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Abstract Title: The Impact of Supply Chain Strategy on Supplier Functions and Organizational Performance

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The Impact of Supply Chain Strategy on Supplier Functions and Organizational Performance

ABSRACT

The relationship between key components of supply chain strategy and functions of immediate suppliers is less well understood. Similarly, the structure connecting the supply chain strategy and various organizational performance measures requires better awareness. This paper proposes a framework linking supply chain strategy and performance. The structured framework describes the relationships between strategy, objectives, internal and external organization, and performance. The paper postulates how strategy influences immediate supplier functions and eventually performance. The empirical study of 188 organizations provides insights into what works for various organizational positioning and supplier orientations. The study establishes the main aspects of supply chain strategy and finds strong positive impact of supply chain strategy on supplier functions through supplier focus. Also, the study empirically validates the strong role of immediate suppliers. Finally, the paper discusses theoretical and managerial implications of the structural model results and concludes with some directions for future research.

Keywords: Supply chain strategy, supplier functions, organizational performance, empirical research, structural equation modeling

1. INTRODUCTION

The importance of the strategy in developing the organizational competitiveness is well known and extensively documented. Organizations are appreciating the importance of strategy in enhancing the competitiveness of supply chains. Now, it is often stated, the competition is between supply chains.

The primary step for better performance of organizations lies in strategic alignment of their supply chain. Through strategic positioning, organizations seek to develop common goals amongst supply chain partners. The secondary step in enhancing competitiveness of supply chain depends upon achieving internal and external integration of organizations.

The main objective of the current research is to develop and empirically test a framework to investigate the impact of supply chain strategy and immediate suppliers on organizational performance. The paper seeks to establish a relationship between a strategic orientation of a supply chain, supplier focus, supplier functioning and organizational performance.

2. BACKGROUND LITERATURE

Significance of supply chain strategy continues to rise in the business environment. The relationship between strategic focus and organizational performance is mostly positive and supply chains are no exceptions. Organizations have discovered supply chain management (SCM) as a source of long term competitive advantage.

SCM has received vast attention in recent management research. The literature divides supply chain strategy into two fundamental taxonomies: supply chain strategy for physical efficiency (cost and quality); and supply chain strategy for responsiveness (Qi, Boyer, & Zhao, 2009). Fullerton and Wempe (2009) argue for a positive impact of lean operations strategy on financial performance indicators. Agile strategy, on the other hand, stresses on increasing flexibility and delivery reliability of organization and supply chain. Similarly, proponents of competitive strategy argue for organizations to develop strategies for customer needs on the basis of quality, cost, innovation and flexibility. There are others who argue for organizations to keep

order qualifiers of responsiveness and lean focus in sight. Gunasekaran, Lai, and Cheng (2008) stress a strategy framework to include cost, quality and responsiveness focus.

Kristal, Roth, and Huang (2010) observe supply chain strategy to be ambidextrously benefitting for company resources. They see organizations developing both explorative and exploitative supply chain strategies. A supply chain strategy is explorative when organization explores opportunities for improvement in the management of their supply chains. Whereas, a supply chain strategy is exploitative when organization exploits the existing resources to improve management of its supply chain. The authors argue that organizations with ambidextrous supply chain strategy enjoy higher product quality, flexibility, delivery reliability and reduced cost and the latter have positive impact on market and financial performance.

Similarly, some studies are in place to find a theoretical link between supply chain strategy and financial performance of an organization. Christopher and Ryals (1999) find effectiveness of supply chain, complemented with consumer franchise and customer relationship management, as a mean of increasing value for shareholders.

Although there is a tremendous amount of research on SCM, there is a lack of research on supply chain strategy, both in the development of theoretical frameworks and empirical testing of theory. Cheng and Grimm (2006) observe the use of out dated and secondary data in many of the strategy research papers in the area of SCM. Kouvelis, Chambers, and Wang (2006) report the use of a single focal firm perspective, overlooking the dyadic relationship of the firm in a supply chain network. Akyuz and Erkan (2010) stress the importance of development and use of performance measurement systems based on balance scorecard approach and supply chain operations reference (SCOR) model.

3. RESEARCH FRAMEWORK

Figure 1 presents a macro view of internal and external factors affecting supply chain objectives and performance. Internal functions govern management of operations and relationships inside an organization, such as customer focus, product development, and process management. External functions, or functions outside the boundary of a firm, include management of supply chain partners. Clearly, better performance of internal and external functions of an organization help achieve the organizational objectives and improve organizational performance.

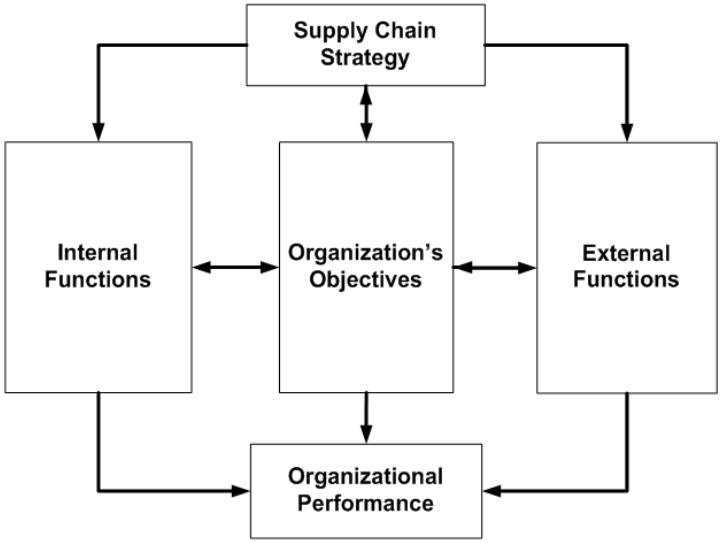


Figure 1: A macro view of the SCM framework affecting organizational performance

Perhaps, a complete study covering organization's objectives, internal and external factors affecting SCM and performance is beyond the scope of current research. Therefore, the study is limited to the constructs related to supply chain strategy, functions of immediate key suppliers and organizational performance. The following sub-sections review and define the constructs of the macro model of the research.

Strategic Supply Chain Orientation

The literature on supply chain strategy focuses on two main themes of agile and lean supply chains. In addition, there is a realization for the supply chain strategy to have lean and agility focus (Qi, Zhao, &Sheu, 2011). Another important part of the supply chain strategy is commitment of the top management to SCM related activities. This is important as success of strategic actions significantly depends upon commitment from the top (O'Reilly, Caldwell, Chatman, Lapiz, & Self, 2010). Hence, an organization considering SCM as an important part of the business strategy has at least three characteristics: supply chain lean focus; supply chain responsiveness focus; and top management commitment with SCM. These characteristics account for a higher level construct namely strategic supply chain orientation (SSCO).

Supplier Related Constructs

Supplier focus: Suppliers play an important role in development of competitive position of a firm. Improvement in supplier functions positively affects firm performance in many ways (Liker & Choi, 2004). A reduction of supplier base is widely seen as an important feature of supplier focused firms. Usually, reduction in number of suppliers makes it viable to develop and pursue common agendas. Organizations can setup cross-functional teams with suppliers for short-term operations and long-term goal setting process and such relationship becomes more viable with limited number of suppliers (Hoegl& Wagner, 2005).

Supplier commitment with SCM: As discussed before, the top management commitment is necessary for the success of strategic objectives. Long term relationships motivate top management of suppliers to put supply chain goals at a position comparable to their

organizational goals and develop a commitment with supply chain goals (Narayanan & Raman, 2004).

Supplier use of information technology: The use of information technology (IT) by suppliers has an implication on SCM. IT plays a crucial role in information sharing and resulting collaboration in supply chain operations (Simatupang & Ramaswami, 2008). Real time demand and inventory information sharing, which is vital in managing supply chain functions, is possible with the use of IT.

Supplier quality practices: Quality management practices of suppliers play an important role for in-house quality rejections, cost of scrap and rework, reduction in inventory, process improvement, and overall business performance (Sila & Ebrahimpour, 2005). Availability of latest product and service production technology also helps suppliers improve their product and service quality.

Supplier cost effectiveness: Cost effectiveness of suppliers is an important area of concern in buyer-supplier relationship. Organizations collaborate with their suppliers for cost reduction efforts and cost is one of the primary determinants in supplier selection process. Organizations can develop long term relationship with selected suppliers and understand their cost structure in supplier development process (Ahmadjian& Lincoln, 2001).

Supply flexibility: The construct of flexibility is quite visible in manufacturing research but supply flexibility has received relatively lesser attention. Hopp, Iravani, and Xu (2010) use the term vertical flexibility to describe a construct similar to supplier flexibility. They argue that a

supply chain has vertical flexibility if each echelon in the chain is capable of efficiently meeting planned and unplanned changes in demand.

Supply delivery reliability: Supplier product and service delivery reliability has an important and direct implication on firm performance. The capability of supplier to deliver on time during both routine schedule and on urgent demand reduces stock-outs and overstocks (Lee &Whang, 1997). Short lead times discourage buyers to purchase in bulk and help save inventory cost in supply chain. State of the art transportation facilities and management systems can help in reducing the inventory level and overall cost.

Organizational Performance

The measurement of performance on one dimension, while ignoring others, can divert attention of a manager from other strategically important performance measures. This research sets out to measure organizational performance in four dimensions: operational performance; quality performance; market performance; and financial performance. The constructs of operational, quality, market and financial performance are adapted from previous empirical quantitative survey based studies (Brah, Wong, &Rao, 2000; Brah& Chong, 2004; Kaynak& Hartley, 2008). Despite much emphasis in management literature, their concurrent use is not so common. Here, the model benefit from supply-chain operations reference-model (SCOR) version 9.0 (SCC, 2008) for measuring the four dimensions of organizational performance.

4. HYPOTHESES

The primary objective of the study is to establish a relationship between supply chain strategy, functions related to immediate suppliers and organizational performance (Figure 2).

Supplier Focus

Research on SCM structures emphasize the benefits of supplier base reduction, including cost effectiveness due to economies of scale, quality and delivery reliability, and transportation costs reduction. The reduced number of suppliers results in a mutually beneficial long term buyer-supplier relationship of trust. Both parties share information about their processes, quality performance and even cost structure (Helper &Sako, 1995). It is argued that collaboration with suppliers and other supply chain partners benefit overall supply chain (Saeed, Malhotra, & Grover, 2011). Therefore, firms with a high level of strategic commitment with SCM would exhibit a similar level of supplier focus.

H1: Strategic supply chain orientation positively impacts supplier focus.

Supplier Commitment with SCM

Sharing operational and strategic level information with suppliers strengthens long term and trust based relationship (Chen &Paulraj, 2004). Supplier focus helps organizations seek commitment of top management of suppliers towards common objectives. Top management commitment of suppliers with common supply chain goals will enhance suppliers to perform according to expectations of buyer firm. Consequently, Narayanan and Raman (2004) expect both organizations to collaborate to increase overall gain of the supply chain. This collaborative relationship shall improve buyer product quality, cost, customer loyalty and financial health.

H2a: Supplier focus positively impacts supplier commitment with SCM.

H2b: Supplier commitment with SCM positively impacts organizational performance.

Supplier use of IT

SCM relies heavily on the uses of IT for information sharing and collaboration. The use of IT enhances flexibility and agility in supply chain. Organizations encourage their suppliers to use IT for supply chain related information sharing. Suppliers, on the other hand, are more inclined to make investments in developing IT infrastructure with the buyer organization if they perceive the relationship to be beneficial, strategic and collaborative (Frohlich, 2002). Fast flow of information provides more time to suppliers for production planning and reduces manufacturing lead time, stock-outs and over-stocking at buyer organization.

H3a: Supplier focus positively impacts supplier use of IT.

H3b: Supplier use of IT positively impacts organizational performance.

Supplier Quality Practices

Long term collaborative relationship with suppliers reduces opportunistic behavior of suppliers. Frequent meetings with supply chain partners increases social ties and enhance reciprocity, fairness and reduce sense of competition between them (Loch & Wu, 2008). The suppliers perceive the value of relationship more than a mere transaction. Such perception of relationship motivates the suppliers to meet expectations of the buyer firm by enhancing their quality practices. Quality conscious buyer-supplier partnership can be a source of competitive advantage in customer satisfaction (Li, Ragu-Nathan, Ragu-Nathan, &Subba, 2006). The quality practices of suppliers have advantageous influence on buyer in-house quality rejections, cost of scrap and rework, reduction in inventory, process improvement, and overall business performance.

H4a: Supplier focus positively impacts supplier quality practices.

H4b: Supplier quality practices positively impact organizational performance.

Supplier Cost Effectiveness

Long-term supplier development activities help organizations understand cost structure of their key suppliers (Ahmadjian& Lincoln, 2001). Frequent meetings between buyers and suppliers increases pace of resolution of cost related issues of suppliers (Sanders, 2007). Purchasing from limited selected suppliers allows economy of scale and hence cost effectiveness. Perception of a long term relationship discourages opportunistic behavior by continuous business interest. Buyer organizations, with cost effective suppliers, sell their products at a competitive price thereby increasing customer satisfaction and market size.

H5a: Supplier focus positively impacts supplier cost effectiveness.

H5b: Supplier cost effectiveness positively impacts organizational performance.

Supply Flexibility

Supplier focus has implications on supply flexibility both in long and short-runs. In the long-run suppliers are willing to change their manufacturing processes and technology along with the changing needs of buyers. In the short-run, sharing of required and accurate information between buyers and suppliers helps suppliers anticipate changes in demand. As a result the suppliers are in a better position to continue smooth supply, with lesser degree of over-stocking or under-stocking. Such flexibility of supply reduces safety stocks, lead time, and safety production capacity (Hopp, Iravani, &Xu, 2010).

H6a: Supplier focus positively impacts supply flexibility.

H6b: Supply flexibility positively impacts organizational performance.

Supply Delivery Reliability

In a strategic partnership, suppliers work to improve their delivery arrangements to meet buyer's scheduled and urgent needs on time. Quick and flexible transportation system enhances supplier capability to deliver products and services on time with less lead time. Supply delivery reliability, in turn, has important implication on buyer cost, quality, and timely delivery reliability. Short lead time discourages buyers to purchase in bulk and enable to save in inventory cost (Li et al., 2006). Hence the following hypotheses:

H7a: Supplier focus positively impacts supply delivery reliability.

H7b: Supply delivery reliability positively impacts organizational performance.

5. RESEARCH METHODOLOGY

The research follows the usual survey procedure of literature review, face to face interviews, pretesting and mass mailing.

Questionnaire Design

The design of questionnaire follows simple and standard procedures. The demographic questions of section one consist mostly of multiple choice types. Section two to four ask the questions related to strategy, supplier focus, supplier functions, and organizational performance on five point Likert scale.

Items Generation

The strategic supply chain orientation construct consists of three components: supply chain lean focus; supply chain responsiveness focus; and top management commitment with SCM. Review of studies such as by Kristal, Roth, and Huang (2010), Qi, Boyer, and Zhao (2009), Zu, Fredendall, and Douglas (2008), and Brah, Tee, and Rao (2002) provide backdrop for the items of the three low level constructs. In the same way, review of former studies such as Flynn, Huo, and Zhao (2010), Krause (1999),Fynes, Voss, and de Burca (2005),Kaynak and Hartley (2008),Yeung (2008),Swafford, Soumen, and Nagesh (2006), and Narasimhan, Swink, and Viswanathan (2010) provide basis for developing items for supplier related constructs. The organizational performance consists of four constructs: operational; quality; market; and financial performance. The general insights come from studies such as Brah and Chong (2004), Zu, Fredendall, and Douglas (2008), Kristal, Roth, and Huang (2010), Chen and Paulraj (2004).

Pretest Study

The pretest sample of 30 respondents consists of middle to senior managers familiar with supply chain functions of their companies. One of the authors visits the respondents and follows protocol method, where respondents are encouraged to think aloud. The pretest covers both individual and overall questionnaire.

Data Collection

The target respondents consist of middle to top managers in the relevant functional departments of organizations. The sampling frame consists of 850 potential participants from two main sources: membership of the supply chain association of Pakistan (SCAP) and the list of

companies registered with three large stock exchanges of Pakistan. The response consists of 188workable responses leading to an effective response rate of 22%. Table 1 shows the demographic profile of the respondents.

Table 1: Demographic profile of the respondents

Positions of the respondents		
Positions	Frequency	Percent
Top Management (e.g. CEO)	43	23
Senior Management (Technical) (e.g. Sr. Operations Manager)	93	49
Senior Management (Non-technical) (e.g. Manager Development)	30	16
Middle Manager (Technical) (e.g. Deputy Manager Production)	7	4
Others	15	8
Total	188	100

Number of Employees			**Industrial sectors**		
Employees	Frequency	Percent	Sector	Frequency	Percent
<50	2	1	Automobile	17	9
51-100	15	8	Chemical/process plants	37	20
101-200	22	12	Engineering manufacturing	52	28
201-500	70	37	FMCG	35	19
501-1500	27	14	Textile	24	13
>1500	52	28	Others + Not mentioned	23	12
Total	188	100	Total	188	100

6. RESULTS

Measurement Model Results

The content validity of the constructs comes from a comprehensive review of relevant literature. Moreover, the authors obtain feedback of the relevant faculty and managers to increase content and context validity. The final model, in the process of improving convergent and discriminant validities, deletes items with factor loadings below 0.7. Whereas, convergent validity is the extent to which multiple measures of the same construct are in agreement and values of ρ_{vc} (AVE) higher than 0.50 provide satisfactory evidence of the convergent validities

of all constructs. Similarly, significant difference between chi-square values of constrained and unconstrained models shows high discriminant validity of the two constructs (Segars& Grover, 1993).

Final grouping of the constructs takes shape of three sets: set A (strategic supply chain orientation constructs); set B (supplier functions constructs); and set C (performance constructs).A series of chi-square difference tests in each set indicate that all constructs satisfy the above criterion of discriminant validity. All constructs have more than 0.7 alpha values (mostly above 0.80) and CFI value of higher than 0.90 in a single factor CFA model of each construct, thus satisfying reliability and unidimensionality requirements. Moreover, authors estimate the parameters for measurement models of the higher level constructs of strategic supply chain orientation and organizational performance. Both constructs satisfy recommended values of model fit and the results find satisfactory model parameter for the supplier focus construct as well.

Structural Model Results

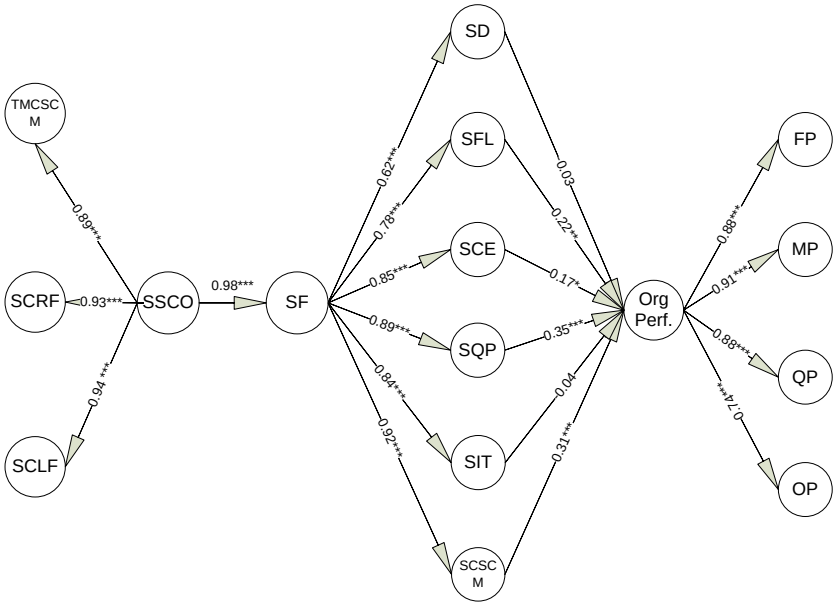
Figure 2 shows the results of the hypotheses tests using AMOS structure modeling software. The directions of arrows represent the direction of relationship. The model shows an overall satisfactory fit (χ^2 = 1952.003; χ2/df = 1.438; CFI = 0.933; TLI = 0.929; NNFI = 0.933; RMSR = 0.036, and RMSEA = 0.048) (Segars& Grover, 1993).

Results of Hypotheses Testing

Figure2 shows result of hypotheses testing. The structural model supports all hypotheses except the relationships of supplier use of IT and supplier delivery reliability with organizational

performance. In addition, the results indicate a significant reflection of strategic supply chain orientation and organizational performance in their lower level latent variables.

Construct	Code
Supply chain lean focus	SCLF
Supply chain responsiveness focus	SCRF
Top mgt comt. with SCM	TMCSCM
Strategic supply chain orientation	SSCO
Supplier comt. with SCM	SCSCM
Supplier use of IT	SIT
Supplier cost effectiveness	SCE
Supplier quality practices	SQP
Supply flexibility	SFL
Supply delivery reliability	SD
Organizational performance	Org Perf.
Operational performance	OP
Quality performance	QP
Market performance	MP
Financial performance	FP
Supplier focus	SF



***p<0.001; **p<0.01; *p<0.05

Figure 2: A structural model and path estimates of strategy, suppliers and performance

Managerial Implications of Results

The test of hypotheses bears few implications for supply chain managers. The study provides clear evidence of positive effect of supply chain strategic orientation and supplier focus. It shows positive effect of supplier focus on organizational performance. Moreover, the study finds significant impact of supply chain strategy on management of suppliers and their functions. The structural model finds supplier functions influence organizational performance. Therefore, the findings highlight the importance of suppliers and emphasize the need for alignment of strategic goals of an organization and its key suppliers. The congruence of goals, in turn, results in better organizational performance and thus provides a competitive advantage to the entire supply chain.

Possible Explanation of Two Unsupported Hypotheses

The study finds a lack of support for a positive relationship of the supplier use of IT with organizational performance. The unexpected finding is less surprising for emerging economies. A number of environmental constraints including lack of professional expertise and lack of availability of quality IT systems also hinder effective utilization of IT (Hassan, 1994).

Similarly, the study finds missing support for a positive relationship between supply delivery reliability and organizational performance. Perhaps, the root cause of weak or no relationship between supply delivery reliability and performance lies in IT, as well. Usually, the relationships are easier to maintain in case of a single product or with the use of MRP like IT infrastructure in a multiple product environment. Also, there is a possibility of overstretching the impact of supply delivery reliability on performance indicators. Hence, arguably the impact of supply delivery reliability with overall organizational performance may be too weak to appear in the proposed structural model in the current sampling space.

Limitations of the Study

One of the limitations of the study is the sample size of 188 from a variety of industries, which calls for care in interpretation of the structural modeling results. Another limitation is self-reporting bias. Usually, multiple responses from diverse people in each organization can minimize the bias. But, it is not always possible to identify respondents with appropriate functional background and knowledge about the business performance of their company. Finally, it is important to mention that the significant correlation in hypotheses only shows an association and does not imply causation.

7. DISCUSSION AND CONCLUSION

The paper seeks to study the supply chain organizational framework. The proposed conceptual model of the study is quite straightforward: the supply chain strategy stipulates the objectives of an organization in view of its internal and external functions. The internal and external organization, in turn work to meet the objectives in order to achieve better organizational performance in terms of operational, quality, market and financial performance. The study seeks to limit the inquiry to the supply chain related functions in order to limit the scope of research while fully appreciating the effects of broader management functions in an organization.

Support for the Proposed Framework

The study develops three strategy related constructs: supply chain responsiveness focus; supply chain lean focus; and top management commitment with SCM. While some studies propose a ranking of order winner and order qualifier for the first two constructs, most reports see top management commitment with SCM as critical for successful implementation of the strategy. Clearly, the data in this research provides evidence to indicate the three constructs represent a higher order construct of strategic supply chain orientation.

In addition, the paper develops the construct of supplier focus. As evident in Figure 2, the results of the full structural model indicate a strong positive effect of strategic supply chain orientation on supplier focus. The finding is in congruence with the belief of long term collaborative relationship with suppliers to play a vital role in the implementation of supply chain strategy.

The study finds a strong positive impact of supplier focus on the supplier functions, which help buyer organization achieve long term supply chain goals. The structural model results indicate supplier focus has a strong positive impact on the above six factors defining supplier focus ($p<0.001$). The findings indicate suppliers improve their buyer-related-functions when they see the relationship with the buyer as strategic and collaborative. Thus the alignment of supplier and buyer supply chain strategy helps organization achieve its strategic goals.

Moreover, the paper uses a balance between financial and non-financial measures to gauge performance. Results indicate an adequate model fit and significant factors loadings of the full structural model suggest the lower level constructs of operational, quality, market and financial performance are fully reflected in the higher level construct of organizational performance. The study finds positive impact of supply flexibility, supplier cost effectiveness, supplier quality practices, and supplier commitment with SCM on organizational performance. However, the data does not show significant impact of supplier use of IT and supply delivery reliability with organizational performance.

Conclusion and Future Research

The data supports all proposed relationships in the structural model except two. The results indicate strategic supply chain orientation and organizational performance are significantly reflected in their lower level latent variables.

The paper discusses theoretical and managerial implications of the proposed structural model. Often, managers demand more clarity on what constitutes supply chain strategy and how it impacts organizational performance? The current study lies at the heart of this issue. The study

develops the strategy construct and finds strong positive impact of supply chain strategy on supplier functions through supplier focus. The findings indicate suppliers improve their buyer-related-functions when they see the relationship with buyer as strategic and collaborative. The paper identifies the key supplier functions affecting buyer firm organizational performance. The study finds a positive impact of the supplier functions on organizational performance, which establishes the importance of suppliers in achieving organizational as well as supply chain goals.

Finally, future research may focus on comparing the similarities and differences between developed and emerging markets. The studies may explore the differences in the sector, age of the firm and the longevity of the supplier buyer relationship. The future research may consist of a longitudinal study to see the effect of relationship over a period of time.

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