, the item should be investigated. The order point must be selected at a figure high enough so that the state will be sufficient to satisfy the maximum number of expected demands upon the stock during the period when the replacement stock is on order. In brief:

Order point = Maximum expected usage during lead time.

But the lead time cannot always be accurately determined and the usage during lead time cannot always be accurately forecasted. However, in cases where both these are absolutely predictable, the order point is simply stated:

Order point = Known requirements during lead time.

When material usage rates and/or each time are based on estimates rather than firm figures, it is expedient to make an upward adjustment of the order point. This process is done through the introduction of safety stock.

Order point = Expected lead time usage + safety stock

Thus, “safety stock” is referred to an extra inventory needed to protect against unrealizable and inaccurate forecasts. Excessive safety stocks boost inventory investment; inadequate safety stocks fail to have the desired protection against stock outs. Thus when forecasts of lead time and usage are perfectly accurate, then:

Maximum inventory = order quantity + safety stock

Minimum inventory = safety stock

Average inventory = 1/2 of the order quantity +  
Safety stock

(if usage is steady)

## 5. Cost of Possession of Inventories

It is an admitted fact that the carrying of inventories involves an exorbitant cost. According to the findings of Professor Alford and Bangs, “*the annual cost of carrying a production inventory average approximately 25 percent of the value of the inventory*”. Everett Welch has also found that, “*the annual carrying costs of inventory average somewhat over 20 percent of the total inventory value, exhibiting a range of some 10 to 34 percent*”. Since there are numerous costs involved in holding inventories, but the main costs involved in possession inventories are (a) Cost of Capital, (b) Insurance Cost, (c) Property Taxes, (d) Storage costs (e) Obsolescence and Deterioration (f) Acquisition cost (g) Purchase cost and (h) Ordering cost. These are briefly discussed in the following section.

- a) **Cost of Capital:** When a firm purchases production material and carry inventories, it leaves a lower capital available to the firm in the form of working capital for other purposes. To ascertain, whether the capital employed in inventories has been justified or not, the ratio of sales to inventory should be calculated. To raise this ratio, the company should either reduce inventories or increase sales without a corresponding increase in inventories. In this way the company’s earnings on investment will boost up. Since money tied up in inventories represent a ‘blockage of capital, therefore, it is logical for the company to charge a rate of interest equal to that it could have earned if invested somewhere else. The opportunity cost varies from company to company and from year to year. At the peak of the business cycle, carrying costs can be extremely high because very profitable alternative opportunities are available and vice-versa.
- b) **Insurance Cost:** The Company may be required to pay insurance charge to insure their assets against possible loss from fire and other forms of damage. This insurance cost is a 100 percent variable cost.
- c) **Property Taxes:** This cost may vary from state to state and is 100 percent variable in nature. Property taxes are levied on the assessed value of a firm’s property. The greater the inventory value, the greater the property value and consequently the higher is the firms tax bill.
- d) **Storage costs:** The most obvious cost is the storage cost, which includes rent for storage facilities. Salaries and personnel and related storage expenses are involved in it Storage cost, however vary with the type of material stored, type of storage facilities used and so on.
- e) **Obsolescence and Deterioration:** It is an admitted fact that whenever there are inventories, a certain percentage of a given inventory becomes absolute. No matter how diligently the warehouse manager guards against this occurrence, a certain amount of obsolescence and deterioration always takes place. Well managed companies ruthlessly weed out surplus inventory and dispose it off from the warehouse. “*The general rule is never to hold inventories for which there is no immediate need. And with new products being introduced at an increasing rate, the probability of occurrence of obsolescence is increasing accordingly. Consequently, the larger the inventory, the greater is the absolute loss from this source.*”
- f) **Acquisition cost:** Most companies carry inventory not because they need protection against stock-outs, but because of reducing their cost of acquisition. Since by ordering and buying large

quantities they reduce both purchase cost and order cost. Therefore, it becomes necessary to know the cost of writing a purchase order, the cost of stocking material and the quantity discount available for the item being purchased/

- g) **Purchase cost:** When a company buys in large quantities suppliers will cut their prices because their costs are lower when they get a simple large order instead of a number of small orders. This enables them not only to reduce their administrative expenses but by manufacturing in larger lots they even reduce unit cost of production. A larger purchase order also increases buyer's bargaining power and it is easier to wrangle concerns from suppliers.
- h) **Ordering cost:** Besides, these larger orders also reduce most other costs of acquisition e.g. the cost of making the purchase, excluding receiving, and paying for the material, interplant and intra plant transportation, packing and so on. However, ordering cost is insignificant only with purchases of very high value. Order costs may be substantially high if the purchase lots are in small items.

However, for the proper management of inventories, various techniques have been developed. The important ones are discussed as under:-

### 1. ABC Analysis

ABC (always better control) or CIE (control by importance and exception) is an analytical approach aimed at keeping the investment low and also avoiding the stock out of critical items at the same time.

A stock out of production parts and materials can be costly, production may be held up if either items is out of stock. Safety stocks almost always are a better value for low cost items they are far expensive ones. Modern inventory control system takes this into account by classifying items by value of usage. The high value items have lower safety stocks, because the cost of protection is so high. However, the low – value items carry much higher safety stocks. This necessitates the controlling manager to recognize the rupee importance of each individual inventory items. Each item should be studied in terms of its price, usage and lead time as well as specific procurement or technical problems. On this basis, it would be easier to allocate departmental effort and expense to tasks of controlling thousands of inventory items.

ABC analysis is a basic analytical management tool which enables top management to place the efforts where the results will be greatest. This technique, popularly known as 'Always Better Control or the Alphabetical Approach' provides maximum overall protection against stock outs for a given investment in safety stocks. This analysis reveals a measure of the inventory importance of each component helping to put 'first things first'. It is an analytical approach that provides "the most control for the least amount of controlling.

Herbert J. Richmond designates this plan as proportionate Value Analysis (PVA). The procedure for ABC analysis consists of the following steps:-

- a. Prepare a list of all items to be held in inventory
- b. Average the items in order to value to be spend in descending order
- c. Assign serial numbers to items as arranged above
- d. Computer for each items percentage proper in the total for: (a) total cost – total cost of each item divided by total cost of all material, (b) items – number of items divided by total number of items
- e. Convert simple percentage into cumulative percentage both for the items and value consumption
- f. The items covering upto certain percentage may be 65 percent of total consumption in value may be considered to be A items; the next set of items whose aggregate value covers say 20 percent of the total may be considered as B items; and the remaining set of items whose

aggregate value covers by 15 percent of the total may be put under C category. Finally find also the percentage of A, B and C group items in relation to total items.

The Table 3.1 exhibits the comparative importance of A, B and C group items:-

<b>A</b>	<b>B</b>	<b>C</b>
<b>Close control</b>	<b>Moderate control</b>	<b>Loose control</b>
Budgeted almost on hand to mouth approach	Based on past usage	When supply gets low, order more
Close check on schedule revision	Some check on change in needs	No check against needs
Continual expediting	Expediting for prospective shortage	No expediting
Low safety stocks	Larger safety stocks	Large safety stocks
Keep record of receipt and use	Keep record of receipt and use	No record and less paper work

After throwing light on ABC analysis and its uses, however, there are various other techniques which have come forth from time to time in order to arrive at a better control in inventory management. They are discussed in the following section.

## 2. The HML Classification

This method is similar to ABC classification. But in this case instead of the consumption value of items, the unit value of the item is considered. As the name itself implies, the materials are classified according to their unit value as high, medium or low valued items. The cut off points will depend on the individual items. For example, kerosene will be a low value item for a jeweler and a high value item for a shopkeeper. However, the focus in this classification is so directed as to control the purchase prices.

## 3. The XYZ Classification

The XYZ Classification has the value of inventory stored as the basis of differentiation. This exercise is usually undertaken once a year during the annual stock taking exercise. X items are those whose inventory values are high, while Z items are those whose inventory values are low. Understandably, Y items fall in between these two categories. This classification helps in identifying the items which are being extensively stocked.

## 4. The VED Classification

The VED classification is applicable largely to spare parts. Spares are classified as vital, essential and desirable. This implies that V class of spares have to be stocked adequately to ensure the operation of the plant because by definition the non-availability of vital spares can cause havoc and stop the wheels of organization. Some risk can be taken in respect of the E class of spares. Stocking of desirable (D) spares can even be done away with if the lead time for their procurement is low. However, it is essential that this classification is done by the technical department or by those in charge of the maintenance of the plant. This classification can be very helpful to capital intensive process industries. A combination of XYZ and VED methods can give an idea of what are the items that should be disposed off so as to trim the inventory.

## 5. The SDE Classification

The SED classification is one where the materials are sorted as scarce to obtain or difficult to obtain. This classification is primarily directed towards controlling purchase, lead – zinc and related supply source problems.

## 6. The GOLF Classification

Under this classification, materials are classified according to the nature of suppliers. The nature of suppliers will determine the quality, continuity of supply, lead time, payment terms and clerical work involved, G, category covers Government supplier. O, category implies open suppliers, who usually form the bulk of suppliers. Local suppliers i.e. L category are those from whom cash purchases can be made. And, lastly F category refers to the foreign suppliers.

## 7. The Limit Technique

A technique called LIMIT (Lot Size Inventory Management Interpolation Technique) has been developed to make it possible to attain the economics of the EOQ concept and to study the alternatives available in balancing ordinary and inventory carrying costs. This technique was developed as part of a special project for the American Production and Inventory Society, Chicago in the year 1963.

Limit is designed to handle a family of items which passes over common manufacturing facilities. All the parts that pass through a screw machine, department or a milling machine department or all parts purchased by one buyer would be logical groups to be handle with LIMIT.

## 8. Two Bin System

The oldest and simplest is the “two bin system”. One bin holds a reserve of material equal to the amount that will normally be consumed during the lead time, plus an extra amount for safety stock. The other holds the balance of the inventory. When stock in the second bin is used up, the order point is reached. A clerk requisitions a new supply of material and then draws on the reserve for his needs. When the order is delivered, the reserve supply is brought up to its former level, and the balance of the order is put into the other bin to be drawn on for immediate needs.

The two bin system is best suited for items of low value, fairly consistent usage and short lead time. It is most commonly used for office supplies. And in smaller plants it also is used for maintenance, repair and operating supplies. It rarely is suitable for production materials because it does not provide any record of stock on hand and is not sensitive to changes in demand or lead time.

The solution of the inventory problem is to find the approximate levels for holding inventories and the ordinary sequence and the quantities so that the total cost incurred is minimized. The demand and supply conditions impose the constraints within which the relevant costs have to be optimized. The three conditions can be termed as the demand being certain, risky and uncertain respectively. On the supply front, there are two possibilities which can be termed as static, if only a single supply is possible during the consumption period; and dynamic if otherwise.

## 9. Economic Order Quantity (EOQ) Concept

Economic order quantity is referred to that size of order which gives maximum economy in purchasing the materials. It is also known as optimum or standard order quantity or EOQ offers solutions to inventory problems. The concept of EOQ is equally more applicable to raw materials, storage of finished goods and in transit inventories. Economic order quantity concept helps in finding approximate levels for holding inventories. It facilitates the fixation of ordering sequence and the quantities so as to minimize the total material cost. Thus, before taking a decision on economic order quantity, the inventory cost are considered and analyzed threadbare. EOQ is the point of minimum cost at which the ordering cost will be just equal to the carrying cost such that neither excess material is ordered, nor too many orders are placed for the same material during a period in time. This also depends upon the nature and complexity of production etc. One of the formulae for calculating EOQ is as:

When:

Q = Ideal purchase quantity

S = Cost of ordering

D = Annual usage or demand in units

I = Inventory carrying cost expressed as a percentage of annual inventory

C = Unit cost of material

Then:

$$EOQ = \sqrt{\frac{2DS}{CI}}$$

OR

$$EOQ = \sqrt{\frac{2 \times (\text{Annual usage or demand in units}) \times (\text{order cost in re - order})}{(\text{Unit cost of material in Re. unit}) \times (\text{carrying cost in \% year})}}$$

Where

$$\begin{aligned} (\text{Inventory carrying cost}) &= (\text{Average Inventory}) \times \\ & \quad (\text{Unit cost of material}) \\ & \quad \times (\text{Inventory carrying cost in percent per period}) \end{aligned}$$

And where:

$$\text{Annual Set - up cost} = \frac{DS}{Q}$$

From the discussion, the various concepts relating to inventory and its management are cleared. The conceptual clarity is essential for understanding the subject of inventory management in its right perspective. How the inventory concepts have been adopted in the woolen textile industry of Kashmir and how various techniques of inventory management are being followed are the issues which have been examined in the next chapter.

#### **10. Inventory turnover ratio:**

A ratio showing how many times a company's inventory is sold and replaced over a period. The days in the period can then be divided by the inventory turnover formula to calculate the days it takes to sell the inventory on hand or 'inventory turnover days'

Generally calculated as:

$$\text{Inventory Turnover} = \frac{\text{Cost of sales}}{\text{Average Inventory}}$$

### **The Textile Industry**

Almost every developing nation has textile manufacturing which is among the first industries to be established. The textile industry is primarily concerned with the production of yarn, and cloth and then the subsequent designing or manufacture of clothing and their distribution. There is such a diverse product and application range of textiles, the type of processing used is highly variable and depends on site-specific manufacturing practices.

In 2002, textiles and apparel manufacturing accounted for \$400 billion in global exports, representing 6% of world trade and 8% of world trade in manufactured goods. In the beginning of 21st century, the largest importing and exporting countries were developed countries like



European Union, the United States, Canada and Japan. The countries with the largest share of their exports in textiles and apparel are Bangladesh( 85.9%) ,Macau( 84.4%), Cambodia(72.5%), Pakistan(72.1%), El Salvador( 60.2%), Mauritius(56.6%), Sri Lanka( 54.3%),Dominican Republic( 50.9%), Nepal( 48.7%), Tunisia( 42.4%).

### **Statement of the Problem:**

Inventories have come to be recognized as a vital problem area needing top priority. Apart from fire fighting and adhoc measures, hardly any organized approach seems to be in vogue in most of our enterprises. For tangible results on sustained basis, the basic cause at the root of the problem needs to be identified and tackled with efficiency. Inventory control thus deserves utmost attention. Inventory control is a technique of maintaining stock at an optimum level. The reason of carrying inventories is to ensure regular supply of materials as and when required. Insufficient inventories hamper production process and mitigate sales volume. On the other hand, excessive inventories tie up working capital and boost up carrying costs. So the necessity is to strike balance between stock out and excessive stock. It is essentially important to maintain the inventory level in the sector which is a fast growing sector all over the world.

The process of inventory management has gained importance all over the world, in India with the increase in the size of business enterprise, complex production technology and the adoption of professional management techniques inventory management has become a necessity. India has 1227 textile mills with 29 million spindles. While yarn is mostly produced in the mills, fabrics are produced in the power loom and handloom sectors as well. The industry continues to be predominantly based on cotton; 65% of raw material consumed is cotton. One estimate is that in India over 60% of the spindles are more than 25 years old. Obsolete machinery leads to low output and poor quality of goods. As a result Indian textile industry is facing problems in facing global competition ( Ksudhaman, The Hindu). The present study is aimed to explore the researches on inventory related issues keeping in view the following objectives:

### **Objectives**

1. To make an in-depth research and literature review of inventory management systems with special reference to Textile Industry.
2. To examine the Inventory management systems presently prevalent in the textile industry and to examine the weakness, if any.

### **Literature Review**

**Richard A. Lancioni & Keith Howard-1978** in their study considers the inventory management as an extremely important function to any business, the inadequacies in control can result in serious problems. If inventories are managed in an inefficient manner, it is likely to result in delays in production, dissatisfied customers, or curtailment of working capital.

**Mohammad Morshedur Rahman-2011**, says that the textiles Industry plays a vital role in the socio-economic development of Bangladesh, but the profitability of this industry is not satisfactory. He studied whether the profitability is affected by Working Capital Management.

Ratio Analysis, Correlation Matrix and Regression Analysis have been used in his study to show Profitability, Working Capital position, correlation between them and the impact of Working Capital on Profitability respectively. Annual Reports and official records as well as primary data collected through questionnaire were the sources of data. His study observed that profitability and Working Capital Management position of the Textiles Industry are not satisfactory which revealed that Correlation exists between Working Capital Management and Profitability. His study also shows that Working Capital Management has a positive impact on Profitability.

**Md. Mazedul Islam, Adnan Maroof Khan and Md. Monirul Islam-2013**, In their study they have mentioned that the importance of the textile industry in the economy of Bangladesh is very high. The garments manufacturing sector earned \$19 billion in the year to June 2012, one of the impoverished nation's biggest industries. Currently the textile industry in Bangladesh is facing great challenges in its growth rate. The major reasons for these challenges can be the global recession, unfavorable trade policies, internal security concerns, the high cost of production due to increase in the energy costs, different safety issues specially fire, etc. With an in-depth investigation they found that the Bangladesh textile industry can be brought on top winning track if government and others individuals takes serious actions in removing or normalizing the above mentioned hurdles. Additionally, the government should provide subsidy to the textile industry, minimize the internal dispute among the exporters, withdraw the withholding and sales taxes etc. Purchasing new machinery or enhancing the quality of the existing machinery and introducing new technology can also be very useful in increasing the research and development (R and D) related activities that in the modern era are very important for increasing the industrial growth of a country.

**Shahid Ali-2011**, He has studied the association between working capital management and the profitability of textile firms in Pakistan. Efficiency of working capital management is reflected by three variables, cash conversion efficiency, days operating cycle and days of working capital. We use return on assets, economic value added, return on equity, and profit margin on sales as proxies for profitability. A balanced panel dataset covering 160 textile firms for the period 2000–05 is analyzed and he estimates an ordinary least squares model and a fixed effect model. Return on assets is found to be significantly and negatively related to average days receivable, positively related to average days in inventory, and significantly and negatively related to average days payable. Also, return on assets has a significant positive correlation with the cash conversion cycle, which would suggest that a longer cash conversion cycle is more profitable in the textiles business. The findings of the regression analysis show that average days in inventory, average day's receivable, and average days payable have a significant economic impact on return on assets. The findings of the fixed effect model reveal that average days in inventory and average day's receivable both have a significant impact on return on assets.

**Mehrunisa Sajjad and Khuram Shahzad Bukhari** - The study done in Pakistan presents an in-depth analysis of how cash management, inventory management and trade credit management practices affects the Working Capital Management in a local spinning, weaving and composite units' setting and the way they impact the firm's profitability. They observed that with relatively poor cash management and inventory management practices, textile companies have remarkably better trade credit management arrangements. Larger companies have superior cash management, inventory management and trade credit management as compared to medium and smaller units. Due to absence of inventory control systems in majority of the firms with no effective re-ordering techniques, there appears a serious need to review and strengthen the inventory management policies and based on revised inventory controls an appropriate re-

ordering system should be designed. Textile companies are remarkably better at trade credit management and most of the companies have special mechanisms to expedite collections and cheques. Putting it together, larger spinning, weaving and composite units have superior working capital management practices as compared to the smaller and medium textile units (spinning, weaving and composite). The dilemma of the industry is the mindset of managers always relying on past experience and traditional judgment. A very few have adopted the sophisticated techniques for cash management, inventory management and trade credit management. All components have a significant impact on earnings per share and EBIT of the respective organization as illustrated by linear regression analysis with cash management having the strongest impact and are found to be critical decisive in the success or failure of a textile firm. Their research findings are likely to be beneficial for the corporate decision makers of the textile industry, financial institutions and policy makers in Pakistan in order to execute the most favorable strategies to support industrial growth.

**HA, Mwansale, FJ, Sichona, RRJ, Akarro-2011**, They examined inventory situation at Urafiki Textile Mills Co Ltd in Dar-es-Salaam, Tanzania and tried to develop the Economic Order Quantity (EOQ) model that will be used to determine number of units of an item to order at a time and the re-order point ( $r$ ), that is the level to which stocks of items are allowed to fall before ordering other items, for raw materials. The resulting EOQ for each raw material is compared to the actual ordered quantities so as to see whether there is any relationship between them in operational cost reduction. Their study used cross section secondary data from Urafiki. They used normal distribution test to compare operational cost reduction. The use of Excel was made to find EOQ and the re-order point. Their result shows that the relationship between the EOQs and the ordered quantities at Urafiki in terms of operational cost reduction was significant. Therefore, it is recommended that in order to manage inventory effectively, Urafiki needs to employ inventory control methods such as the EOQ model to obtain reasonable ordered quantities for its raw materials.

**Dr. T.S Devaraja-2011**, India is the world's 2<sup>nd</sup> largest producer of textiles and garments after China. It is the world's third largest producer of cotton—after China and the USA—and the second largest cotton consumer after China. The Indian textile industry is as diverse and complex as country itself and it combines with equal equanimity this immense diversity into a cohesive whole. The fundamental strength of this industry flows from its strong production base of wide range of fibres / yarns from natural fibers like cotton, jute, silk and wool to synthetic /man-made fibres like polyester, viscose, nylon and acrylic. The growth pattern of the Indian textile industry in the last decade has been considerably more than the previous decades, primarily on account of liberalization of trade and economic policies initiated by the Government in the 1990s. The relative ease of setting up clothing companies, coupled with the prevalence of developed-country protectionism in this sector, has led to an unparalleled diversity of garment exporters in the third world. Apparel is an ideal industry for examining the dynamics of buyer-driven value chains.

**Donald S. Allen-1995**, His study support the anecdotal evidence that inventory management methods in the United States have changed significantly over the past decade or two, which is evident in the reduced business inventory-to-sales ratio, driven almost entirely by lower inventories of work-in-process, and materials and supplies rather than finished goods. The impact of these changes in inventory management techniques on business cycles is ambiguous. All other things being equal, inventory management innovations should reduce the probability of unintended accumulation. But as long as firms overestimate or underestimate future demand, inventory cycles will persist. And if cutbacks in production are required to reduce inventory then

the resulting reduction in income could result in lower demand and further inventory buildup. Inventory management innovations are not a panacea for all the business cycles. In the long run these innovations in Inventory management can contribute to a faster response of production to changes in demand. It can in turn reduce the boom-bust cycle in the economy.

**Donald S. Allen-1997**, The common assumption is that firms use inventories to smooth production. Like his previous research based on aggregate data, his research at the level of individual companies fails to confirm this hypothesis, although select firms showed evidence of seasonal smoothing. But the results do confirm the stylized empirical regularity that production varies more than sales, both at the firm level and in the aggregate. One possible explanation of the failure to confirm smoothing is that increased demand prompts firms to raise their inventory targets levels; thus “planned” inventory increases are positively correlated with sales. Unplanned inventory changes, which would reflect the buffer stock motivation, are negatively correlated with sales but insufficient to make the variance of production less than that of sales. In the buffer stock test of the correlation between changes in sales and changes in inventory, most firms’ showed negative correlations. This finding is consistent with the idea that inventories act as a buffer stock to unexpected changes in sales. The negative correlation between changes in sales and changes in inventory may be a better test of whether buffer stock movement is prompted by random demand in the presence of partial adjustment and serially correlated demand. Thus result also seems to suggest that many industries may be making partial adjustments in their inventories.

**Pollution Prevention In The Textile Industry Developed By:U.S. Epa/Semarnap Pollution Prevention Work Group-1996**,The work group study reveals that properly controlling of raw materials, intermediate products, final products, and wastes is a significant way to minimize pollution. Wastes may consist of either raw materials that are out of date, no longer used, or unnecessary; or final products that are no more required or damaged. Including wastes in an inventory program can make them more recoverable. Improving inventory control ranges from simple modifications in the procedure of ordering materials to just-in-time (JIT) manufacturing techniques. *Improved inventory control can reduce material expenses and reduce the waste that is generated, and its associated costs.*

The following changes can improve inventory management:

- Purchase only the amount of material needed.
- Review materials for hazardous content, and examine alternatives that are less hazardous.
- Track and control the use of materials to reduce excess use.
- Designate specific employees/ departments as responsible for the purchase and disposition of supplies and material.

**Ian M.Taplin-2006** found while studying the EU textile and clothing industry, that clothing proves more robust in retaining an employment presence than the more capital-intense textile sector. This is surprising since labor intense industry is expected to suffer more from intensified global competition than capital intense ones. Job losses continue in both sectors but firms are innovating in restructuring practices to remain competitive and responsive to buyer pressure. Technological innovation and the pursuit of niche markets plus increased outsourcing are key responses. Thus among all the pressures they leave no scope for internal inefficiencies within the firm.

**Pawan Kumar-1996**, Inventories are viewed by most of the business world as a large potential role and not as a measure of wealth as was prevalent in old days. The inventory stocked in excess of demand may lead to drastic price cuts, so as to be saleable before it becomes worthless because of obsolescence. The inventory stocked less than the demand may lead to the business out of the market. There is a constant fear in the minds of businessmen because of uncertainty in the market situations, whether to stock or not to stock. With rather tight monetary market, optimization of resources through proper inventory control becomes one of the major challenges for the material managers in every organization. Widening gulf between theory and practice has become remarkable phenomena in this age of science and technology. When the frontiers of knowledge are widening and the theory is developing at fast rate, the practice is lagging far behind. This is probably true about all branches of knowledge and especially true for inventory management area. Inventories play essential and pervasive role in almost every sector.

**Lee-in Chen Chiu-2007**, After 51 years of Japanese colony, starting 1945, Taiwan revitalized her textile industry via six stages: (1) recovery, (2) cotton product development, (3) export expansion and emerging product scope, (4) growth, (5) maturity and upgrading of technology, and (6) transformation, outward investment, and innovation. During the developing process, the role of government policies, such as investment friendly taxation and environment; development of small and medium sized enterprises; textile specific policy/regulation and institutions; development of complementary industries and a reasonable labour market and regulations play the important role. Current manufacturing strength has shifted to cross-strait division of labour in China and Southeast Asian countries. How to deal with the post quota era of changing WTO rules (e.g. rules of origin) will be the critical factors in influencing the success of ASEAN + China economic integration and the competitiveness of Taiwan's textile industry.

**Dan M. Becker- and Stephen Stanley-1992** stated that with the advent of the computer and changes in business management techniques it is believed that there is an improvement in inventory control, which is evident as most analysts cite the decline in the ratio of inventories to sales in manufacturing. The improved inventory control implies a faster adjustment of inventories to changes in sales as well as a decline in the average ratio of inventories to sales. There are other goods-stocking sectors to consider besides manufacturing. In contrary to widely held opinion, improved inventory control can result in increased, rather than reduced, volatility in inventory investment. The question of whether inventory control has improved is an empirical one; the resolution has important implications for the business cycle because recessions largely turn on the behavior of inventory adjustments. The findings provide clear evidence of improved inventory control in manufacturing, both in finished goods stocks and in inventories of materials and supplies and work in progress. For retail and wholesale trade, the results are mixed. Finally, they seek to determine empirically what effect these refinements have had on inventory investment volatility. Their findings show that, contrary to popular belief, investment volatility has increased in both the manufacturing and trade sectors.

**Gerald Ochieng Ondiek-2012**, The study has examined the recognition Kenyan manufacturing firms are giving to materials management and the benefits of adopting good materials management practices since long-term success and survival of any firm depends on how well their costs are managed. The study surveyed medium and large manufacturing firms based in Nairobi, Kenya. A stratified random sampling technique was used to select 55 firms, out of those

23 percent of the firms were found to recognize materials management as they had an in-charge reporting directly to the chief executive officer. However, generally Kenyan firms were not practicing professionalism in materials management and owing to the huge amount of resources they were committing on materials related activities. A lot of emphasis need to be directed towards materials management and it should be recognized as a top management function.

### **Conclusion:**

While going through the available literature it was found that almost each country that has a growing textile sector is trying to tackle with the problem of deciding the efficient Inventory level. Many researchers have shown interest in the field of inventory management and have come up with beautiful work. As the field of inventory management is not very old, so many aspects are yet believed to be explored. The textile sector is again a growing sector which gained its importance in recent past. Not much amount of work has been done on this area of managing inventories in Textile sector. So it leaves an ample scope for this study.

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