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Operational Challenges in Inventory Management

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Abstract

In any business or organization, all functions are interlinked and connected to each other and are often overlapping. Some key aspects like supply chain management, logistics and inventory form the backbone of the business delivery function. Therefore, these functions are extremely important to marketing managers as well as finance controllers. Inventory management is a very important function that determines the health of the supply chain as well as the impacts the financial health of the balance sheet. Every organization constantly strives to maintain optimum inventory to be able to meet its requirements and avoid over or under inventory that can impact the financial figures. Inventory is always dynamic. Inventory management requires constant and careful evaluation of external and internal factors and control through planning and review. Most of the organizations have a separate department or job function called inventory planners who continuously monitor, control and review inventory and interface with production, procurement and finance departments.

Keywords: Operational Challenges, Inventory Management

1.0 INTRODUCTION

Inventory is an idle stock of physical goods that contain economic value, and are held in various forms by an organization in its custody awaiting packing, processing, transformation, use or sale in a future point of time. Any organization which is into production, trading, sale and service of a product will necessarily hold stock of various physical resources to aid in future consumption and sale. While inventory is a necessary evil of any such business, it may be noted that the organizations hold inventories for various reasons, which include speculative purposes, functional purposes, physical necessities etc. From the above definition the following points stand out with reference to inventory: All organizations engaged in production or sale of products hold inventory in one form or other, inventory can be in complete state or incomplete state, inventory is held to facilitate future consumption, sale or further processing/value addition and all inventoried resources have economic value and can be considered as assets of the organization.

1.1 Different Types of Inventory

Inventory of materials occurs at various stages and departments of an organization. A manufacturing organization holds inventory of raw materials and consumables required for production. It also holds inventory of semi-finished goods at various stages in the plant with various departments. Finished goods inventory is held at plant, FG Stores, distribution centers etc. Further both raw materials and finished goods those that are in transit at various locations also form a part of inventory depending upon who owns the inventory at the particular juncture. Finished goods inventory is held by the organization at various stocking points or with dealers and stockiest until it reaches the market and end customers. Besides Raw materials and finished goods, organizations also hold inventories of spare parts to service the products. Defective products, defective parts and scrap also forms a part of inventory as long as these items are inventoried in the books of the company and have economic value.

Types of Inventory by Function

INPUT	PROCESS	OUTPUT
Raw Materials	Work In Process	Finished Goods
Consumables required for processing. Eg : Fuel, Stationary, Bolts & Nuts	Semi-Finished Production in various stages, lying with various departments	Finished Goods at Distribution Centers throughout Supply Chain

etc. required in manufacturing	like Production, WIP Stores, QC, Final Assembly, Paint Shop, Packing, Outbound Store etc.	
Maintenance Items/Consumables	Production Waste and Scrap	Finished Goods in transit
Packing Materials	Rejections and Defectives	Finished Goods with Stockiest and Dealers
Local purchased Items required for production		Spare Parts Stocks & Bought Out items
		Defectives, Rejects and Sales Returns
		Repaired Stock and Parts
		Sales Promotion & Sample Stocks

2.0 INVENTORY MANAGEMENT CONCEPTS

Inventory management and supply chain management are the backbone of any business operations. With the development of technology and availability of process driven software applications, inventory management has undergone revolutionary changes. In the last decade or so we have seen adaptation of enhanced customer service concept on the part of the manufacturers agreeing to manage and hold inventories at their customer's end and thereby effect Just in Time deliveries. Though this concept is the same in essence different industries have named the models differently. Manufacturing companies like computer manufacturing or mobile phone manufacturers call the model by name VMI - Vendor Managed Industry while Automobile industry uses the term JIT - Just In Time whereas apparel industry calls such a model by name - ECR - Efficient consumer response. The basic underlying model of inventory management remains the same. Let us take the example of DELL, which has manufacturing facilities all over the world. They follow a concept of Build to Order where in the manufacturing or assembly of laptop is done only when the customer places a firm order on the web and confirms payment. Dell buys parts and accessories from various vendors.

DELL has taken the initiative to work with third party service providers to set up warehouses adjacent to their plants and manage the inventories on behalf of DELL's suppliers. The 3PL - third party service provider receives the consignments and holds inventory of parts on behalf of Dell's suppliers. The 3PL warehouse houses inventories of all of DELL's suppliers, which might number to more than two hundred suppliers. When DELL receives a confirmed order for a Laptop, the system generates a Bill of material, which is downloaded at the 3PL, processed and materials are arranged in the cage as per assembly process and delivered to the manufacturing floor directly. At this point of transfer, the recognition of sale happens from the Vendor to Dell. Until then the supplier himself at his expense holds the inventory. Let us look at the benefits of this model for both Dell as well as Its Suppliers:

1. With VMI model, Dell has reduced its inbound supply chain and thereby gets to reduce its logistics and inventory management costs considerably.

2. DELL gets to postpone owning inventory until at the time of actual consumption. Thereby with no inventories DELL has no need for working capital to be invested into holding inventories.

3. DELL does not have to set up inventory operations and employ teams for operations as well as management of inventory functions.

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Supplier Benefits

1. Supplier gets to establish better relationship and collaboration with DELL with long-term business prospect.

2. By agreeing to hold inventories and effect JIT supplies at the door to DELL, supplier will be in a better position to bargain and get more business from DELL.

3. With VMI model, supplier gets an opportunity to engage in better value proposition with his customer DELL.

4. Supplier gets confirmed forecast for the entire year with commitments from DELL for the quantity off take.

5. VMI managed is managed by 3PL and supplier does not have to engage himself in having to set up and manage inventory operations at DELL's premise.

6. 3PL Managed VMI holds inventories of all suppliers thereby charges each supplier on per pallet basis or per sq.ft basis. Supplier thereby gets to pay on transaction basis without having to marry fixed costs of inventory operations.

2.1 Need for Inventory Management

Inventory is a necessary evil that every organization would have to maintain for various purposes. Optimum inventory management is the goal of every inventory planner. Over inventory or under inventory both cause financial impact and health of the business as well as effect business opportunities. Inventory holding is resorted to by organizations as hedge against various external and internal factors, as precaution, as opportunity, as a need and for speculative purposes.

2.1.1 Reasons why organizations maintain Raw Material Inventory

Most of the organizations have raw material inventory warehouses attached to the production facilities where raw materials, consumables and packing materials are stored and issue for production on JIT basis. The reasons for holding inventories can vary from case to case basis.

1. Meet variation in Production Demand: Production plan changes in response to the sales, estimates, orders and stocking patterns. Accordingly, the demand for raw material supply for production varies with the product plan in terms of specific SKU as well as batch quantities. Holding inventories at a nearby warehouse helps issue the required quantity and item to production just in time.

2. Cater to Cyclical and Seasonal Demand: Market demand and supplies are seasonal depending upon various factors like seasons; festivals etc and past sales data help companies to anticipate a huge surge of demand in the market well in advance. Accordingly, they stock up raw materials and hold inventories to be able to increase production and rush supplies to the market to meet the increased demand.

3. Economies of Scale in Procurement: Buying raw materials in larger lot and holding inventory is found to be cheaper for the company than buying frequent small lots. In such cases one buys in bulk and holds inventories at the plant warehouse.

4. Take advantage of Price Increase and Quantity Discounts: If there is a price increase expected few months down the line due to changes in demand and supply in the national or international market, impact of taxes and budgets etc, the companies tend to buy raw materials in advance and hold stocks as a hedge against increased costs. Companies resort to buying in bulk and holding raw material inventories to take advantage of the quantity discounts offered by the supplier. In such

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cases the savings on account of the discount enjoyed would be substantially higher that of inventory carrying cost.

5. Reduce Transit Cost and Transit Times: In case of raw materials being imported from a foreign country or from a faraway vendor within the country, one can save a lot in terms of transportation cost buy buying in bulk and transporting as a container load or a full truck load. Part shipments can be costlier. In terms of transit time too, transit time for full container shipment or a full truck load is direct and faster unlike part shipment load where the freight forwarder waits for other loads to fill the container which can take several weeks. There could be a lot of factors resulting in shipping delays and transportation too, which can hamper the supply chain forcing companies to hold safety stock of raw material inventories.

6. Long Lead and High demand items need to be held in Inventory: Often raw material supplies from vendors have long lead running into several months. Coupled with this if the particular item is in high demand and short supply one can expect disruption of supplies. In such cases it is safer to hold inventories and have control.

2.2 Finished Goods Inventory

All Manufacturing and Marketing Companies hold Finished Goods inventories in various locations and all through FG Supply Chain. While finished Goods move through the supply chain from the point of manufacturing until it reaches the end customer, depending upon the sales and delivery model, the inventories may be owned and held by the company or by intermediaries associated with the sales channels such as traders, trading partners, stockiest, distributors and dealers, C & F Agents etc.

2.2.1 Why and when do Organizations hold Finished Goods Inventories?

1. Markets and Supply Chain Design: Organizations carry out detailed analysis of the markets both at national as well as international / global levels and work out the Supply Chain strategy with the help of SCM strategists as to the ideal location for setting up production facilities, the network of and number of warehouses required to reach products to the markets within and outside the country as well as the mode of transportation, inventory holding plan, transit times and order management lead times etc, keeping in mind the most important parameter being, to achieve Customer Satisfaction and Demand Fulfillment.

2. Production Strategy necessitates Inventory holding: The blue print of the entire Production strategy is dependent upon the marketing strategy. Accordingly, organizations produce based on marketing orders. The production is planned based on Build to stock or Build to Order strategies. While Build to Order strategy is manufactured against specific orders and does not warrant holding of stocks other than in transit stocking, build to Stock production gets inventoried at various central and forward locations to be able to cater to the market demands.

3. Market penetration: Marketing departments of companies frequently run branding and sales promotion campaigns to increase brand awareness and demand generation. Aggressive market penetration strategy depends upon ready availability of inventory of all products at nearest warehousing location so that product can be made available at short notice – in terms of number of hours lead time, at all sales locations throughout the state and city. Any non-availability of stock at the point of sale counter will lead to dip in market demand and sales. Hence holding inventories becomes a necessity.

4. Market Size, location and supply design: Supply chain design takes into account the location of market, market size, demand pattern and the transit lead time required to reach stocks to the market and determine optimum inventory holding locations and network to be able to hold inventories at national, regional and local levels and achieve two major objectives. The first

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objective would be to ensure correct product stock is available to service the market. Secondly stocks are held in places where it is required and avoid unwanted stock build up.

5. Transportation and Physical Barriers: Market location and the physical terrain of the market coupled with the local trucking and transportation network often demand inventory holding at nearest locations. Hilly regions for example may require longer lead-time to service. All kinds of vehicles may not be available and one may have to hire dedicated containerized vehicles of huge capacities. In such cases the will have to have an inventory holding plan for such markets. Far away market locations mean longer lead times and transportation delays. Inventory holding policy will take into account these factors to work out the plan.

6. Local tax and other Govt. Rules: In many countries where GST is not implemented, regional state tax rules apply and vary from state to state. Accordingly, while one state may offer a tax rebate for a particular set of product category, another state may charge higher local taxes and lower interstate taxes. In such cases the demand for product from the neighboring state may increase than from the local state. Accordingly inventory holding would have to be planned to cater to the market fluctuation. While in case of exports from the country of origin into another market situated in another country, one needs to take into account the rules regarding import and customs duties to decide optimum inventories to be held en route or at destination.

7. Production lead times: FG inventory holding becomes necessary in cases where the lead-time for production is long. Sudden market demand or opportunities in such cases require FG inventories to be built up and supplies to be effected.

8. Speculative gain: Companies always keep a watch on the economy, annual state budget, financial environment and international environment and are able to foresee and estimate situations, which can have an impact on their business and sales. In cases where they are able to estimate a increase in industry prices, taxes or other levies which will result in an overall price increase, they tend to buy and hold huge stocks of raw materials at current prices. They also hold up finished stock in warehouses in anticipation of an impending sale price increase. All such moves cause companies to hold inventories at various stages.

9. Avoid Certain Costs: Finally, organizations hold FG inventories to satisfy customer demand, to reduce sales management and ordering costs, stock out costs and reduce transportation costs and lead times.

2.3 Holding Inventories

Every business organization that is engaged in manufacturing, trading or dealing with salable products holds inventories in one form another. Inventory is held in the form of raw materials or in the form of salable goods. Since every unit of inventoried item has an economic value and is itemized in the books of account of the company, inventory can be considered to be an asset of the company. Inventory Management is a critical function performed by planners to balance the inventory holding so as to ensure that optimum inventory levels are maintained. Any excess inventory will result in incremental costs of maintaining inventory and affects the financials of the company as it blocks working capital. Under inventory on the other hand can seriously hamper the market share. Any customer order that is not fulfilled due to a stock out is not at all a good sign. Therefore, the responsibility of striking a fine balance in holding lean inventory calls for smart planning and continuous monitoring of the inventory levels coupled with quick decision-making. Due to the above factors all organizations generally tend to avoid holding inventories except at certain times.

It has been noticed that inventory buildup in process and manufacturing industries is often a sign of hidden problems, which lie underneath and are not visible at the surface level. In other words, one can say that to cover up inefficiencies in the internal systems, people build up inventories as safety stocks. Stock build up can occur as a solution to cover up supplier inefficiencies. If the vendors are not reliable

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and the flow of raw materials cannot be ensured, there results a trend to hold buffer inventories in the form of raw materials or semi manufactured Work in Process inventories. In other cases, inventory buildup can happen due to bad quality. The inventory cost increase and resultant inventory storage cost can be attributed to cost of quality. If the production is not consistent with quality, the goods produced will get rejected leading to an increase in rejected inventory. Secondly, to make up for the loss due to quality rejection, one would have to increase production and hold finished goods inventory.

In other cases, production delays can lead to buildup of inventories too. Production delays can be attributed to varied reasons such as bad design of the product, production layout inefficiencies, production stoppage due to breakdowns, Lengthy process times etc. Besides these causes, there could be many other problems related to people and management resulting in slackness on the shop floor, which can add to inventory holding at various stages. Such inventory build-ups not only block the working capital and increase un necessary cost of maintaining and storing the inventories, but also hide the problems which can cause serious threat to the business. Management should be watchful to identify any such inventory buildups and investigate into the root cause and solve such problems.

An inventory buildup at the raw material side as well as the finished goods side gives cause for worry to the finance controllers. Any non-moving inventory is a cause for concern because it not only blocks up the funds of the organization but the incremental cost of holding the inventory keeps increasing over a period of time and effect the bottom line figures. More importantly inventory over a period of time is susceptible to loss, theft, pilferage and shrinkage. It can also become obsolete and deteriorate over a period of time if not used within the shelf life. Hence inventory levels are always on the radar of not only finance controllers, but of the top management as well.

3.0 INDEPENDENT AND DEPENDENT DEMAND INVENTORIES

Inventory Management deals essentially with balancing the inventory levels. Inventory is categorized into two types based on the demand pattern, which creates the need for inventory. The two types of demand are Independent Demand and Dependent Demand for inventories.

Independent Demand: An inventory of an item is said to be falling into the category of independent demand when the demand for such an item is not Dependent upon the demand for another item. Finished goods Items, which are ordered by External Customers or manufactured for stock and sale, are called independent demand items. Independent demands for inventories are based on confirmed Customer orders, forecasts, estimates and past historical data.

Dependent Demand: If the demand for inventory of an item is Dependent upon another item, such demands are categorized as Dependent demand. Raw materials and component inventories are Dependent upon the demand for Finished Goods and hence can be called as Dependent demand inventories. Take the example of a Car. The car as finished goods is a held produced and held in inventory as independent demand item, while the raw materials and components used in the manufacture of the Finished Goods - Car derives its demand from the demand for the Car and hence is characterized as Dependent demand inventory. This differentiation is necessary because the inventory management systems and process are different for both categories. While Finished Goods inventories which is characterized by Independent demand, are managed with sales order process and supply chain management processes and are based on sales forecasts, the Dependent demand for raw materials and components to manufacture the finished goods is managed through MRP -Material Resources Planning or ERP - Enterprise Resource Planning using models such as Just in Time, Kanban and other concepts. MRP as well as ERP planning depends upon the sales forecast released for finished goods as the starting point for further action.

Managing Raw Material Inventories is far more complicated than managing Finished Goods Inventory. This involves analyzing and co-coordinating delivery capacity, lead times and delivery schedules of all raw material suppliers, coupled with the logistical processes and transit timelines involved in transportation and warehousing of raw materials before they are ready to be supplied to the production shop floor. Raw material management also involves periodic review of the inventory holding, inventory counting and audits, followed by detailed analysis of the reports leading to financial and management decisions.

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Inventory planners who are responsible for planning, managing and controlling Raw Material inventories have to answer two fundamental questions, which can also be termed as two basic inventory decisions.

a. Inventory planners need to decide how much of Quantity of each Item is to be ordered from Raw Material Suppliers or from other Production Departments within the Organization.
b. When should the orders be placed?

3.1 Inventory Costs

Inventory procurement, storage and management is associated with huge costs associated with each these functions. Inventory costs are basically categorized into three headings:

Ordering Cost: Cost of procurement and inbound logistics costs form a part of Ordering Cost. Ordering Cost is Dependent and varies based on two factors - The cost of ordering excess and the Cost of ordering too less. Both these factors move in opposite directions to each other. Ordering excess quantity will result in carrying cost of inventory. Whereas ordering less will result in increase of replenishment cost and ordering costs. These two above costs together are called Total Stocking Cost. If you plot the order quantity vs the TSC, you will see the graph declining gradually until a certain point after which with every increase in quantity the TSC will proportionately show an increase. This functional analysis and cost implications form the basis of determining the Inventory Procurement decision by answering the two basic fundamental questions - How Much to Order and When to Order. How much to order is determined by arriving at the Economic Order Quantity or EOQ.

Carrying Cost: Inventory storage and maintenance involves various types of costs namely: Inventory Storage Cost and Cost of Capital. Inventory carrying involves Inventory storage and management either using in house facilities or external warehouses owned and managed by third party vendors. In both cases, inventory management and process involves extensive use of Building, Material Handling Equipments, IT Software applications and Hardware Equipments coupled managed by Operations and Management Staff resources.

- Inventory Storage Cost: Inventory storage costs typically include Cost of Building Rental and facility maintenance and related costs. Cost of Material Handling Equipments, IT Hardware and applications, including cost of purchase, depreciation or rental or lease as the case may be. Further costs include operational costs, consumables, communication costs and utilities, besides the cost of human resources employed in operations as well as management.

- Cost of Capital: Includes the costs of investments, interest on working capital, taxes on inventory paid, insurance costs and other costs associate with legal liabilities.

The inventory storage costs as well as cost of capital is Dependent upon and varies with the decision of the management to manage inventory in house or through outsourced vendors and third party service providers. Current times, the trend is increasingly in favor of outsourcing the inventory management to third party service provides.

For one thing the organizations find that managing inventory operations requires certain core competencies, which may not be in line with their business competencies. They would rather outsource to a supplier who has the required competency than build them in house. Secondly in case of large-scale warehouse operations, the scale of investments may be too huge in terms of cost of building and material handling equipments etc. Besides the project may span over a longer period of several years, thus blocking capital of the company, which can be utilized into more important areas such as R & D, Expansion etc. than by staying invested into the project.

4.0 INVENTORY CLASSIFICATION

4.1 ABC Classification, Advantages & Disadvantages

Inventory is a necessary evil in any organization engaged in production, sale or trading of products. Inventory is held in various forms including Raw Materials, Semi Finished Goods, Finished Goods and Spares. Every unit of inventory has an economic value and is considered an asset of the organization irrespective of where the inventory is located or in which form it is available. Even scrap has residual economic value attached to it. Depending upon the nature of business, the inventory holding patterns may

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vary. While in some cases the inventory may be very high in value, in some other cases inventory may be very high in volumes and number of SKU. Inventory may be help physically at the manufacturing locations or in a third party warehouse location. Inventory Controllers are engaged in managing Inventory. Inventory management involves several critical areas. Primary focus of inventory controllers is to maintain optimum inventory levels and determine order/replenishment schedules and quantities. They try to balance inventory all the time and maintain optimum levels to avoid excess inventory or lower inventory, which can cause damage to the business.

4.1.1 ABC Classification

Inventory in any organization can run in thousands of part numbers or classifications and millions of part numbers in quantity. Therefore, inventory is required to be classified with some logic to be able to manage the same. In most of the organizations inventory is categorized according to ABC Classification Method, which is based on pareto principle. Here the inventory is classified based on the value of the units. The principle applied here is based on 80/20 principles. Accordingly, the classification can be as under:

A - Category Items Comprise 20% of SKU & Contribute to 80% of $ spend.
B - Category Items Comprise 30% of SKU & Contribute to 15% of $ spend.
C - Category Items Comprise 50% of SKU & Contribute to 5% of $ spend.
The above is only an illustration and the actual numbers as well as percentages can vary.

Example: Table of Inventory Listing by Dollar Usage Percentage.

Item	Annual Usage in No. Units	Unit Cost-$	Usage in Dollars	Percentage of Total Dollar Usage
1	5,000	1.50	7,500	2.9%
2	1,500	8.00	12,000	4.7%
3	10,000	10.50	105,000	41.2%
4	6,000	2.00	12,000	4.7%
5	7,500	0.50	3,750	1.5%
6	6,000	13.60	81,000	32.0%
7	5,000	0.75	3,750	1.5%
8	4,500	1.25	5,625	2.2%
9	7,000	2.50	17,500	6.9%
10	3,000	2.00	6,000	2.4%
Total			$254,725	100.0%

4.1.2 Advantages of ABC Classification

- This kind of categorization of inventory helps one manage the entire volume and assign relative priority to the right category. For Example, A Class items are the high value items. Hence one is able to monitor the inventory of this category closely to ensure the inventory level is maintained at optimum levels for any excess inventory can have huge adverse impact in terms of overall value.
- A Category Items: Helps one identify these stocks as high value items and ensure tight control in terms of process control, physical security as well as audit frequency.
- It helps the managers and inventory planners to maintain accurate records and draw management's attention to the issue on hand to facilitate instant decision-making.
- B Category Items: These can be given second priority with lesser frequency of review and less tightly controls with adequate documentation, audit controls in place.
- C Category Items: Can be managed with basic and simple records. Inventory quantities can be larger with very few periodic reviews.

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Example: Take the case of a Computer Manufacturing Plant; the various items of inventory can be broadly classified as under:

SKU Description	Classification of Inventory	Remarks
Processor Chips	A Class	Kept under High Value Storage/Asset Tracking / Access Control required
Memory Chips	A Class	Kept under High Value Storage/Asset Tracking / Access Control required
Hard Disk / Storage Media	A Class	Kept under High Value Storage/Asset Tracking / Access Control required
Software License	A Class	Kept under High Value Storage/Asset Tracking / Access Control required
Disk Drives	A Class	Normal Storage / Access Control Required
Cabinet / Case	B Class	Normal Procedures
Battery Pack	B Class	Normal Procedures
Monitor	A Class	Normal Storage / Access Control Required
Keyboard	B Class	Normal Procedures
Training Manuals	C Class	Minimal Procedures
Mouse	B Class	Normal Procedures
Stickers	C Class	Minimal Procedures
Screws & Nuts	C Class	Minimal Procedures
Power Cord	C Class	Minimal Procedures
Starter Assembly Pack-Instructions	C Class	Minimal Procedures

4.1.3 Disadvantages

- Inventory Classification does not reflect the frequency of movement of SKU and hence can mislead controllers.
- B & C Categories can often get neglected and pile in huge stocks or susceptible to loss, pilferage, slackness in record control etc.

4.2 Finished Goods Inventory Classifications and Terminologies

While inventory classification of raw materials for Inventory Management purposes follows ABC Classification, Finished Goods inventory is classified under additional categories based on various attributes including sales volumes/patterns, functional attributes and operational requirements.

4.2.1 Stock Category depending upon Sales Channels

Finished Goods at the very basic level is manufactured and stocked separately depending upon the Business Units as well as the Sales Channels.

1. A normal standard category common to most of the products is the classification of – Export SKU & Domestic SKU stocks. Along with FG Stocks exists a separate classification of spare parts and accessories under FG Inventory.

2. Many product categories classify inventory based on Sales Channels as under:

   SKUS for Institution Sales

SKUS for Channel Sale

SKUS for Direct Delivery

SKUS for Sales to Govt., Defense and NGO and other projects

a. The basic product may be the same, but depending upon the classification they may contain additional bundling or kitting items etc.
b. Computer Industry is a classic example, which follows the above classification in FG inventory.

3. Automotive Components and Products are categorized into:
    a. OE Supply SKU - SKUS, which are manufactured to supply to Original Equipment Manufacturers.
    b. After Market SKU - SKUS, which are manufactured to supply to Spares Market through Dealer Network.
    c. Exports - SKUS, which are manufactured for Export out of the Country.

4. FG Stock: Fast Moving, Slow Moving & Non Moving - FG Inventory is often categorized into Fast Moving, Slow Moving and Non Moving stocks indicating their frequency and volume of sales. This categorization is intended to serve the functional purpose of determining the sales performance of categories of Goods.

5. Bought Out Items SKU Category: All the FG goods marketed and sold by an organization need be manufactured by themselves. They could be sourcing items from other vendors or buying items from overseas markets. Global companies normally have plants spread over all continents and manufacture different categories of products. In such cases a particular countries requirement of certain products may be sourced from overseas factories of the company.

Inventory for such imported and bought out items is maintained under separate bucket to be able to identify them easily. Their valuation and costing and profit margins may be different from those of in house manufactured goods. Further imported Goods would have import duty and tax liabilities, which may be different from that of in house manufactured inventory. Example: Computers and Desktops are manufactured by Global MNCs like Dell, HP & Lenovo. They have established manufacturing facilities in various countries catering to the local and international markets. Typically, they produce few of the SKUS locally and the other products are sourced from overseas facilities. They also buy monitors, keyboard and accessories from OE Suppliers. These are considered bought out items in their inventory l listing.

6. Other functional categories of inventory: In warehouses, to facilitate operational processes as well as for ease of identification etc., inventory is categorized into many more classifications including but not limited to:
    a. Stock on Hold - Inventory that is frozen/blocked and cannot be released for sale or consumption.
    b. Scrap & Obsolete - Materials that are rejected, damaged and not usable or those that have crossed the shelf life and expiry date are categorized under scrap category.

When a particular SKU is no longer salable due to lack of demand and has become obsolete, it gets classified under obsolete stock and continues to be valued in the books of accounts.

4.3 Inventory Control - Inventory Audits and Cycle Counts

Any inventory of Raw materials, finished goods as well as Intermediate in process inventory has an economic value and is considered an asset in the books of the company. Accordingly any asset needs to be managed to ensure it is maintained properly and is stored in secure environment to avoid pilferage,

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loss or thefts etc. Inventory control assumes significance on account of many factors. First of all, inventory of raw materials as well as finished goods can run in thousands of SKU varieties. Secondly inventory can be in one location or spread over many locations. Thirdly inventory may be with the company or may be under the custody of a third party logistics provider. These factors necessitate inventory maintenance mechanisms to be devised to ensure inventory control. Inventory control is also required as an operational process requirement. Inventory is having two different dimensions to it. On one level it is physical and involves physical transactions and movement of inventory.

While on the other hand, inventory is recognizable by the book stock and the system stocks maintained. This necessitates inventory control mechanism to be implemented to ensure the book stocks and the physical stocks match at all times. Thirdly the inventory always moves through supply chain and goes through various transactions at various places. The number of transactions and handling that it goes through from the point of origin to the point of destination is numerous. Therefore, it becomes essential to control inventory and have visibility through the pipeline including transit inventory. Inventory control is exercised through inventory audits and cycle counts. An inventory audit essentially comprises of auditing the books stocks and transactions and matching physical stocks with the book stock.

Cycle counts: Cycle count refers to the process of counting inventory items available in physical locations. Depending upon the nature of inventory, number of transactions and the value of items, cycle count can be carried on periodically or perpetually.

1. Daily Cycle Count: Normally where the number of SKUs is very high coupled with high n umber of transactions and through put, daily cycle count is initiated, where in a certain percentage of locations or SKUs are counted on daily basis and physical stock is compared with system stock. By the end of the month all of the stocks would have been covered once in cycle count.

Inventory system throws up a count list based on an analysis of the movements of fast moving SKUs along with other attributes like value etc. In some of the system, inventory controllers can set up the attributes for each cycle count.

2. Quarterly & Half Yearly Cycle Counts: End of the sales quarter or end of half yearly sales, finished goods and spare parts are normally covered under inventory audit and a 100% cycle count is carried out.
3. Wall to Wall Cycle Count: End of financial year and closing of books entails doing wall to wall cycle count of all stocks lying in all locations and tallying with books of account. This is a mandatory audit requirement and until stock figures are reconciled, certified by auditors and published, New Year books of accounts cannot be started a fresh.

4.3.1 How the audit process works?

Except for daily cycle counts, all other cycle counts entail counting hundred percent of all the stocks by stopping all transactions during the counting period. System transactions are also frozen until the count is completed. Inventory system throws up count list with SKU number, description and location number. The operator goes to the location, checks the SKU, counts the qty available and updates the list, which is then fed into the system. The system reconciles the physical quantity with system quantity and throws up discrepancy report, which is further worked upon to tally and adjust inventory.

4.4 Factors Leading to Inventory Inefficiencies

In any company inventory management is one area that the managements always focus on when it comes to improving business efficiencies and cutting costs. An inventory reduction drive always yields results, which are visible and releases cash back into business. Does this mean that inventory management is inefficient? The answer can be a yes and a no.

Inventory management function is dependant upon physical operations involving multiple locations and agencies and processes. The inter dependence upon transactions which are sequential and parallel, renders inventory susceptible to inefficiencies occurring in operations, transactions, and documentation over a period of time.

Another possible factor that can hamper the inventory efficiencies is the system setup that is used to manage the inventory. Quite often one can find that the system setup and process defined in the system is not user friendly and cumbersome. An efficient system should define and guide the physical

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process as well as documentation process. The system process should in turn be developed based on the business process requirement. In many cases the operations are made to suit the system setup, which already exists in some basic form and not suited to the particular business process on hand.

Poor system setup that does not match with the shop floor warehouse set up renders operations in efficient. It is very common to come across complaints from users with regard to non-availability of features to work around the processes; at times processes are lengthy and cumbersome leading to operational delays. Non availability of different reports and loops and bugs in the system can often push the operations teams to find shortcut methods to bypass the system processes and carry on with the work, resulting in inventory inefficiencies as well as inefficient operations.

In cases where a company has outsourced the inventory management to a third party service provider, the inventory management complications increase manifold. You have the company's ERP or inventory system on one hand and the third part service providers inventory management system or warehouse system on the other hand. At any given point of time both have to be reflecting the same inventory accuracy and also match with physical stock available on shop floor, but this is not the case always. In cases where the systems are interfaced too inventory in one system cannot mirror the other and reconciling transactions between the two systems can be cumbersome and time consuming.

Health of the inventory accuracy as well as inventory management can also depend upon the inventory strategy of the company and its outlook. A few companies treat inventory to be a necessary evil and just about ensure processes are compliant and inventory audits are regularly held. They do not deal with and treat inventory as an important asset that needs to be managed and reviewed to keep it lean and accurate.

Those companies, which are aware of the implications and benefits that a lean inventory management practice can have on their business, strive to build good management practices and keep finding ways to optimize the processes. Any efficiency brought about with change in processes adds to the company's profits. Hence they give attention to and invest in driving inventory management strategy and practices, which are benchmarked against the best in the industry.

Decisions with regard to level of inventory to be carried, who owns and carries the inventory in the supply chain are some of the key decisions that drive efficiencies in inventory management. Besides this technology can also bring about process improvements speeding up the sales and delivery processes and to a certain extent reduces manpower resources and associated costs too.

Inventory management is an ongoing and dynamic process. To keep out the inefficiencies in systems, processes and physical operations, calls for active management participation and continuous improvement in all processes and systems that are involved in inventory management.

5.0 CONCLUSION

Inventory management operations are increasingly being outsourced to third party service providers, thereby ensuring that the investments and costs in managing the inventories are reduced. This is a welcome trend provided the company's focus on overseeing and reviewing both inventory management as well as inventory operations periodically to ensure proper controls are maintained and processes followed. Inventory management entails study of data on movement of inventory, its demand pattern, supply cycles, sales cycles etc. Active management calls for continuous analysis and management of inventory items to target at lean m inventory Management. Inventory Management function is carried out by the inventory planners in the company in close co-ordination with procurement, supply chain logistics and finance, besides marketing departments.

The efficiencies of inventory management are largely dependent upon the skills and knowledge of the inventory planners, the focus and involvement of management and the management policies coupled with the inventory management system. However, inventory operations management is not under the control of the inventory management team but rests with the third party service providers. In this section of the article we aim to uncover few of the critical areas and action points on the part of operations that can impact the inventory of the company.

Unskilled Labor and Staff: Inventory operations management is a process-oriented operation. Every task and action required to be carried out by the operatives will impact the inventory as well as the delivery lead times and other parameters. Therefore, knowledge of what one is required to do and the

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effect of the action should be known to the operatives who are on the shop floor. For Example: If an operative is given a put away task, he should know how and where he should put away the pallet, how to scan the pallet ID and confirm it back to the system. Besides he should also know the impact of not completing any of these actions or doing something wrong. The impact his action will have on the system as well as physical inventory should be clear to the operative.

Secondly different inventory items would have to be handled differently. Operatives who are carrying out the task should know why and what is required to be done. They should also know the consequences of not following the process. A pallet might have to be scanned for the pallet id and put away on a floor location, while a carton might have to be opened and scanned for individual boxes inside and put away into a bin. The operatives should be trained on the entire process and understand why and what he is doing.

The WMS systems are quite operational and task intensive. Where the warehouses are being managed on RF based systems, the operatives should be able to manage the RF readers, understand how to access and complete transactions through the RF Guns. Often it is noticed that when the warehouse operations are being managed by a third party service provider and the principle customer is not present at the location, the quality of staff and operatives is compromised and people are not given adequate training before being allocated their responsibility. Such situations can lead to inventory discrepancies.

In adequate SOP, Training and emphasis on processes compliance: When an inventory management project kicks off at a third party warehouse location, both the principle customer as well as the third party service provider work on the project and setup basic processes, document them in Standard Operating Procedures and conduct training as a part of the project management methodology. However, over a period of time, the nature of business requirements changes, resulting in change in the operating processes. These do not get documented in terms of amendments and the SOPs become outdated. Thereafter one finds that the new comers who are introduced on the shop floor are required to learn the processes by working along with others whereas no training or SOP document is provided to him for reference. With the result they often have half-baked knowledge of the processes and carry on tasks not knowing why they are doing and what they are required to do.

This situation is very dangerous for the health of the inventory and it shows slackness in the attitude of the third party service provider. Continuation of such a situation will lead to bad housekeeping, inventory mismatches, discrepancies and also affect the service delivery. If left unchecked can lead to theft, pilferage and misuse of inventory. In any third party owned inventory operations warehouse, the principle client should ensure that periodic review and training is conducted for all staff. Inventory operations should be periodically reviewed and inventory counts and audits carried out regularly.

5.1 Operational Challenges in Inventory Management

The latest trend in all industries has been to outsource inventory management functions to Third Party Service providers. Companies outsource both Raw Material Inventory as well as Finished Goods to the Service Provider. In case of finished goods inventory, depending upon the supply chain design, there may be multiple stocking points at national, regional and state levels. In such an event each of the warehouse a different service provider may manage operations, as one may not be able to find a supplier having operations all over the country. Therefore, the inventory in such a situation will be managed in the Company's system as well as in the Service provider's system. Inventory management and control becomes a critical function especially in such situations where multi locations and multiple service providers are involved. To ensure Inventory control is maintained across all locations, following critical points if focused upon will help:

1. Establish and outline Operations Process for Service Providers: Draw up SOP - Standard Operating procedure detailing warehouse operations process, warehouse inventory system process as well as documentation process. Especially in a 3rd Party Service Provider's facility, it is important to have process adherence as well as defined management, authorization and escalation structure for operations failing which inventory operations will not be under control.

2. Establish inventory visibility at each of the location through MIS Reports: Draw up list of reports and MIS data for all locations and ensure they are mailed to a central desk in the inventory team

for daily review. The inventory team leader should analyze daily reports of all locations and highlight any non-conformity and resolve them as well as update the management.

3. Initiate Daily Stock count procedure to be carried out at all of the locations and reported back to the inventory desk. Daily stock count should be able to reflect location accuracy, stock accuracy as well as transaction summary for the day.

4. Monthly audits and inventory count should be implemented at all locations without fail and insist on one hundred percent adherence.

5. Quarterly inventory - wall-to-wall count or half yearly and annual wall-to-wall count should be implemented depending upon the volume of transactions as well as value of transactions at each location.

6. Central Inventory team to be responsible for ensuring review of all reports and controlling inventories at all locations.

7. Inventory reconciliation - involves reconciling physical inventory at site with the system inventory at 3PL Site and then reconciling 3PL System stocks with company's system stock.

8. Visiting major sites and being present during physical stock audits on quarterly or half yearly basis is very important.

9. Lastly keep reviewing processes and ensure training and re training is carried out regularly and at all times at site so that a process oriented culture is imbibed and all operating staff understand the importance of maintaining processes as well as inventory health.

Inventory is nothing but money to the company. If 3PL vendor is managing the inventory, needless to say you should have your processes in place to be able to control and maintain inventory health.

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