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Management of Supply Chain in Small Scale Manufacturing Units (With special reference to Ahmednagar MIDC area)

Dr. Satish S. Ubale,
satishubale@yahoo.com
Professor & Director,
Matrix School of Management Studies, Pune.

ABSTRACT

The small scale industries play an important role in the development and industrialization of any developing country. These industries provide large scale employment and form the strength of large and medium industries. The small scale industry helps in fulfillment of the objective of the balanced regional development because it can be easily started in any part of the country with less capital investment. The study was conducted with the objective of understanding the importance of supply chain Management for small scale manufacturing units improvement required to be implemented so as to improve overall operational efficiency and increase productivity. Researcher calculated the length of various stages of the chain, supply chain efficiency and supply chain working capital productivity suggesting the unit's steps to be taken for improvement.

Keywords: *Supply chain efficiency, working capital productivity, Manufacturing, length of supply chain and organized sector.*

INTRODUCTION

The Small Scale Industries have been the backbone of our national economy. With a few thousand units at the time of independence, the number of units have risen to a whopping 1000 lakh with one third of them registered affording employment to more than five crore people claiming a share of 70% in the gross turnover in the manufacturing sector, where the small scale manufacturing units accounts for 60% of the total production, direct & indirect. Small scale manufacturing units in India creates largest employment opportunities for the Indian populace, next only to Agriculture. It has been estimated that a lakh rupees of investment in fixed assets in the small scale sector generates employment for four persons.

Traditionally marketing, distribution, planning, manufacturing, and the purchasing departments of various organizations operated independently. These functional departments have their own objectives which are often conflicting. For example, marketing department's objective of high customer service levels and maximum revenue conflict with manufacturing and distribution goals, like reduction of finished goods inventories. Many manufacturing operations are designed to maximize throughput and lower costs with little consideration for the impact on inventory levels and distribution capabilities. There is a critical need for a mechanism through which the different functions can be integrated. Enabling effective integration of the various functional entities is the primary objective of supply chain management. Single companies are not able to survive on their own; they can survive only as part of the supply or value chain in an increasingly competitive business environment. It is the supply chain, which will bring true competitive advantage to companies, by satisfying customers' needs and lowering operating costs. Therefore the role of supply chain management is critical in managing issues that arise across

organizational boundaries, improving corporate competitiveness and profitability in today's operating environment emphasized that individual businesses no longer compete as solely autonomous entities, but rather as supply chains. The major sufferer from all this were small scale manufacturing units because they had to face the pressure to produce low priced products without any delay in delivery schedule with no other option left than to improve performance.
To improve performance of supply chain in small scale manufacturing units, detailed study was needed to be carried out. Keeping the objective of improvement, Researcher has taken the task and presented his findings in the thesis.

OUTLINE OF STUDY

The present treatise has been divided into eight chapters.

- Chapter one: It is introductory in nature and is concerned with MIDC - the state's industrial catalyst, Small scale manufacturing units and Supply chain management. This chapter throws a light on above mentioned topics to understand the research and researchers point of view.
- Chapter two: analyses the literature review of national and international publications on supply chain. This literature survey extracts information from some of the literature available on this subject.
- Chapter three: introduces the manufacturing units where the researcher has conducted his study.
- Chapter four: explains the objective, scope & limitations, hypothesis and methodology of the study with detailed methodology used for the research.
- Chapter five: gives the analysis and interpretation of data collected with the help of tables and graphs.
- Chapter five: conclusions and findings constitutes this chapter which is based on the data collected, observations made, interviews conducted and discussions carried during the research.
- Chapter seven: includes recommendations and suggestions made by the researcher, which concludes the thesis.
- Chapter eight: Bibliography and questionnaire is included in this chapter.

RESEARCH METHODOLOGY

The researcher aims to study the important contributing factors of supply chains in small scale manufacturing units and its various aspects. The management of small scale manufacturing units faces many problems in managing a supply chain, e.g. correct forecasting method, inventory management, make or buy decisions, strategic decisions and evaluating performance of the firm with respect to supply chains, etc.

Collection of data: The sample consists of small-scale manufacturing units from MIDC area of Ahmednagar city which were selected by random sampling from the list of manufacturing units published in Ahmednagar Industrial Directory by MIDC office, Ahmednagar.

Primary data: the tools like, structured questionnaire, participative and non participative observations and interviews were used by the researcher for the purpose of collecting primary data.

Secondary data: information regarding government orders, rules, schemes to support small scale manufacturing units, through relevant official literature survey was carried out in various libraries, published survey reports, newspapers, magazines, trade journals which were published weekly, fortnightly or monthly was also referred and its outcome was considered while giving recommendations.

Processing of data: The main objective of the research was to study the management of supply chain of small scale manufacturing units in Ahmednagar MIDC thus the data collected was processed with the help of computer and is presented with the help of tables, charts, graphs, bar charts, pie charts. Standard statistical tools were used for the analysis of data. Tools like t-test, z-test, χ^2-test and measures of central tendency & measures of dispersion were used. Averages, standard deviations and coefficient of variations of various groups of firms were calculated.

OBJECTIVES OF THE RESEARCH

1. To study the product management and strategic network design for products manufactured in small scale manufacturing units.
2. To study the demand analysis and procurement procedure followed by small scale manufacturing units.
3. To study the outsourcing of procurement of materials and components.
4. To study the logistics management of small scale manufacturing units.
5. To study the product development for customer satisfaction and to study CRM.
6. To study the overall performance of small scale manufacturing units.

HYPOTHESIS

1.Product management and strategic network design helps small scale manufacturing units to manage their products.

By using t-test and z-test hypothesis is tested and rejected.

2.Procurement procedure is dependent on demand analysis followed by small scale manufacturing units.

By using t-test and z-test hypothesis is tested and accepted

3.The outsourcing of procurement of materials and components decides the distribution policies of small scale manufacturing units.

By using t-test and z-test hypothesis is tested and rejected

4.Logistics management has significance with reference to efficiency of small scale manufacturing units.

By using t-test and z-test hypothesis is tested and rejected

5.CRM practices of small scale manufacturing units improve customer's satisfaction.

By using t-test and z-test hypothesis is tested and rejected

6.Performance measurements of small scale manufacturing units give direction to supply chain management.

By using t-test and z-test hypothesis is tested and rejected.

FINDINGS AND CONCLUSIONS

A survey of the Ahmednagar industrial area revealed that over the last thirty years, MIDC could not achieve substantial industrial advancement. Industrial production increased at an average compound rate of two to three percent per annum. The output is only six times of what it was in 1975 when land for Ahmednagar MIDC was finalized. Since that time many government units, heavy and big engineering companies, middle export oriented manufactures, private limited companies and mainly sugar factory dependent small scale units has greatly contributed to the economy of state.

The findings of the research are as follows

- Researcher concludes that network design concept is absent in small scale manufacturing units and also they are completely unaware of this.
- Lack of forecasting create a problem in planning process though, 61% of the units under study are using demand forecasting for the business planning purpose, still 39% lack in its

implementation. Researcher concludes that market research as a favorite method for forecasting is being utilized by majority of small scale manufacturing units but scientific approach should be developed by the units under study.

Units under study are managing their material resource planning, 75% of the firms apply MRP and 25% looses advantage of the same out of total 44 units under study. To be more specific researcher concludes that 73% of units apply MRP for direct and indirect material where as 24% for direct and 3% for indirect material.

Purchasing involves funds which have alternative uses and should be given utmost importance. Researcher concludes that small orders dominate other methods of purchasing like blanket and stockless in small scale manufacturing units where the above concept is completely missing. 52% of the units understudy purchases in small orders where as 37% units prefer blanket and 11% prefer stockless and other methods of purchasing.

➢ It is also concluded by the researcher that in the world of information technology very few small scale manufacturing units are making use of internet facility to search for the sources of supplies i.e. only 7% units, where as methods like referring trade directories are still popular in 77% units and 16% units refers catalogs which are time consuming methods. Researcher also concludes that only 43% units refer historical data while making purchases indicating good record keeping procedure whereas other units are not at the advantage of historical data as it is not in use.

To reduce cost and concentrate on the core competencies of the business units, which is missing in small scale manufacturing units under study, researcher found that only 10 units (22%) under study out of 44 units outsource some of their activities. Out of these 10 units, 6 units (60%) outsource for strategic and investment reasons, remaining 4 units (40%) outsource for internal in capabilities and foe reducing cost of production.

Researcher concludes that 78% units understudy is far away from outsourcing and they should understand the importance of outsourcing in today's changing business environment for their growth and development.

Transportation is an important supply chain driver because all the material is brought from different locations. Movement of material is important component of supply chain being non value adding process adds unnecessary cost to the product. 18 units under study purchase their major raw material from within the state reducing the complexity of transportation where as only 41units purchase other material from state reducing the lead time of procurement and ultimately reducing the length of supply chain.

To own the transport facility firms needs capital investment and many times it remains idle for days together leading to inefficiency of capital productivity. 91% of the firms own the facility and rest uses shared transport facility. Moreover 98% of the units under study use roadways which is decided by lot size in 66% units, speed of delivery in 21% units and cost and safety in 13% of units.

Warehouses are owned by the respective firms and the raw material is stored into it.

➢ Cost of product increases to the extent of 15 to 25% and even more because of material handling in organizations. To reduce the unwanted cost the handling should be reduced to minimum. The study reveals that units under study knows the importance of location of stores and for this reason 86% units have their stores either near to entrance gate or near to the consuming department but the housekeeping part is lagging and needs utmost attention.

Researcher found that equally important factor of location of finished goods stores, 91% units have this facility near to main entrance or middle of the production plant. It is also concluded during physical visits to units that 80% of units use floor operated material handling equipments

and posses less interest towards use of allied material handling equipments. Proper selection of material handling equipment reduces the cost to a measurable extent, researcher could not find allied material handling equipments with the units under study at the time of personal visits.55% units under study believe in material handling affects the productivity as well as production.

Various criteria can be listed while selecting material handling equipment. Researcher concludes that 57% units give importance to safety, 18% are of the opinion that flexibility of equipment is important and 16% gives stress on efficient service and rest 9% to cost factor.

Small scale manufacturing units face natural disadvantage when dealing with the overall management of the supply chain that concerns them because of small size and high fragmentations. Small scale manufacturing units generally do not have a clear view of the entire supply chain beyond their immediate operations and contacts. Therefore, units under study can only manage the supply chain within their close proximity. It is concluded by the researcher that 40 out of 44 units under study sells goods within the state in their owned transport facility by road only and no other mode of transportation is used as transportation of finished goods is within the Maharashtra.

Researcher concludes that 71% units under study prefer lot size over speed of delivery, transportation of cost and safety in selecting mode of transport. Researcher also concludes that 48% unit's product weight is more than 100 kgs and has huge size which makes packaging difficult. Packaging material used in other units are corrugated sheets and plastic containers. All these packed goods are stored in their own warehouses.

- Best practice in SCM dictates the necessity to share and coordinate information with all suppliers and customers linked to them. Fear of survival leads to non sharing of data and information among small scale manufacturing units and their customers. It is concluded by the researcher that 95% of the units collects required CRM information through telephone and no statistical tools are applied to the data thus collected. While conducting the personal interview with the owner/manager researcher observed that the customers of the units under study are satisfied with their performance because of their expertise in the field, quality of products and good pricing.
- It was found that performance of small scale manufacturing units with respect to different measures were

Length of supply chain

Length of supply chain depends on days of raw material, days of work in progress and days of finished goods. It is concluded by the researcher that 7 out of 11 engineering units (64%) have more length of supply chain due to a larger value of days of finished goods as compared to values of days of raw material & days of work in progress. To reduce the length of supply chain efforts have to be given to reduce the days of finished goods i.e. inventory of finished goods should be low as possible. The corresponding percentages for the remaining units are 86%, 50%, 83%, 67% & 100% respectively. From the above statistics researcher concludes that the chemical units under study are performing good since their average length of the supply chain is minimum amongst all along with the smallest value of coefficient of variation (CV), manufacturing units follow chemical units in performance. The remaining units need much improvement in their performance.

Efficiency of Supply Chain Management

The internal supply chain inefficiency ratio is measure of the efficiency of internal supply chain management. Firms with efficient supply chain systems will have relatively lower scores on this performance measure.

Researcher concluded that efficiency ratio can be reduced by either increasing sales value or reducing inventory figure. Increasing sales volume is difficult for these small scales manufacturing units thus these units must strive to reduce inventory by applying selective inventory control methods. From the above results, it is concluded that the manufacturing units have smallest inefficiency value (i.e. maximum efficiency) with the lowest coefficient of variation. The chemical units follow them in performance but with a higher value of coefficient of variation. The other units need improvement in their performance.

Supply chain working capital productivity

After detailed analysis of the table for supply chain working capital productivity it is concluded by the researcher that inventory figures are more for the units under consideration and should be reduced to improve the supply chain working capital productivity. In this case, the manufacturing units seem to perform best with the maximum average supply chain working capital productivity, but with a little higher coefficient of variation. The engineering units follow manufacturing units in performance. In both the cases coefficient of variation's are high. So action is required to reduce the variations in the SWCP of these units.

Using t-test for all the 44 units in combination the calculated t-value is found to be-0.2150. After comparing this value with tabulated value ($t_{43, 0.05} = 1.65$) researcher concluded that the null hypothesis is accepted at 5% level of significance indicating none of the units show a good performance.

Further to conclude through z-test, the same null hypothesis was used as in t-test above against the corresponding alternative hypothesis based on all 44 units. The P-value calculated (0.5860) was compared with probability value 0.05. Researcher concludes that the null hypothesis is accepted indicating that all the 44 units taken together are not showing good performance.

Moreover the small scale manufacturing has to face keen competition and ever increasing expectation of customers particularly in quality and delivery of product. Ahmednagar MIDC has greatly contributed to the economy of Maharashtra. The major contributing units are chemicals, steel products, electronics, electrical equipments, seamless pipes, edible oils, rubber products, plastic and fiber pultrusion, etc. by marketing their products.

- Ahmednagar MIDC has in recent years also made a qualitative change in addition to the quantitative expansion. It has embraced the concepts of optimum scales of production state of the act technology and levels of production. Though it has still a long way to go in this respect, a good beginning has already made and it augured well for future.
- The small scale manufacturing units, the largest industrial employer in Ahmednagar, contribute to nearly 17 percent of Maharashtra's industrial output. It is these businesses that supply the larger companies with raw materials, assemblies or sub components and where human rights are often violated, environmental laws are neglected and child labour prevails.
- The situation worsens when small scale manufacturing units are put under pressure to produce cheap products and deliver in time. There are various bottlenecks in the role the supply-chain can play as a driver. As 92 percent of the Ahmednagar MIDC workforce falls under the unorganized sector it is difficult to enforce and control to trace back products. Furthermore, large buyers work with many contractors and many end products may exchange hands 3-4 times before reaching the consumer.
- The major challenges in front of small scale manufacturing units are to develop proper distribution channels, spend major portion of profit for marketing, to cope severe competition, to have a proper balance between quality and price, develop brand loyalty, transport goods to the large manufacturers and market with required specification and to promote product through new innovative ideas. These are the fields where small scale manufacturing units have to work with top priority.

- Small scale manufacturing units in the Ahmednagar MIDC are, apparently, in need of an effective supply chain management to be able to make its own strong and authentic lobby to take up the cause of long suffering small scale manufacturing units on a state level. In the present environment of competitiveness and liberalization, it becomes imperative that the small scale manufacturing units gear up with latest trends in technology, management, marketing strategy as liberalization opens the door for global competition.
- Improvement in important activities such as demand forecasting, production planning, store supply management, warehouse management is needed in small scale manufacturing units. Cooperation from governmental and private organizations is expected in terms of guidance, support and incentives for good performers of SCM systems in small scale manufacturing units.
- Sickness in small scale manufacturing units is attributed to a number of factors like inefficient management practices, over ambitious projects, dispute among partners and non-availability of credit. As a cumulative effect of the above mentioned reasons many small scale manufacturing units are facing problems. Therefore this there is a need to study enacts supply chain management styles in these units.

Based on the detailed survey researcher arrived at several key conclusions, few of them are as follows

1. Low awareness of good SCM practices
2. Slow implementation of SCM
3. Limited and localized SCM
4. Absence of information sharing
5. Low level of IT usage for SCM
6. Lack of Government support

RECOMMENDATIONS

There are many ways in which the small scale manufacturing units can expedite the adoption of SCM to achieve higher productivity. Some key recommendations are listed below.

1. Work in group
2. Sponsored training and development programs
3. SCM as a tool to grow
4. Outsourcing of SCM
5. Weakness analysis
6. Government support
7. Other recommendations

Based on statistical conclusions researcher would like to recommend the following

a. Control of finished goods inventory which will help to reduce the length of supply chain.
b. Electronic links to firms and customers has to be improved to gain better CRM.
c. Continuous flow of products and information has to be maintained between these units and small scale manufacturers.
d. Proper material resource planning needed to avoid uncertainty.
e. Scientific purchasing procedure should be followed by small scale manufacturing units.
f. Supplier's warehouse should be used as far as possible.
g. Transport facility should be shared by these small scale manufacturing units, which will help to reduce the non value adding transportation cost.
h. Firms should work on plant layout, mixed layout is recommended to take advantage of both types of layouts.
i. Allied material handling equipment should be used which will give dual benefits of flexibility in material handling and reduced capital investment.

Supply chain management has an impact on the performance of small scale manufacturing units situated in the Ahmednagar MIDC. Looking forward, the small scale manufacturing units displays tremendous potential in generating employment and boosting economy in the state. The newly defined rules are work in group, concentrate on core competency and share the infrastructure that holds the key to success in the small scale manufacturing units.

SCOPE FOR FUTURE RESEARCH

More research can be done on distribution operations in the future, as well as on reverse supply chain management for small scale manufacturing units.

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