AN IDEA FOR RAW MATERIAL MARKET OF COMMON INVENTORIES USED IN MANUFACTURING UNITS
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ABSTRACT: Inventory management is the process of efficiently overseeing the constant flow of units into and out of an existing inventory. This process usually involves controlling the transfer of units in order to prevent the inventory from becoming too high, or declining to levels that could put the operation of the company into difficulty. Many times we have seen that non-availability of raw materials always create problem for manufacturing units. Competent inventory management also seeks to control the costs associated with the inventory, both from the perspective of the total value of the goods included and the tax burden generated by the cumulative value of the inventory. Purpose of this paper is to give idea for creating a market (as stock Market or crude oil market) for common raw material for manufacturing units like (i.e. graphite). Companies used to spend huge amount to get raw material for their units and at the time of urgency they don’t get and faces problem. The objectives of this market can be to give benefit to raw material supplier and to draw rules and regulation for inventory market. This can help countries which have rich source of raw material but have no buyers.

KEYWORDS: Raw material, Inventory Management, Exchange, Speculations, Inventory Postponement, Futures, Demand and Supply chain Management, Hedge, Margin Money.

INTRODUCTION: Inventory is the number of products or resources held available in stock by an organization and can include raw materials, work-in-process, component parts, and finished products. Due to the globalization of the market the number of brands for similar products is growing and the amount of competition is huge. For example, as a customer you can go to a local bookstore to buy a book. But on the internet customers can find more titles for lower prices. Inventory control system is a coordinated set of rules and procedures.¹ When studying inventory management, there is a need to further study these variables, “customer needs vendor partnerships, technology, data integrity, and performance measurements”² and their affects on inventory management.

Companies face a dilemma in today’s aggressive marketplace, where on one hand, customers demand tailored products and require that their orders are filled quickly, but on the other hand they do not want to pay a best for this customization and accessibility. Therefore, organizations are exploring ways toward postponement strategy in response to constantly changing demands. Some researcher³ has noted, e-business provides new opportunities in areas such as efficient procurement, the use of secondary and spot markets, auctions and mass customization. Here we see some overlap with revenue management considerations.⁴

We have seen that many companies faces problem in inventory control and inventory management so for them inventory exchange or raw material exchange can play vital role for growing economies (i.e. India, Pakistan, Sri Lanka, Nepal). Inventory exchange can be a good tool for measuring the inventory prices in the Indian subcontinent. Now we have to think that how many factors can influence the price of the inventories.
There can be three factors that influence market prices. First, there are the market fundamentals of actual supply and demand. Some materials which are regularly used by manufacturing units, demand of these materials will be high and so the prices will also be crucial. Second, there may be expectations regarding the underlying fundamentals. Third can be some market actors, such as speculation and market manipulation. There is a subtle but important difference between speculate on and manipulation. Speculation is behavior in response to expectations of price trends (Such as holding Zinc if one believes there will be continued price increase). Speculation, when not excessive, is a normal part of market conduct.

Some researchers\(^5,6,7\) have argued that today for manufacturing industry, the cost of holding inventory, extensive product proliferation and the risk of obsolescence, especially in rapidly changing markets, make the expense of holding large inventories of finished goods excessive and that high-demand items naturally have safety stock assigned to them, but in many organizations there are so many very-low-demand items that keeping any stock of these items is unreasonably expensive, so they argue that companies must now provide good service while maintaining minimal inventories. Therefore, inventory management approaches are essential aspects of any organization.

Before moving further we have to think that what kind of The Nature of the Product and the type of Demand Process we should know that the product is consumable, perishable and/or recoverable/repairable? What generates the demand? Are there primarily external customers or is there internal usage? Is the item used as a spare part for regular maintenance and/or repair?\(^5,6,9\) Are we talking about an end item or a component of two or more other items?\(^10\) Are life cycle considerations important? Is it a new item, in its growth phase, mature, or facing declining demand?

In addition, what are important influences on the demand in a specific period? These can include marketing decisions (promotions, special pricing), competitor actions, general economic conditions, seasonal effects, and so on. Is the demand primarily from a captive market or is there a significant chance of losing sales/consumption when demands take place during an out-of-stock situation? Are there different classes of customers that have to be distinguished\(^11\)?

There are a number of possible choices in modeling the demand process. For simplicity in exposition we can ignore most of the above mentioned issues and assume that demand is to be modeled as just a function of calendar time. The possibilities include:

- Deterministic, level demand.
- Deterministic, but varying in a known way with time.\(^12,13,14,15,16,17,18\)
- Known stationary distribution with known parameters – commonly used distributions include the normal, gamma,\(^19\) Poisson and negative binomial. There are also special cases such as slow movers\(^20\) intermittent demand (long periods with no demands) and erratic demand items (Small size transactions mixed with occasional, much larger ones – the compound Poisson distribution can be useful here).\(^21,22,23,16\) The so-called "known" parameters are in fact usually estimated from sample data.\(^24\)
- Known stationary distributions but with parameters not assumed known – Bayesian methods can be used in this context.\(^25\)
- Non-stationary, probabilistic demand – Strictly speaking, most practical demand patterns are in this category, but associated mathematical models become very complicated in terms of data requirements, computational needs and user understanding.\(^26,2,27,28\)
Inventory items have been classified or clustered in groups for the purpose of joint replenishment policy.\(^{(29,30,31,32)}\) Generic inventory stock control policies are derived using multi-item classification.\(^{(23)}\) Clustering of items has also been done in production and inventory systems.\(^{(30)}\)

Multi-criteria inventory classification has been done by parameter optimization using genetic algorithm.\(^{(33)}\) Artificial neural networks (ANNs) have been used for ABC classification of stock keeping units (SKUs). ANN has been used in a pharmaceutical company.\(^{(32)}\) The model proposed has been described in figure-I. In the present research, it has been proposed to discover purchase patterns using data mining. For this purpose, sale transaction data of the inventories contained in the 'Materials' module can be used for mining association rules describing demand interdependencies.

Further, time-dependent and location or space-dependent association rules can be mined by proper segregation of the past sale transaction data from the "Materials" module. Using the modules of 'Materials' and 'CRM (Customer Relationship Management)' containing the demographical and other profiles of the customers, 'classification' technique of data mining can be applied to learn the impact of customer profiles on purchase pattern. Clustering of customers can also be done. The model can integrate various transactions based on the decision and action taken in other domains of finance, maintenance, human resource management, marketing, supply chain etc. In such cases, we find association rules with a mixture of real items with 'virtual items'. Virtual items are basically events, decisions and attributes etc. representing fields in a database or a data warehouse.

**Literature Review:** There are a good number of works that are related to this topic, but some studies are of particular relevance and interest.\(^{(34)}\) A typical manufacturing firm spends on average, 56 cents out of every dollar of revenue to cover the direct cost of purchased goods, and this percentage figure is higher for the typical wholesaler or retailer.\(^{(35)}\) The consequences of poor inventory management may result in the customer's looking elsewhere in order to have their requirements met. Businesses that rely on high technology needs to ensure they can have their issues resolved in a timely manner, as any delay may lead to a loss in revenue or production.\(^{(36)}\) Inventory management approaches are a "function of product, operational and demand related variables such as delivery time, obsolescence, coefficient of variation of sales and inventory turnover" and that logistics managers are more likely to decentralize inventory in order to stock product close to the customer's facility if the customers demand a reduced delivery time.\(^{(37)}\)

On the other hand, organizations that have a long lead time of production, in turn leading to a large amount of inventory, means that there is no flexibility to meet changing customer orders on a day-to-day basis. Therefore, the problem with this inventory management decision is that “when the forecast is off—which is usually the case-companies may be left with a volume of unsold products or its market may evaporate overnight when consumer preferences change or when a competitor comes up with a new and better product”.\(^{(23)}\) Therefore, for an organization to adopt the right inventory management approach, this inventory exchange can be a good system in order to gain more customers through customer satisfaction.\(^{(23)}\)

There is a “push”, “pull” and “just in time” inventory management system. The just in time system is based on the "pull" from the market, and this "pull production is based on a short, slim production line with the shortest possible production lead time, which allows the company to respond to the fluctuating orders from the market”. “This system ensures that the minimum-required number of the popular models is always in stock, (and) in addition to increasing flexibility and reducing inventory to the minimum, the number of operators on the line can be drastically reduced, (and so) as
a result, the overall cost of operations can be drastically reduced”.(23) Postponement fosters a new way of thinking about the supply chain and identified that postponement is an important characteristic of modern and competitive supply chains.

**OBJECTIVES:** Setting the objectives for Raw Material Exchange for Indian Subcontinent.

**We know some possible objectives of concern to manufacturer which includes:**
1. Cost minimization.
2. Profit maximization.
3. Maximization of rate of return on stock investment.
4. Determination of a feasible solution.
5. Keeping at an acceptable level the amount of human effort expended in the management and control of inventories.
6. Ensuring flexibility to cope with an uncertain future.
7. Minimizing political conflicts (In terms of the competing interests) within the organization.

**After seen this we can set some objectives for a Raw Material Exchange:**

**The core objectives of an Inventory Exchange:**
1. To create a fair, orderly and efficient system for matching supply and demand in order to enable what is called “price discovery” or the true market price based on the alignment of supply and demand.
2. To achieve this alignment, an inventory exchange can and must regulate market conduct through certain risk management instruments designed to ensure that market conduct follows the principles of a fair, orderly, and efficient marketing system.
3. To hedge of transferring risk related to the possession of material through any adverse moments in price. Liquidity and Price discovery to ensure base minimum volume in trading of an inventory through market information and demand supply factors that facilitates a regular and authentic price discovery mechanism.
4. To maintaining buffer stock and better allocation of resources as it augments reduction in inventory requirement and thus the exposure to risks related with price fluctuation declines. Resources can thus be diversified for investments.
5. Price stabilization along with balancing demand and supply position. Futures trading leads to predictability in assessing the domestic prices, which maintains stability, thus safeguarding against any short term adverse price movements.
6. To provide liquidity in Contracts of the inventories traded also to ensure in maintaining the equilibrium between demand and supply.
7. To provide flexibility, certainty and transparency in purchasing inventories facilitate bank financing. Predictability in prices of inventories would lead to stability, which in turn would eliminate the risks associated with running the business. This would make funding easier and less stringent for banks to manufacturers.

**Benefits of Raw Material Exchange:** Through the exploration and research of inventory postponement and inventory speculation, many inventory management approaches will be applied in the high technology organizations to observe which one of these is adopted or if in fact both inventory management approaches are adopted. By understanding which inventory management approach is
being applied in the high technology organizations, the implications of this approach, whether it is inventory postponement or inventory speculation, will be investigated in this industry. The most common inventory management method is inventory speculation\(^{(34)}\) in which a firm can purchase items and physically hold this inventory within its storage facilities before there is a demand from the consumer.

There are several advantages of Raw Material Exchange in Inventory Management:

1. There will be an ability to respond quickly to demand or requirement as well as the ability to protect itself against fluctuations in prices.\(^{(34)}\)
2. Another advantage of inventory speculation is that there can also be a reduced inbound transportation costs from buying in bulk. But it will increase inventory holding costs, given the need for storage, material handling and tracking, and given the threat and expense of inventory obsolescence, particularly when operating in highly volatile competitive environments”.
3. Inventory speculation makes it possible to gain economies of scale in manufacturing and logistics operations, and limit the number of stock out. Inventory speculation is the movement of goods to advance inventories and that they should be carried out as early as possible time in the marketing flow in order to reduce the costs of the marketing system.
4. Inventory postponement\(^{(23,34)}\) is not good for any manufacturing unit. Researchers have shown that inventory postponement can lead to a risk of lost sales caused by the firm being unable to respond quickly to consumer requests but not having the inventory readily accessible and available.
5. \(^{(34,36)}\)When the dollar value per unit of a purchased item is high and when sales volume for units of this item fluctuates greatly, inventory postponement would be preferred over inventory speculation. However,\(^{(23)}\) inventory speculation would be a "better approach" than inventory postponement when a purchased item is a relatively standard product in early stages of the product life cycle and faces low demand uncertainty and low customer order-to-delivery time but high-delivery frequency”\(^{(34)}\).
6. Length of delay the carrying the raw material is specific to a product but the common strategic motivation is to gain better information about customer demand by waiting to customize a product for a particular market or customer.\(^{(23,34,36)}\) Postponement enables forecasters to make better predictions about end product demand over time since the standard module is built-to-forecast and the finished product is built to a better forecast or even built-to-order.

Raw Material Exchange will be really a great help in solving the many inventory management issues. However, there can be some drawbacks to it is beneficial to delay commitment to product-specific characteristics as late as possible in order to avoid a mismatch between orders and inventory on hand. A firm operating under an inventory postponement approach would deliberately delay the purchase and the physical possession of inventory items until demand or usage requirements are known with certainty.\(^{(34)}\) Through inventory postponement, a firm can minimize the risk of inventory obsolescence, reduce the opportunity cost of having capital tied up in these items, and avoid acquiring inventory storage and tracking expenses since this inventory is physically located with the supplier.

FINDINGS: Customer satisfaction is the way the customer thinks about the company and deals with the meeting or exceeding of expectation over the lifetime of the products and/or services. The
measurement of customer satisfaction is not an exact science because of its subjectivity. Because customer satisfaction is non-quantitative in nature, it requires sampling and statistical analysis. Satisfaction is identified by different industries in different ways depending on the customer's relationships and the nature of the business. Manufacturers may look at the desire of on-time delivery and meeting the requirement of certain specifications. It has been proved that a five percent increase in loyalty can increase profits by 25 to 85 percent.\(^{38}\)

Loyal customers are six times more likely to repurchase or recommend the purchase of the product or service to someone else. Studies have shown that on average, four percent of the customers will be dissatisfied or complain about the product and/or service. The various studies have also shown that a dissatisfied customer is likely to tell nine other people, while a satisfied customer will tell five people about the good treatment.\(^{38}\) Edward Marien, director of supply chain management at the University of Wisconsin, defines “perfect order” as when a customer finds the right product, destination, condition, documentation, and cost.

But many times small and medium size manufacturing units faces problem with on-time delivery of the raw material because of different factors and then it delays their order and then create problem for the company. Whenever any company wants to complete any order in time they have to pay either huge amount or they will not get any raw material for completing the order. If we established new exchange which is especially for common inventory it will be very useful and profit making for companies and countries too. This raw material exchange can help in Inventory management problems which often interact with other areas of operations or supply chain management. Examples include:

1. Provision of raw materials for production scheduling,
2. Production of inventories of finished items constrained by aggregate output rates determined by medium range production planning,
3. Inventories needed for service activities,\(^{(1)}\)
4. Selection of the locations and capacities of warehouses,
5. The modes of transportation to be used for inbound and outbound shipping,\(^{(39,40)}\)
6. The effects of pricing, promotion and other marketing decisions, and
7. The choice of suppliers.

When a company buys Futures, it doesn’t have to pay the entire amount, just a fixed percentage of the cost. This is known as the margin. Let’s say one company is buying an iron ore futures contract. The minimum contract size for an iron ore future can 1 Ton. 1 ton of iron ore may be worth Rs 100000. The margin for iron ore can be set by the exchange say 3.5%. So company only end up paying Rs 3500.

The low margin means that company can buy futures representing a large amount of iron ore by paying only a fraction of the price. So company or person bought the iron ore Futures contract when it was Rs 100000 per 1 ton. The next day, the price of iron ore rose to Rs 110000 per 1 ton. Rs 10000 will be credited to buyer account. The following day, the price dips to Rs 90000. Rs 10000 will get debited from company’s account.

This exchange can help in price stabilization also because many countries have different prices for different raw material. Now but the question is that how this exchange will work. Figure 1 will the show the flow chart for a raw material exchange. It have scope of many changes but a typical exchange can work on the below mention flow chart.
REFERENCES:

CONCEPTUAL ARTICLE


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