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OUTSOURCING: MAKE VERSUS BUY FOR SMALL SCALE MANUFACTURING UNITS

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Abstract

The small scale manufacturing units has lately come into the limelight, with increased focus from several government institutions, corporate bodies and banks, and is viewed as agents of growth. 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 international competition, to have a proper balance between quality and price, develop brand loyalty, transport goods to the market with required specification and to promote product through new innovative ideas. To achieve the same, small scale manufacturing units has to work with top priority on forecasting methods and whether to make intermediate components internally or to buy them from various suppliers so as to take care of customer's requirements on time.

This paper investigates the extent to which small scale manufacturing units of Ahmednagar MIDC uses forecasting methods and make or buy decision and its implications on efficiency of their supply chain.

Introduction

The small scale manufacturing units have made significant contribution towards technological development and exports. Small scale manufacturing units have been established in almost all-major sectors in the Indian industry such as *food processing, agricultural inputs, chemicals & pharmaceuticals, engineering, electrical, electronics, electro-medical equipment, textiles and garments leather and leather goods, meat products, bio-engineering, sports goods, plastics products, computer software, etc.*

Forecasting is an art, not a science. A forecast is a mechanism that serves two fundamental purposes. First, it gives you visibility to the amount of revenue or profit that can be generated from your business. Second, it defines the level of risk to which you will be exposed. Small scale manufacturing units cannot forecasts perfectly and only a few can do it consistently with a reasonable level of accuracy. Even with the best forecast, there are going to be changes due to customer push-outs, cancellations, fluctuations in demand.

The make versus buy issue is strategic in nature and involves the following key decisions: What activities should be carried out by the firm and what activities should be outsourced? How to select the entities / partners to carry out outsourced activities and what should be the nature of the relationship with those entities? Should the relationship be transactional in nature or should it be a long-term partnership?

Any firm should follow these four strategies

- ***Essential products***: The focus is on reducing the number of parts and the number of suppliers. The aim is to reduce the time and complexity. The time saved here is used to focus on strategic suppliers and bottleneck suppliers.
- ***Standard products***: These items provide an opportunity for buying the products to save time and money. A firm can focus on operational-level so that costs can be reduced.
- ***Vital products***: This includes fewer items with high total purchase value. A firm must work towards establishing collaborative, long-term relationships with suppliers for this type of components.
- ***Desirable products***: These items represent relatively low value, a firm should actively keep looking at alternative sources of supply. It includes products not available throughout the year.

In doing the above-mentioned analysis, firms seem to focus on items involved in direct

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purchases or those that affect the cost of goods sold.

RESEARCH METHODOLOGY

In responding to the challenge of globalisation, businesses entities are organised differently compared to the past. The present business model, 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 make or buy decision, which will bring true competitive advantage to companies, by satisfying customers' needs and lowering operating costs. Therefore managing issues that arise across organisational boundaries, improving corporate competitiveness and profitability in today's operating environment emphasised that individual businesses no longer compete as solely autonomous entities, but rather as strategic decisions.

Researcher feels that small scale manufacturing units can improve profitability by implementing good strategy in a proper manner in their organisations. Researcher's interest is to understand the awareness of make or buy decision and its implications on efficiency of their supply chain among small scale manufacturing units.

OBJECTIVES OF THE RESEARCH

1. To study the demand analysis and procurement procedure followed by small scale manufacturing units.
2. To study the outsourcing of procurement of materials and components and its implications on efficiency of their supply chain.

SCOPE AND LIMITATIONS OF THE STUDY

The scope and limitations of the study are briefly stated below. This paper aims at studying the management of supply chain. The research sample selected for this is drawn from industrial area of Ahmednagar MIDC.

1. Research is restricted to small-... manufacturing units in Ahmednagar MIDC... and no other area will be considered.
2. The research is concerned upon a random... selected sample to fifty small-... manufacturing units.
3. The study aims at examining the make or ... aspect, no other aspects will be considered.
4. The findings of the study are based ... primary and secondary data. The primary data has been collected through responses received from owners and managers working at different levels of organisation.
5. The study is limited to small-scale manufacturing units engaged in manufacturing activities, small-scale units from other fields viz. service sector are not taken in consideration.

HYPOTHESIS

1. The outsourcing of procurement of materials and components decides the efficiency of supply chain in small scale manufacturing units.
2. The supply chain inefficiency is independent of the type of small scale manufacturing units.

METHODOLOGY

Collection of data

The sample consists of fifty small-scale manufacturing units from MIDC area of Ahmednagar city which were selected by random sampling from the list of manufacturing units published by MIDC office, Ahmednagar. Despite of all possible and pertinent efforts made by the researcher only 44 respondents extended their cooperation and filled the questionnaire. Thus the effective size of the sample is 44 out of 50.

Primary data

To collect the facts and figures from the sample selected, a pilot questionnaire was prepared and provided to twenty five subjects and was requested by researcher to read the statements and make tick marks for appropriate choice on the questionnaire itself. Researcher got the normal distribution curve on the basis of pilot survey as well as comments from the

respondents about the questionnaire. After thorough study and detailed discussion with guide and prominent personalities from the subject field the deficiencies were removed by redrafting the questionnaire and filling the gap to cover all the aspects of supply chain and the data expected and is distributed to the respondents of the sample chosen.

Interview is a direct method of collecting data which involves presentation of oral-verbal stimuli and reply in terms of oral-verbal response. Personal interviews and group interviews were conducted for gathering more correct and confidential information. Researcher got the intimate aspect of individuals on the research topic at the time of the interview.

With the help of all these types of observations the researcher collected the information for its validation and objectivity.

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.

Statistical methods used for calculation

- X^2-test is based on chi-square distribution and as a parametric test is used for comparing a sample variance to a theoretical population variance.

$$X^2 = \sum (O_i^2/E_i) * N$$

*Where, E_i = row total * column total / N*

O_i = observed frequency,

E_i = expected frequency

N = total of frequency

- Measure of central tendency and dispersion was used to compare data and conclusions were given.

ANALYSIS AND INTERPRETATION OF DATA

The data after collection is processed and analysed in accordance with the outline laid for the purpose at the time of developing the research plan. This is essential for a research and for ensuring that researcher have all relevant data for making comparisons and analysis. The term analysis refers to the computation of certain measures along with searching for patterns of relationships that exist among data groups. In the process of analysis, relationships or differences supporting or conflicting with original or new hypothesis is subjected to statistical tests of significance to determine with what validity data can be said to indicate any conclusions.

TABULATION REPRESENTATION

Organisation profile

Gathering basic information like initial investment, turnover, number of workers working, number of working shift, level of management participation and product categories will help in understanding the structure of units under study.

a) Initial investment

The researcher tries to assess the initial investments of the small scale manufacturing units. Initial investment is required to start the business and to purchase plant and machinery.

Sr. No.	Particulars	Frequency	%
1.	0-10 lakhs	11	25
2.	10-30 lakhs	10	23
3.	30 lakhs & above	23	52
Total		44	100

Table 1

It is observed that 52% of the firm's investment is more than 30 lakhs, 23% firm's investment is between 10 & 30 lakhs and 25% firm's investment is not more than 10 lakhs.

b) Annual turnover

Annual turnover help the researcher to know the size of the firm and business size.

Sr. No.	Particulars	Frequency	%
1.	0-10 lakhs	03	07
2.	10-30 lakhs	13	29
3.	30 lakhs & above	28	64
Total		44	100

Table 2

64% of the respondent units have turnover between 30 lakhs and above, 29% of the respondent units have turnover between 10 and 30 lakhs whereas only 7% of the units understudy have turnover between 0 to 10 lakhs.

c) Product category

Researcher has divided the sample selected into different product categories to study the differences in the performances of these units, categories wise.

Sr. No.	Particulars	Frequency	%
1.	Engineering	11	25
2.	Manufacturing (others)	07	16
3.	Maintenance/Packaging	06	14
4.	Agri Products	04	09
5.	Casting/Fabrication	12	27
6.	Chemical	04	09
Total		44	100

Table 3

27% of the total sample constitutes Casting/Fabrication units, 25% of the sample constitutes Engineering units, percentage of other manufacturing units is 16, percentage of Maintenance/Packaging units is 14, Agri Product units is 9% and Chemical units are 9%.

d) Business objectives

To get the idea of firm's objective in running the business, researcher asked the question to respondent.

Sr. No.	Particulars	Frequency	%
1.	Maximise customer satisfaction	02	04
2.	Maximise profit	36	82
3.	Increase return on investment	03	07
4.	Increase turnover (sales)	03	07
Total		44	100

Table 4

82% small scale manufacturing units under study indicates that profit maximization is the business objective, 7% indicates objective is to increase return on investment, 7% units have objective as increase in turn over (sales) and rest 4% has objective of maximize customer satisfaction.

Demand forecasting

Forecasting is unavoidable and is the weakest link of the supply chain. Most of the firms do not like to carry out the exercise of forecasting. Forecasting about demand gives the approximate figure of the quantity which will be demanded thus helps in proper planning of procurement and logistics for the same. This is essential for smooth flow of production.

a) Whether you use forecasting of demand for production planning?

Researcher wanted to know whether small scale manufacturing units use demand forecasting for planning purpose or not. Whether they are aware of demand forecasts benefits or not.

Sr. No.	Particulars	Frequency	%
1.	Yes	27	61
2.	No	17	39
Total		44	100

Table 5

It is observed by the researcher that 61% of the firms under study use demand forecasting to predict the future demand whereas 39% doesn't use forecasting as a planning tool.

i) What period generally you consider for forecasting?

The key factor in choosing a proper forecasting approach is the time horizon for the decision requiring forecasting. In the competitive market uncertainties has increased which effects the forecast and firm cannot forecast accurately even though it uses the most reliable method. Generally short term forecasting is considered as reliable time horizon.

Sr. No.	Particulars	Frequency	%
1.	Short term	22	81
2.	Medium term	01	04
3.	Long term	04	15
4.	Very large term	00	00
Total		27	100

Table 6

Out of 44 respondents only 27 respondents apply the forecasting technique. The above table shows the information relating to those 27 units.

It can be observed that 81% of the units under study prefer short term as period of forecasting, 15% prefer long term and only 4% units consider medium term forecasting reliable.

ii) Which method you use for demand forecasting?

Forecasting methods are primarily subjective and they rely on human expertise. Method of forecasting may depend upon the type of the product firm manufactures. Choice of proper method requires knowledge of all the methods available. Delphi method employs a panel of experts in arriving at the forecast and proceeds through a series of rounds. Market research involves estimation of the market size based on testing new products or ideas with a few selected potential customers. Lifecycle analogy is diffusion model, where proportion of innovators, imitators and the overall market size helps firm to distribute demand through different stages of product life cycle. Informed judgement forecast is based on experience and understanding of the situation.

Sr. No.	Particulars	Frequency	%
1.	Delphi approach	02	07
2.	Market research	22	82
3.	Life cycle analogy	03	11
4.	Informed judgement	00	00
Total		27	100

Table 7

82% of the units under study uses market research method, 11% uses life cycle analogy and rest 7% uses Delphi approach. Market research is the most preferred method of demand forecasting in majority of the business activities in general and the same is observed in small scale manufacturing units under study in Ahmednagar MIDC.

iii) Does demand forecasting methods affects efficiency of forecasting?

Demand forecasting provides critical information to supply chain planning. The right method is key factor to gather the critical information and achieving the efficiency.

Sr. No.	Particulars	Frequency	Percentage
1.	Yes	16	59
2.	No	11	41
Total		27	100

Table 8

Out of 27 small scale manufacturing units, 16 units agree that forecasting methods affect the efficiency of forecasting. In totality 59% agrees and 41% disagrees with the statement. Though 59% units under study understand the importance of demand forecasting methods which affects the efficiency, still there is a need to make the rest of 41% units aware of efficiency dependency of demand forecasting.

b) Whether demand forecasting has helped your organization in improving procurement procedure?

Forecasting in supply chain context is the art and science of predicting future demand which helps the organisation in improving the procedure used for procurement. Researcher tried to find the opinion of the respondent regarding usability of demand forecasting.

Sr. No.	Particulars	Frequency	%
1.	Yes	19	70
2.	No	08	30
Total		27	100

Table 9

In small scale manufacturing units, 70% of the respondents confirmed that demand forecasting has helped them to improve procurement procedure and 30% disconfirmed the statement. The researcher observed that few firms were performing well in terms of purchasing raw material.

Make or Buy decision

The make versus buy decision evaluates the contribution of each activity. Firms can identify core activities from a strategic perspective either through the business process route or by product architecture route. When a firm decides to outsource some core process, it must keep the necessary architecture knowledge in house.

a) Which activities you outsource?

Outsourcing is important factor which will decide the competency of the small scale manufacturing units.

Sr. No.	Particulars	Yes		No	
		Frequency	%	Frequency	%
1.	Order processing	02	05	42	95
2.	Inventory management	03	07	41	93
3.	Customer service	01	02	43	98
4.	Procurement	00	00	44	100
5.	Import/Export management	01	02	43	98
6.	Information system	04	09	40	91
7.	Manufacturing	01	02	43	98
8.	Warehousing	00	00	44	100
9.	Transportation	04	05	40	95

Table 10

Outsourcing in SCM is important but the researcher observed that the respondent firms outsource only few activities.

b) What are the major reasons for outsourcing of above activities?

Various reasons can be given for which outsourcing is done in firms.

Sr. No.	Particulars	Frequency	%
1.	Strategic reasons	03	30
2.	Investment reasons	03	30
3.	Lower cost	02	20
4.	Lack of internal capability	02	20
Total		10	100

Table 11

Only ten units out of 44 units outsource few activities. It can be observed that 6 out of ten units are outsourcing their activities for strategic and investment reasons and 4 units outsource their activities to lower the cost and due to lack of internal capabilities.

Evaluating the implications of make or buy decision on efficiency of their supply chain

The internal supply chain inefficiency ratio is measure of the efficiency of internal supply chain management. To calculate this ratio, researcher considered total inventory carrying costs and the distribution costs to the components of the internal supply chain management costs. Researcher calculates the internal supply chain inefficiency ratio as follows:

$$SCC = DC + INV \times ICC$$

$$SCI = SCC / NS$$

Where, DC = *distribution cost,*

INV = *inventory (inclusive of raw materials, semi-finished goods and finished goods),*

SCC = *the supply chain management costs,*

NS = *net sales,*

ICC = *the inventory carrying cost,*

SCI = *the supply chain inefficiency ratio.*

The inventory carrying cost for most firms is estimated to be in the range of 0.15 – 0.25. In the absence of any data, one can work with an inventory carrying cost of 0.2. *Firms with efficient supply chain systems will have relatively lower scores on this performance measure.*

Sr. No.	Company Name	*supply chain management costs (SCC) In lakhs*	*Net Sales (NS) In lakhs*	SC Inefficiency
	Engineering units			
1.	Ahmednagar Steels Pvt. Ltd.	4.12	1000	0.004
2.	Sachin Pattern & Engineering Works	84.25	84	1.003
3.	Shriram Udyog	23.42	120	0.195
4.	Super-Tech Heavy Equipments	670.79	1800	0.400
5.	Varun Industries	184.93	60	3.080
6.	Sahayadri Engineering Works	3.27	10.2	0.321
7.	Ashok Projects	50.18	120	0.418
8.	Mauli Industries	80.89	7.2	11.234
9.	Kaushik Enterprises	670.79	1800	0.320
10.	Rajput Engineering Works	33.91	120	0.286
11.	Mahesh Engineering Works	5.55	90	0.062
	Manufacturing units (others)			
1.	Kirti Galicha Tiles	69.59	144	0.483
2.	S.B. Precision Springs	3.29	36	0.091
3.	M/S Swami Tiles	91.24	132	0.690
4.	Thacker Rubber & Allied Industries Pvt. Ltd.	72.83	48	1.517
5.	Aayush Kitchen Trolleys	4.08	24	0.170
6.	D.P. con Engineering	9.79	50	0.196
7.	Shree Rajlaxmi Industries	0.04	12	0.003
	Chemical units			
1.	Sunil Industrial Corporation	6.88	18	0.382
2.	Estelle Chemicals Pvt. Ltd.	429.48	500	0.859
3.	Krishna Chemicals	8.64	18	0.480
4.	M/S Mahesh Marketing	227.27	60	3.790
	Casting/Fabrication units			
1.	Super-Tech Engineers	670.79	1800	0.370
2.	Chetak Industries	77.07	120	0.642
3.	Apra Casting	79.00	108	0.648
4.	Supreme Industries	208.03	360	0.579
5.	Star Casting (Pvt.) Ltd.	97.03	1000	0.097
6.	Sheetal Foundry	10.21	60	0.170
7.	Forcas Impex Pvt. Ltd.	10.21	63.8	0.160
8.	Utkarsha Industries	5.93	11	0.540
9.	Shreenivas Fab Innovative Pvt. Ltd.	54.45	27.6	1.970
10.	Saee Engineering & Fabricators	184.20	36	5.117
11.	Guru Engineering works	47.30	36	1.314
12.	Manakos Engineers & fabricators	75.19	30	2.506
	Maintenance/Packaging units			
1.	Abhiruchi Enterprises	14.42	40	0.360
2.	Cargo Pack Industries	349.00	35	9.970
3.	Shree Balaji Powder Coating & Anodizing	520.13	24	21.67
4.	Durga Polytherm Pvt. Ltd.	100.88	20	5.044
5.	S.S. Suppliers	161.79	180	0.900
6.	Trimurty Foundry	22.14	120	0.185

Agri product units				
1.	Chaitanya Poultry Feeds & Hatcheries	7.67	14.4	0.532
2.	J.K. Engineering & Industries	28.17	72.0	0.391
3.	Shubham Agro Implement	54.45	27.6	1.940
4.	Mahesh Fabrication	1370.55	100	13.70

Table 12- Figures of elements of efficiency of supply chain

It can be observed from the table that the inefficiency ratio is low for the firms outsourcing the processes and also for the firms not outsourcing the processes.

CONCLUSION AND FINDINGS

In the paper, an attempt has been made to analyse the make or buy decision and its implications on efficiency of their supply chain in small scale manufacturing units of Ahmednagar MIDC using the data collected by the researcher.

General conclusions

Organisation profile

Gathering basic information like initial investment and product categories researcher has come to the following conclusions.

Initial investment is required to start the business and to purchase plant and machinery. 52% of the units have invested more than 30 lakhs, where as 48% units understudy has invested less than 30 lakhs. It is concluded that more than 71% of the units have manpower less than 20 indicating majority of the units require less manpower and complexity is less as compared to the bigger firm present the same area.

If we look in the industry mix it is concluded that casting/fabrication units constitutes 27%, engineering units constitutes 25%, manufacturing 16%, maintenance/packaging units 14%, agri products and chemical units 9% each with the major business objective of profit maximization and other minor objective of increase returns on investment, turnover and maximization of customer satisfaction.

Demand forecasting

Forecasting is the pre condition of good planning. Lack of forecasting may 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. Planning never gives guarantee of success but still it definitely reduces the uncertainties. To reduce uncertainties time horizon plays key role in today's competitive business environment short time horizon based forecasting using market research is in practice by 22 units out of 27 under study.

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

Make or Buy decision

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.

Statistical conclusions

Statistical tools were used by the researcher to analyse the calculated data and following conclusions were given.

Standard statistical tools like measure of central tendency and measure of dispersion were used by the researcher for the analysis of the performance of supply chain management of small scale manufacturing units under study and are presented in the table below.

Sr. No.	Types of Units	Average	Standard Deviation	Coefficient of Variation (in %)
1	Engineering units	1.5748	1.3178	216.6807
2	Manufacturing units (others)	0.4500	0.5274	117.2000
3	Chemical units	0.4800	1.6214	337.7708
4	Casting/Fabrication units	1.1761	1.4502	123.3058
5	Maintenance/Packaging Units	6.3548	8.4036	132.2402
6	Agri Product units	4.1408	6.4111	154.8276

Table 13-Statistics related to supply chain inefficiency

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. The data clearly indicates that the outsourcing of procurement of materials and components does not decide the efficiency of supply chain in small scale manufacturing units.

Researcher also calculated chi-square test for the independence of two attributes at 5% level of significance to test the independence the type of unit with supply chain inefficiency. The corresponding Chi-Square value is 19.1701 as against tabulated value of $X^2_{10,0.05} = 18.307$. The hypothesis of independence of type of units is rejected in case of supply chain inefficiency. It is concluded that the supply chain inefficiency depends on the type of small scale manufacturing units.

RECOMMENDATIONS

The collected data was analysed and interpreted and conclusions are verified and checked with the help of statistical techniques such as chi square test, averages, standard deviation and coefficient of variation. These tests are conducted in order to verify the hypothesis in order to bring out a clear picture. The researcher proposes to arrive at certain recommendations on the basis of factor listed below for small scale manufacturing units in the area mentioned viz. *Demand forecasting & Make or buy decision.*

The researcher's recommendations, with reference to above mentioned factors are as below,

- Forecasting being the precondition for planning any activity in the business, 39% units under study is not using demand forecasting for planning purpose. These units may be planning informally but a formal structured planning need to be developed by these small scale manufacturing units. Majority of the small scale manufacturing units are using a method of market research for demand forecasting, researcher would like to suggest small scale manufacturing units should also use other scientific demand forecasting methods.

  The best way to arrive at a forecast is to set up internal processes to ensure ongoing interaction between sales, marketing, and operations. It is important to make forecasts and make necessary modifications based on prior levels of accuracy, changing supply conditions, capacity and inventory levels. By applying other scientific methods of demand forecasting procurement can be more effective as to the existing status of the small scale manufacturing units.
- Outsourcing has become a part of business today but the importance is yet not clear to the small scale manufacturing units under study, Therefore researcher would like to suggest that small scale manufacturing units should start outsourcing activities other than core business activities to the maximum extent. Researcher knows that implementation of outsourcing business

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