

## AN EXAMINATION OF PRODUCT INNOVATION AND THE BUYER-SUPPLIER RELATIONSHIP IN PAKISTANI FIRMS

Muhammad Shakeel Sadiq Jajja

Shaukat Ali Brah

Syed Zahoor Hassan

Vijay R. Kannan

### ABSTRACT

**Purpose:** This study explores the interface between buyers and suppliers in the context of product innovation in an emerging economy. Specifically, it examines the strategic and tactical initiatives necessary to drive inter-organizational alignment and thus positive innovation outcomes. It also examines the impact of organizational characteristics on product innovation.

**Method:** Using survey data from 191 organizations in Pakistan, a structural equation model of the relationships between buyers' and suppliers' strategic focus on innovation, supplier innovation focus, collaborative innovation, and measures of product innovation and market performance is tested. In addition, hierarchical regression analysis is used to identify the impact of various organizational characteristics on product innovation performance.

**Findings:** The results suggest that a firm's product innovation performance is positively influenced by strategic buyer-supplier alignment with regard to product innovation, and the existence of mechanisms that foster inter-organizational collaboration. This in turn has a positive impact on market performance. Product innovation performance is also influenced by a firm's age, the nature of its ownership, and the extent to which it exports its products.

**Originality:** The study offers new insight into the role of inter-organizational collaboration as a driver of product innovation. Moreover, it adds to a limited literature on supply chain management in emerging economies generally, and on product innovation in the Indian sub-continent specifically.

**Keywords:** Product Innovation, Buyer-Supplier Relationships, Structural Equation Modelling, Hierarchical Regression, Emerging Economy

### INTRODUCTION

Innovation is an important driver of competitiveness (Quinn, 2000). It represents the efforts of a diverse set of stakeholders across the supply chain in response to competitive, regulatory, and economic forces (Kok and Biemans, 2009). These forces are driving a need for more innovative, responsive, customer oriented, and flexible supply chains. The challenge organizations face is to develop supply chains that are can innovate consistently and thus create sustainable competitive advantage (Roy et al., 2004). The literature identifies product innovation as an outcome of

organizational and supply chain innovativeness (Dougherty and Hardy, 1996, Lau et al., 2010). It is one type of innovation that results from multistage innovation processes designed to achieve advantageous competitive positions (Baregheh et al., 2009). Product innovation can refer to the frequent introduction of new and valuable products or significantly modified existing products (Un et al., 2010). While interest in product innovation management at the organizational level is not new, in recent years there has been increasing interest in innovation in a supply chain context. Appropriate supply chain capabilities and practices are essential to achieving sustained competitiveness through innovation (Melnik et al., 2010). Data suggests that there is a direct relationship between innovation oriented supply chain practices and levels of innovation (Modi and Mabert, 2010). Moreover, it is accepted that supplier involvement and collaborative efforts are essential drivers of innovation (Sivadas and Dwyer, 2000, Guenter and Grote, 2012).

Suppliers represent a potential source of product innovations (Henke Jr. and Zhang, 2010, Heidt and Scott, 2011). A study of European companies found that in addition to product benchmarking and customers, suppliers were a key source of ideas for generating product innovations. (Arundel et al., 1995). Moreover, suppliers were more willing to invest in technology and share innovative ideas when their relationships with customers were strategic, collaborative, and open. Since supplier products are embedded in those of buyers, supplier innovativeness has a direct impact on buyer performance (Azadegan et al., 2008).

While there is a considerable body of literature on innovation, there is only limited research, either conceptual or empirical, on innovation in the context of buyer-supplier relationships (Roy et al., 2004, Wu and Ragatz, 2010). This provides space for more studies on the impact of the closeness of collaborative relationships on innovation potential (Nieto and Santamaria, 2007). Moreover, mixed results on the impact of supplier knowledge on product innovation also suggest a need for more empirical investigation (Tsai, 2009, Kok and Biemans, 2009, Lau et al., 2010).

An important trend that has implications for innovation is the shift of manufacturing and supply chain activity to emerging economies. These economies have different environmental dynamics than those of developed economies, but have expanded the global innovation landscape in recent decades (Lema et al., 2012). Asia, which houses a number of emerging economies, is expected to produce 50% of the world's total GDP in 2050 and hold 70% of the world's added capital stock in 2030 (Kohli et al., 2011). As the examples of companies such as HTC, Huawei,

and Haier illustrate, one of the keys to companies in emerging countries establishing themselves on a global platform is the ability to innovate, build strong brands, and transition away from being merely sources of low cost production.

Research on innovation in general, and the role of buyer-supplier relationships specifically, is, to date, largely based on data from developed economies. Few studies have examined issues related to the supply chain in emerging economies (Humphrey, 2003). In particular, there is a need for rigorous empirical research on supply chain management in South Asia (Khilji, 2012). The rising number of innovative companies in South Asian countries coupled with limited prior research provides motivation for examining supply chain management in the region (Osama et al., 2012). This study therefore proposes and empirically tests a theoretical model of the relationships between buyer and supplier strategic focus on product innovation, the buyer-supplier relationship, and measures of innovation and market performance in companies in Pakistan. In addition, it explores demographic and organizational traits associated with product innovation.

## **RESEARCH FRAMEWORK**

A firm's strategic focus on innovation can be characterized by an organizational commitment to developing and delivering new products and those with the latest technology, and to proactively adjusting supply chains, in advance of the competition, in response to evolving customer needs (Li and Atuahene-Gima, 2001). This focus should also be aligned with broader firm level strategies (O'Reilly et al., 2010). In a supply chain context, the combined efforts of supply chain partners are likely to produce more innovative ideas and products than uncoordinated efforts of individual firms. This suggests that a challenge a buyer faces is to align its strategies and resources with those of its suppliers, and to develop supply chains that can introduce innovative products faster than the competition.

The implication of aligning buyer and supplier strategies and resources is that buyers must identify suppliers committed to achieving shared long term common goals with regard to innovation (Yu, 2008). Their suppliers should have a track record of innovation, and the managerial and technical capacity to innovate. In addition, alignment calls for clarity of roles and expectations to avoid conflict. This creates and strengthens a mutual understanding of innovation goals (Martins and Terblanche, 2003) and enables them to be achieved (Lee, 2004). Innovation focused buyers encourage their suppliers to enhance their technology and innovation capabilities

by spending more on R&D and widening their range of expertise. They encourage their suppliers to develop independent technological competencies, and work with multiple buyers to gain a variety of knowledge and skills (Hagel, 2002). They see suppliers as ‘near innovators’ capable of developing innovative products and solutions for application in the buyer’s market (Melnik et al., 2010). Innovative companies believe that suppliers are capable of generating knowledge and innovation, and create buyer-supplier innovation structures within which innovation can flourish.

In addition to having a shared vision of innovation, a critical factor from an execution standpoint is creating conditions that foster meaningful collaboration. Collaboration and integration with suppliers play an important role in achievement of supply chain goals (Flynn et al., 2010, Paulraj et al., 2008). Firms are less likely to achieve supply chain objectives absent effective mechanisms for inter-organizational engagement (Ahmadjian and Lincoln, 2001). Innovation focused firms develop long term collaborative relationships with suppliers and meet with them frequently to define and evaluate short- and long-term innovation goals (Hoegl and Wagner, 2005, Martins and Terblanche, 2003). They encourage experimentation and do not discourage the “right kind of failures” of suppliers (Anthony et al., 2006). The development of innovative products requires the alignment of supply functions that come from long-term, trusting, and mutually beneficial buyer-supplier relationship (Lee, 2002). We therefore posit that

*H<sub>1</sub>: Buyer innovation focus positively influences supplier innovation focus*

*H<sub>2</sub>: Buyer innovation focus positively influences buyer-supplier collaboration*

The literature argues that an innovation focus must prevail among all stakeholders and contributors if innovation is to yield corresponding outcomes (Lichtenthaler et al., 2011). Traits of innovative products include perceived newness, originality, novelty and uniqueness (Henard and Szymanski, 2001). Product innovation has also been defined in terms of the novelty and meaningfulness of new products, and the timeliness with which such products were introduced (Wang and Ahmed (2004). Innovative products can also be more efficient, cost effective, customer oriented, and capable of attracting new customers.

A shared commitment to innovation reduces the length of the new product development process and reduces inefficiencies in supply chain processes (Sanders, 2007). It encourages the sharing of information on emerging customer needs, competitive requirements, and regulatory changes. A shared commitment encourages resource allocation decisions that can lead to the desired innovation outcomes. Strategic choices that reflect the availability of resources including

information, capital, creative people, and research and development intensity increase the propensity to innovate within buyer-supplier dyads (Deeds, 2001, Rice et al., 2012). Technological independence and supplier knowledge also bring new ideas to the buyer-supplier partnership. Engaged suppliers can become aware of the long term innovation goals of their customers which can in turn enhance their own innovation capabilities (Martins and Terblanche, 2003). The prior involvement of suppliers, the use of inter-organizational cross teams, and the sharing of accurate and relevant information across the supply chain enhance product innovation (Henke Jr. and Zhang, 2010, Parker et al., 2008). As Craighead et al. (2009) noted, a strong shared commitment to innovation coupled with knowledge development capacities distinguished the supply chains of innovative companies from those of less innovative companies. Based on evidence from the literature, we posit that

*H<sub>3</sub>: Supplier innovation focus positively impacts product innovation performance*

*H<sub>4</sub>: Buyer-supplier collaboration positively impacts product innovation performance*

Firms innovate to enhance their position in the marketplace. The frequent introduction of innovative products can satisfy the changing needs and wants of customers (Li and Atuahene-Gima, 2001). Firms that are able to continuously introduce new, more efficient, and customer oriented products can increase the size of their target markets, customer retention, and market share (Prajogo and Sohal, 2003). We therefore posit that

*H<sub>5</sub>: Product innovation positively impacts market performance*

Organizational characteristics of firms can influence product innovation (Kok and Biemans (2009), and this can be industry dependent (Vega-Jurado et al. (2008). Craighead et al. (2009) observed that older companies tended to be more cost effective in their innovation efforts than younger counterparts. Zhou and Wu (2010) noted that the orientation of a firm towards collaboration with foreign partners was positively related to its innovation capabilities. Tsai (2009) reported that large firms have deeper innovation-focused collaborative relationships with partners than small firms. Nieto and Santamaria (2007) found that both firm size and export intensity are significant predictors of innovation among firms exhibiting more novel innovations. Lau et al. (2010) found a significant positive correlation between company size, measured in terms of the number of employees, and product innovativeness among companies from Hong Kong and China.

However, evidence of the relationship between contextual variables and product innovation is in general limited. We therefore posit that

*H<sub>6</sub>: Organizational demographics influence product innovation performance*

Consistent with prior work, organizational characteristics are defined in terms of the buying firm's age, size in terms of revenue and number of employees, ownership (local, joint venture, foreign), and export sales in relation to overall sales.

## **RESEARCH METHODOLOGY**

A survey instrument was developed based on prior literature. Saleh and Wang (1993) argued for innovation strategies that encouraged risk taking, pro-activeness, and commitment from senior leadership. Alegre-Vidal et al. (2004) identified flexibility as a component of the strategy of innovative firms, while Qi et al. (2009) and referred to agility as a factor in innovation strategy. These studies and the work of Sánchez and Pérez (2005) on supply chain flexibility, agility and strategy provided the motivation for items related to buyer innovation focus. There are few studies that offer measurement items related to supplier innovation focus. However, several qualitative and theoretical studies provided insight in developing corresponding survey items (e.g., Dobni (2008), Ahmed (1998), Martins and Terblanche (2003), Roy et al. (2004), Henke Jr. and Zhang (2010), Lee (2004)). Studies on purchasing strategy, supply management, and supply chain integration by Flynn et al. (2010), Hoegl and Wagner (2005), and Swink et al. (2005) were used to develop items related to collaborative innovation. Several prior empirical studies were used to develop items for product innovation ((Prajogo and Sohal (2003), Alegre-Vidal et al. (2004), Wang and Ahmed (2004), Li et al. (2006)). Finally, the work of Kim and Lee (2010) and Kristal et al. (2010) was used to develop the market performance construct.

All survey items were developed using five point Likert scales. The complete survey instrument was pre-tested by thirty senior managers familiar with their firms' supply chain functions, and researchers familiar with domain of the study. Following revisions to the instrument, it was sent to 850 middle and senior managers in the relevant departments of organizations registered with the three large stock exchanges in Pakistan in Karachi, Lahore, and Islamabad. The total design methodology (Dillman (2007) was used to guide the data collection process. A total of 255 surveys were returned of which 64 were incomplete, yielding 191 useable

responses or an effective response rate of 22.5%. Insignificant t-test results to the responses of 25 early and late respondents on 15 randomly selected items indicated the absence of non-response bias (Armstrong and Overton, 1977). Table 1 summarizes the profile of the sample used for analysis purposes.

-----  
Insert Table 1 here  
-----

## RESULTS

To improve convergent and discriminant validity, only scale items with factor loadings in excess of 0.70 were included in the measurement models (Table 2). Values of Cronbach's  $\alpha$  in excess of 0.70 provide evidence of the reliability the constructs (Nunnally and Bernstein, 1994). Moreover, all constructs have values of the Comparative Fit Index (CFI) in excess of 0.90 in a single factor confirmatory factor analysis model (CFA), thus satisfying unidimensionality requirements. Confirmatory factor analysis of all variables indicates good model fit ( $\chi^2 = 253.599$ ;  $\chi^2/\text{d.f.} = 1.786$ ; RMR = 0.042; RMSEA = 0.064; CFI = 0.948; TLI = 0.938; IFI = 0.949; NFI = 0.891). Values for average variance extracted ( $\rho_{\text{vc}}$  or AVE, Table 3) in excess of 0.50 provide satisfactory evidence of convergent validity (Segars and Grover, 1993). A significant difference between the values of  $\chi^2$  for constrained and unconstrained models provides evidence of the discriminant validity of two constructs. On fixing the value of the correlation between pairs to one, the value of  $\chi^2$  increased significantly among all pairs of constructs. All values of  $\chi^2$  were significant ( $p < 0.01$ ) with a change in one degree of freedom, thus providing satisfactory evidence for discriminant validity of the constructs.

Single common factor analysis indicates that only 31.6% of variance is explained by a single component factor of all the items. A value less than 50% indicates that the data does not exhibit significant common method bias (Podsakoff et al., 2003). In addition, a significant increase ( $p < 0.001$ ) in the value of  $\chi^2$  ( $\chi^2 = 253.6, 142 \text{ d.f.}$  to  $\chi^2 = 1511.78, 152 \text{ d.f.}$ ) between a single-factor model and a model in which items are loaded onto their respective constructs provides further evidence of the absence of common method bias.

Using AMOS structural modeling software, the full structural model including control variables was evaluated to establish path estimates (Figure 1). The model exhibits good fit ( $\chi^2/\text{d.f.}$

= 1.851; CFI = 0.919; TLI = 0.900; IFI = .921; RMSEA = 0.067) and suggests that all path coefficients are significant. The latter provides support for hypotheses 1 and 2 regarding the influence of buyer innovation focus on supplier innovation focus ( $\beta = 0.223$ ) and buyer-supplier collaboration ( $\beta = 0.312$ ), and hypotheses 3 and 4 for the impact that supplier innovation focus ( $\beta = 0.185$ ) and buyer-supplier collaboration ( $\beta = 0.161$ ) have on product innovation performance. The results also indicate that product innovation has a direct impact on market performance ( $\beta = 0.338$ ).

-----  
Insert Figure 1 here  
-----

To examine the impact of organizational demographics on product innovation performance, hierarchical regression analysis (forward method) was conducted using SPSS (Version 19). Table 4 summarizes the values of the variables used. Coefficients of the weighted average product innovation measurement scale were derived from the component score coefficient matrix of the CFA for the product innovation scale items. Results show that company age, ownership, and export sales explain 19.1% percent of the variance in product innovation performance (Table 5). Each of the variables significantly increases the explained variance when included in the regression model. Revenue and number of employees do not increase the explained variance significantly when added to the model ( $p > 0.05$ ). Moreover, they are not significant predictors of product innovation performance even when product innovation performance is exclusively regressed on them.

-----  
Insert Table 4 here  
-----  
-----  
Insert Table 5 here  
-----

## **DISCUSSION AND CONCLUSION**

The results of this study lend support for the notion that long-term collaborative relationships with suppliers can play a critical role in the successful implementation of a firm's



innovation focused supply chain strategy (Henke Jr and Zhang, 2010). Evidence of this in the context of an emerging economy, in which cultural norms that may impact inter-firm collaboration differ from environments previously studied, is an important new finding. The results illustrate that in the Pakistani context, the selection of and partnering with suppliers that share a similar orientation towards innovation orientation can lead to the generation of new ideas across the supply chain. Moreover, it can lead to exchanges of knowledge related to a wide spectrum of issues, as well as product and process technologies. Buyer-supplier relationships that are open to testing new ideas can stimulate product innovation and serve as a motivation for suppliers. However, consistent with prior research, the results also highlight the importance of creating long term strategic alignment around innovation, and the need to build mutual understanding, commitment, and trust. Enhancing competitive capabilities, whether through innovation, flexibility, or quality, requires a long time horizon and appropriate allocation of resources. The congruence of buyer and supplier goals at both the strategic and operational levels, and the development of structural mechanisms that foster cooperation, are thus critical.

Company age, ownership, and export focus are factors in product innovation. While it is common to associate newer entrepreneurial firms with product innovation, findings suggest that more established companies may have deeper knowledge of markets and more mature processes for innovation and engagement with supply chain partners. They may also have greater access to critical resources and be able to establish barriers to entry. Financial resources in particular have contemporaneous effects. Steady investment over an extended period of time has carryover returns in terms of product innovation (Henard and McFadyen, 2012). The finding that the nature of company ownership influences innovation is not surprising, particularly in an emerging economy context. Foreign partners or owners bring technologies, management processes, as well as different perspectives regarding the nature and execution of innovation. Jajja and Hassan (2012) recently reported that Millat Tractors Limited (MTL), which has enjoyed long-term technology collaborations with Massey Ferguson and Perkins from the United Kingdom, has emerged as one of the most innovative firms in the Pakistani automotive sector. Relationships that extend over four decades have enabled MTL to train its engineers, develop management systems, and establish engine manufacturing and tractor assembly processes. MTL has in turn trained key vendors at Massey Ferguson and Perkins facilities abroad. Similarly, it is not surprising that there is a correlation between export sales and product innovation performance. Companies from emerging

economies must meet international standards as well compete against more established companies when selling products overseas. As such, this creates a motivation as well the necessity to be more innovative in their product offerings.

The current research is not without limitations. The sample used does not represent a true cross section of the Pakistani economy, thus care is needed in generalizing the results obtained. Innovation is often driven by industry specific characteristics and dynamics. Moreover, the current sample was dominated by relatively older companies. Either of these factors may have had a biasing impact of the results. However, this provides an opportunity for future study that allows more nuanced conclusions to be drawn. The results may also have been influenced by the sample size and the fact that firms that participated in the study were drawn from those listed on the three stock exchanges. This may explain why the sample was dominated by larger firms, and thus why, contrary to prior findings, firm size did not appear to influence product innovation performance.

In addition to addressing the limitations above, future research might include longitudinal analysis of innovation and the development of buyer-supplier relationships to better understand the enablers and challenges associated with creating and sustaining innovation efforts. Case studies of innovative companies may be particularly informative in helping to understand the drivers of inter-organizational innovation processes. Research might also examine cultural and contextual factors that differentiate collaborative innovation efforts in emerging economies compared those in developed countries.

## REFERENCES

- AHMADJIAN, C. L. & LINCOLN, J. R. 2001. Keiretsu, governance, and learning: case studies in change from the Japanese automotive industry. *Organization Science*, 12, 683-701.
- AHMED, P. K. 1998. Culture and climate for innovation. *European Journal of Innovation Management*, 1, 30-43.
- ALEGRE-VIDAL, J., LAPIEDRA-ALCAMI, R. & CHIVA-GOMEZ, R. 2004. Linking operations strategy and product innovation: an empirical study of Spanish ceramic tile producers. *Research Policy*, 33, 829-839.
- ANTHONY, S. D., EYRING, M. & GIBSON, L. 2006. Mapping your innovation strategy. *Harvard Business Review*, 86, 104-113.
- ARMSTRONG, J. S. & OVERTON, T. S. 1977. Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, 14, 396-402.

- ARUNDEL, A., VAN DE PAAL, G. & SOETE, L. 1995. Innovation strategies of Europe's largest industrial firms: Results of the PACE survey for information sources, public research, protection of innovations and government programmes. MERIT.
- AZADEGAN, A., DOOLEY, K. J., CARTER, P. L. & CARTER, J. R. 2008. Supplier innovativeness and the role of interorganizational learning in enhancing manufacturer capabilities. *Journal of Supply Chain Management*, 44, 14-35.
- BAREGHEH, A., ROWLEY, J. & SAMBROOK, S. 2009. Towards a multidisciplinary definition of innovation. *Management Decision*, 47, 1323-1339.
- CRAIGHEAD, C. W., HULT, G. T. M. & KETCHEN JR, D. J. 2009. The effects of innovation-cost strategy, knowledge, and action in the supply chain on firm performance. *Journal of Operations Management*, 27, 405-421.
- DEEDS, D. L. 2001. The role of R&D intensity, technical development and absorptive capacity in creating entrepreneurial wealth in high technology start-ups. *Journal of Engineering and Technology Management*, 18, 29-47.
- DILLMAN, D. A. 2007. *Mail and internet surveys: The tailored design method*, New Jersey, John Wiley & Sons Inc.
- DOBNI, C. B. 2008. Measuring innovation culture in organizations: The development of a generalized innovation culture construct using exploratory factor analysis. *European Journal of Innovation Management*, 11, 539-559.
- DOUGHERTY, D. & HARDY, C. 1996. Sustained Product Innovation in Large, Mature Organizations: Overcoming Innovation-to-Organization Problems. *The Academy of Management Journal*, 39, 1120-1153.
- FLYNN, B. B., HUO, B. & ZHAO, X. 2010. The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28, 58-71.
- GUENTER, H. & GROTE, G. 2012. Collaborative planning and its antecedents: An assessment in supply chain relationships. *Journal of Management & Organization*, 18, 36-52.
- HAGEL, J. 2002. Leveraged growth: expanding sales without sacrificing profits. *Harvard Business Review*, 80, 68-77.
- HEIDT, T. V. D. & SCOTT, D. 2011. More similar than different: A study of cooperative product innovation with multiple external stakeholders. *Journal of Management & Organization*, 17, 95-122.
- HENARD, D. H. & MCFADYEN, M. A. 2012. Resource Dedication and New Product Performance: A Resource-Based View. *Journal of Product Innovation Management*, 29, 193-204.

- HENARD, D. H. & SZYMANSKI, D. M. 2001. Why some new products are more successful than others. *Journal of Marketing Research*, 362-375.
- HENKE JR, J. W. & ZHANG, C. 2010. Increasing Supplier-Driven Innovation. *MIT Sloan Management Review*, 51, 41.
- HENKE JR., J. W. & ZHANG, C. 2010. Increasing Supplier-Driven Innovation. *MIT Sloan Management Review*, 51, 41-46.
- HOEGL, M. & WAGNER, S. M. 2005. Buyer-supplier collaboration in product development projects. *Journal of Management*, 31, 530-548.
- HUMPHREY, J. 2003. Globalization and supply chain networks: the auto industry in Brazil and India. *Global Networks*, 3, 121-141.
- JAJJA, M. S. S. & HASSAN, S. Z. 2012. MTL: Innovating in supply chain. Lahore University of Management Sciences - Working Case Report.
- KHILJI, S. E. 2012. Editor's perspective: Does South Asia matter? Rethinking South Asia as relevant in international business research. *South Asian Journal of Global Business Research*, 1, 8-21.
- KIM, D. & LEE, R. P. 2010. Systems collaboration and strategic collaboration: Their impacts on supply chain responsiveness and market performance. *Decision Sciences*, 41, 955-981.
- KOHLI, H. S., SHARMA, A. & SOOD, A. 2011. *ASIA 2050: Realizing the Asian Century*, India, SAGE.
- KOK, R. A. W. & BIEMANS, W. G. 2009. Creating a market-oriented product innovation process: A contingency approach. *Technovation*, 29, 517-526.
- KRISTAL, M. M., HUANG, X. & ROTH, A. V. 2010. The effect of an ambidextrous supply chain strategy on combinative competitive capabilities and business performance. *Journal of Operations Management*, 28, 415-429.
- LAU, A. K. W., TANG, E. & YAM, R. C. M. 2010. Effects of supplier and customer integration on product innovation and performance: Empirical evidence in Hong Kong manufacturers. *Journal of Product Innovation Management*, 27, 761-777.
- LEE, H. L. 2002. Aligning supply chain strategies with product uncertainties. *California Management Review*, 44, 105-119.
- LEE, H. L. 2004. The triple-A supply chain. *Harvard Business Review*, 82, 102-113.
- LEMA, R., QUADROS, R. & SCHMITZ, H. 2012. Shifts in Innovation Power to Brazil and India: Insights from the Auto and Software Industries. *IDS Research Reports*, 2012, 1-84.

- LI, H. & ATUAHENE-GIMA, K. 2001. Product innovation strategy and the performance of new technology ventures in China. *The Academy of Management Journal*, 44, 1123-1134.
- LI, S., RAGU-NATHAN, B., RAGU-NATHAN, T. & SUBBA RAO, S. 2006. The impact of supply chain management practices on competitive advantage and organizational performance. *Omega*, 34, 107-124.
- LICHTENTHALER, U., HOEGL, M. & MUETHEL, M. 2011. Is Your Company Ready for Open Innovation? *Sloan Management Review*, 53, 45-48.
- MARTINS, E. C. & TERBLANCHE, F. 2003. Building organisational culture that stimulates creativity and innovation. *European Journal of Innovation Management*, 6, 64-74.
- MELNYK, S. A., DAVIS, E. W., SPEKMAN, R. E. & SANDOR, J. 2010. Outcome-driven supply chains. *MIT Sloan Management Review*, 51, 33-38.
- MODI, S. B. & MABERT, V. A. 2010. Exploring the relationship between efficient supply chain management and firm innovation: an archival search and analysis. *Journal of Supply Chain Management*, 46, 81-94.
- NIETO, M. J. & SANTAMARIA, L. 2007. The importance of diverse collaborative networks for the novelty of product innovation. *Technovation*, 27, 367-377.
- NUNNALLY, J. C. & BERNSTEIN, I. H. 1994. *Psychometric theory*, New York, McGrawHill.
- O'REILLY, C. A., CALDWELL, D. F., CHATMAN, J. A., LAPIZ, M. & SELF, W. 2010. How leadership matters: The effects of leaders' alignment on strategy implementation. *The Leadership Quarterly*, 21, 104-113.
- OSAMA, A., HASSAN, S. Z. & CHATHA, K. A. 2012. The atlas of Islamic-world science and innovation: Country case study no. 3. Lahore: The Organisation of the Islamic Conference (OIC).
- PARKER, D. B., ZSIDISIN, G. A. & RAGATZ, G. L. 2008. Timing and extent of supplier integration in new product development: a contingency approach. *Journal of Supply Chain Management*, 44, 71-83.
- PAULRAJ, A., LADO, A. & CHEN, I. J. 2008. Inter-organizational communication as a relationship competency: Antecedents and performance outcomes in collaborative buyer-supplier relationships. *Journal of Operations Management*, 26, 45-64.
- PODSAKOFF, P. M., MACKENZIE, S. B., LEE, J. Y. & PODSAKOFF, N. P. 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879-903.
- PRAJOGO, D. I. & SOHAL, A. S. 2003. The relationship between TQM practices, quality performance, and innovation performance: An empirical examination. *International Journal of Quality & Reliability Management*, 20, 901-918.

- QI, Y., BOYER, K. K. & ZHAO, X. 2009. Supply chain strategy, product characteristics, and performance impact: Evidence from Chinese manufacturers. *Decision Sciences*, 40, 667-695.
- QUINN, J. B. 2000. Outsourcing innovation: The new engine of growth. *Sloan Management Review*, 41, 13-28.
- RICE, J., LIAO, T.-S., MARTIN, N. & GALVIN, P. 2012. The role of strategic alliances in complementing firm capabilities. *Journal of Management & Organization*, 18, 858-869.
- ROY, S., SIVAKUMAR, K. & WILKINSON, I. F. 2004. Innovation generation in supply chain relationships: a conceptual model and research propositions. *Journal of the Academy of Marketing Science*, 32, 61-79.
- SALEH, S. D. & WANG, C. K. 1993. The management of innovation: strategy, structure, and organizational climate. *Engineering Management, IEEE Transactions on*, 40, 14-21.
- SÁNCHEZ, A. M. & PÉREZ, M. P. 2005. Supply chain flexibility and firm performance: A conceptual model and empirical study in the automotive industry. *International Journal of Operations & Production Management*, 25, 681-700.
- SANDERS, N. R. 2007. An empirical study of the impact of e-business technologies on organizational collaboration and performance. *Journal of Operations Management*, 25, 1332-1347.
- SEGARS, A. H. & GROVER, V. 1993. Re-examining perceived ease of use and usefulness: A confirmatory factor analysis. *MIS Quarterly*, 17, 517-525.
- SIVADAS, E. & DWYER, F. R. 2000. An examination of organizational factors influencing new product success in internal and alliance-based processes. *Journal of Marketing*, 64, 31-49.
- SWINK, M., NARASIMHAN, R. & KIM, S. W. 2005. Manufacturing practices and strategy integration: Effects on cost efficiency, flexibility, and market-based performance. *Decision Sciences*, 36, 427-447.
- TSAI, K. H. 2009. Collaborative networks and product innovation performance: Toward a contingency perspective. *Research Policy*, 38, 765-778.
- UN, C. A., CUERVO-CAZURRA, A. & ASAKAWA, K. 2010. R&D Collaborations and Product Innovation. *Journal of Product Innovation Management*, 27, 673-689.
- VEGA-JURADO, J., GUTIÉRREZ-GRACIA, A., FERNÁNDEZ-DE-LUCIO, I. & MANJARRÉS-HENRIQUEZ, L. 2008. The effect of external and internal factors on firms' product innovation. *Research Policy*, 37, 616-632.
- WANG, C. L. & AHMED, P. K. 2004. The development and validation of the organisational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Management*, 7, 303-313.

- WU, S. J. & RAGATZ, G. L. 2010. The role of integrative capabilities in involving suppliers in New Product Development: a knowledge integration perspective. *International Journal of Manufacturing Technology and Management*, 19, 82-101.
- YU, L. 2008. Collaborating with the right partners. *Sloan Management Review*, 50, 8-9.
- ZHOU, K. Z. & WU, F. 2010. Technological capability, strategic flexibility, and product innovation. *Strategic Management Journal*, 31, 547-561.

**Table 1:** Demographic profile of sample

<b>Number of Employees</b>		<b>Industrial sectors</b>	
Number of employees	Frequency	Sector	Frequency
<50	2	Automobile	17
51-100	15	Chemical/process plants	22
101-200	24	Engineering manufacturing	40
201-500	66	FMCG/Food/Retail	33
501-1500	33	Pharmaceutical	12
>1500	51	Textile	35
		Telecom/IT	12
		Others, Not mentioned	20
<b>Age of company</b>		<b>Revenue</b>	
Number of years	Frequency	Million USD	Frequency
0-5	20	<0.6	4
6-10	19	0.61-6	63
11-15	55	7-10	45
>15	97	11-60	38
		>60	41
<b>Positions of Respondents</b>		<b>Ownership</b>	
Positions	Frequency		Frequency
Top Managers	42	Local	137
Senior Managers	126	Joint venture (JV)	22
Middle Manager	9	Foreign	32
Others	14		



**Table 2: Measurement Items, Factor Loadings, Construct Validity**

Construct	Indicator Variable	Factor Loading <sup>1</sup>	Cronbach $\alpha$	CFI
Buyer Innovation Focus (BIF) <sup>2</sup>	1. In meetings and communications, top management highlights that		0.89	0.93
	a. Our supply chain should be capable of developing new products ahead of competitors	0.84		
	b. Delivery of latest technology products/services to our customers is essential.	0.86		
	c. Our supply chain proactively adjusts to satisfy customers' newer needs rather than being reactive	0.76		
	d. We spend more than the competition average on R&D	0.71		
	2. Our top management believes that suppliers are sources of innovation in products/services.	0.74		
Supplier Innovation Focus (SIF) <sup>2</sup>	1. Top management of our key suppliers wants to continuously introduce innovative products/services.	0.79	0.83	1.0
	2. Our key suppliers express that continuous introduction of innovative products/services is a source of competitive advantage.	0.84		
	3. Employees of our key suppliers stress on continuous introduction of innovative products/services during meetings.	-		
	4. Our suppliers have developed new products/processes for us in the recent years.	0.72		
Buyer-Supplier Collaboration (BSC) <sup>2</sup>	1. Our firm		0.88	1.0
	a. Includes suppliers in teams made for resolving supply chain issues.	-		
	b. Develops long-term relationships with key suppliers.	0.80		
	c. Frequently meets with key suppliers to discuss supply chain issues.	0.80		
	d. Evaluates suppliers' capability to manage supply chain challenges during supplier selection process.	0.86		
	e. Considers supplier issues in long term strategy development process.	0.75		
	2. We allow our key suppliers to experiment and learn. We do not punish them on failed experiments.	-		
	3. Openness to new ideas is an important criterion when we select our key suppliers.	-		

Product Innovation (PI) <sup>3</sup>	1. Level of newness and uniqueness of products/services	0.86	0.91	1.0
	2. Customer orientation of new products/services	0.90		
	3. Frequency of introduction of new products/service	0.83		
	4. Value for customers in products/services	0.82		
Market Performance (MP) <sup>3</sup>	1. Market share is	0.83	0.71	1.0
	2. Market share growth rate	0.79		
	3. Brand acceptability	0.90		

<sup>1</sup> Loadings < 0.70 not included

<sup>2</sup> 1 = Strongly Disagree, 5 = Strongly Agree

<sup>3</sup> 1 = Below Competition Average, 5 = Above Competition Average

**Table 3. Convergent and Discriminant Validity (Average Variance Extracted)**

	BIF	SIF	BSC	PI	MP
BIF	<i>0.615</i>				
SIF	0.265	<i>0.616</i>			
BSC	0.329	0.125	<i>0.646</i>		
PI	0.208	0.291	0.245	<i>0.728</i>	
MP	0.07	0.099	0.083	0.338	<i>0.879</i>

**Table 4: Measurement of Organizational Demographics**

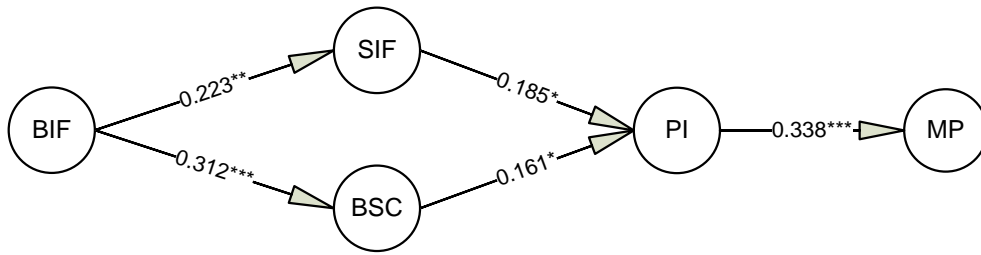
Variable	Measurement process/scale
OD <sub>1</sub> : Ownership	Local = 1; Joint venture = 2; Foreign = 3
OD <sub>2</sub> : Age of the company	0-5 years = 1; 6-10 years = 2; 11-15 = 3; more than 15 years = 4
OD <sub>3</sub> : Exports	Export sales as % of total sales
OD <sub>4</sub> : Revenue (Million US\$)	≤ 0.6 = 1; 0.61 - 6 = 2; 7 - 10 = 3; 11 - 60 = 4; ≥ 60 = 5
OD <sub>5</sub> : No of employees	≤ 50 = 1; 51-500 = 2; 501-1000 = 3; 1001-5000 = 4; ≥ 5000 = 5

**Table 5: Regression Results**

Model	R	R Square	Change Statistics		
			R Square Change	F Change	Sig. F Change
1	0.287	0.082	0.082	16.982	0.000
2	0.386	0.149	0.066	14.651	0.000
3	0.437	0.191	0.043	9.846	0.002
4	0.441	0.195	0.003	0.750	0.388
5	0.441	0.195	0.000	0.025	0.875

1. Predictors: (Constant), Ownership
2. Predictors: (Constant), Ownership, Age of company
3. Predictors: (Constant), Ownership, Age of company, Exports
4. Predictors: (Constant), Ownership, Age of company, Exports, Revenue
5. Predictors: (Constant), Ownership, Age of company, Exports, Revenue, Number of employees

Model 3 Parameters	Unstandardized Coefficients		Standardized Coefficients	t-stat	Sig.	R Square
	B	Std. Error	Beta			
Constant	2.337	0.194		12.036	0.000	0.191
Ownership	0.277	0.067	0.271	4.111	0.000	
Age of Company	0.194	0.052	0.247	3.741	0.000	
Exports	0.005	0.002	0.207	3.138	0.002	



(\* P-level = 0.05; \*\* P-level = 0.01; \*\*\* P-level = 0.001)

**Figure 1.** Structural Model Estimates