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Optimization of Inventory through Supply Chain Management Concept- A Case Study

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ABSTRACT

The growth of SME's is fast and their impact on the economy is becoming bigger. How to manage the inventory effectively and efficiently often is a challenge for these automobile industries. The study took place at KiranUdyog Ltd., a company involved in manufacturing a automobile parts. For KiranUdyog the inventory problem is stock-out (Physically) which occur frequently. The company wants to improve its efficiency and is considering a change in the inventory management. The purpose of this study is to investigate the reasons behind the inventory management inefficiency and then the proposed managerial suggestions will be presented to deal with the issues. The study is considered as qualitative single-case study. Data collection is mainly through the interviews with the top manager and other staff involved in inventory control operations. Secondary data is retrieved from the information system to provide mismatching of fifteen items using a purposive sampling approach. Data analysis follows the theoretical framework. SME's have limited financial resources and bargaining power. They are suffers due to mismatching of ERP inventory with physical inventory The authors analyze the collected data and make a MIS(Material Inventory Sheet) to establish a formal inventory control system as the solution to improve the company's inventory management.

INTRODUCTION

Supply chain management (SCM) is the term used to delineate the management of the flow of materials, information, and funds crossways the entire supply chain, from suppliers to component producers to last assemblers to dispersion (warehouses and retailers), and ultimately to the consumer. In point of fact, it often includes after-sales service and redden or recycling. Figure 1.1 is a systematic diagram of a supply string. In counterpoint to multi level inventory management, which organize inventories at many locations, SCM mainly involves coordination of information and stuff among multiple firms. Supply chain management has created much interest in recent years many types of grounds. Many managers now accomplished that actions taken by one member of the string could regulate the profitability of all others in the string. organizations are rising its thinking in terms of competing as part of a supply string opposite to the other supply chains, rather than as a single firm against other organizations. Also, as firms successfully streamline its own operations, the next opportunity for improvement is through better coordination with their suppliers and customers. Even, the unevenness, increases in moving up the supply chain from consumer to grocery store to distribution center to central warehouse to manufactory, a phenomenon that is often called the bullwhip effect (see Figure 2 as an example). The costs of this unevenness are highly inefficient use of production and warehouse resources, eminent transportation costs, and high inventory costs, to name some few. Acer America, Inc. sacrificed $20 million in profits by paying $10 million for air consignment to keep up with rising rapidly requirement, and then pay $20 million more later when that inventory became disused.

It looks like that integration, long the dream of management gums, has finally been sinking into the minds of western managers. Some would debate that managers have long been interested in integration, but the deficiency of information technology made it impossible to apply a more "systems oriented" approach. With the recent burst of cheap information technology, it seems only natural that business would become more supply chain focused. However, while technology is clearly to enable of integration, it alone can not explain the radical organizational changes in both individual organization and entire industries.

Objective

The purpose of this thesis project is to investigate and identify the reasons behind the inefficient inventory management in KIRAN UDYOG PVT. LTD. Then the researcher try to propose feasible suggestions to improve the company‟s inventory management through his analysis, after analyse the various theories and understanding the company‟s

structure. In other word we want to create a standard sheet for automobile sector by which SCM manger get the complete plant Raw material information on a single desk. This will help the SCM department in the procurement of material & also avoid the excess money investment in the purchase of material.

Need of Work

Effective inventory flow management in supply chains is one of the key factors for success. The challenge in managing inventory is to balance the supply of inventory with demand. A company would ideally want to have enough inventories to satisfy the demands of its customers no lost sales due to inventory stock-outs. On the other hand, the company does not want to have too much inventory staying on hand because of the cost of carrying inventory. Enough but not too much is the ultimate objective (Coyle, Bardi & Langley, 2003).

The inventory investment for a business takes up a big percentage of the total budget, yet inventory control is one of the most neglected management areas in small firms. Many small firms have an excessive amount of cash tied up to accumulation of inventory sitting for a long period because of the slack inventory management or inability to control the inventory efficiently. Poor inventory management translates directly into strains on a company‟s cash flow.

The studied company, KIRAN UDYOG PVT. LTD. works in a Automobile sector distributing the automobiles components to its customers. The company has difficulty in matching its supply with the customer demand efficiently, which means they are unable to fulfill the demand of customer. The management problem has affected negatively their profitability mainly due to the shortage of plan. It is considered that the problem results from insufficient control over inventory and volatile demand for each product on a monthly base.

REVIEW OF LITERATURE

Literature Survey

There are a good number of works that are related to this topic which are illustrated below.

S.P. Desselle, and D.P. Zgarrick, Purchasing and Inventory Management, Pharmacy Management conclude that Inventory management is the continuing process of planning, organizing and controlling inventory that aims at minimizing the investment in inventory while balancing supply and demand.

J. W. Stoner analyse that Inventory is the supply of raw materials, partially finished goods called work-in-progress and finished goods, an organization maintains to meet its operational needs. It represents a sizeable investment and a potential source of waste that needs to be carefully controlled. It managers keep too much inventory on hand, they will waste money storing it and lose money it inventories are damaged or stolen.

Scott Grant Eckert(2007) examines inventory management and the role it plays in improving customer satisfaction. It looks at how food companies have been under pressure to streamline their inventory systems, and the consequences of such actions. It also examines how many retailers are trying to implement a “perfect order” system and how suppliers are constantly under pressure to meetthe demands of these retailers. Many food companies are, therefore, looking at various inventory management systems as they belief this will have a positive effect on the satisfaction of their customers. The paper also outlines the methodology used in the research and concludes by pointing out the limitations of the research as well as suggestions for further research. Organizations using modern inventory management processes are utilizing new and more refined techniques.

These techniques help to optimize inventories, which decrease inventory and lower costs, and to maximize customer service. With these improvements in inventory management, organizations are becoming more competitive in the delivery of high level customer service and value. Halts could result A.R. Cannon(2008), “Inventory improvement and financial performance,” stated that inventory turnover ratio and inventory days are negative correlation with gross margin . This is important for any company to achieve lower inventory days because it showed that the company does not have high holding cost for handling inventory and it brings the definition of frequent re-stock reflecting a good in product sales. For the textile industry, if the inventory days take longer, it indicates that the company holds an outdated fashion.

Monk Ellen and Bret Wagner(2009) Concepts in Enterprise Resource Planning Safety stock is a term used by logisticians to describe a level of extra stock that is maintained to mitigate risk of stock outs due to uncertainties in supply and demand. Adequate safety stock levels permit business operations to proceed according to their plans.

C. Eroglu and C. Hofer(2011),“The inventory-performance link revisited” indicates that there is positive relationship between inventory management and performance. Therefore, based on this previous research, the researchers expect that there is a relationship between inventory management in company and its performance.

S. Sahari, M. Tinggi, and N. Kadri (2012), "Inventory management in Malaysia construction firms: Impact of performance" which stated that efficient inventory management, it would be expected that the number of inventory days will be lower where it will increase firm performance. This also indicates that inventory management only give minor impact to company performance and company X should consider other factors.

T. Lwiki, P. B. Ojera, N. G. Muginda, and V. K Wachira (2013), "The impact of inventory management practices on financial performance " it focuses on one of the variables which is inventory management. Inventory management is a crucial part of a firm because mismanagement of inventory threatens a firm‟s viability such as too much inventory consumes physical space, creates financial burden, and increases the possibility of damage, spoilage and loss [6]. To achieve good company performance, the company must able to create the highest profit at the lowest cost.

Dr. Angel Raphella. S (2014) conclude that Inventory problems of too great or too small quantities on hand can cause business failures. If an organization experiences stock-out of a critical inventory item, production. Inventory management indicates the broad frame work of managing inventory. The inventory management technique is more useful in determine the optimum level of inventory and finding answers to problem of safety stock and lead time. Inventory management has become highly developed to meet the rising challenges in most Corporate entities and this is in response to the fact that inventory

Inventory Control Systems

Inventory control usually becomes one of the problems that bother for the managers. There are many inventory control systems and control techniques discussed in books and journal articles. In the following content, some inventory control systems will be introduced.

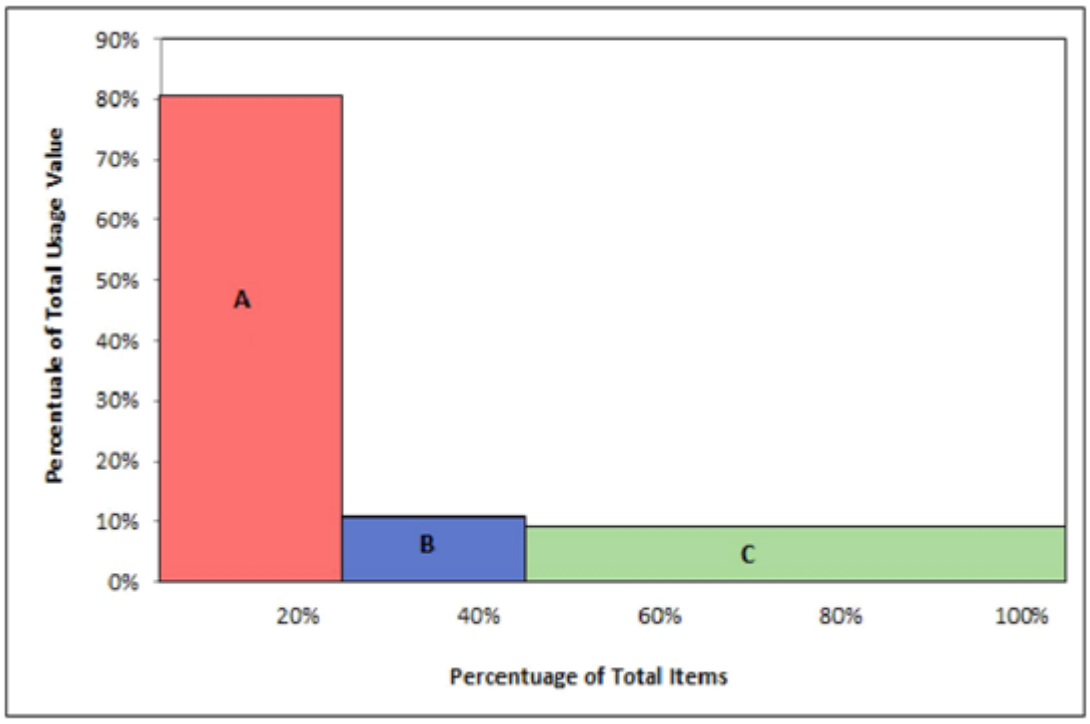


Figure 1: Representation of ABC analysis

Onwubolu et al. (2006) also mentioned, when we are doing an ABC classification, different types of inventory should be analyzed separately, such as, finished goods analysis is done separately from raw materials.

Alternative Order Quantity Approach

For small business, the inventory control systems should be inexpensive, easy to under-stand, easy to use, and not too time-consuming. From the managers‟ aspects, the ideal systems are those that allow them to set policies, rules, and procedures easily, and have them implemented by the subordinate without any difficulty (Lin, 1980).

The application of the EOQ formula for a small business is much more difficult than that for a large corporation. Some estimating parameters, like order cost and inventory carrying cost for EOQ are not easy when records of various costs

are inadequate or nonexistent. EOQ might have to be re calculated each time there is a change in interest rate, price, or demand. This will increase the order cost, and is not suitable for a small business (Lin, 1980).

Lin (1980) suggests the following two methods can be easily adapted for small business use. The first method is called maximum inventory. The manager sets the maximum stock level for each item based upon his/her experiences or analysis of company‟s financial situation and desirable return on inventory investment. The formula is:

OQ=Maximum Inventory level – Reorder Point+ DDLT

OQ: order quantity

DDLT: demand during lead time

The second method that he proposed is called desired covering period. Based on sales forecast, the manager can set the order quantity that will cover the period he/she likes. The outcome number might have to be modified to meet business requirements. For instance, the sup-plier probably sells certain products at the multiple of batch quantity or sets a minimum order quantity for a product.

According to Bloomberg et al. (2002), inventory classification systems help allocate time and money in inventory management and allow firms to deal with multiple product lines and multitude of stock-keeping units (SKU). The most widely used classification model is ABC analysis.

ABC analysis is an inventory classification technique in which the items in inventory are classified according to the dollar volume (value) generated in annual sales (Fuerst, 1981).

According to Onwubolu and Dube (2006), when ABC analysis is applied to an inventory situation, it determines the importance of items and the level of control placed on the items. The result of importance ranking is determined by two factors, the usage rate for an item and its unit value. These two factors can be multiplied to give the annual usage value (AUV), which is the total value of the annual usage. The bigger each factor, the more top ranking is the item. Therefore, close control is more important for fast moving items with a high unit value. To the contrary, for slow moving, low unit value items the cost of the stock control system may exceed the benefits to be gained and simple methods of control should be substituted.

By dividing a company‟s inventory into different classifications-A, B, or C, Onwubolu et al. (2006) indicates that managers can focus on the items that account for the majority of the inventory. Fuerst (1981) describes, generally, the A items include approximately 10 percent of the items in inventory, while accounting for roughly 50 percent of the dollar volume generated. The next classification, B items, includes roughly 40 percent of the items with 40 percent of the dollar volume. The remaining items, the C items, account for only 10 per-cent of the dollar volume, yet include approximately 50 percent of the items.

Case Study Strategy

Robson (2002:178) defines case study as „a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence‟ (cited in Saunders et al., 2003).

The researcher must be alert to the need for multiple sources of evidence. „All evidence is of some use to the case study researcher: nothing is turned away.‟ (Gillham, 2000, p.20) But this does not mean that you should talk to a lot of different people, but that you need to look for different kinds of evidence: what people say, what they are doing, what they are making or producing, what documents and records show.

Gillham (2000) gave us the following list of six main evidences.

- Documents. These can be letters, policy statements, regulations and guidelines. They provide a formal framework to which a researcher may relate the informal reality.
- Records. These are the evidences that go back in time but may provide a useful longitudinal fix on the present situation. These may well be stored in computer files.
- Interviews. This is an inadequate term for the range of ways in which people can give you information.

- Direct observation. It is used mainly when a researcher needs to be more systematic in how he or she observes.
- Participant observation. This is the more usual sort in a case study-where a researcher is „in" the setting in some active sense-perhaps even working there but keeping the ears and eyes open, noticing things that they might normally overlook.
- Physical artifacts. These are things made or produced. Sometimes this kind of evidence is most important when a researcher is doing a multiple case study.

As to our research project, we investigated the current situation of inventory management in Kiran Uyog by using multiple sources of evidence, for instance, the interviews with the top manager and other related staff at Kiran Udyog, and take sample of fifteen items which are mismatched. When we were visiting at Kiran Uyog, we conducted direct observation on inventory of raw material

There are two major types of case study, single case study and multiple case study.

Yin (2003, p.40) indicates that „the single case study is analogous to a single experiment, and many of the same conditions that justify a single experiment also justify a single-case study."Compared with single case study, multiple cases" evidence is often considered more compelling and the overall study is regarded as being more robust. The distinct disadvantage of multiple-case study is that it requires extensive resources and time and cannot be taken lightly (Yin, 2003).

We used the single case study approach to conduct the research project at Kiran Udyog. Employing the single case study strategy enabled us to fully understand the research context and acquire considerably deep understanding about specific management issues by constraining the research scope.

Material Inventory Sheet

Now a day"s small & medium enterprises in India which cannot acquired the SAP system in plant. They work on different type departmental MIS system to track the material information on a single sheet. This is also very popular method in automobile sector.

Company Profile

Kiran Udyog Pvt. Ltd. is established its first unit in Delhi in 1984. The company has earned all these years to acquire a distinctive identity for its brands as well as company name.

Table 1 Company Profile

Company Name	Product profile	Employee strength	Number of equipment	Annual Production	Work schedule operations
Kiran Udyog	Sheet Metal works in 2W & 4w	200	120	25million	A,B& C SHIFT working

Customer Base

The products of Kiran Udyog Pvt. Ltd. are being supplied to various customers in India and abroad. Some of significant customers are as follows:

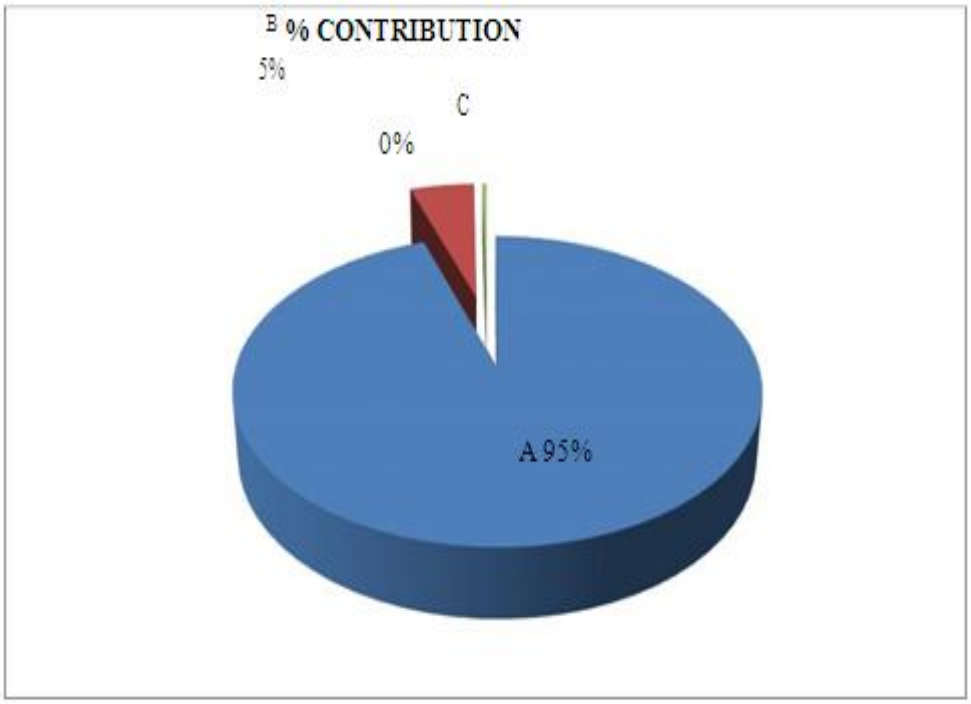
Table 2 Customers name.

Two Wheelers Customer	Four Wheelers Customer
Honda Group	Tata
Yamaha Motors	Nissan
Suzuki Group	Maruti Suzuki
Hero	Calsonic Kanser
Hero Motors	Renault
Piaggio	Denso
Mahindra	Avtec, etc.

We can get the list of these items in rank order by percentage of avaliability and classify them into A, B or C. As what has been mentioned in theoretical framework, the classification is using a model of priroity of the items. the appropriate quantity of the items for the classification as shown in Table

S.NO.	COMPONENT	ERP Stock (Kg)	Physical Stock (Kg)
1	Box Cover	8240	4560
2	Window panel Left	1320	1329
3	Window panel Right	5216	2980
4	CONTROL Box (OLD)	2980	2890
5	Control BRACKET (NEW)	3338	1976
6	Gear Cover	1265	1265
7	TOP COVER	1072	1070
8	Sheet Frame	4129	1290
9	Rear Frame L	5272	5234
10	Mirror Cover Left	9876	4567
11	Mirror CoverRight	5678	5546
12	Side Box L	3489	3245
13	Side Box R	9087	8970
14	Rear Frame R	8753	8545
15	Partition Box	2689	2675

Graphical Representation of the Problem identification-Contribution (Kg)



5.2 Graphical Representation of the Problem identification-Contribution (%)

CONCLUSION

Inventory management is critical for most companies, but is especially crucial for small businesses because when compared with large companies, they usually have limited resources and bargaining power, which have negative effects on the way inventory can be managed.

Many small businesses face great challenges in managing inventory when they seek developments. This thesis is trying to connect theories with a real case and propose managerial solutions that the small business firm, HEM-SOL, can implement to improve its inventory management.

In the present case of my work at the initial phase of work we collect data of company supply chain inventory control department & it was observed that there is lot of mismatch between actual material present on the shop floor & material registered in the ERP. Due to this SCM department face problem in the procurement of material & also failure in the completion of customer monthly supply. To eliminate the mismatch of material shortage & excess we create a MIS (Material inventory control chart/Format) for automobile sector to avoid material mismatch & daily tracking of Raw material. This format provides complete shop floor material analysis on a single sheet. Items that make the largest impact on a company‟s overall inventory cost performance. Following the ranking from the analysis, we can place different controls on items A, B and C to im-prove the total inventory performance.

FUTURE SCOPE

In the present case we developed a MIS system for controlling of Raw material in the Plant of automobile sector. By this method we get huge success to set record of all Raw material consumed & not consumed on a single sheet. The next step we can take in this project is that Production manager in plant face lot of problem to capture the multi operation piece inventory on a single sheet. In automobile industry part have been completed in various operation like press shop, weld shop ,paint shop etc. so to capture exact data of all department inventory control on a single sheet we can developed MIS for weld shop , press shop also by following the same procedure as used in this project that must be very useful for tracking of produced part on shop floor.

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