



The International Journal of Logistics Management

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Article information:

To cite this document:

Syed Awais Ahmad Tipu Kamel A. Fantasy , (2014), "Supply chain strategy, flexibility, and performance", The International Journal of Logistics Management, Vol. 25 Iss 2 pp. 399 - 416

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Supply chain strategy, flexibility, and performance

A comparative study of SMEs in Pakistan and Canada

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Received 3 January 2013
Revised 5 May 2013
Accepted 15 July 2013

Abstract

Purpose – The purpose of this paper is to compare the supply chain strategy, flexibility, and performance relationships in the context of SMEs in Canada and Pakistan.

Design/methodology/approach – The research is based on a quantitative approach using a questionnaire survey from a total of 170 small and medium-sized Pakistani manufacturing companies. The current study draws upon the earlier work of Fantasy *et al.* (2009) for comparative purpose and employs path analysis technique.

Findings – The results partially confirm the findings of previous study on Canadian SMEs with regard to the relationships among strategy, flexibility, and performance in the context of supply chain. The survey results revealed that SMEs in Pakistan adopt followers strategy in order to achieve financial and non-financial performance. Whereas in the previous study, Canadian SMEs adopted innovative strategy and customer-oriented strategy in order to enhance their performance.

Originality/value – The literature did not reveal any study which attempted to compare supply chain strategy, flexibility, and performance of SMEs in developed and developing countries. The current study fills this important gap in the literature.

Keywords Supply chain management, SMEs, Developing countries, Strategy, Value chain, Performance, Flexibility, Developed countries

Paper type Research paper

Introduction

It is imperative to improve our understanding of supply chain practices in different regions of the world; this would let organizations employ different business strategies due to increasing competitive pressures as a result of globalization (Manuj and Mentzer, 2008). Organizations in developing countries face extreme macroeconomic volatility (Tybout, 2000), operate in a constantly changing business environment (Chadee and Kumar, 2001), and experience institutional instability (Farashahi and Hafsi, 2009). These factors urge organizations to streamline their business operations in order to survive. This also underlines differences between the supply chain environments in developing countries and those in more developed regions (Avittathur and Swamidass, 2007). Though much of the supply chain literature is focussed on developed regions, the same is not true about the comparative views of supply chains in developed and developing countries. The need for more comparative studies in the supply chain literature has been highlighted by many researchers (Nadvi and Halder, 2005; Prasad *et al.*, 2005).

Small and medium-sized enterprises (SMEs) often play a critical role in local as well as global supply chains (Singh *et al.*, 2009). Given the varying nature of business environments, SMEs in developing countries may employ distinct supply chain strategies, experience different levels of flexibility, and show varying degrees of performance in comparison to SMEs in more developed regions. Moreover, SMEs from developing



countries participate in global supply chains as the firms in developed countries shift their operations to low-wage developing countries.

Few studies have employed the comparative lens in order to investigate the supply chains of SMEs in developing and developed countries. Comparative studies in the supply chain literature have recognized the potential differences and similarities between developed and developing countries. However, several questions still remain unanswered with regard to different facets of supply chain management. The review of supply chain literature revealed that many key dimensions remained unexplored, taking into account comparative perspectives of SMEs in developed and developed countries. In order to fill this gap, the present study draws upon the earlier work of Fantazy *et al.* (2009), which has investigated the supply chain strategy, flexibility, and performance of SMEs in Canada. The current study extends their work and compares the supply chains of SMEs in Canada and Pakistan.

Comparative studies in supply chain management

There is a dearth of research into comparing supply chains of organizations operating in developed and developing countries. Sachan and Datta (2005) reviewed 442 papers published from 1999 to 2003 in three academic journals: *Supply Chain Management: An International Journal*, *Journal of Business Logistics*, and the *International Journal of Physical Distribution & Logistics Management*. It was revealed that around 80 percent of the authors of supply chain studies belong to either the US or Europe and they tend to explore the supply chain problems in developed regions. However, only 6 percent of the authors belong to Asia and merely 4 percent represent the combination of authors from different regions. This uneven regional distribution of supply chain studies underpins the need to explore the supply chains of developing country organizations and investigate how they are similar or different from their counterparts in more developed regions. It is also pertinent to examine as the MNCs from developed countries either target developing countries as a place to launch their products or as a source of low-cost raw materials.

The comparative studies of supply chains tend to focus on organizations in developed countries (e.g. see Fearne *et al.*, 2001; Halldórsson *et al.*, 2008; Menachof *et al.*, 2009) or emerging and developing countries (Humphrey, 2003). Some studies explore the supply chain dynamics of foreign organizations entering into developing country markets. Han *et al.* (2002) discussed the supply chain integration attempt of Wal-Mart in Korea. Some of the challenges faced by Wal-Mart include the absence of a competitive supply chain infrastructure, a mismatch between internationally adopted strategies and indigenous distribution mechanisms, and the lack of or slow relationship-building process among supply chain partners. Avittathur and Swamidass (2007) examined the flexibility of US manufacturing plants and their suppliers operating in India. It was found that manufacturing plants preferred flexible and stable just in time (JIT) suppliers who are located in proximity.

These studies underline supply chain-related challenges faced by developed country organizations when they operate in a developing country. This improves our understanding of how different cultural and regional factors could streamline or hinder supply chain activities and developed country organizations articulate their approaches toward supply chains for effective execution of their logistical operations. However, there is a paucity of research about the comparative view of SME manufacturing organizations in developed and developing countries.

Scant attention has been paid toward comparative studies of supply chains in developed and developing countries. Prasad *et al.* (2005) examined the build to order

supply chains in developed and developing countries and revealed that operations in developing countries were significantly different from those in developed countries. Some of these differences included the use of more coordinated control to save replenishment costs, greater uncertainty with the lead-time, prevalence of supplier discounts, and the use of visual replenishment signals for determining reorder quantity. Singh *et al.* (2009) examined the competitiveness of SMEs in India and China and revealed that SMEs in India pay more attention to supplier development whereas Chinese SMEs focus more on cost reduction. The study conducted by Bhatnagar *et al.* (2003) revealed that firms locating their plants in Singapore placed more emphasis on infrastructure, availability, and proximity of suppliers. On the other hand, firms emphasizing factors such as proximity to market, size of market, and stability of market conditions located their plants in Malaysia.

Nadvi and Halder (2005) explored the global value chain linkages between surgical instrument industry clusters in Germany and Pakistan. It was found that the cluster in Pakistan focussed on mature products in comparison to the cluster in Germany, which focussed on new product development. Close ties resulted in better product quality and enhanced export capabilities for the cluster in Pakistan. In comparison to the cluster in Germany, the study also revealed little or no inter-, intra-, and extra-cluster linkages in the case of the Sialkot, Pakistan cluster, which resulted in less radical product development.

In summary, comparative studies of the supply chain provide some insights into the dynamics of supply chains in developed and developing countries. However, to the best knowledge of the authors, the literature did not reveal any study that attempted to compare supply chain strategy and flexibility, and the performance of SMEs in developed and developing countries. To fill this void in the supply chain literature, we first focus on the SMEs, as they are more prone to challenges due to the volatile nature of business environments. Second, we believe that there is a need to provide more insight into the supply chain strategies, flexibility, and performance of SMEs through comparative studies of developed and developing countries. This attempt will better inform supply chain managers in order to make effective global supply chain decisions.

Supply chain strategy, flexibility, and performance

Strategy and flexibility are regarded as important factors in improving the supply chain performance (Christopher and Ryals, 1999; Jenkins and Wright, 1998). The examination of the likely effects of strategy on flexibility and flexibility on supply chain performance could potentially enhance the effectiveness of supply chain initiatives. However, the relationships among strategy, flexibility, and performance have received little attention in the supply chain literature (Fantazy *et al.*, 2009).

Supply chain strategy

Strategic management of the supply chain calls for a system perspective in which an integrated supply chain strategy is crucial in order to establish a value creation process among supply chain partners (Vickery *et al.*, 2003). A two-dimensional view of the integrated supply chain strategy incorporates: integrative information technologies and supply chain integration. Integrative information technologies include deployment of integrated information systems or electronic data interchange in order to ensure internal and external integration. The study conducted by Vickery *et al.* (2003) revealed a positive relation between integrative information technologies and supply

chain integration. The study showed that customer service mediated the relationship between supply chain integration and firm performance.

Supply chain managers need to take a dynamic view of supply chain strategy as they are often required to adjust the strategy in order to remain competitive and to satisfy varying customer requirements. Aitken *et al.* (2003) suggested that companies should consider a product lifecycle approach while adopting supply chain strategies. Demand characteristics change during product lifecycle phases, which posit the need of a flexible approach toward employing supply chain strategies. These include a design-and-build strategy during the introduction stage, an MRP production strategy during the growth stage, and employing the Kanban approach if sales volume climbs.

Supply chain partners also make strategic choices in terms of supplier partnering, cross-functional teams, and closer customer relationships in order to achieve a higher level of supply chain integration (Vickery *et al.*, 2003). A higher degree of supply chain integration leads toward better firm performance (Narasimhan and Jayaram, 1998; Anderson and Katz, 1998; Frohlich and Westbrook, 2001). Resource utilization among supply chain partners is a critical component of this strategy. A more efficient use of resources leads toward operational efficiency gains (Closs *et al.*, 2011). Successful companies consider supply chain strategy as an important part of corporate strategy in order to gain a competitive advantage (Harrison and New, 2002).

Different types of supply chain strategies have been proposed in the literature. For example, Katz *et al.* (2003) regarded information sharing as a key element of supply chain strategy and proposed four strategies: innovating, following, modularizing, and appending. Fisher (1997) considered the product and demand strategies crucial in effectively managing supply chains. He proposed two types of supply chain strategy: an efficient supply chain and a responsive supply chain. Supply chain managers should match the supply chain process to the product type. The efficient process is geared toward functional products or staple goods, whereas the responsive supply chain process is more appropriate for innovative products. Other supply chain strategies reported in the literature include risk-hedging supply chains and agile supply chains (Lee, 2002). The risk-hedging supply chain employs strategies that emphasize risk sharing and pooling of resources to manage supply disruptions. Agile supply chains deploy responsive and flexible strategies aiming to fulfill unpredictable customer needs at the front end and minimize the risk of supply shortages at the back end.

However, for comparative analysis, we used three supply chain strategies proposed by Fantazy *et al.* (2009): innovative strategy (INS), customer-oriented strategy (COS), and follower strategy (FOS). The INS emphasizes the importance of being the first mover and gaining sustainable competitive advantage. The COS strategy tends to satisfy customers through reasonable quality and exceptional customer service. The firms adopting the FOS strategy usually follow others and tend to achieve low cost production.

Supply chain flexibility

Supply chain flexibility takes into account the interplay among internal organizational functions, such as manufacturing or marketing, and the external supply chain partner and the likely effects on the customer (Vickery *et al.*, 1999). A wide range of supply chain flexibility dimensions have been proposed in the literature (e.g. see Duclos *et al.*, 2003; Oke, 2005; Salvador *et al.*, 2007; Vickery *et al.*, 1999). Flexibility relates to the functional aspects or flexibility in logistics and operations (Kim, 1991), hierarchical aspects or flexibility at the company or shop level (Koste and Malhotra, 1999), and the

operational perspective or flexibility with regard to volume, variety, process, and materials (D'Souza and Williams, 2000). Process flexibility relates to the number of product types to be produced at each supply chain plant. Logistics flexibility incorporates downstream or distribution flexibility or approaches to launch a product to the market and upstream or procurement flexibility, which is sourcing a product from a supplier (Garavelli, 2003). Other types of flexibility reported in the literature include product flexibility or the ability to customize the product according to the customer requirements, access flexibility or the ability to ensure widespread distribution coverage (Vickery *et al.*, 1999), delivery flexibility or the ability to adopt a JIT approach, sourcing flexibility or the ability to find alternate sources for purchasing components or raw materials (Sanchez and Perez, 2005), and information systems flexibility or the ability to align information systems with changing information needs while responding to changing customer needs (Duclos *et al.*, 2003).

A firm's specific circumstances may require a higher level of supply chain flexibility in order to mitigate risk and achieve business goals. This often requires supply chain partners to add capacity and consider sourcing redundancy. This is possible if supply chain partners have a commonality of goals and are willing to share cost-benefit trade-offs (Simchi-Levi, 2011). The study conducted by Vickery *et al.* (1999) examined the relationship of volume flexibility and launch flexibility to environmental uncertainties and business performance. Volume flexibility refers to a firm's ability to adjust capacity in response to customer demands. Launch flexibility relates to a firm's ability to introduce completely new products or variations/improvements of existing products. It was found that the volume flexibility assisted in managing marketing practices uncertainty and launch flexibility helped in overcoming product uncertainty. Volume flexibility was positively related to firm performance, market share, and market share growth. The study by Sanchez and Perez (2005) also found a positive relationship between supply chain flexibility and performance. It was revealed that companies prefer to enhance basic flexibility capabilities at the shop floor level, in comparison to strengthening aggregate flexibility capabilities at the customer-supplier level. However, aggregate flexibility capabilities were more likely to enhance a firm's performance. They also emphasized that companies are more likely to enhance their flexibility capabilities if facing a higher degree of environmental uncertainty and technological complexity.

Garavelli (2003) suggested a network approach toward the supply chain given the fact that supply chains increasingly involve interactions among various plants and suppliers located in different places. He suggested that companies should aim for limited flexibility instead of having no flexibility or full flexibility. According to Garavelli (2003), this moderate approach can help companies to optimize supply chain operations and manage flexibility costs by assigning certain products to specific plants and source components from specified suppliers.

As we extend the study of Fantazy *et al.* (2009) for the purposes of comparison, we employ the same flexibility dimensions as Fantazy *et al.* (2009) used in their study in Canada. They proposed five key supply chain dimensions: new product flexibility (NPF), sourcing flexibility (SOF), product flexibility (PRF), delivery flexibility (DLF), and information systems flexibility.

Supply chain performance

Both financial and non-financial measures are important in assessing supply chain performance. Various supply chain metrics are reported in the literature, such as delivery cost per unit, order fulfillment lead-time, customer return rate, inventory days of supply,

obsolescence rate, and warranty costs (Harrison and New, 2002). Both intermediate performance outcomes, such as customer service and final performance outcomes related to cost performance, are important in assessing supply chain performance (Vickery *et al.*, 2003). Maskell (1991) also appreciated the need of considering both financial and non-financial performance measurements. He argued that the financial measures facilitate strategic decision making while non-financial measures are critical in managing day-to-day supply chain operations.

Fantazy *et al.* (2009) considered net profit performance (NPP) and sales growth performance (SGP) as financial measures and lead-time performance (LTP) and customer satisfaction performance (CSP) as non-financial measures. For comparison purposes, we employed the same measures in the current study.

Basic research model and hypotheses

In total four hypotheses have been developed according to the causal relationships articulated in the research model in Figure 1. In this research model, supply chain strategy is linked with various types of supply chain flexibility and posited as a primary influence on supply chain performance.

In the current study, we explore if the findings established in SMEs in Canada also hold in SMEs in Pakistan. As discussed earlier, we draw upon the limited extant literature on comparative studies in supply chain management and propose the following hypotheses. Drawing upon the above mentioned theoretical model and earlier work of Fantazy *et al.* (2009), we tested the following hypothesized relationships among strategy, flexibility, and performance:

- H1. Pakistani SMEs are different from Canadian SMEs with regard to the direct effects of supply chain strategy on the adoption of supply chain flexibility.
- H2. Pakistani SMEs are different from Canadian SMEs with regard to the direct effects of supply chain flexibility dimensions on supply chain performance (financial and non-financial).
- H3. Pakistani SMEs are different from Canadian SMEs with regard to the direct effects of supply chain strategy on the supply chain's performance (financial and non-financial).
- H4. Pakistani SMEs are different from Canadian SMEs with regard to the indirect effects of supply chain strategy on supply chain's performance through its effect on supply chain flexibility dimension.

Research method

In order to sustain the effectiveness of the comparative study a questionnaire previously developed by Fantazy *et al.* (2009) in assessing Canadian manufacturers



Figure 1.
Basic research model

Sources: Gerwin (1993), Suarez *et al.* (1996), Gupta and Somers (1996) and Kumar *et al.* (2006)

was mailed to SMEs across Pakistan's manufacturing firms. Careful selection of the sample was necessary to reduce the influence of suspected contaminants. Since size and industry type are the important issues which could profoundly influence supply chain strategy and supply chain flexibility, these two issues were treated as potential contaminants whose effects had to be observed for the success of the study. The official definition of SME was adopted since there was a lack of uniform definition across countries. The size of SME manufacturers in Pakistan ranged from 10 to 250 employees (SMEDA, 2010) while in Canada it ranged from 10 to 499 employees.

In order to eliminate or reduce the influence of industry type, the sample of firms for this study was drawn from a similar group of industries. Further, the authors were cautious in targeting the same sampling frame for both studies. The sampling frame in this study comprises CEO, owner, president, general manager, and supply chain managers. The survey was sent to 1,000 manufacturers within Pakistan. Each survey included a personalized cover letter that promised confidentiality. To prompt survey participants to fill out the survey, a dedicated task force was formed to follow-up the progress and a follow up call was also made to each firm within 72 hours.

At the outset, to permit statistical analysis and genuine comparison on the empirical data, a target of at least 170 participating firms was established. A total of 185 responses were received out of approximately 1,000 responses (a response rate of 18.5 percent). Of the 185 returns, 15 were deleted due to missing information which resulted in 170 useable questionnaires for analysis (usable response rate 17 percent). The respondent organizations are composed of six manufacturing sectors. The rationale for selecting the six types of manufacturing firms was to create a diverse sample from which it would be easier to develop comparative analysis. The overall distribution from each manufacturing sector is as follows: textile product mills 22.94 percent, machinery manufacturing 15.88 percent computer and electronic product manufacturing 15.29 percent, electrical equipment, appliance, and component manufacturing 13.53 percent, sport and leisure 11.17 percent, and pharmaceutical and medical equipment 21.17 percent.

It was important to test the non-response bias before we continued our research study. One common approach in testing non-response bias is based on the assumption that the opinions of late responders are representative of non-respondents (Armstrong and Overton, 1977). In this research study, 30 surveys were randomly selected from the first and last groups of completed surveys received. The *t*-test results comparing the two groups including all the variables studied in this research revealed no statistically significant differences across them. Therefore, we concluded that the non-response bias was not a concern in this study.

Operational measures of the variables

We adopted a similar questionnaire style to the one developed by Fantazy *et al.* (2009) based on a seven-point Likert-type scale with minor modification. In general, the questionnaire was divided into four main sections: basic data, supply chain strategy, supply chain flexibility, and supply chain performance.

Basic data

This section collects information on the profiles of the firms, such as firm name, address, respondents position within the company, type of manufacturing industry, number of employees in the organization, type of products produced, approximate turnover, and the number of years the firm has implemented a supply chain program.

Supply chain strategy

An 18-item scale in this survey was designed with reference to the supply chain strategy model by Fantazy *et al.* (2009) to measure three supply chain strategies: innovating, customer orientation, and following. The “supply chain strategy” indicates subjective evaluations pertaining to the relative emphasis on various action programs, such as outsourcing-related inputs, offering a high margin of services along with the core products or services already being offered, and timely introduction of new product and new technology. The internal reliability coefficients, Cronbach’s α for each supply chain strategy type, and comparison study are presented in Table I.

Supply chain flexibility

In total, 38 items affecting supply chain flexibility were identified from Fantazy *et al.* (2009). This section collects data pertaining to a firm’s relative competitive edge on the five dimensions of the customer-focussed supply chain flexibility. The criteria question employed a seven-point scale with end points “Poor” and “Excellent”. The internal reliability coefficients, Cronbach’s α for each supply chain flexibility dimension, and comparison study are presented in Table I.

Supply chain performance

In this study, four dimensions were used to measure a firm’s supply chain performance. Respondents were asked to rate overall supply chain performance using the following measures: SGP, NPP, CSP, and order LTP. CSP was measured by multiple items and the remaining three dimensions were measured by a single item, adopted from Fantazy *et al.* (2009). The criteria compared with the relative major competitors for the last three years; the response options were anchored on a seven-point scale with “1” being “Very Weak” and “7” being “Very Strong.” The comparison of internal reliability coefficients, Cronbach’s α for each supply chain performance dimension are presented in Table I.

Path analysis model

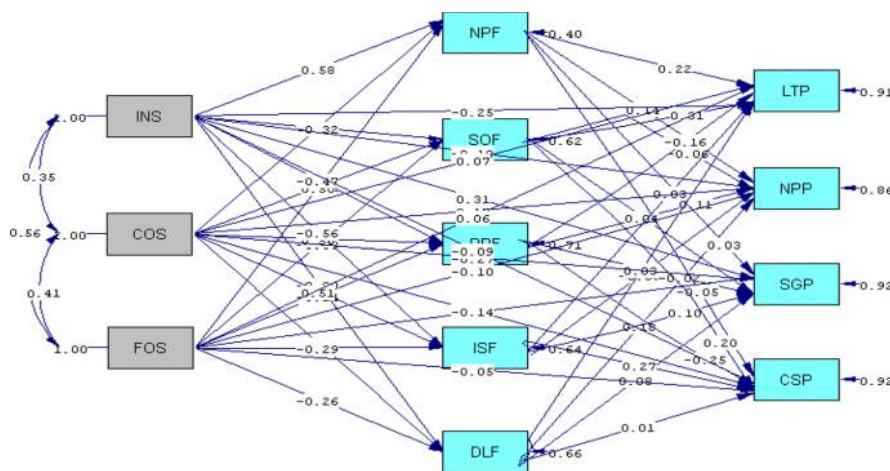
Before testing the supply chain flexibility model, it was important to check the model identification for obtaining the correct estimate of the parameter values. It was

Variables	Current study (Pakistan) α	Number of items	Pervious study (Canada) α	Number of items
Innovative strategy (INS)	0.8632	5	0.9436	5
Customer-oriented strategy (COS)	0.8001	4	0.8413	4
Follower strategy (FOS)	0.9055	5	0.9062	5
New product flexibility (NPF)	0.8542	7	0.9435	7
Sourcing flexibility (SOF)	0.9654	8	0.7662	8
Product flexibility (PRF)	0.8831	7	0.9283	7
Information systems flexibility (ISF)	0.8997	8	0.9176	8
Delivery flexibility (DLF)	0.9765	8	0.8863	8
Net profit performance (NPP)	–	1	–	1
Sales growth performance (SGP)	–	1	–	1
Lead time performance (LTP)	–	1	–	1
Customer satisfaction performance	0.9001	3	0.8221	3

Table I.
Results of Cronbach’s α
values comparison study

important to calculate the number of parameters to be estimated by the model and observed variables. The supply chain flexibility path model was over-identified. With 12 observed variables, there were $(12 \times 13)/2 = 78$ observations; the number of parameters to be estimated was 62, including the variances of 12 variables (three observed and nine unobserved, that were the disturbance), three co-variances between the observed exogenous variables, and a total of 47 direct effects. Furthermore, to fit the model some elements were set to free (i.e. error covariance set to free); in total 11 error covariance were set to free, as explained below. Thus, the supply chain flexibility model degrees of freedom were $78 - 62 - 11 = (df = 5)$ as shown in Figure 1). Because the number of observations is much greater than the number of parameters to be estimated, we concluded that the supply chain flexibility model was over-identified and can be tested statistically.

The supply chain flexibility model presented in Figure 2 shows a reasonable fit of supply chain strategy, supply chain flexibility, and supply chain performance to the empirical data. The observed $\chi^2 = 6.07$, degree of freedom (df) = 5, p -value = 0.02911, and RMSEA = 0.04. Generally, a rule of thumb is that $RMSEA \leq 0.05$ indicates close approximate fit, values between 0.05 and 0.08 suggest reasonable error of approximation, and $RMSEA > 0.10$ suggests a poor fit (Brown and Cudeck, 1993). The GFI was 0.99, which also indicated a good fit, and AGFI was 0.91. Cutoff value for GFI was 0.90 and 0.80 for AGFI (Bentler and Bonett, 1980; Bentler, 1989). Both values were above the suggested cutoff level. Three additional goodness-of-fit indices – the NFI, the NNFI, and CFI – were also tested. Both NFI (0.98) and NNFI (0.99) were greater than 0.90, indicating an acceptable fit (Bentler and Bonett, 1980; Bentler, 1989; Tanaka and Huba, 1984). Finally, the CFI was 0.99, which indicated a good fit (Bentler and Bonett, 1980; Bentler, 1989; Tanaka, 1993). A rule of thumb for the CFI and other incremental indexes is that values greater than 0.90 may indicate a reasonably good fit of the researcher’s model (Hu and Bentler, 1999). However, $CFI = 1.0$ means only that $\chi^2 < df$, not that the model has a perfect fit.



Notes: $\chi^2 = 12.45$, $df = 5$, p -value = 0.02911, RMSEA = 0.04

Figure 2. LISREL supply chain flexibility model (Pakistan data)

Results and data analysis

The aim of this study was to compare the results with previously conducted research in the Canadian SME environment. In this section, we have highlighted the hypotheses that showed differences either in the direction of the relationships or in the levels of significance. The results in Table II demonstrate the relationship between supply chain strategy and supply chain flexibility. The results of *H1* indicate that all relationships are similar except DLF, which presents negative relationships with INS in the current study. On the other hand, this relationship was positive in the previous study. However, in both studies the standardized path coefficients for INS and DLF were 0.01, in opposite directions, and statistically insignificant in both cases.

Referring to *H1*, the study concludes that Pakistani SMEs are not different from Canadian SMEs with regard to the direct effects of supply chain strategy on the adoption of supply chain flexibility. The results reject *H1*.

In the context of *H2*, the regression results and the standardized path coefficient representing the relationship between flexibility and performance are demonstrated in Table III. In previous study, SOF presented a positive relationship with NPP where as in current study this relationship is negatively associated. The negative relationship in the Pakistan sample is inconsistent with literature. Previous literature studies (Fantazy *et al.*, 2009; Tannous, 1996) found a positive relationship between SOF and NPP. This finding is rather unexpected as, in general, SOF has a positive and strong relationship with NPP. However, the negative relationship between SOF and NPP is statistically insignificant. Another important difference in this finding is the relationship between NPF and LTP. In the current study, the standardized path coefficient for NPF is 0.22, which indicates a moderate positive relationship. The positive relationship is significant at 10 percent levels. Our finding on the association between LTP and NPF is consistent with literature. On the other hand previous study finding was negatively related. Our positive result validates the claim of Fantazy *et al.* (2009), which suggested the need for additional field studies in this area. Finally, our results indicate negative

Supply chain flexibility	Current study (Pakistan) Supply chain strategies			Pervious study (Canada) Supply chain strategies		
	INS	COS	FOS	INS	COS	FOS
NPF	0.58*** (0.065)	-0.11** (0.054)	-0.31*** (0.066)	0.58 (0.07)	-0.11 (0.05)	-0.31 (0.07)
SOF	-0.32** (0.080)	0.50*** (0.070)	-0.38*** (0.082)	-0.32 (0.08)	0.50 (0.07)	-0.38 (0.07)
PRF	-0.47*** (0.090)	0.50*** (0.071)	-0.14 (0.080)	-0.47 (0.09)	0.50 (0.07)	-0.14 (0.09)
ISF	-0.56*** (0.081)	0.53*** (0.067)	-0.29*** (0.083)	-0.56 (0.08)	0.51 (0.07)	-0.29 (0.09)
DLF	-0.01 (0.06)	0.43*** (0.068)	-0.26*** (0.084)	0.01 (0.08)	0.43 (0.07)	-0.26 (0.08)
	-0.166	6.39	-3.06	0.125	6.28	-2.99

Table II.
(*H1*) Supply chain strategy and supply chain flexibility relationships

Notes: *n* = 170. ***, **, *Significant at 1, 5, and 10 percent levels, respectively

Performance	Current study (Pakistan) Supply chain flexibilities					Pervious study (Canada) Supply chain flexibilities				
	NPF	SOF	PRF	ISF	DLF	NPF	SOF	PRF	ISF	DLF
NPP	0.14	-0.06	0.11	0.18	-0.001	0.12**	0.24**	-0.075	-0.10	-0.18
	(0.12)	(0.13)	(0.13)	(0.12)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.12)
SGP	1.18	-0.48	0.86	1.49	-0.02	1.97	1.90	-0.56	-0.75	-1.47
	(0.12)	(0.13)	(0.14)	(0.12)	(0.13)	(0.10)	(0.11)	(0.11)	(0.11)	(0.07)
LTP	0.23	0.30	-0.16	0.64	0.78	1.84	-1.62	0.15	-1.70	1.99
	(0.12)	(0.13)	(0.14)	(0.12)	(0.13)	(0.11)	(0.06)	(0.13)	(0.12)	(0.11)
CSP	1.82	2.41	-1.15	0.25	0.24	-1.59	1.83	0.36	0.31	2.12
	(0.13)	(0.07)	(0.14)	(0.12)	(0.13)	(0.07)	(0.07)	(0.081)	(0.076)	(0.07)
	-0.40	1.57	-1.80	0.07	2.03	-2.40	1.98	2.65	3.40	3.44

Notes: $n = 170$. ***, **, *Significant at 1, 5, and 10 percent levels, respectively

Table III.
(H2) Supply chain flexibility and supply chain performance relationships

relationship between PRF and CSP and statistically significant at 10 percent levels. However, in the previous study PRF presented positive relationships with CSP and was statistically significant at a 1 percent level. It is rather surprising to observe the negative impact of PRF on CSP. With regard to H2, the study concludes that Pakistani SMEs are partially different from Canadian SMEs with regard to the direct effects of supply chain flexibility dimensions on supply chain performance (financial and non-financial). The results partially support H2.

Table IV displays the results of direct effect of strategy on performance. Our findings support previous study results with some exceptions. The results shown in Table IV provide partial support for the existing claim on the direct relationship between strategy and performance. In the Pakistani SMEs, INS is negatively associated with NPP, however, statistically insignificant. In the previous study, this relationship was positively associated and statistically significant at 10 percent levels.

Performance	Current study (Pakistan) Supply chain strategies			Pervious study (Canada) Supply chain strategies		
	INS	COS	FOS	INS	COS	FOS
NPP	-0.18	-0.17*	0.096	0.11*	0.042**	-0.085
	(0.12)	(0.09)	(0.11)	(0.06)	(0.022)	(0.114)
SGP	-0.025	-1.88	1.85	1.87	1.93	-0.74
	(0.13)	(0.098)	(0.12)	(0.107)	(0.0097)	(0.097)
LTP	2.40	-2.72	0.94	3.08	-1.95	0.019
	(0.13)	(0.097)	(0.12)	(0.030)	(0.059)	(0.073)
CSP	-1.96	0.69	0.49	-2.06	2.37	-1.79
	(0.13)	(0.098)	(0.12)	(0.749)	(0.011)	(0.032)
	-0.69	-1.38	-0.42	-1.88	3.09	-1.97

Notes: $n = 170$. ***, **, *Significant at 1, 5, and 10 percent levels, respectively

Table IV.
(H3) Direct effects of supply chain strategy on supply chain performance

The negative relationship between COS and NPP yielded path standardized coefficient score of -0.17 and statistically significant at 10 percent levels. Finally, the relationship between FOS and NPP was weak but positive with coefficient of 0.096 and statistically significant at 10 percent levels. In general, we can conclude that Table IV showed similar findings except the relationships between NPP and the three supply chain strategies. Referring to *H3*, the study concludes that Pakistani SMEs are partially different from Canadian SMEs with regard to the direct effects of supply chain strategy on the supply chain's performance (financial and non-financial). In general the results partially support *H3*.

Table V presents the regression results and standardized coefficient of the total effects of supply chain strategy and supply chain flexibility on the performance. The results demonstrate major differences compared with the previous study. Comparing the results in Table V for the total effects of strategy and flexibility on performance of Pakistan SMEs with Canadian SMEs, we notice that FOS is positively associated with all supply chain performance and statistically significant. However, this relationship was negatively associated in the case of Canadian SMEs. This is a strong indication that Pakistani SMEs adopt FOS in achieving financial and non-financial performance rather than adopting other two supply chain strategy types. On the other hand, Canadian SMEs were negatively associated with FOS. Since the current study focusses on SMEs in Pakistan, these firms have limited resources and an inadequate economic environment, which could be a strong evidence for adopting FOS. In the context of *H4*, the study concludes that Pakistani SMEs are partially different from Canadian SMEs with regard to the indirect effects of supply chain strategy on supply chain's performance through its effect on supply chain flexibility dimension. The results partially support *H4*.

Discussion

With regard to Table II, which represents *H1*, the comparison between samples did not reveal any significant differences. The relation of supply chain strategy and supply chain flexibility provided similar results. To some extent, this finding is an unexpected result given the fact that SMEs in developing countries operate in a different supply chain environment in comparison to more developed countries (Avittathur and Swamidass, 2007). According to the results shown in Table II, the only difference between the two studies relates to the positive relationship of DLF and INS in the case of SMEs in Canada. In Pakistani manufacturing SMEs, this relationship was negative. The possible explanation for this relationship is that COS in SMEs in Pakistan could be more prevalent in order to achieve DLF. This underpins the quest of SMEs to quickly deliver the products in order to achieve customer satisfaction.

According to the results shown in Table III, SMEs in Canada achieved financial performance (NPP and SGP) through NPF, however, in the case of SMEs in Pakistan, the relationship between NPF and financial performance (NPP and SGP) is positive but insignificant. The interesting results in Table III pertain to the positive relationship between NPF and LTP in the case of SMEs in Pakistan, though this relationship is negative in the Canadian study. Manufacturing organizations in Pakistan have a vast network of small vendors (Tipu, 2012), which could help them achieve NPF with less LTP. However, the Pakistani SMEs have not achieved NPP through SOF in contrast to SMEs in Canada. One possible explanation for this interesting finding is that SMEs in developing countries have many sourcing opportunities due to the presence of indigenous small vendors. However, this results in a more competitive market situation and could lead toward lower financial performance of SMEs in terms of NPP and SGP.

Performance	Current study (Pakistan)						Supply chain strategies						Pervious study (Canada)										
	INS		COS		FOS		INS		FOS		COS		INS		FOS		COS		INS		FOS		
	Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total	Indirect	Total	
NPP	0.05	-0.13	0.09	-0.08	-0.08	0.016	0.08	0.19**	-0.06	-0.10	-0.06	-0.10	-0.05	-0.13	(0.8)	(0.05)	(0.06)	(0.06)	(0.06)	(0.10)	(0.06)	(0.06)	(0.10)
	0.57	-2.63	1.54	-1.33	-1.33	2.66	0.88	1.90	-1.00	-1.25	-1.00	-1.25	-0.76	-1.30	0.08	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	-0.04	0.27	0.09	-0.18	-0.07	0.04	0.27***	0.60***	-0.15**	-0.17**	0.03	0.05	0.03	0.05	(0.08)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
SGP	-0.52	4.50	1.66	-3.60	-1.17	1.82	3.58	6.66	-2.93	-2.46	-2.93	-2.46	0.53	0.55	-0.13**	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	0.08	-0.17	0.08	0.15	-0.02	0.036	-0.14	-0.20**	0.18**	0.32***	-0.06	-0.19*	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
	0.98	-2.83	1.43	2.50	-3.33	3.6	-1.55	-2.11	3.20	4.14	3.20	4.14	-1.00	-1.88	-0.13**	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
CSP	-0.13**	-0.22	0.12	-0.02	-0.01	0.039	-0.39***	-0.53***	0.45***	0.48***	-0.17**	-0.24**	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
	-1.47	-4.4	2.15	-2.00	-1.00	1.95	-4.87	-6.63	7.41	6.85	7.41	6.85	-2.46	-2.73	-0.17**	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06

Notes: *n* = 170. ***, **, *Significant at 1, 5, and 10 percent levels, respectively

Table V.
(H4) Total effects of supply chain strategy and supply chain flexibility on the performance

The negative relationship between PRF and CSP in the case of SMEs in Pakistan shows less focus on customer satisfaction performance compared to SMEs in Canada, where the market is very competitive for gaining customer satisfaction. Lack of technological capabilities and knowledge could be observed in Pakistani manufacturing organizations (Nadvi and Halder, 2005). This could result in difficulties if SMEs need PRF in terms of customization. This is evident from our results which show negative relationship between CSP and PRF as illustrated in Table III.

Table IV shows the negative relationship between COS and NPP in the case of SMEs in Pakistan. This relationship is positive in the case of SMEs in Canada. This implies that SMEs in Canada adopt COS in order to improve their financial performance through achieving customer satisfaction. However, it seems that SMEs in Pakistan do not focus on achieving customer satisfaction; rather they are inclined toward employing FOS for their survival as is shown in Table IV.

As shown in Table V, the total effect of strategy and flexibility on performance demonstrates interesting results. Our comparative analysis revealed that SMEs in Canada and Pakistan achieved a non-financial performance. However, in the case of Canada, SMEs employing INS achieved financial performance (NPP and SGP) while SMEs in Pakistan only achieved SGP but did not achieve NPP. This might be due to lower margins and intense competition in developing countries. Also, it appears that SMEs in Pakistan, due to their weak technological capabilities (Awny, 2005), tend to adopt FOS and try to imitate other companies.

As shown in Table V, SMEs in Canada adopting COS achieved non-financial performance. However, Canadian SMEs did not prefer to adopt FOS in order to improve their performance. On the other hand, in the case of SMEs in Pakistan, the total effect indicates positive and significant relationships of FOS with all four performance dimensions. This underpins that SMEs in Pakistan are not competing to be innovative in order to achieve customer satisfaction. Rather, they tend to imitate each other given the nature of the volatile market situation in developing countries (Chadee and Kumar, 2001). This could be due to the limited resources and economic restrictions imposed on SMEs operating in developing countries in comparison to larger organizations.

Managerial and theoretical implications

Taking into account the triad of strategy, flexibility, and performance will potentially help supply chain managers to optimize supply chain operations in developing countries. Both micro- and macro-level factors could be considered in future conceptualizations of strategic supply chain flexibility and performance consequences. This will potentially help supply chain managers in developing countries to better understand their respective business environments. This also presents an opportunity to adopt best practices in order to optimize efficiency gains and play an instrumental role in steering public policy in logistics infrastructure.

Pakistan manufacturers have achieved an acceptable level of CSP through DLF. The standardized path coefficient for DLF and CSP was 0.27. Being able to respond to demand volatility apparently enhances a firm's ability to increase CSP. However, the results show that DLF has a negative effect on NPP. Unfortunately, increasing DLF does not seem to improve new design and innovation associated with those strategies (Fantazy *et al.*, 2009). Pakistan manufacturers have not achieved LTP, SGP, and NPP through DLF. This is a strong indication that Pakistani manufacturers are not placing a stronger emphasis on financial performance. NPF has positive direct effects only on LTP.

Ironically, this flexibility has either a negative or a weak positive relationship with other performance dimensions. The only explanation for this unexpected finding is that a supply chain organization adopting NPF places a stronger emphasis on LTP than on other performance dimensions. It appears that Pakistani manufacturers, who are shortening the time to market, are seeing a benefit in their customer satisfaction.

The comparative analysis in this research study suggests that Pakistani supply chain managers need to think critically about which type of flexibility they implement and that they should not increase all dimensions of flexibility in their capacity; some dimensions of flexibility may not significantly contribute to the overall performance. Pakistani supply chain managers will benefit from this comparative study by carefully selecting the flexibility dimensions that they need to focus on for their organizational financial and non-financial improvement. For instance, SOF is not critical for firms with INS strategy but benefits COS. Considering the limited resources of SMEs and developing country financial limitation, it is important for Pakistani managers to carefully assess their strategic needs before selecting any flexibility plan, otherwise the result can be competitively negative. On the other hand, it is essential that Pakistani firms analyze existing flexibility during the development of the supply chain strategy. This implication has been emphasized by many previous studies (Fantazy *et al.*, 2009; Chang *et al.*, 2003). It may be counterproductive for a firm to enhance flexibility without changing its strategy (Milgrom and Roberts, 1990).

Conclusions and future research directions

In conclusion, the current study confirms the theoretical assertion that supply chains in developing countries could be different from developed countries (Avittathur and Swamidass, 2007). Although there are some similarities between Canadian and Pakistani manufacturers, our study has revealed significant differences which will improve our understanding of supply chain dynamics in a comparative context. Though the Canadian manufacturers adopted INS, the same was not true in case of SMEs in Pakistan. The FOS was more prevalent among Pakistani manufacturers. This underlines the important implications for supply chain managers and underscores avenues for future research. There is a need to explore the barriers that could hamper Pakistani manufacturers' efforts toward employing INS and COS.

The majority of the SMEs in developing countries operate in the informal sector or black economy and their business operations are undocumented. Future research could possibly explore the strategy, flexibility, and performance of manufacturing firms operating in informal and formal sectors of the economy in both developed and developing countries. Also, future researchers could compare the supply chain strategy flexibility and performance of large manufacturing organizations in developed and developing countries.

References

- Aitken, J., Childerhouse, P. and Towill, D. (2003), "The impact of product lifecycle on supply chain strategy", *International Journal of Production Economics*, Vol. 85 No. 2, pp. 127-140.
- Anderson, M.F. and Katz, P.B. (1998), "Strategic sourcing", *International Journal of Logistics Management*, Vol. 9 No. 1, pp. 1-13.
- Armstrong, J.S. and Overton, T.S. (1977), "Estimating non-response bias in mail surveys", *Journal of Marketing Research*, Vol. 14 No. 3, pp. 396-402.

- Avittathur, B. and Swamidass, P. (2007), "Matching plant flexibility and supplier flexibility: lessons from small suppliers of US manufacturing plants in India", *Journal of Operations Management*, Vol. 25 No. 3, pp. 717-735.
- Awny, M. (2005), "Technology transfer and implementation processes in developing countries", *International Journal of Technology Management*, Vol. 32 Nos 1/2, pp. 213-220.
- Bentler, P.M. (1989), *EQS Structural Equations Program Manual*, BMDP Statistical Software, Los Angeles, CA.
- Bentler, P.M. and Bonett, D.G. (1980), "Significance tests and goodness of fit in the analysis of covariance structure", *Psychological Bulletin*, Vol. 88 No. 3, pp. 588-606.
- Bhatnagar, R., Jayaram, J. and Phua, Y. (2003), "Relative importance of plant location factors: a cross national comparison between Singapore and Malaysia", *Journal of Business Logistics*, Vol. 24 No. 1, pp. 147-170.
- Brown, M.W. and Cudeck, R. (1993), "Alternative ways of assessing model fit", in Bollen, K.A. and Long, J.S. (Eds), *Testing Structural Equation Models*, Sage, Newbury Park, CA, pp. 136-162.
- Chadee, D. and Kumar, R. (2001), "Sustaining in the international competitive advantage of Asian firms: a conceptual framework and research propositions", *Asia Pacific Journal of Management*, Vol. 18 No. 4, pp. 461-480.
- Chang, S.-C., Chen-Lung, Y., Hsin-Chia, C. and Chwen, S. (2003), "Manufacturing flexibility and business strategy: an empirical study of small and medium sized firms", *International Journal of Production Economics*, Vol. 83 No. 1, pp. 13-26.
- Christopher, M. and Ryals, L. (1999), "Supply chain strategy: its impact on shareholder value", *International Journal of Logistics Management*, Vol. 10 No. 1, pp. 1-10.
- Closs, D.J., Speier, C. and Meacham, N. (2011), "Sustainability to support end-to-end value chains: the role of supply chain management", *Journal of the Academy of Marketing Science*, Vol. 39 No. 1, pp. 101-116.
- D'Souza, D. and Williams, D. (2000), "Toward a taxonomy of manufacturing flexibility dimensions", *Journal of Operations Management*, Vol. 18 No. 5, pp. 577-593.
- Duclos, L.K., Vokurka, R.J. and Lummus, R.R. (2003), "A conceptual model of supply chain flexibility", *Industrial Management & Data Systems*, Vol. 103 No. 6, pp. 446-456.
- Fantazy, K., Kumar, V. and Kumar, U. (2009), "An empirical study of the relationships among strategy, flexibility, and performance in the supply chain context", *Supply Chain Management: An International Journal*, Vol. 14 No. 3, pp. 177-188.
- Farashahi, M. and Hafsi, T. (2009), "Strategy of firms in unstable institutional environments", *Asia Pacific Journal of Management*, Vol. 26 No. 4, pp. 643-666.
- Fearne, A., Hornibrook, S. and Dedman, S. (2001), "The management of perceived risk in the food supply chain: a comparative study of retailer-led beef quality assurance schemes in Germany and Italy", *International Food and Agribusiness Management Review*, Vol. 4 No. 1, pp. 19-36.
- Fisher, M.L. (1997), "What is the right supply chain for your product? A simple framework can help you figure out the answer", *Harvard Business Review*, March/April, pp. 105-116.
- Frohlich, M.T. and Westbrook, R. (2001), "Arcs of integration: an international study of supply chain strategies", *Journal of Operations Management*, Vol. 19 No. 2, pp. 185-200.
- Garavelli, A. (2003), "Flexibility configurations for the supply chain management", *International Journal of Production Economics*, Vol. 85 No. 2, pp. 141-153.
- Halldórsson, A., Larson, P. and Poist, R. (2008), "Supply chain management: a comparison of Scandinavian and American perspectives", *International Journal of Physical Distribution & Logistics Management*, Vol. 38 No. 2, pp. 126-142.

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- Han, D., Kwon, I.-W., Bae, M. and Sung, H. (2002), "Supply chain integration in developing countries for foreign retailers in Korea: Wal-Mart experience", *Computers and Industrial Engineering*, Vol. 43 No. 1, pp. 111-121.
- Harrison, A. and New, C. (2002), "The role of coherent supply chain strategy and performance in achieving competitive advantage: an international survey", *The Journal of Operational Research Society*, Vol. 53 No. 3, pp. 263-271.
- Hu, L.-t. and Bentler, P.M. (1999), "Cut off criteria for fit indexes in covariance structure analysis: conventional criteria vs new alternatives", *Structure Equation Modeling*, Vol. 6 No. 1, pp. 1-55.
- Humphrey, J. (2003), "Globalization and supply chain networks: the auto industry in Brazil and India", *Global Networks*, Vol. 3 No. 2, pp. 121-141.
- Jenkins, G. and Wright, D. (1998), "Managing inflexible supply chains", *International Journal of Logistics Management*, Vol. 9 No. 2, pp. 83-90.
- Katz, P., Pagell, D.J. and James, M.B. (2003), "Strategies of supply chain communities", *Supply Chain Management: An International Journal*, Vol. 8 No. 4, pp. 291-302.
- Kim, C. (1991), "Issues on manufacturing flexibility", *International Journal of Production Research*, Vol. 2 No. 2, pp. 4-13.
- Koste, L. and Malhotra, M.K. (1999), "A theoretical framework for the dimensions of manufacturing flexibility", *Journal of Operations Management*, Vol. 18 No. 1, pp. 75-93.
- Lee, H. (2002), "Aligning supply chain strategies with product uncertainties", *California Management Review*, Vol. 44 No. 3, pp. 105-119.
- Manuj, I. and Mentzer, J. (2008), "Global supply chain risk management", *Journal of Business Logistics*, Vol. 29 No. 1, pp. 133-155.
- Maskell, B.H. (1991), *Performance Measurement for World Class Manufacturing*, Productivity Press, Portland, OR.
- Menachof, D., Bourlakis, M. and Makios, T. (2009), "Order lead-time of grocery retailers in the UK and Greek markets", *Supply Chain Management: An International Journal*, Vol. 14 No. 5, pp. 349-358.
- Milgrom, P. and Roberts, J. (1990), "The economics of modern manufacturing technology, strategy, and organization", *The American Economic Review*, Vol. 80 No. 3, pp. 511-528.
- Nadvi, K. and Halder, G. (2005), "Local clusters in global value chains: exploring dynamic linkages between Germany and Pakistan", *Entrepreneurship & Regional Development*, Vol. 17 No. 5, pp. 339-363.
- Narasimhan, R. and Jayaram, J. (1998), "Causal linkages in supply chain management: an exploratory study of North American manufacturing firms", *Decision Sciences*, Vol. 29 No. 3, pp. 579-605.
- Oke, A. (2005), "A framework for analysing manufacturing flexibility", *International Journal of Operations & Production Management*, Vol. 25 No. 10, pp. 973-996.
- Prasad, S., Tata, J. and Madan, M. (2005), "Build to order supply chains in developed and developing countries", *Journal of Operations Management*, Vol. 23 No. 5, pp. 551-568.
- Sachan, A. and Datta, S. (2005), "Review of supply chain management and logistics research", *International Journal of Physical Distribution & Logistics Management*, Vol. 35 No. 9, pp. 664-705.
- Salvador, F., Rungtusanatham, M., Forza, C. and Trentin, A. (2007), "Mix flexibility and volume flexibility in a build-to-order environment: synergies and trade-offs", *International Journal of Operations & Production Management*, Vol. 27 No. 11, pp. 1173-1191.
- Sanchez, A. and Perez, M. (2005), "Supply chain flexibility and firm performance: a conceptual model and empirical study in the automotive industry", *International Journal of Operations & Production Management*, Vol. 25 No. 7, pp. 681-700.

- Simchi-Levi, D. (2011), "Operations rules: how to mitigate risk based on business objectives", *The European Business Review*, March-April.
- Singh, R., Garg, S. and Deshmukh, S. (2009), "The competitiveness of SMEs in a globalized economy: observations from China and India", *Management Research Review*, Vol. 33 No. 1, pp. 54-65.
- Small and Medium Enterprises Development Authority (SMEDA) (2010), SMEDA, Lahore, available at: www.smeda.org.pk/main.php?id=2 (accessed July 12, 2012).
- Tanaka, J.S. (1993), "Multifaceted conceptions of fit in structural equation models" in Bollen, K.A., Long, J.S. (Eds.), *Testing Structural Equation Models*, Sage, Newbury Park, CA, pp. 10-39.
- Tanaka, J.S. and Huba, G.J. (1984), "Confirmatory hierarchical factor analysis of psychological measures", *Journal of Personality and Social Psychology*, Vol. 46 No. 3, pp. 621-635.
- Tannous, G.F. (1996), "Capital budgeting for volume flexible equipment", *Decision Sciences*, Vol. 27 No. 2, pp. 157-177.
- Tipu, S. (2012), "Open innovation process in developing-country organizations: extending the Stage-Gate model", *International Journal of Business Innovation and Research*, Vol. 6 No. 3, pp. 355-378.
- Tybout, J.R. (2000), "Manufacturing firms in developing countries: how well do they do, and why?", *Journal of Economic Literature*, Vol. 38 No. 1, pp. 11-44.
- Vickery, S., Calantone, R. and Droge, C. (1999), "Supply chain flexibility: an empirical study", *Journal of Supply Chain Management*, Vol. 35 No. 3, pp. 16-24.
- Vickery, S., Jayanth, J., Droge, C. and Calantone, R. (2003), "The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct vs indirect relationships", *Journal of Operations Management*, Vol. 21 No. 5, pp. 523-539.

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