I J A B E R, Vol. 14, No. 8, (2016): 5523-5531

IMPACT OF SUPPLY CHAIN MANAGEMENT PRACTICES IN AUTOMOTIVE SECTOR

R. Suresh Kannan[*], D. Nisar Ahmed[**] and B. Balaji[***]

Abstract: *Supply Chain Management (SCM) has become a very important and critical issue for an organization due to globalization and ever-increasing competition. It has been recognized by many organizations as a strategy to attain business goals. SCM aims at movement of goods and services from one end of the chain to the other through different stages so as to improve the efficiency, effectiveness, productivity and profitability of the entire process. Thus, enhancing supply chain performance (SCP) is a critical approach for achieving competitive advantages for companies. A study was conducted in the Automotive sector in order to analyse the relationship between SCM practices, Competitive Advantage and Organisational Performance.*

Keywords: *SCM, Competitive Advantage, Organisational Performance, Automotive sector.*

1. INTRODUCTION

1.1. Supply Chain Management

Supply Chain Management (SCM) has become a very important and critical issue for an organization due to globalization (Marwah *et al.*, 2014) and ever-increasing competition. It has been recognized by many organizations as a strategy to attain business goals (Gunasekaran *et al.*, 2008). SCM aims at movement of goods and services from one end of the chain to the other through different stages so as to improve the efficiency, effectiveness, productivity and profitability of the entire process. Thus, enhancing supply chain performance (SCP) is a critical approach for achieving competitive advantages for companies (Cai *et al.*, 2009).

A few definitions of SCM over the years are presented here:

a) "*SCM is the integration of business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders*" (Lambert *et al.*, 1998).

b) "*SCM is the systemic, strategic coordination of the traditional business functions and the tactics across [these] business functions within a particular company*

* Doctoral Research Scholar, R & D Centre, Bharathiar University, Coimbatore.

** Doctoral Research Supervisor, R & D Centre, Bharathiar University, Coimbatore & Director, Measi Institute of Management, Chennai.

*** Professor, Shree Gurukripa Institute of Finance & Management, Chennai.

and across businesses with the supply chain, for the purpose of improving the long-term performance of the individual companies and the supply chain as a whole" (Mentzer *et al*., 2001).

c) "*SCM is the process of developing decisions and taking actions to direct the activities of people within the supply chain toward common objectives*" (McCormack and Johnson, 2001).

d) "*SCM is the art and science of creating and accentuating synergistic relationships among the trading partners in supply and distribution channels with the common shared objective of delivering products and services to the 'right customer', in the 'right quantity', and at the 'right time'* (Vakharia, 2002).

e) "*SCM is the task of integrating organizational units along a supply chain and coordinating material, information, and financial flows in order to fulfil (ultimate) customer demands with the aim of improving competitiveness of a supply chain as a whole*" (Stadtler, 2002).

f) "*SCM is the integrated, process-oriented planning and management of material, information and financial flows along the entire value chain; from the customer to the supplier of raw material […]*" (Kuhn and Hellingrath, 2002).

g) "*SCM is the efficient management of the end-to-end process, which starts with the design of the product or service and ends with the time when it has been sold, consumed, and finally, discarded by the consumer. This complete process includes product design, procurement, planning and forecasting, production, distribution, fulfilment, after-sales support, and end-of-life disposal*" (Swaminathan et al., 2003).

h) "*SCM is the process of planning, implementing and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods, and related information from point-of-origin to point-of-consumption for the purpose of conforming to customer requirements*" (Simchi-Levi et al., 2003).

i) "*SCM, as we envision, is a novel management philosophy that recognizes that individual businesses no longer compete as solely autonomous units, but rather as supply chains. Therefore, it is an integrated approach to the planning and control of materials, services and information flows that adds value for customers through collaborative relationships among supply chain members*" (Chen and Paulraj, 2004).

j) "*SCM is the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole*" (Christopher, 2005).

k) "The material and informational interchanges in the logistical process, stretching from acquisition of raw materials to delivery of finished products to the end user. All vendors, service providers, and customers are links in the supply chain" (Council of Supply Chain Management Professionals, 2010**)**.

l) *"A series of integrated enterprises that must share information and coordinate physical execution to ensure a smooth, integrated flow of goods, services, information, and cash through the pipeline"* (Coyle *et al.,* 2013).

1.2. Competitive Advantage

Today's global competition environment entails facing the rapid technology progress and high customer expectations, companies find it hard to win the competition only depending one's own capacity (Su *et al.,* 2008). In this situation, the establishment of the supply chain partnership among companies and the coordination of the partners are highly valued. Also, many companies struggle in justifying the cost of quality within their supply chain, but many companies fail to see the cost associated with varying quality levels from their suppliers. In order to create a quality product, which is one of the competitive advantages, company must address all aspects of the supply chain, including individual processes and supplier selection (Tan *et al.,* 2002). This is the main role of the supply chain management.

1.3. Indian Automotive Industry

The Indian auto components industry manufactures a wide range of products for both domestic consumption and exports. The industry manufactures around 20,000-30,000 auto components which can be grouped under the following categories: Engine parts, Drive transmission and steering parts, Body and chassis, Suspension and braking parts, Equipment, Electrical parts, and others.

The Strengths, Challenges, Opportunities and Threats (SCOT) Analysis for automotive industry is presented.

1.3.1. Strengths

a) Easy access to raw materials.

b) Ability to cater to low volume.

c) Established domestic manufacturing base.

d) Investments by Foreign car manufacturers.

e) Increase in export levels.

f) Low cost and cheap labour.

g) Rise in working and middle class income.

h) Increasing demand for European quality.

i) Expert skill in producing small cars – goof for environment.

j) Large pool of engineers.

1.3.2. Challenges

a) Lack of economies of scale.
b) Supply chain infrastructure bottlenecks.
c) Presence of a large counterfeit components market.
d) Low quality compared to other automotive countries.
e) Low labour productivity.
f) High interest rate and overhead level.
g) Production costs are generally higher than some other Asian states, such as China.
h) Low investment in R & D area.
i) Local demand is still towards low cost vehicles.

1.3.3. Opportunities

a) Growing population in the country.
b) Large and growing domestic auto market.
c) MNCs looking at low-cost outsourcing countries.
d) Focus from the government in improving the road infrastructure.
e) Rising living standards.
f) Increase in income level.
g) Better car technology is demanded.
h) Rising rural demand.
i) Car is a status symbol.
j) Women drivers have increased.
k) Proximity to other growing Asian markets.

1.3.4. Threats

a) Influx of spurious parts.
a) Cheap imports from other low-cost countries such as China, Thailand, Taiwan, etc.
b) Slowdown in global markets.
c) Less skilled labour.
d) Lack of technology in Indian companies.
e) Increase in import tariff and technology cost.
f) Smaller players that do not fulfil international standards.
g) Increasing congestion in urban areas.

1.4. Need for Research

India has traversed a long way in adoption of new technologies and global supply chain best practices in its automotive sector. Literature pertaining to Indian auto industry is not comprehensive in nature mainly due to characteristics of evolution of the sector in an emerging market. The present need is for effective, pragmatic supply chain practices to percolate wider among channel partners of OEMs. This indicates the need for focused research in areas such as evolving supplier evaluation strategies and frameworks, changing role of supply chain managers and leaders, collaboration and trust development with both upstream and downstream entities.

1.5. Research Gaps

Literature reveals that most studies have dealt with variables impacting supply chain management practices only. Research linking SCM practices with organizational performance are scant in Indian manufacturing industry. Similarly there is hardly any research linking SCM practices with competitive advantage. The current doctoral-level research tested these dimensions in a single research model to foster a more holistic attempt at understanding the relationships between such dimensions.

The research aids to answer questions like: Do organizations with high levels of SCM practices have high levels of competitive advantage? Do organizations with high level of SCM practices have high levels of organizational performance? Do organizations with high levels of competitive advantage have a high level of organizational performance?

2. MATERIALS AND METHODS

2.1. Research Design

Causal research design was used for this research.

2.2. Objectives of Research

The objectives of the research were: (a) to ascertain the perception of automotive organisations in Chennai about SCM practices, competitive advantage and organisational performance, and (b) to propose a conceptual framework and test the causal relationships between study variables.

2.3. Sampling Design

The population comprised automotive companies in India. The frame comprised automotive companies in Chennai cluster (state of Tamilnadu). Multi-stage sampling was employed for the study. The first stage involved Proportionate Stratified Sampling wherein strata comprised three categories: (i) Four wheelers

including cars, Trucks, tractors, and buses, (ii) Automotive components like tyres and lighting, and (iii) Other Ancillary Automotive components. The second stage involved random sampling within each stratum. Refusals and rejections were accounted for and it was ensured that 379 usable samples were collected.

The number of automotive companies in Chennai cluster was 27,926 companies according to the industrial profile of Kancheepuram District (DIC, 2012) compiled by MSME Development Institute.

Sample size, when population is known, can be ascertained using the Table developed by Krejcie and Morgan (1970). Since the number of firms in Kancheepuram district was 27,926 and closer to 30,000, the table value of sample size 379 (when population size is 30,000) was taken.

2.4. Data Collection Design

The primary data collection method was Survey method. The primary data collection instrument was a structured questionnaire. Face-to-face and telephonic unstructured interviews were also conducted with automotive industry employees and executives in order to understand the market scenario and to compile Strengths, Challenges, Opportunities and Threats (SCOT) analysis.

2.5. Pilot Study and Reliability Analysis

A pilot study was undertaken, prior to survey, wherein 55 organizations were administered a survey instrument (structured questionnaire) comprising 30 rating items. The survey instruments were suitably modified based on their response to the survey besides feedback. Similarly, feedback was also taken from a few industry executives. The final research instrument comprised 26 items with an alpha value of 0.871.

2.6. Limitations of Research

The study was focused on SCM practices, organizational performance and competitive advantage only and other dynamics of supply chain management were not under its purview. There may be changes in the service sector / logistics and supply chain sector environments in the future which in turn may influence changes in practices and perceptions.

2.7. Conceptual Framework

(i) SCM Practices (SCMP): SCMP have been defined as a set of activities undertaken in an organization to promote effective management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole (Bratic, 2011; Christopher, 1998).

(ii) Competitive Advantage (CA): Competitive advantage is the extent to which an organization is able to create a defensible position over its competitors. It comprises capabilities that allow an organization to differentiate itself from its competitors and is an outcome of critical management decisions. Competitive advantage would be measured in terms of quality, price/cost, delivery dependability, product innovation and time to market (Bratic, 2011).

(iii) Organizational Performance (OP): Organizational performance refers to how well an organization achieves its market-oriented goals as well as its financial goals. The short-term objectives of SCM are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain. Organizational performance would be measured in terms of marketing performance, financial performance and knowledge management (Yamin *et al*., 1999).

3. RESULTS AND DISCUSIION

3.1. Structural Equation Modelling (SEM)

The standardised path coefficient and result of null hypotheses are presented in Table 1.

Do SCM practices have an effect on organizational performance?

H_{01}: SCM practices have no effect on organizational performance.

The results reveal that the coefficient of SCM Practices (SCMP) being 0.546 represents the effect of SCMP on Organizational Performance (OP), holding other variables as constant. The p value is less than 0.001 and therefore the null hypothesis is rejected. SCMP has an effect on OP.

Do SCM practices have an effect on competitive advantage?

H_{02}: SCM practices have no effect on competitive advantage.

The results reveal that the coefficient of SCM Practices (SCMP) being 0.9 represents the effect of SCMP on Competitive Advantage (CA), holding other variables as constant. The p value is less than 0.001 and therefore the null hypothesis is rejected. SCMP has an effect on CA.

Does competitive advantage have an effect on organizational performance?

H_{03}: Competitive advantage has no effect on organizational performance.

The results reveal that the coefficient of Competitive advantage (CA) being 0.489 represents the effect of CA on Organizational Performance (OP), holding other variables as constant. The p value is less than 0.001 and therefore the null hypothesis is rejected. CA has an effect on OP.

Table 1
SEM Analysis

Hypothesised Path			*Std. Path Coefficients*	*p value*
CA	<—-	SCMP	0.9	***
OP	<—-	SCMP	0.546	***
OP	<—-	CA	0.489	***

*** implies Null hypothesis is accepted as it significant at p<0.001.
Source: Primary Data

The Goodness of Fit index (GFI) value was 0.967, Adjusted Goodness of Fit Index (AGFI) value was 0.922 and Comparative Fit index (CFI) value was 0.942. All these values were greater than 0.9 indicating a very good fit. It was found that Root Mean Square Error of Approximation (RMSEA) value was minimal at 0.059 (lesser than 0.08). Thus Good fit exists for research model.

4. CONCLUSION

The positive coefficient implies that for every 0.546 unit increase in SCMP, there will be 1 unit increase in OP. The positive coefficient implies that for every 0.9 unit increase in SCMP, there will be 1 unit increase in CA. The positive coefficient implies that for every 0.489 unit increase in CA, there will be 1 unit increase in OP.

This analysis helps in understanding the contribution (effect) of SCM practices on organisational performance and competitive advantage. Competitive advantage also influences organisational performance. The firms need to ensure that there is proper coordination, collaboration and integration both within the organisation and external entities. Competitive advantage can only be gained when strategically important activities are performed involving lower costs relative to competitors. Performance needs to be continuously monitored and measured.

References

Bratic, D., (2011), "Achieving a Competitive Advantage by SCM". IBIMA Business Review Journal, pp. 1-13.

Cai, J., Liu, X D., Xiao, Z H., Liu, J., (2009), "Improving supply chain performance management: a systematic approach to analysing iterative KPI accomplishment". Decision Support System, 46, No. 2, p. 512.

Chen, I J., Paulraj, A., (2004), "Understanding supply chain management: critical research and a theoretical framework". International Journal of Production Research, 42, No. 1, pp. 131-163.

Christopher, Martin, (1998), "Logistics and supply chain management: Strategies for reducing cost and improving service". Financial Times. Pitman Publishing.

Christopher, Martin, (2005), "Logistics and supply chain management: Creating value adding networks"., 3rd ed.. Harlow.

Council of Supply Chain Management Professionals. (2010)"*Supply Chain Management Terms and Glossary*"., accessed at http://cscmp.org.

Coyle, J. J., Langley, C. J., Novack, R. A., Gibson, B. J., (2013), "*Supply Chain Management: A Logistics Perspective*". Mason, OH: South-Western Cengage Learning.

DIC, Kanceepuram, (2012), "Profile of Kancheepuram District". MSME Development Institute, Government of India, p. 10.

Gunasekaran, A., Lai, K H., Cheng, Edwin T C., (2008), "Responsive supply chain: a competitive strategy in a networked economy". Omega, 36, No. 4, pp. 549-564.

Krejcie, Robert V., Morgan, Daryle W., (1970), "Determining sample size for research activities". Educational and Psychological Measurement, 30, pp. 607-610.

Kuhn, A., Hellingrath, B. (2002), "Supply chain management: optimal cooperation in the value chain". Berlin, Germany.

Lambert, D M., Cooper, M C., Pagh, J D., (1998), "Supply chain management: implementation issues and research opportunities". International Journal of Logistics Management, 9, No. 2, pp. 1-19.

Marwah, A K., Thakar, G., Gupta, R C., (2014), "Determinants of supply chain performance in the Indian manufacturing organizations". International Journal of Business Research and Management, 5, No. 1, pp. 14-27.

McCormack, K. P., Johnson, W. C., (2001), "Business process orientation: gaining the e-business competitive advantage". Florida, St. Lucie Press.

Mentzer, J. T., Flint, D. J., Hult, G T M., (2001), "Logistics service quality as a segment-customized process". Journal of Marketing, 65, No. 4, pp. 82-104.

Simchi-Levi, David, Kaminsky, Phillip, Simchi-Levi, Edith (2003), "Designing and managing the supply chain: concepts, strategies, and case studies". Homewood, IL: Richard D. Erwin.

Stadtler, Hartmut, (2002), "Supply chain management: an overview, in Stadtler, Hartmut and Christoph Kilger (Eds.): Supply chain management and advanced planning: concepts, models, software and case studies (2nd ed.), Berlin Heidelberg New York, pp. 7-28.

Su, Q., Shi, J-H., Lai, S. J., (2008), "Study on supply chain management of Chinese firm from the institutional view". International Journal of Production Economics, 115, No. 1, pp. 362-373.

Swaminathan, Jayashankar, M., Tayur, Sridhar R., (2003), "Models for supply chains in e-business". Management Science, 49, No. 10, pp. 1387-1406.

Tan, K C., Lyman, S B., Wisner, J D., (2002), "Supply chain management: a strategic perspective". International Journal of Operations and Production Management, 22, No. 6, pp. 614-631.

Vakharia, A. J., (2002), "e-business and supply chain management". Decision Sciences Journal, 33, No. 4, pp. 495-504.

Yamin, S., Gunasekruan, A., Mavondo, F T., (1999)"Relationship between generic strategy, competitive advantage and firm performance: an empirical analysis". Technovation, 19, No. 8, pp. 507-518.