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Supply Chain Manufacturing Alliances in the Automotive Industry: Impacts on Financial Performance

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Abstract

Manufacturing alliances and synergetic supply chain linkages affect firm performance, competitive advantages, and knowledge creation for alliance partners. Supplier-buyer interactions enhance cost reduction, delivery cycle-time improvement in product and process technology advantages. The literature analyzing supplier manufacturing capabilities (SMC) and supplier development (SD) between buyer and supplier could lead to SD and improve performance. Few studies, however, explore the impact of such linkages on improved financial performance of both SMC and SD. Our research explores the effect of supplier manufacturing capabilities' improvement and enhancement of financial performance.

The data analysis is structural equation modeling (SEM), based upon a questionnaire distributed to 241 enterprises, suppliers to SAPCO company—a Central Asian IKCO automotive producer in strategic alliances with Suzuki and Peugeot/Citroen, among others. The results support the hypothesized model in which SMC has a direct influence on SD practices and improved financial performance for the network partners.

Keywords: Supplier manufacturing capabilities, supplier development alliances, financial performance

Introduction

Supplier manufacturing capabilities play a pivotal role in supply chain configurations and management mediating the flow of critical production inputs into the firm. Supply chain collaborative advantage with alliance partners provides for strategic benefits and could lead to knowledge creation. Sánchez-Rodriguez, et al. (2005) suggests that purchasing initiatives are part of a structural model that is significant and constitutes an essential element for the success of the supply chain partners. Increasingly, the purchasing function is viewed as an integral part of cross-functional system, of material requirements planning (MRP) and just-in-time logistics (Sriram, et al. 1997).

Closely coordinated supply chain collaborative advantage with synergistic alliance partners provides for strategic benefits through the supply chain partnerships and unleashes benefits and knowledge creation (Cao and Zhang, 2010). Moreover, coordinated modes of cross-corporate linkages between buyer and supplier create a framework for corporate efficiencies and effectiveness and lead to improved production and financial metrics as well as intra-firm efficient outcomes, enhance supplier manufacturing capabilities, and improve the management of the supply chains (Sriram and Stump, 2004). Supply chain management practices are based upon a firm capability framework that depicts linkages in an increasingly connected international market. Ajami and Goddard (2018) advance a two-dimensional framework; a multinational and global orientation, or strategic orientation, and configuration of assets and capabilities. Similarly, the framework for these linkages, according to other scholars, is transactional, first, second—transitional and relational. These prototypes of linkages determine the shape of the supply chain and dictate the configuration of assets and capabilities of both buyers and suppliers, which could result in improvement in the buyer/supplier financial results (Paulraj, et al, 2012). Under these prototypes, make or buy decisions, as well as outsourcing have strategic implications for both buyers and suppliers. The make or buy decisions can be a measured factor for profitability, contributing to the financial health of the enterprise (McIvor, et al., 1997; McIvor 2005).

The concept of supply chain development, first introduced in the academic literature by Leenders (1989), was a way to understand how manufacturers can increase the number of qualified suppliers and to help improve supplier performance. Over time, supply chain development has had a major influence on overall management of supply chains (Mortensen and Arlbjorn, 2012). In this, both supplier and buyer play a critical role in ensuring the overall product quality and enhancing supply chain performance efforts (Sanchez-Rodrigues, 2009). Several empirical studies maintain that financial performance is dependent on the role that the finance function plays in a firm's strategic planning process (Narasimhanand Das, 2001; Chen, et al., 2004). Moreover, it is important to take into consideration the importance of the purchasing function and its impact on business and financial performance, and the configurations of purchasing strategies, practices, and initiatives (Gonzalez-Benito, 2010). In today's global economy, restructuring the purchasing function plays an important role in organizational efficiencies. The role of purchasing function is not only limited to obtaining the right material but also expands to the acquisition of products with the appropriate delivery time and place and from the right source (Thrulogachantar and Zailani, 2011). In buyer-supplier interactions, both costs and benefits are analyzed and could end in an improved financial offering (Ramsay and Wagner, 2009).

Supplier manufacturing capabilities are considered critical to fostering and facilitating close interactions with a number of suppliers. The relational competency perspective suggests that having close ties with a limited number of suppliers and increasing investments and commitment in relational-specific assets ultimately fosters greater trust and cooperation among the supply chain's partners. Trust could enhance the possibilities for cooperation among the partners and could lead to mutual gains for most entities (Chen, et al., 2004; Ulagusand Eggert, 2004). The concept of enhancement of supplier capabilities focuses on the characterization and classification of purchasing strategies according to practices and initiatives implemented by the purchasing function (Krause, et al., 2000., Gonzalez-Benito 2010., Hum, 2000) suggest that competitive advantages in terms of quality cost are important in analyzing the relationship and relatedness of the purchasing and supply strategies to business and financial performance. Moreover, supplier development as a long-term strategy can be improved due to the competitiveness of the buyer organizational structure and configurations of assets and capabilities.

The aim of this study is to determine the effect of supply manufacturing capabilities on supplier development and financial performance in SAPCO. The central research question focuses upon the impact of strategic purchasing, supplier development, and financial performance.

Theoretical Framework and Hypotheses as they relate to Supplier Manufacturing Capabilities and Development

Supplier manufacturing capabilities has been identified as a critical factor for supplier involvement in the buyer's product development process and the implementation of effective communication and evaluation practices, thus making this an integral part of building successful buyer-supplier relations (Sanchez-Rodriguez, 2009). Prahinski and Benton (2004) highlighted the importance of cooperative relationships between buyer and supplier that could lead to successful outcomes and enhance performance. Humphreys, et al. (2004) recognize the important role that supply and material purchases initiatives play in the overall performance of the supply chain partners.

Moreover, supplier development programs (SDP) can also aid in the development of supplier capabilities through improved communication and other related processes that influence synergetic strategic orientation.

Data analytics, using structural equation modeling (SEM) from a US automotive supplier sample points out that enhancement of cooperation could come about by open communication. Supplier development is then central to the process of improvement in supplier performance. (Narasimhan, and Das, 2001; Das, et al., 2006) identified buyer-supplier relationship development as a strategic component in purchasing and supply management sourcing. To improve supplier performance, a firm can start with a limited involvement activities, such as supplier evaluation, and move on to much more elaborate and resource-demanding activities and investment in equipment as well as training of the supplier employees(Nithya, 2013). The central question in this framework is to understand how various types and levels of supplier development initiatives can be linked to specific outcomes for both the supplier and the buying firm. Modi and Mabert (2007) and Wagner (2006) suggest that the development of supplier capabilities will require far more than a low-level of involvement activities. Moreover, Arroyo-Lopez (2012) and Cousins, et al. (2008) research clearly points out that desired outcome for both buyer and supplier, if clearly mapped out, can distinguish between high and low performance in supply chain capabilities, both domestically and globally (Ajami and Goddard, 2018).

Cousins, et al. (2008) research, based upon their analysis of UK automotive manufacturing firms point out that increased socialization between buyers and suppliers could also mediate to enhance financial performance and could lead to further improvement in the process of interaction between both supplier and buyer. Equally important is the improvement in quality. This is due to the fact that the supplier is capable of managing operations more efficiently and developing expertise in solving technical and logistical problems. Improved products and better quality come about as the relationship improves over time (Dubois and Araujo, 2007). Moreover, the authors conclude that different supply strategies can evolve to meet the expectations of the final consumer in order to reduce costs through standardization. Faes and Matthyssens (2009) cite similar results for purchasing strategies' changes and improvement in the public sector as well.

The supplier development literature has primarily focused on case studies and focused on the auto industry, both in the US and elsewhere. Chen and Paulraj (2004) and Watts and Hahn (1993) studied other industries and reported that supplier development was primarily the domain of large firms among US-buying enterprises. Further, they reported that supplier development activities were most likely to be of short term, targeted to improve supplier product or service performance instead of the development of long-term supplier capabilities.

Hypothesis 1: Suppliers' manufacturing capabilities will be positively related to supplier development.

Suppliers Manufacturing Capabilities and Financial Performance

Supplier manufacturing capabilities that are well-developed, properly implemented have a positive impact on firms' performance. Therefore, the involvement of purchasing in the strategic planning process should also have a positive effect on the supplier manufacturing capabilities. A proactive approach to the strategic management of the purchasing function could lead to increased profits and improved financial performance and competitiveness. Accordingly, strategic purchasing would be expected to have a positive direct effect on a buyer's performance. Moreover, the effect of strategic purchasing on performance could also be mediated by supply management practices. The combination of strategic purchasing and supplier development practices and activities and their configuration between supplier and buyer could lead to competitive advantages for both. Thus, we expect that a buying firms' strategic purchasing effort could lead to improved performance both directly and indirectly, mediated by supplier development (Sanchez-Rodriguez, 2009).

Hypothesis 2: Suppliers' manufacturing capabilities will be positively and correctly related to financial performance.

Linking Supplier Development and Financial Performance

Bai and Sarkis (2011) define supplier development as, "any set of activities undertaken by a buying firm to identify, measure and improve supplier performance and facilitate the continuous improvement of the overall value of goods and services supplied to the buying company's business unit." Continuous improvement in supply chain development is central according to the multi-method approach relying on Gray system theory and rough set theory has made it possible for supplier organizations to identify corporate cultures and practices that could enhance successful supplier performance.

Traditionally, the success of a supplier development program has relied upon cost reduction and delivery time improvement. However, it's been proposed that supplier development may be more effective in process-oriented modes rather than result-oriented because process-oriented practices do contribute to building additional capabilities that could lead to permanent improvements. Wagner and Krause (2009) differentiated between supplier development goals which involved the improvement in short-term abilities that could advance long-term capabilities for product innovation, collaboration, and continuous process improvement. The authors argued that, under a relational perspective, the supplier-customer dyad leads to benefits not from corrective actions but from mutual learning and other, related complementary capabilities. Instead of traditional, short term-oriented measures, the buying firms should take a strategic perspective that could improve dynamic capabilities in the long term. Arroyo-Lopez, et al. (2012) highlights the importance of supplier development programs and commitments to the financial success of the partners network. Furthermore, it suggests that designing supplier firm activities could come about due to strategic involvement and higher level of investments by the supplier firm and, in certain situations, the role of government support and policies could positively influence supplier development programs and lead to successful financial outcomes and metrics for all participants in the value-added chain. Supplier development processes, when introduced earlier in the manufacturing process, may lead to the design specification of the products. Initially, supply chains need to be constructed and rely upon strategic capacity of the organization and become the foundation for the supplier selection process and supplier network design (Bai and Sarkis, 2011).

Supplier development enables rent-generating mechanisms. For example, involvement of the supplier in the buyer's new product design process enables joint investments and combining valuable and limited resources; sharing of cost structure information enable knowledge exchange; and the reward and recognition of a supplier's achievements, enables more effective framework and improved outcomes. In this context, supplier development could be viewed as a strategy where both buyer and supplier combine their resources with other firms' to improve performance metrics and garner additional competitive advantages. Krause, et al. (2000) suggest that the evaluation of suppliers' involvement could be done through site visits as well as a supplier reward and recognition system that leads to improved performance. Forker and Hershauer (2000) research points out that the involvement of the buyer in the supplier's new product design process led to better performance for both supplier and buyer. Timely and accurate information is also crucial to buyer-supplier decision making and could lead to superior performance (Handfield, et al., 2006). Tan (2001) reported that sharing confidential strategic information (i.e., production schedules and costs) with the supplier is positively correlated with a firm's overall business performance and metrics. Additionally, involving the supplier in the buyer-product design process provides the buyer with access to the partners' technology (Kibbeling, 2013). Suppliers, meanwhile, are given the opportunity to work with the buyer to identify products and components that can most efficiently be produced given their production capabilities (Trent and Monczka, 2000). The implementation of supplier development results in increasing supplier performance capabilities and leads to improvement in the buying firm's financial performance (Sanchez and Rodriguez, 2009). Thus the following hypothesis:

Hypothesis 3: Supplier development will be positively related to financial performance.

Research Methodology:

The research methodology chosen to test the research hypotheses required collecting information regarding the suppliers' firms' linkages through a questionnaire to obtain information that was not publicly available. The survey questionnaire was sent to purchasing managers of supplier firms in order to map out strategic purchasing information and metrics. Moreover, the causal research method focused upon exploring the factors related to the suppliers' firms using a structural equation modeling technique (SEM).

Sampling:

The research sample included the suppliers of SAPCO company. The questionnaire was distributed to 287 companies of SAPCO. The plain stochastic was chosen. In such a research method, known as random sampling, the subjects are randomly selected, and the results obtained would allow us to generalize the results towards the entire sample. Of the total sample questionnaire, 187 valid returns were received.

Respondents' Demographic Variables

The sample included 19% females and 81% males, and the ages of the respondents ranged from 35 to 45 years.

Questionnaires and Measures:

The questionnaire included two parts. The first contained participants' demographic information, and the second part examined the key factors considered by the suppliers of SAPCO company. The questionnaire included fifteen questions utilizing a five-point scale. To test the reliability of the various methods, calculations related to the coefficients chose the alpha method technique. In the first stage of the distribution of the questionnaire, 35 questionnaires resulted in a reliability index of 0.822. The minimum reliability index for the research questionnaire was 0.70, and the obtained alpha coefficient is, thus, appropriate to ensure the reliability of the questionnaire, and the items' reliability coefficient were obtained using alpha method and SPSS software. Table 1 maps out the results. The questionnaire used items and questions similar to those of Sanchez-Rodriguez and has a content validity of .250. These questionnaires were distributed to managers and suppliers of SAPCO.

Table 1. Alpha Values

Row	Variable	Question	alpha coefficient
1	Suppliers manufacturing capabilities	4	0.86
2	Supplier development	6	0.84
3	Financial Performance	5	0.91

Results and Hypotheses Testing:

The research hypotheses testing was carried out using the path analysis method. The path diagram analysis method was used in order to show which variables cause changes in other variables. When a method drawn as the path diagram is continued through fit/goodness index, the diagram can be employed to then test the hypothesis by showing a causal relation between the displayed variables in the path diagram. Therefore, the first step is measurement of model fit/goodness. The basic question relates to the model appropriateness in order to find an answer for the question raised. To find an answer it is necessary to evaluate x^2/df (ratio of chi square to the degree of freedom) along with other variables which are related to the model fit/goodness. With regard to LISREL's output, the calculated x^2/df gave us the result of 2.73 thus confirming the model fit/goodness. The main fit/goodness indices for the model are NNFI, IFI, RMSEA, CFI, and RMS as shown in Table 2. Table 2 shows the output of LISREL and optimal value of these indices.

Table 2: fit indices of model

Index	Index value based on the model	Results
x^2/df	2.73	The model's fit goodness is confirmed
SRMR	0.066	The model's fit goodness is confirmed
NNFI	0.92	The model's fit goodness is confirmed
GFI	0.93	The model's fit goodness is confirmed
AGFI	0.91	The model's fit goodness is confirmed
IFI	0.97	The model's fit goodness is confirmed

Table 3 shows the results of the path analysis.

Table 3: Results of the path analysis

Hypothesis no.	Hypothesis description	Standard Value	t-value	Result
H_1	Suppliers manufacturing capabilities will be positively related to supplier development	0.58	5.31	Accepted
H_2	Suppliers manufacturing capabilities will be positively and directly related to financial performance	0.67	6.25	Accepted
H_3	Supplier development will be positively and directly related to financial performance	0.47	4.35	Accepted

Conclusion and Implications of the Study:

The results of this research provide ample support to confirm the linkages between supplier manufacturing capabilities and supplier development. Our research clearly shows that strategically oriented supplier development practices render positive results for the buying firm. Moreover, our results are similar to that of Dyer and Singh's relational model (1998). In that framework, Dyer and Singh affirm that cooperative strategies result in competitive advantages and, if embedded in intra-firm strategic implementations of resource endowments and organizational capabilities will enhance organizational performance, including financial factors. (Dyer, et al, 2008**)** also indicate that competitive advantages will result to both buyers and suppliers and could lead to the development of synergetic networks of the alliance resulting in common benefits for the members in the network. In today's global and regional markets, the threats and opportunities of production linkages are immense and do increase supply chain complexity and risk. Supply chain synergistic linkages among the network partners allow for better risk management and achieve superior performance, financial and otherwise (Wiengarten, et al., 2016). Additionally, involving the supplier in the buyers' product design processes could provide the buyer with access to the partners' technologies, thus allowing the suppliers the opportunity to work with the network members to identify issues that relate to enhanced efficiency and effectiveness that could be embodied in the production function of the network participants. (Cao and Zhang, 2010). Moreover, the findings of this study can help to strategically assess the existing linkages between strategic purchasing and supplier development and the value-added creation for the network. To reiterate, the findings of our research are similar to the results of (Ulaga, et al., 2006; Sanchez-Rodrigues, 2009) and suggest that strategically-oriented supplier development practices could help the supplier in creating additional value-added metrics for the buying firm along the following four dimensions: product quality, delivery, product costs, and process costs.

Overall, the results of the study support the notion of enhanced supplier manufacturing capabilities on supplier development and could enhance strategic purchasing as it relates to financial performance. The results of the research hypotheses are also parallel to the work of Sanchez (2009). Long-term value creation is, thus, one of the key organizational goals for strategic purchasing and supplier development leading to improved performance for the buying firm network. The result of this research provides overall strategic organizational guidance to the planning process, purchasing plans, and possible linkages to corporate strategies in order to also help with new product development processes. Moreover, the results could provide additional collateral, organizational, and human resource strategic benefits that result in win-win outcomes, both organizational and financial, to achieve mutually desired results that could also provide for improved training of the personnel involved in this value-added chain activity and could further allow for supplier improvement and development of the information systems and data analytics of the network.

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