



STUDY ON PERFORMANCE MEASUREMENTS OF SMALL SCALE MANUFACTURING UNITS, MIDC, CHANDRAPUR

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Abstract

The supply chain is often referred to as a value chain. A typical supply chain includes information, funds and physical material flows, which run parallel to the value chain. 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. Researcher feels that small scale manufacturing units can improve profitability by implementing supply chain in a proper manner in their organisations. Researcher's interest is to understand the awareness of SCM practices among small scale manufacturing units.

Keyword: *Correct Forecasting Method, Inventory Management, Make Or Buy Decisions, Strategic Decisions And Evaluating Performance.*

Introduction

In responding to the challenge of globalisation, businesses entities are organized differently compared to the past. Changes have been made to the supply chain in the form of new development such as company organisational structure, just-in time delivery, and warehousing and logistics operation. Before, businesses wanted to own all the activities encompassed in their supply chain, but now they only control the strategic core of their supply chain activities and depend more on external business partners. 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 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 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 supply chains.

Review of literature

Supply chain coordination via mediated constraint relaxation, J. Christopher Beck & Mark S. Fox, **Research Paper**, Toronto, Ontario (M5S 1A4), May 15, 1994. Coordination of the participants in the supply chain of a manufacturing enterprise is a key to agile reaction to unexpected events. As a starting point, we take a mediated approach to coordination: a single agent is responsible for recovery of the supply chain from a disruptive event. This mediator gathers commitment information from other agents and forms a constraint graph. If the event is truly disruptive, this graph will reflect infeasibility: a subset of agents can no longer meet commitments. Repair of the graph is done via constraint relaxation controlled by the mediating agent. We present a schema for constraint relaxation algorithms and experimental results on Partial Constraint Satisfaction Problems (PCSPs). We sketch the coordination protocol that is being developed.

Company Profile

Chandrapur Industrial area was established by MIDC in the year 1972. The area is well developed with quality infrastructural facilities such as roads, water supply and street lights. Many renowned industries are operating from this area. MIDC had acquired 591 hectares of land for the area.

Objectives of MIDC are

1. Rapid and orderly establishment and growth of firms in the entire area to achieve balanced industrialization.
2. To achieve balanced industrial development of Chandrapur with an emphasis on developing parts and underdeveloped parts of the firms.
3. Facilitate entrepreneurs in setting up firms at various locations in MIDC.
4. Infrastructural development in setting up firms at various locations in MIDC.

Research Methodology

Objectives of Study

1. To study the product development for customer satisfaction and to study CRM.
2. To study the overall performance of small scale manufacturing units.
3. To study the product management and strategic network design for products manufactured in small scale manufacturing units.

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

Data Analysis

Collection of Data

The sample consists of fifty small-scale manufacturing units from MIDC area of Chandrapur city which were selected by random sampling from the list of manufacturing units published by MIDC office, Chandrapur. 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.

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

Performance of SSMU's Engineering Units

Sr. No.	Company Name	Length of SC	SC Inefficiency	SC Working Capital Productivity
1	Adarsh tiles pipes industries	0.55	0.004	38.23
2	Anand Engineering	0.053	1.003	0.200
3	Antoney mech. Engg	0.018	0.195	1.010
4	Best fabrication & Engg works	0.390	0.400	0.480
5	Central India Engineers	0.177	3.080	0.082
6	Ganesh Coolers & Fabrication	0.219	0.321	0.722
7	J. K. Industries	0.770	0.418	0.466
8	Laxmi Engineering Works	0.287	11.234	0.178
9	Manav Engineering	0.450	0.320	0.500
10	Perfect Engineering Works.	2.516	0.286	0.695
11	Plast Mould Industries	0.228	0.062	0.695

Manufacturing Units (Others)

Sr. No.	Company Name	Length of SC	SC Inefficiency	SC Working Capital Productivity
1	Amar Art Products	1.267	0.483	0.860
2	B. M. Chawhan & Son	0.095	0.091	2.090
3	Bhartia Pulverisers	0.508	0.690	0.289
4	Carbon Processors	0.520	1.517	0.134
5	Daliya Cement Udyog	0.208	0.170	16.94
6	Haryana Coasted Papers Ltd.	0.406	0.196	0.857
7	India Explosives Ltd	0.006	0.003	17.65

Chemical Units

Sr. No.	Company Name	Length of SC	SC Inefficiency	SC Working Capital Productivity
1	Abhideep Chemical Pvt. Ltd.	0.128	0.382	0.499
2	Aditya Air products	0.114	0.859	0.220
3	Protect Traffice Device Pvt. Ltd.	0.129	0.480	0.465
4	Multi Organics Pvt. Ltd.	0.290	3.790	0.054

Casting / Fabrication Units

Sr. No.	Company Name	Length of SC	SC Inefficiency	SC Working Capital Productivity
1	Bohra Cement Products	0.458	0.370	0.530
2	Chandrapur Cement Products	3.055	0.642	0.309
3	Decorative Paper Board Pvt. Ltd.	0.882	0.648	0.333
4	Economic Cement Co.	3.453	0.579	0.350
5	Pima Controls Pvt. Ltd.	0.167	0.097	0.970
6	Hemac Precision	0.300	0.170	1.426

7	Kaveri Industrial Fabrication & Casting	0.320	0.160	1.420
8	Kushal Plastic	0.463	0.540	0.360
9	Maharashtra Carbon Pvt. Ltd.	2.190	1.970	0.101
10	Perfect Tech-aids Pvt. Ltd.	1.320	5.117	0.393
11	Wirecloth industries	0.130	1.314	0.149
12	Pfizer Ltd.	0.374	2.506	0.082

Maintenance / Packaging Units

Sr. No.	Company Name	Length of SC	SC Inefficiency	SC Working Capital Productivity
1	Anupam Plastic	0.127	0.360	0.543
2	Balaji Gunny Bags	0.047	9.970	0.099
3	Bhardwaj Engineers	8.231	21.67	3.260
4	Ginni Paper Products	0.178	5.044	0.038
5	Perfect International Pvt. Ltd.	0.101	0.900	1.090
6	Perfect Packing Industries	1.420	0.185	2.186

Agri product Units

Sr. No.	Company Name	Length of SC	SC Inefficiency	SC Working Capital Productivity
1	Dinshaws Dairy Foods Limited	0.614	0.532	0.406
2	Perfect Oil Pvt. Ltd.	0.278	0.391	0.490
3	Pikman Auto Ancillary Pvt. Ltd.	2.100	1.940	0.100
4	Saurabh Oils	7.140	13.70	0.072

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

Statistics Related To Length of Supply Chain

Sr. No.	Type of Units	Average	Standard Deviation	Coefficient of Variation (in %)
1	Engineering units	0.5144	0.6991	135.9059
2	Manufacturing units (others)	0.4300	0.4196	97.5814
3	Chemical units	0.1653	0.0834	50.4537
4	Casting/Fabrication units	1.0927	1.1696	107.0406
5	Maintenance/Packaging units	1.6840	3.2499	192.9869
6	Agri product units	2.5330	3.1717	125.2152

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.

Statistics Related To Supply Chain Inefficiency

Sr. No.	Type of Units	Average	Standard Deviation	Coefficient of Variation (in %)
1	Engineering units	1.5748	3.3178	210.6807
2	Manufacturing units (others)	0.4500	0.5274	117.2000
3	Chemical units	0.4800	1.6213	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

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.

Statistics Related To Supply Chain Working Capital Productivity

Sr. No.	Type of Units	Average	Standard Deviation	Coefficient of Variation (in %)
1	Engineering units	4.1666	11.3316	271.9633
2	Manufacturing units (others)	5.5457	8.0534	145.2188
3	Chemical units	0.3095	0.2109	68.1280
4	Casting/Fabrication units	0.5353	0.4754	88.8056
5	Maintenance/Packaging units	1.2027	1.2824	106.6216
6	Agri product units	0.2670	0.2121	79.4396

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.

Conclusion

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 none sharing of data and information among small scale manufacturing units and their customers. It is concluded by the researcher that 95% of the units collect 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. Plant layout is dependent on the production process. 52% units under study use process layout, 25% use product layout, 14% use mixed type of layout and 9% are not bothered about the plant layout. Production type varies accordingly, 30 units are in job work, 12 units are in batch production, 2 units are in flow type production and none of the units have any other type of production. 35 units i.e. 80% are using flow chart to control the production process. Researcher concludes from above analysis that majority of the small scale manufacturing units give the importance to production planning and control activities in their production activities. 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.

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