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The Study of Supply Chain Management Strategy and Practices on Supply Chain Performance

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Abstract: The purpose of this research is to explore the relationship between supply chain management strategy and chain management practices on supply chain performance. The main tools of data collection instrument used was a questionnaire which was administrated to a total sample of 200 managers are classified by job title and respondents are, also classified by their job functions are corporate executive, purchasing, manufacturing/production, distribution/logistic, SCM, transportation, material and operation from Iranian manufacturing industry. The response rate was 62% while 51% was usable questionnaires. Sample selection was based on convenience sampling. The data were analyzed using mean, standard deviation and correlation between independent and dependent variables. The analyses involved statistical methods, such as reliability and validity tests and multiple regressions. The finding showed that supply chain management practices have a significant relationship with supply chain performance statically. However, supply chain management strategy is a weak predictor of supply chain management performance.

Key words: Supply chain management strategy, supply chain management practices, manufacturing firms, supply chain management performance, Iran

INTRODUCTION

Supply chain has become an important focus of competitive advantage for organization business. The management of supply chain study emphasizes how to maximize the overall value of the firm by better using and deployment of resources across the whole of the firm. A supply chain is the set of values adding activities connecting the enterprise's suppliers and its customers. The principle of supply chain activity is receiving input from firm's suppliers add value deliver to customers. A supply chain encompasses all the parties that involved, directly or indirectly in fulfilling a customer request. The supply chain includes manufacturer, suppliers, transporters, warehouses, retailers and even customers themselves. Within each organization, such as a manufacturer, the supply chain includes all function involved in receiving and filling a customer request. These functions includes new product development, marketing, operation, distribution, finance, customer service and other function that related to serving customer request (Chopra and Meindl, 2007). Effective supply chain management is important to build and sustain competitive advantage in product and services of the firms. Gunasekaran and Ngai (2004) and Qrunfleh (2010) stated that the performance of supply chain was influenced by managing and integrating key element of information into their supply chain. To achieve effective supply chain integration, the firms need to implement information technology (Handfield and Nichols, 1999; Qrunfleh, 2010). Brandyberry *et al*. (1999) suggested that by using technology of information, the firms could managing the flow and impact of numerous supply chains dimension, such as quality, cost, flexibility, delivery and profit. Byrd and Davidson (2003) found that information technology impact the supply chain effectiveness. They stated that the development and long-term utilization of information technology lead to better firm performance in terms of Return on Investment (ROI), Return on Equity (ROI) and market share. Vickery *et al*. (2003) showed that supply chain coordination and integration is facilitated by using integrated information technology which directly impacts a financial performance of the firms.

According to Qrunfleh (2010), to achieve a competitive advantage and better performance, supply chain management strategy need support the business strategy. The purpose of this study to find out the effect of supply chain management strategy, such as lean, agile and hybrid supply chain on supply chain performance. This study, also investigates the effect of supply chain management practices in terms of strategic supplier partnership, customer relationship and information sharing on supply chain performance. The study is organized as follows.

Literature review and hypotheses: The research objectives in this study were designed to investigate the effect of supply chain management strategy on supply

chain performance and to determine whether supply chain management practices has impact on supply chain performance. Within these objectives, there are 3 concepts that needed to be explored to obtain an understanding of these objectives. These concepts are:

- Supply chain management strategy that encompasses lean, agile and hybrid supply chain
- Supply chain management practices that includes supplier partnership, customer relationship and information sharing
- Supply chain performance in terms of supply chain integration, flexibility and customer responsiveness

Supply chain management has been becoming increasingly important in competitive business. To compete at the supply chain level, firms must adopt an appropriate supply chain management strategy. The strategy needs integrate and coordinate throughout the supply chain to generate the performance of supply chain members (Green *et al*., 2008; Cohen and Roussel, 2005; Wisner, 2003). Mason-Jones *et al*. (2000) and Lewicka (2011) argued that supply chains need to adopt a strategy that suits both their particular product and marketplace. Fisher (1997) suggested that the 1st step in developing the supply chain strategy is to consider the nature of the demand for an organization's product, proposing that these are either functional or innovative.

Vonderembse *et al*. (2006) discussed 3 types of supply chains that are necessary to match 3 types of products: Standard, innovative and hybrid. They demonstrate that standard products which tend to be simple products with limited amounts of differentiation should be produced by a lean supply chain. Lean supply chain employ continuous improvement efforts and focus on eliminating wastes across the supply chain. On the other hand, innovative products which may employ new and complex technology require an agile supply chain. Agile supply chain responds to rapidly changing global markets by being dynamic and flexible across organizations. Hybrid products which are complex products have many components and participating companies in the supply chain; therefore a variety of supplier relationships may be needed which they refer to hybrid supply chains. Hybrid supply chains combine the capabilities of lean and agile supply chains to meet the needs of complex products. Towill and Christopher (2002) suggest that there are 3 types of supply chain strategies: Agile, lean and hybrid supply chains. In their study, a case study was provided to show how a lean and agile supply chain can be successfully combined to have a lean/agile supply chain strategy which they refer to as hybrid or leagile supply chain. Naylor *et al*. (1999) uses the term legality, as an integration of lean and agile paradigms with the aid of a decoupling point in the supply chain. Thus, they provide a personal computer company, as a case study to demonstrate how agility and leanness can be combined successfully within the supply chain to meet customers requirements.

The traditional domain of the information systems strategy is to improve the efficiency and effectiveness of organizations (Bakos and Treacy, 2013; Qrunfleh, 2010). Earl (1989) and Qrunfleh (2010) argued that the information sharing strategy should originate from the business strategy. This means that information technology should facilitate implementing the business strategy (whatever that business strategy is) and help achieve its goals. Supply chain management practices encompasses set of approaches and practices that effectively integrate with suppliers, manufactures, distributors and customers to improve the long-term business performance and their supply chain (Chopra and Meindl, 2007; Tseng, 2010). In this study, supply chain management practices are defined, as several of management activities that purposed to improve the supply chain performance (Li *et al*., 2006; Wong *et al*., 2005; Zhou and Benton, 2007; Koh *et al*., 2007; Qrunfleh, 2010). Strategic supplier partnerships need better coordination between the organization and its suppliers; companies tend to have a long-term relationship with suppliers that create value. In this study, a strategic supplier partnership is defined, as the long term relationship between the organization and its suppliers which influences the strategic and operational capabilities of individual participating companies to help them achieve significant ongoing benefits (Li *et al*., 2005, 2006; Monczka *et al*., 1998). A strategic supplier partnership include buying goods and services from suppliers and impacting the suppliers system and operational capabilities, adding value and improving the supply chain performance (Monczka *et al*., 1998; Qrunfleh, 2010).

Li *et al*. (2006) stated that customer relationship is the entire array of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers and improving customer satisfaction. Vickery *et al*. (2003) emphasize the importance of establishing a close customer relationship, as a major practice of supply chain integration to enable organizations to respond faster to customers. Li *et al*. (2005) emphasize the importance of information sharing to SCM practice. The main principle of SCM is sharing of information within supply chains (Moberg *et al*., 2002). By sharing information with members of the supply chain, an organization can respond more quickly to the customer's changing needs (Li and Lin, 2006). Supply chain integration is degree of all the activities within an organization, suppliers and customers are integrated together (Stevens, 1990; Stock *et al*., 1998, 2000;

Narasimhan and Jayram, 1998). Supply chain integration involves effective communication among all supply chain members (Turner, 2012). Customer responsiveness is directly connected to information in which suitable use of information is important to achieve customer responsiveness. To support this argument, Daugherty *et al.* (1995) found that information availability and customer responsiveness are positively related which resulted in improving firm performance. The need for flexibility originates from customers; since customers ask for variety, quality, competitive prices and faster delivery. This has forced companies to make design changes quickly and respond faster to customer needs in order to sustain the company's competitive advantage. As a result, companies need to be flexible enough to react to changes in customers demands (Aggarwal, 1997). This study examines, the supply chain management strategy that consists of lean, agile and hybrid supply chain and its relationship to supply chain performance. Hence, the following hypotheses will be tested:

H_1: Supply chain management strategy is positively related to supply chain performance
H_{1a}: Supply chain management strategy is positively related to supply chain integration
H_{1b}: Supply chain management strategy is positively related to supply chain flexibility
H_{1c}: Supply chain management strategy is positively related to customer responsiveness

Researchers proposed that supply chain management practices that consist of strategic supplier partnership, customer relationship and information sharing and its relationship to competitive advantage of the firm. Hence, the following hypotheses will be tested:

H_2: Supply chain management practices is positively related to supply chain performance
H_{2a}: Supply chain management practices is positively related to supply chain integration
H_{2b}: Supply chain management practices is positively related to supply chain flexibility
H_{2c}: Supply chain management practices is positively related to customer responsiveness

MATERIALS AND METHODS

Sampling and data collection: The data collection instrument used was a questionnaire which was administrated to a total sample of 200 managers are classified by job title and respondents are, also classified by their job functions are corporate executive, purchasing, manufacturing/production, distribution/logistic, SCM, transportation, material and operation from Iranian manufacturing industry.

Reliability analysis: The Cronbach's alpha was conducted to assess the reliability of each scale. Alpha values over 0.7 indicate that all scales can be considered reliable (Nunnally, 1978). For each of the item scales, factor analysis was used to reduce the total number of items to manageable factor. Principal components analysis is used to extract factors with eignevalue >1. Varimax rotation is used to facilitate interpretation of the factor matrix. Sampling adequacy measurement tests are, also examined via the Kaiser-Meyer-Olkin statistics to validate use of factor analysis. Factors analysis showed that the KMO value of 0.81 indicate sampling adequacy. The factor model indicates 3 distinct factors loading without any misclassification: Lean, agile and hybrid supply chain. Cronbach's alphas among 20 items in the questionnaires exceeded 0.7. About 7 items are identified for Lean Supply Chain (LSC), 8 items are identified for Agile Supply Chain (ASC) and 5 items for Hybrid Supply Chain (HSC). These items are treated as independent variables.

A similar factor analysis was applied to the supply chain management practices areas: Strategic Supplier Partnership (SSP), Customer Relationship (CR) and Information Sharing (IS). Among 23 items in the questionnaire, 5 items are deleted during the factor analysis. A total of 23 items were reduced to 7 underlying factors loadings. Cronbach's alphas among 18 items in the questionnaires are exceeded 0.7. About 6 items are identified for Strategic Supplier Partnership (SSP), 5 items for Customer Relationship (CR) and 7 items for Information Sharing (IS). These items are also treated as independent variables. The KMO value of 0.78 indicate sampling adequacy. Factor analysis was also applied to the supply chain performance: Supply Chain Integration (SCI), Supply Chain Flexibility (SCF) and Responsiveness Customer (RC). Among 18 items in the questionnaire, 6 items are deleted during the factor analysis. A total of 12 items were reduced to 6 underlying factors loadings. Cronbach's alphas among 18 items in the questionnaires are exceeded 0.7. About 6 items are identified for Strategic Supplier Partnership (SSP), 5 items for Responsive Customer (RC) and 7 items for Information Sharing (IS). These items are treated as independent variables. The KMO value of 0.72 indicate sampling adequacy.

Correlation analysis: The correlation between independent variables (supply chain strategy and management practices) and dependent variables (supply chain performance) were positive. Lean supply chain had a correlation of 0.243, $p<0.01$ with supply chain integration, 0.232, $p<0.01$ supply chain flexibility, 0.241, $p<0.01$ responsive customers. Which mean that the respondents are more likely to evaluate lean supply chain was positive when supply chain performance is positive. Agile supply chain had a correlation of 0.225, $p<0.05$

Table 1: Parameters of the model are estimated using multivariate regression analysis

Parameters	Model 1 dependent variable = Overall SC performance	Model 2 dependant variable = SCI	Model 3 dependant variable = SCF	Model 4 dependant variable = RC
Constant	126.311 (7.422)**	21.188 (7.095)**	17.244 (5.812)**	16.294 (6.481)**
LSC	1.031 (1.589)*	0.119 (1.062)	0.127 (1.142)	0.130 (1.183)
ASC	0.749 (2.065)*	0.216 (2.256)*	0.162 (2.102)*	0.170 (2.186)*
HSC	1.031 (1.989)*	0.119 (1.072)	0.117 (1.172)	0.110 (1.193)
SSP	0.847 (3.054)**	0.216 (3.247)**	0.183 (3.111)**	0.191 (3.185)**
RC	1.221 (3.789)**	0.129 (3.172)**	0.127 (3.171)**	0.122 (2.993)**
IS	1.642 (3.531)**	0.265 (3.280)**	0.242 (2.801)**	0.163 (2.095)*
Adj R^2	0.130	0.199	0.185	0.163
F-value	11.243**	11.040**	7.643**	6.469**

*,**p<0.05 and 0.01

supply chain integration, 0.281, p<0.05 supply chain flexibility, 0.266, p<0.05 responsive customer. Hybrid supply chain has a correlation of 0.282, p<0.01 with supply chain integration, 0.287, p<0.01 supply chain flexibility, 0.335, p<0.01 responsive customers.

Regression analysis: The parameters of this model are estimated using multivariate regression analysis. Table 1 shows coefficients of each model along with corresponding test statistics. In model 1, where the dependent variable is overall supply chain performance, the model seem to be reliable (p-value for F<0.01 and adjusted R^2 of 0.130). Model 2, dependent variable is supply chain integration. The model, also seem to be reliable (p-value for F<0.01 and adjusted R^2 of 0.199). Strategic supplier partnership, customer relationship and information sharing are the important determinant in supply chain integration with p-value for t<0.01, followed by agile supply chain with p-value of t<0.05, lean and hybrid supply chain are not significant with p-value of t>0.05. Model 3, dependent variable is supply chain flexibility. Once again, the model also seem to be reliable (p-value for F<0.01) and adjusted R^2 of 0.185. Strategic supplier partnership, customer relationship and information sharing are important determinant in supply chain flexibility with p-value for t<0.01, followed by agile supply chain with p-value of t<0.05 while lean and hybrid supply chain are not significant with p-value of t>0.05. Model 4, dependent variable is customer responsiveness. The model seem to be reliable (p-value for F<0.01) and adjusted R^2 of 0.163. It appears, strategic supplier partnership and customer relationship has similar effect on the customer responsive. Followed by agile supply chain and information sharing with p-value for t<0.05 while lean and hybrid supply chain are not significant with p-value of t>0.05.

RESULTS

In this research, the following outcomes were obtained: The correlation analysis showed that lean supply chain is not related to supply chain integration, supply chain performance and customer responsiveness. Agile supply chain is related to supply chain integration, supply chain flexibility and customer responsiveness. Hybrid supply chain is not related to all supply chain performance. The research, also found that strategic supplier partnership, customer relationship and information sharing are the important determinant of supply chain performance. For H_{1a} investigate the relationship between supply chain management strategy and integration, this study found that not significant correlation between supply chain strategy and performance. The H_{1b} assessed the relationship between supply chain management strategy and flexibility. Finding show there is a weak relationship between supply chain management strategy and performance. The H_{1c} examine the relationship between supply chain management strategy and customer responsiveness and testing found that there is a weak relationship between supply chain management strategy and customer responsiveness. The H_{2a} considered the correlation between supply chain management practices and integration. According to the result shown that there is significant relationship supply chain management practices and integration. The H_{2b} assessed the relationship between supply chain management practices and flexibility. Findings show that also significant correlation between supply chain management practices and flexibility. The H_{2c} investigates the relationship between supply chain management practices and customer responsiveness. Findings, also show that there is a significant relationship between independent and dependent variables.

DISCUSSION

The most important factor that faced by organizations is implement the strategy to organizational practices. Research findings show that supply chain management strategy is the weak relationship to supply chain performance. Although, supply chain management strategy is the weak of the 2 predictors (supply chain strategy and management practices) of supply chain performance, firms should take note that supply chain

management strategy is important factors and being impact supply chain performance. However, the strategic that has been formulated by top management should be implemented in organizational practices. To effectively managing the supply chain, organizations need to adopt appropriate supply chain strategies into supply management chain practices (Qrunfleh, 2010). Effective supply chain management is critical determinant to building and sustaining competitive advantage in the market place.

CONCLUSION

This study also showed that the strong predictor of supply chain performance are strategic supplier partnership, customer relationship and information sharing. It should be noted that the supply chain management strategy that not implemented into supply chain management practices can not generate the supply chain performance. The research finding shows that in order to do so, there is a need to integrate supply chain management strategy into management practices. Based on the data collected from 200 corporate executives, purchasing managers, manufacturing managers, logistic managers and operation managers from Iranian manufacturing industry, the research hypotheses are tested by using multiple regression models. The result of this study may be contributes to the supply chain management knowledge in several ways. This study was to add to the knowledge on supply chain management performance by exploring the relationship supply chain management strategy, practices and management performance.

IMPLICATIONS

By developing and testing a research framework of supply chain management strategy and practices constructs and conducting an analysis a number of manufacturing firms with valid and reliable instrument, this study represented one of the investigate the relationship supply chain management strategy, management practices and performance. Overall, this study contributes to the knowledge of the role of supply chain management strategy and practices in supply chain management field. First, it proposed a theoretical supply chain management strategy framework that identified lean, agile and hybrid supply chain. Second, this study provides a practical and useful tool for supply chain managers to audit and assess supply chain performance practices. For instance, the supply chain management practices can be used to evaluate the extent to which organizational performance practices have been implemented and their impact on the competitive capability of the firm. Third, this study provides conceptual and prescriptive literature regarding supply chain management strategy and practices. Fourth, the results lend support to the claim that higher level of supply chain management practices lead to higher levels of supply chain performance.

LIMITATIONS

There are a number of limitations that influence the generalizability of this study. First, this study limited only on manufacturing industry. One of the limitations of this single-sector study is that the conclusions may not be generalizable to other sectors. Future studies replicating this research across multiple industries and sector would increase the understanding of supply chain performance. Second, the sample selection was based on a convenience sample which is often used for exploratory research rather than a random probability sample. Additional research could be conducted using a random probability sample. Third, the sample represented a limited number of companies in limited industry. Fourth, the study is based on a self-reported questionnaire. Therefore, there is a possibility of respondents answering questions in a way that is perceived to be more desirable or acceptable than what is actually experienced or believed. Thus, the results of this study should be considered indicative rather than definitive based on these limitations

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