Mean Ranking of Variables Enhancing Supply Chain Performance in Small Manufacturing Firms

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Abstract

Supply chain performance deals with the efficiency in handling supply chain relations between manufacturers, wholesalers, retailers, agents, customers etc. The present study highlights the prominent variables that enhance the supply chain performance in 44 small scale units operating in district Udhampur of J & K State divided into ten lines of operations. The primary data reflecting the research portray was ascertained by its empirical analysis. BTS and Cronbach-alpha stood as the main evaluators for assessing the validity and reliability of the scales in the construct. The results of ranking tables revealed that the variables that enhance supply chain performance are "Duration of relationships", "Firm size", "Individual experience", and "Commitment". Duration of relationships is assigned rank one by almost all managers of manufacturing firms. Firm size is accorded second rank, and third rank was accredited to commitment followed by individual experiences with rank four. Commitment received moderate response. The overall mean scores is divulged and discussed in the present research.

Keywords: Supply, Chain, Performance, Small Scale Industries (SSIs)

Introduction

Supply chain comprises of two words: supply and chain. Supply generally means flow of goods & services from the higher hierarchy to the lower level hierarchy. Chain generally represents an association/ link/ bondage/ connection/ alliance between the persons, here generally the partners or the business parties. The number of parties involved in supply chain is: suppliers-manufacturers-wholesalers-retailers and the end customers. Supply chain in this perspective means the flow or the movement of goods from the suppliers to manufacturers than to wholesalers to retailers and lastly to the final customers. There is also a term known as supply chain management and management here means controlling the flow of goods & services. Therefore supply chain management as a whole means controlling the flow of goods and services by the channel members/parties.

Supply Chain Management often refers to the process oriented management approach to sourcing, producing, delivering goods and services to end customers (Cigolini *et al*., 2004) and to the coordination of various actors belonging to the same supply chain (Harland, 1996) as cooperation in supply chain management paves way to competitive advantage (Christopher & Juttner, 2000).

The success of SCM is dependent on adopters developing specific capabilities (Chandra & Kumar, 2000) including designing flexible organisation, developing a trusting relationship with its suppliers, seeking total supply chain collaboration, enhancing communication to reduce uncertainty & inventory levels, outsource non-core competencies, implement build-to-order manufacturing, reduce inventory and reduce costs. Empirical evidences of SCM applications in major American companies have achieved improvements in customer service, reduced costs, improved return on assets and increased revenues (Kim, 1999). Whipple *et al.* (2002) enticed further improvements by adding sharing of information between partners. McMillan (1996) concluded that to maintain a competitive advantage, the companies must enhance their ability to plan the entire material flow from the suppliers to the customers as an integrated process rather than as a series of discrete functions. Berry & Towill (1992), in their survey of U.K. industries, found substantial reduction in demand uncertainties by reengineering the companies supply chain to enhance demand.

Review of Literature

The concept of supply chain management is gaining momentum in the contemporary era. Though intense research had been done by eminent authors, researchers, academicians, and industrialists, but mean ranking of the variables portrayed in the study had not been divulged by any. Some of the major inferences from the existing literature were that supply chain decisions are often made in an environment that is rich with uncertainty, filled with multiple conflicting objectives and incomplete information. Additionally, it also requires considerations of duties & duty drawback, local content, taxes, and exchange rates (Harrison, 2001). The literature provided insights that supply chain performance can be augmented by designing defensive, coordinated and full response based on inventories, coordination & shop floor improvements, collaboration with competitors, providing secure profitable niches to small firms by overcoming problem of working capital, product quality, customer service, on-time delivery, response time, market demand, low profit margins, selection and evaluation of suppliers on the basis of quality, customer service & delivery criteria, and forming strategic alliances with suppliers, placing orders on certified suppliers using ISO-9000 standards for strengthening linkages, cooperation, communication, (Wisner & Tan, 2001) quality and cost-reduction, optimisation, heuristics and simulation (Sastry, 1999). Further, it was found that the present status and scope of supply chain management is widening and it was even found that 81% of the companies have implemented supply chain management practices in their organisations for reducing total cycle time (TCT) and improving customer satisfaction. The companies now are opting for a multi dimensional performance measurement system to evaluate the performance of their supply chain, use of advanced communication tools via electronic data interchange, enterprise resource planning and other supply chain management software. Intensive use of information communication and partnership development with upstream & downstream members for the development of effective supply chain management practices in manufacturing industries had been the main reasons for adopting the supply chain management practices (Ohdar & Kumar, 2006). The present paper takes into preview the various variables that influence supply chain performance.

Research Design and Methodology

The research methodology adopted for the study is as follows:

Sampling and Data Collection

The study collected authentic primary data from 44 small scale manufacturing units registered under District Industries Centre (DIC), Udhampur of J&K State. The total number of units registered under DIC was 49. Five units were found to be non functional. The 44 small manufacturing units were further categorised into similar ten lines of operations which is revealed as follows: cement (8), pesticide (3), steel (3), battery/ lead/ alloy (5), menthol (2), guns (2), conduit pipes (2), gates/ grills/ varnish (5), maize/ atta/ dal mills (3), and miscellaneous (11). The miscellaneous (not falling in any category) category embraced 11 small scale units namely M/s Supertech Industry**,** M/s Luxmi Electronics Works**,** Shaj Nath Vanaspati Ltd.**,** M/s Aditiya Cables, Poles and Transformers**,** Shankar Lime Industry**,** M/s Unique Carbon Industries**,** M/s B.S. Traders**,** M/s Vijay Candles**,** Everest Health Care Products**,** M/s J.K Petro Chemicals**,** and M/s Ajay Ice Factory**.** The response from managers from all the above stated units was collected with the assistance of census method.

Instrument

Instrument here connotes the survey instrument which was self developed after consulting eminent academicians, industrialists, surveyors, research scholars and even help was availed from existing literature available which comprised general information and some statements of supply chain performance. The data collection form known as questionnaire comprised questions in the nature of ranking, dichotomous and five -point Likert scale, where 1 stands for strongly disagree and 5 for strongly agree. Here in this study, ranking tables are used for drawing meaningful inferences.

Collection of Data

As the nature of the study is empirical, the primary data were collected from the respective respondents (managers) i.e. by approaching them, seeking their time feasibility and availability. The data for the study were collected in ethical consideration. The data were collected with the assistance of census method from the respective respondents. The secondary source of data was also taken into consideration and pure information was collected by different sources: internet, books and empirical papers from referred journals. In the present study only Ranking tables were used for eliciting consequential inferences.

Data Analysis and Interpretation

Table 1 outlays mean ranking of variables that enhancing supply chain performance in small manufacturing firms operating in District Udhampur of J&K State. There are 44 small manufacturing firms operating under SIDCO & SICOP. These 44 small manufacturing firms have been divided into ten lines of operations i.e. the small scale manufacturing units having analogous types of businesses are categorised into homogeneous headings namely cement (8), pesticide (3), steel (3), battery/ lead/ alloy (5), menthol (2), guns (2), conduit pipes (2), gates/ grills/ varnish (5), maize/ atta/ dal mills (3), and miscellaneous (11). The variables that enhances supply chain performance in these ten groups of functional SSI's are "Duration of relationships", "Firm size", "Individual experience", and "Commitment". Duration of relationships is assigned rank one by almost all managers of manufacturing firms except for pesticides/ insecticides, gates/ grills/ varnish/ paint and some miscellaneous firms. Firm size is accorded second rank, third rank was accredited to commitment, and rank four to individual experiences by most of the firms under study. Commitment received moderate response. Overall mean response to the factors in descending order are 1.84 (Duration of relationships), 2.34 (Firm size), 2.77 (Commitment), and 3.00 (Individual experiences) respectively. Since the operations of the firms under study are small and there is distance between firms and markets, supply chain performance would be visible and effective with duration and commitment in relationships.

The ranking categorisation is done as follows:

Cements

The cement category was found to the main and prominent working under DIC with eight different cements units namely: M/s Associated Cements, Zenith Cement Industry, Shivalik Cements, M/s Continental Cement Industry, Wullar Cements, M/s Shri Nath Industry, and Uma Cement Industry. As far as ranking related to the variables enhancing supply chain performance by these firms is concerned seven groups of firms accorded rank one to "Duration of relationships". "Firm size" was given rank two by most of the small units operating there. "Commitment" was consigned rank three. "Individual experience" was accorded rank four. This ranking made it clear that the variable "Duration of relationships" is the main variable that enhances supply chain performance.

Battery/ Lead/ Alloy

The next main group identified under SIDCO and SICOP was battery/ lead/ alloy. Their were again five main units operating underlying this category which were Radha Industries, Pilot Batteries, Durga Batteries, Suraksha Batteries, and Avtar Batteries. Again, "Duration of relationships" was accorded rank one by all the units operating under this group as it was found the main focus of all the small firms operating there. "Individual experience" was given rank two by these small firms and "Firm size" was downgraded with rank three. Accordingly, "Commitment" was accorded rank four as represented in Table 1.

Pesticides/ Insecticides

Three competitive units operating here were M/s Dhanuva Agritech Ltd., Safex Chemicals Ltd., and M/s Modern Insecticides. As far as mean ranking of variables enhancing supply chain performance is entrusted, "Duration of relationships" was accorded rank one by all the units operating under this group. "Firm size" was given rank two by these firms and "Commitment" was assigned rank three. "Individual experience" was accorded the last rank i.e. rank four. It was clear that this industry group also concentrates on duration of relationship as the main factor in determining and enhancing supply chain performance.

Conduit Pipes

M/s Pee Kay Products and Rukhmani Plastics were the only two units found functioning under this category. As far as mean ranking of variables enhancing supply chain performance is entrusted, "Duration of relationships" was accorded rank one by both the units operating under this group. "Firm size" was given rank two by conduit pipes and "Commitment" was consigned rank three. "Individual experience" was accorded rank four. It was clear that the conduit pipes industry also focus on duration of relationships as the main variable that enhances supply chain performance.

Menthol

M/s Harikripa Perfumes Pvt. Ltd. and M/s Mahadurga Industries were found to be operating under this category of industries. "Duration of relationships" was accorded

rank one by both the units operating under this group as it was found as the factor that enhances supply chain performance. "Commitment" was given rank two by these small firms and "Firm size" was consigned rank three. "Individual experience" was accorded rank four.

Guns

Two extreme competitors namely M/s Gulab Gun Factory and M/s Hunter Gun Factory accorded rank one to "Duration of relationships" and "Firm size" was given rank two by both the units. "Commitment" was accorded rank three by both the units. "Individual experience" was accorded rank four.

Steel

Three strong competitors namely M/s Maha Luxmi Steel Fabricators, M/s Faqir Chand Sanak Raj, and M/s Gupta Furniture were competing under this category. Rank one was assigned to "Duration of relationships" as it was found to be their main variable for promoting supply chain effectiveness, "Firm size" ranked two, "Commitment" ranked three and "Individual experience" ranked four.

Gates/ Grills/ Varnish/ Paint

M/s Balaji Industries, M/s Wazir Engineering Works, ISRO Products, Shakti Engineering Works, and M/s Everest Paints were operating under this category. Rank one was allocated to "Firm size" by this group of small firms. "Individual experience" was given rank two by these units, "Duration of relationships" was allotted rank three, and "Commitment" was aligned rank four.

Atta/ Maize/ Dal Mills

This outstanding group comprised three small units namely Shalimar Floor Mills, M/s Udhampur Dal Mills, and M/s Sharda Enterprises. As far as ranking related to variables that enhance supply chain performance is concerned "Duration of relationships" was accorded rank one by all the units operating under this group. "Commitment" was given rank two by this industry. "Firm size" was consigned rank three. "Individual experience" was allotted rank four. It implies that atta/ maize/ dal mills are mainly hovered with Duration of relationships as the main variable for enhancing supply chain performance.

Others (Miscellaneous)

This category includes eleven units in itself which were quite competitive and demand gathering. The names of the units under this group were M/s Supertech Industry, M/s Luxmi Electronics Works, Shaj Nath Vanaspati Ltd., M/s Aditiya Cables, M/s Unique Carbon Industries, M/s B.S. Traders, Poles and Transformers, M/s Vijay Candles, Everest Health Care Products, Shankar Lime Industry, M/s J.K. Petro Chemicals, and M/s Ajay Ice Factory. As far as ranking related to mean variables that enhance supply chain performance is concerned, "Firm size" was accorded rank one by most of the units and "Duration of relationships" was given rank two by almost all the units operating, "Commitment" was appropriated rank three and "Individual experience" was allotted rank four representing the actual figure of variables that enhances supply chain performance.

Overall, all the firms operating under DIC mainly focuses on duration of relationships as the main variable that is indulged in enhancing supply chain performance, followed by firm size, subsequently after that commitment and at the end by individual experiences (Table 1).

Conclusion

The paper portrays fresh findings in terms of the variables that support businesses in enhancing supply chain performances. The results of ranking tables revealed that the variables that enhance supply chain performance are "Duration of relationships", "Firm size", "Individual experience", and "Commitment". Duration of relationships is assigned rank one by almost all managers of manufacturing firms. Firm size is accorded second and third rank was accredited to commitment followed by individual experiences at rank four. Commitment received moderate response. From the practical ground, the supply chain network in connection with government functionaries must encourage the managers and the owners to take initiatives and take advantages of the government policies like DIC offerings, subsidies, seminars, workshops etc in order to enhance the vision and become eagle eye catching target markets and demand forecasters. Managers must be offered a platform to openly transmigrate his/her strategies into practical version without fear of loss of money in order to ensure a healthy and profitable supply chain management.

Table 1: Unit-wise Ranking of Variables that Enhances Supply chain Performance in Small Manufacturing Firms

Manufacturing Units/Factors	Duration of relationships	Firm size	Individual experience	Commitment
Cement	1.87 (I)	2.5 (II)	3 (IV)	2.62 (III)
Battery/ Lead/ Alloy	1.8 (I)	2.7 (III)	2.6 (II)	2.8 (IV)
Pesticides/ Insecticides	2 (II)	1.6 (I)	2.3 (III)	4 (IV)
Conduit pipes	1 (I)	2.5 (II)	3.5 (IV)	3 (III)
Menthol	1 (I)	3 (III)	4 (IV)	2 (II)
Guns	2 (I)	2 (II)	3.5 (IV)	2.5 (III)
Steel	1.3 (I)	2.6 (II)	3 (IV)	3 (III)
Gates/ Grills/ Varnish/ Paint	3 (III)	1.8 (I)	2 (II)	3.2 (IV)
Atta/ Maize/ Dal mills	2 (I)	2.6 (III)	3.3 (IV)	2 (II)
Others (Miscellaneous)	2.45 (II)	2.09 (II)	2.81 (IV)	2.63 (III)
Mean & Rank	1.84 (I)	2.34 (II)	3.00 (IV)	2.77 (III)

Note: Where 1 denotes "highest rank" and 4 denotes "lowest rank"

Limitations of the Study

i. The study is conducted in one area with its own peculiar environment, so its results may or may not be feasible in other areas having divergent environment.

ii. The inferences drawn could be blurred with biasness for the responses gathered from managers of small manufacturing units through surveys. Meaning and concepts of all scale items were made clear to them with their local prominent language. Though immense protection and care was taken for collecting proper information but then also an element of subjectivity cannot be ruled out for interpretation of data so collected.

Directions for Future Research

Future research can be avenue from the perspective of the managers' attitude towards the various dimensions of supply chain performances other than the four discussed in the paper. The research is conducted in small scale units but in future medium and large scale units can be measured on the same perspectives.

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