Linkages between Firm Innovation Strategy, Suppliers, Product Innovation, and Business Performance: Insights from Resource Dependence Theory

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ABSTRACT

Purpose: This study uses resource dependence theory to hypothesize that a buyer's innovation strategy enhances supplier innovation focus and a buyer-supplier relationship that supports product innovation. These in turn positively impact buyer product innovation outcomes and business performance. Moreover, it is argued that the buyer-supplier relationship positively moderates the impact of supplier innovation focus on product innovation.

Design/Methodology: Structural equation modeling and hierarchical linear regression is used to test hypotheses.

Findings: The results support all hypotheses and suggest that company (buyer) age and variables related to buyer engagement with international markets directly influence performance. They also indicate that the buyer-supplier relationship does not moderate the relationship between innovation strategy and innovation performance.

Research Implications: Resource dependence theory suggests that firms lack all the resources needed to achieve their goals and that how they manage interdependencies with other entities influences their success. This study demonstrates that how a firm builds the conditions to effectively leverage the complementary resources and capabilities of suppliers directly influences innovation outcomes and business performance.

Practical Implications: An important factor in firms achieving their product innovation goals is the selection and management of suppliers that are strategically aligned with regard to innovation. While managers need to develop internal innovation capabilities, partnering with like-minded organizations and creating conditions for effective cooperation is a key driver of innovation outcomes.

Originality/Value: In contrast to prior research that has examined operational issues, this study shows how the strategic alignment of buyers and suppliers with regard to innovation is an antecedent of product innovation outcomes. Moreover, it adds to a limited literature on supply chain management practices in emerging markets.

KEYWORDS

Innovation Strategy, Buyer-Supplier Interface, Product Innovation, Empirical Research, Emerging Markets

INTRODUCTION

A firm's product innovation strategy plays an important role in shaping organizational priorities and supply chain wide actions (Quinn, 2000). The strategic, tactical, and operational alignment of inter-organizational actions leads to innovative products, which are commonly characterized as being novel, valuable, and frequently introduced (Kim et al., 2015). However, a managerial challenge organizations face is in developing supply chains capable of producing innovative products in an effective, efficient, and consistent manner (Roy et al., 2004). Melnyk et al. (2010) argued that acquiring sustainable competitiveness through innovation requires appropriate supply chain capabilities and practices. A longitudinal analysis of the number of innovations and supply chain performance between 1987 and 1996 also found a positive relationship between a firm's supply chain functions and the level of innovation (Modi and Mabert, 2010).

Suppliers play a vital role in helping firms develop and launch innovative products (Fynes et al., 2015). They also represent an important source of product innovation (Henke Jr. and Zhang, 2010). Arundel et al. (1995) also found that suppliers were more willing to invest in technology and share ideas with customers when buyer-supplier relationships were strategic, collaborative, and open. Given that a supplier's products are embedded in a buyer's product, supplier innovativeness directly impacts buyer performance (Azadegan et al., 2008).

A significant body of literature has examined factors that impact supplier involvement in a firm's product innovation efforts. As Jean et al., (2014) pointed out however, evidence of the relationships between supplier involvement, innovation, and performance is mixed. Moreover, there is a scarcity of theoretical research on how buyers leverage the buyer-supplier relationship to achieve product innovation (Arlbjørn and Paulraj, 2013). In particular, prior research has not examined the impact of the strategic alignment of buyers and suppliers around product innovation on innovation outcomes, or the broader implications for organizational performance.

Research on the potential of collaborative innovation in emerging markets is also limited. In 2013, emerging markets for the first time accounted for more than half of world GDP in terms of purchasing power parity (Economist, 2013). One estimate projects that by 2025 they will account for fifty percent of global consumption (Atsmon et al., 2012). These numbers suggest significant opportunity for both domestic and foreign producers seeking to establish dominant market positions. In particular, the expansion of supply chains to, and increasing product innovation from emerging markets, have expanded the global innovation landscape in recent years (Lema et al., 2012). Emerging markets have different operating environments than developed markets, yet empirical evidence on product innovation is based largely on developed market

contexts (Lee et al., 2011, Story et al., 2015). Jean et al., (2014) in particular noted that evidence of the impact of supply chain relationships on product innovation in emerging markets is limited.

The current research addresses the gaps identified above, examining whether buyer-supplier alignment around product innovation translates to positive innovation outcomes. Alignment has the potential to enhance a firm's competitiveness in areas including product development lead time, responsiveness to market change, and the delivery of products that offer greater value that those of competitors. Using the lens of resource dependence theory (Pfeffer and Salancik, 2003) this research specifically investigates the influence of a buyer's product innovation strategy on that of its suppliers, how this is affected by the buyer-supplier relationship, and the implications for innovation and business performance. It is based on a survey of firms in India and Pakistan, the two largest economies within the South Asian Association for Regional Cooperation (SAARC), and two of the largest countries by population (WBG, 2014). India and Pakistan share a number of economic factors (Conover, 2011; IMF, 2012), and belong to the group of twelve secondary emerging markets (FTSE, 2016). South Asia has been largely overlooked in management research. Avittathur and Swamidass (2007) in particular noted that supply chain practices in India have received little attention in the literature, despite the increasing importance of India to U.S. companies as a manufacturing location.

The remainder of this study is organized as follows. The next section presents a summary of the literature on the role of suppliers in product innovation, followed by a section on theory and hypotheses development. Details of the research methodology and results are then presented. The paper concludes with discussion of the implications of the results and opportunities for future research.

Suppliers and Product Innovation

While some empirical studies of the impact of suppliers on product innovation have examined the issue from a supplier or dyadic perspective, most are based on data from buyers (Table 1). Several have examined the impact of enabling and moderating factors on product innovation outcomes. For example, a study of engineering and R&D project managers in manufacturing firms examined the relationships between knowledge exchange, new product development performance and the buyer's market performance (Thomas, 2013). Knowledge exchange was shown to have a positive impact on both the efficiency and effectiveness of new product development processes, which in turn positively influenced market performance. R & D collaboration with suppliers was shown to have a greater positive impact on product innovation than collaboration with universities (Un et al., 2010). Collaboration with customers had no impact on innovation, while collaboration with competitors had a negative impact. A survey of automotive manufacturers noted that external integration had a stronger impact on product innovation than internal integration (Wong et al., 2013).

Insert Table 1 here

Studies highlighting the supplier perspective have sought to understand the factors that enhance and influence enablers of supplier innovation. For example, a survey of suppliers with

globally-dispersed customer bases found that joint product development efforts and the development of cooperative ties positively influenced supplier innovativeness (Inemek and Matthyssens, 2013). Ellis et al. (2012) observed that supplier involvement and relational reliability positively impacted buyer access to supplier technology, and that the relationship is mediated by the preferred customer status of a buyer. Wagner and Bode (2013) noted that as the age of a buyer-supplier relationship and supplier perceptions of buyer cooperation increased, a supplier's tendency to share product innovation increased.

An additional theme in the literature has been to identify dimensions of coordination and capability that impact product innovation. Variables related to coordination include communication intensity, collaborative R and D and product development, relational reliability, and supplier-customer homophily, while capabilities and enablers include supplier knowledge, innovativeness, and technology and product development outcomes (Ellis *et al.*, 2012; Inemek and Matthyssens, 2013; Un *et al.*, 2010; Wagner, 2010; Wong *et al.*, 2013; Yan and Dooley, 2013; Yeniyurt et al., 2013).

While much of the literature has focused on tactical aspects of supplier involvement in product innovation, a significant gap exists from a strategic perspective. Specifically, the question of how a buyer's strategic priorities shape the development of a supply base that can enhance buyer product innovation has not been explored.

THEORY AND HYPOTHESES

Supply Base Resources

Resource dependence theory argues that organizations lack all the resources and abilities needed to achieve desired outcomes. Achieving organizational goals is thus contingent on the resources and actions of other organizations, and beyond the control of the focal organization. The actions an organization takes and the interdependencies which exist between it and other entities therefore shape the focal organization's outcomes (Pfeffer and Salancik, 2003). It thus makes sense for firms to seek resources for innovation from supply chain partners and other entities (Hansen and Birkinshaw, 2007).

Since a firm cannot control all the resources and conditions needed to consistently develop innovative products, innovation focused companies develop connections with entities within and outside their supply chains. For example, collaboration with universities, suppliers, customers, and competitors can provide access to knowledge and resources that support innovation (Un *et al.*, 2010). Involving suppliers can make supply chains more responsive to changing customer requirements (Jajja et al., 2016). However, firms are less likely to achieve supply chain innovation objectives if suppliers are not aligned with regard to innovation (Ahmadjian and Lincoln, 2001). Li and Atuahene-Gima (2001) implied that companies focused on product innovation promoted commitment among supply chain partners to introduce new products. They actively sought ways to integrate with supply chain partners to achieve a consistent supply of new product ideas and knowledge (Yang et al., 2013). Innovative companies also articulate a commitment to supply chain partners to achieve shared long term innovation goals (Pulles et al., 2016).

Innovation focused companies select suppliers after examining their own managerial and technical capabilities given desired outcomes (Kannan and Tan, 2006). They encourage suppliers to enhance their technology and innovation capabilities by spending more on R&D, widening their range of expertise, developing independent technological competence, and working with multiple buyers to gain a diversity of knowledge and skills (Hagel, 2002). These companies work with suppliers to improve suppliers' technological capabilities while keeping them technologically independent. The result is knowledgeable suppliers capable of bringing innovation assets to the partnership. This leads to the hypothesis

H_1: A firm's strategic focus on innovation positively influences supplier innovation focus.

Innovation intent must prevail among all stakeholders if innovation is to occur (Lichtenthaler et al., 2011). The convergence of innovation priorities creates and strengthens a mutual commitment to developing capabilities to sustain innovation (Martins and Terblanche, 2003). Indeed, the alignment of buyer and supplier innovation objectives is directly related to supplier innovation outcomes (Sáenz et al., 2013). Craighead et al. (2009) observed that a stronger commitment to knowledge development capacities distinguishes the supply chains of innovative and less innovative companies. Commitment to innovation encourages resource allocation consistent with achieving innovation outcomes. Similarities in buyer and supplier approaches to innovation has a positive impact on the efficiency and effectiveness of a buyer's new product development process (Wagner, 2010). Wynstra et al. (2010) observed that when suppliers are receptive to innovations in their product lines, their propensity to meet changing buyer requirements increases. Johnsen (2009) argued that mutually agreed expectations in the innovation process positively impact the time, cost, and quality associated with new product development.

Capable suppliers have been referred to as 'near innovators' for developing innovative products and solutions for application in the buyer's market (Melnyk *et al.*, 2010). Innovation capability and complementarity within the supply base positively affect a buyer's product innovation potential (Johnsen, 2009). Buyers benefit from the knowledge generation and innovation capabilities of their suppliers (Ahmadjian and Lincoln, 2001). A study of large companies in Europe indicated that after product benchmarking and customers, suppliers are a key source for generating innovative product ideas (Arundel *et al.*, 1995). Relationships with innovative suppliers possessing resources such as information, creative people, and research and development capability can increase the innovation ability of their buyers (Deeds, 2001; Rice et al., 2012). Moreover, technological independence and the knowledge that comes from suppliers working with multiple buyers brings ideas that can benefit the buyer (Hagel, 2002). Conversely, underestimating supplier capabilities and failing to recognize the potential innovation contributions of suppliers can lead to underutilization and loss of buyer-supplier innovation potential (Hansen and Birkinshaw, 2007). The impact of a supplier innovation focus on buyer product innovation is thus characterized by

H_2: Supplier innovation focus has a positive impact on buyer product innovation.

Buyer-Supplier Relationship

According to resource dependence theory, interdependencies among organizations create uncertainty and unpredictability for the focal organization (Pfeffer and Salancik, 2003).

Uncertainty results from the focal organization's inability to predict the behavior of other organizations, such as suppliers, that it transacts with. In the context of buyer-supplier relationships, the theory suggests that innovation focused companies will develop systems to increase supplier engagement in the innovation process, thereby reducing uncertainty and increasing the predictability of supplier behavior. They develop collaborative relationships with suppliers, meeting with them frequently to pursue short- and long-term innovation goals (Hoegl and Wagner, 2005; Martins and Terblanche, 2003). Innovation oriented firms seek integration with supply chain partners to achieve innovation objectives (Yang *et al.*, 2013), and improve product and process development, and delivery activities (Lau, 2011; Roh et al., 2011). They develop communication channels for information sharing with suppliers to enable mutual alignment in support of innovation goals (Liker and Choi, 2004). Innovation focused buyers do not discourage the 'right kind of failures' of suppliers (Anthony et al., 2006). They allow and encourage suppliers to engage in experimentation and exploration activities for mutual benefit. These observations lead to the hypothesis

H_3: A firm's strategic focus on innovation positively influences the buyer-supplier relationship.

Collaboration and integration with suppliers play an important role in achieving supply chain innovation goals (Flynn et al., 2010). The ability of a firm to integrate the capabilities of supply chain partners enhances the firm's ability to embark on both incremental and radical innovations (Soosay et al., 2008). Involving suppliers, utilizing inter-organizational teams, focusing on innovation within and between supply chain partner facilities, and sharing accurate and relevant information across the supply chain all enhance product innovation (Henke Jr. and Zhang, 2010). Collaborative relationships that seek to reduce costs, develop technology and processes, and encourage mutual learning lead to more innovative products (Corsten and Felde, 2005). Supplier involvement in new product development processes, as measured by the quality of buyer-supplier working relations, supplier attitudes toward co-innovation, and co-innovation behavior also positively impact the innovation performance of buyer products (Yeniyurt *et al.*, 2013). Similarly, buyer-supplier relationships characterized by shared risk, reward, training, and trust positively impact product innovation (Johnsen, 2009). These findings suggest

H_4: A supportive buyer-supplier relationship has a positive impact on product innovation.

Moderating Role of Buyer-Supplier Relationship

An important tenet of resource dependence theory is control, which stems from the imbalance of organizational interdependencies. These can be categorized as outcome interdependence and behavior interdependence (Pfeffer and Salancik, 2003). Outcome interdependence exists when outcomes achieved by one party determine those achieved by other parties in the relationship of interdependence. Behavior interdependence occurs when one party must convince another to participate in actions intended to achieve a common objective.

Behavior interdependence suggests that if an agent has resources that are valued by another but has less incentive to share them or has conflicting competitive objectives, the agent will have greater control in the interdependence. Conversely, the focal organization will have less control if the motivations of others possessing valuable resources conflict with their own. In this scenario, a

convergence of competitive objectives and desired outcomes will reduce the effort needed by the focal organization to convince the other organization to participate in actions that would achieve the focal organization's desired outcomes.

In the context of buyer-supplier relationships, resource dependence theory suggests that innovation focused companies seek to develop long-term, collaborative, and mutually rewarding relationships with key suppliers to elicit supplier dependence on the buyer and thus control over them (Pfeffer and Salancik, 2003). A supplier that perceives a buyer to be cooperative and committed to achieving long-term mutual reward will be motivated to share innovations with the buyer even if changes arising from the innovation could disrupt the supplier's operations (Wagner and Bode, 2013). Corsten and Felde (2005) argued that the trust that comes from collaborative buyer-supplier relationships enhances the positive impact of collaboration on the product innovation process. Achieving trust, cooperation, and collaboration however necessitates engaging suppliers in the innovation process. Engagement builds perceptions of buyer-supplier compatibility which in turn encourages suppliers to share innovations with buyers (Sáenz *et al.*, 2013).

Buyer-supplier coordination also reduces uncertainty (Pfeffer and Salancik, 2003). The clarity of expectations that stems from mutual engagement helps parties get the most out of the partnership in terms of product design and development processes (Lettice et al., 2010). The development of innovative products requires the alignment of supply functions which results from collaborative, long-term buyer-supplier relationships (Lee, 2002). Coordination enables the buyer to determine how to best utilize a supplier's capabilities. It also allows suppliers to become aware of buyers' long term innovation goals, which helps to align the innovation capabilities of the parties (Martins and Terblanche, 2003). This alignment leads to more innovative ideas and products than the uncoordinated efforts of individual firms. We therefore posit

H_5: The buyer-supplier relationship positively moderates the impact of supplier innovation focus on product innovation.

Performance Outcomes

The supply chain management literature frequently highlights the importance of linking strategic actions with a broad range of performance measures (Beamon, 1999; Gunasekaran et al., 2004). This study seeks to link product innovation outcomes with performance outcomes in the areas of marketing and financial performance. Frequent introduction of innovative products satisfies the changing needs and wants of customers (Li and Atuahene-Gima, 2001), and the continuous introduction of new, more efficient, and customer oriented products increases the size of the target market. Frequent product introduction also increases repeat purchases of new models and leads to increases in market share (Prajogo and Sohal, 2003). Products that are new to customers and product lines and that utilize new technology can help create new markets that generate increases in sales and profitability (Lau, 2011). Cost effective innovative products can increase total market size and profits by attracting new consumers from untapped market segments (Zu et al., 2008). Based on these observations, we propose

H_6: Product innovation positively impacts business performance.

The hypotheses can be represented by the structural model in Figure 1.

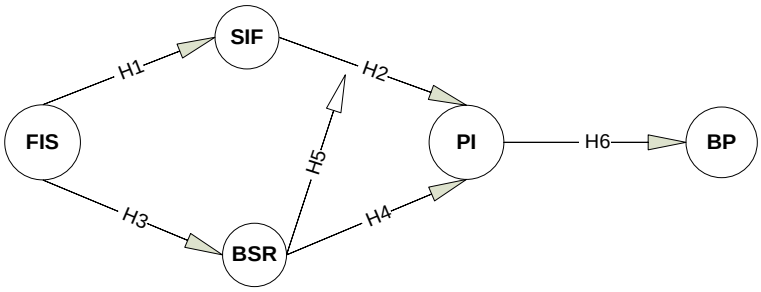


Figure 1. Research Model

METHODOLOGY

A survey was developed, in English, to test the hypotheses. Table 2 summarizes the sources of existing item scales that were used. All items were developed using five point Likert scales. Given time and cost constraints, the questionnaire was pretested by thirty managers from companies in Pakistan who were familiar with their firm's supply chain operations. The profile of the managers was similar to that of the managers in the sampling frame. This, combined with the fact that the instrument was in English, a language commonly used by middle and senior managers in Pakistan and India, obviated the need to carry out pretesting among Indian managers. The instrument was also reviewed by researchers familiar with the domain of study.

Insert Table 2 here

It is not uncommon to select industrial sectors for data collection based on research objectives (Cao and Zhang, 2010). Given the domain of this study, targeted industrial sectors were those in which buyer-supplier relationships were likely to have significant implications for buyer outcomes and performance (automotive, chemical/process, engineering, fast moving consumer goods, pharmaceutical, textile, and telecommunications). A total of 1,300 companies were identified from two sampling frames; companies registered with the three large stock exchanges of Pakistan in Karachi, Lahore, and Islamabad (850), and those registered with The Federation of Andhra Pradesh Chamber of Commerce and Industry and Bangalore Chamber of Commerce and Industry in India (450). Target respondents were middle to top managers in the relevant functional departments of the selected companies. The total design methodology (Dillman (2007) guided data collection. The questionnaire and a cover letter requesting participation and, where relevant, requesting that the instrument be directed to the appropriate individual, were sent to respondents via email. Follow up was carried out using email, telephone, and personal visits.

A total of 397 (255 from Pakistan + 142 from India) questionnaires were returned, of which 101 were incomplete. This yielded 296 (191 from Pakistan, 105 from India) useable responses, an effective response rate of 22.77%. A profile of the sample is shown in Table 3. Two approaches

suggested by Armstrong and Overton (1977) to test for non-response bias were used (Oke et al., 2013). T-tests indicated that differences in responses of 25 early and 25 late respondents from each country to 15 randomly selected items were not significant. T-tests also indicated that early and late respondents did not differ in terms of number of employees.

Insert Table 3 here

Single common factor analysis using SPSS indicated that 35.05% of variance was explained by a single component factor of all items. This suggested that the data did not exhibit significant common method bias (Podsakoff et al., 2003). In addition, a significant increase ($p < 0.001$) in the value of chi-squared ($\chi^2_{309\ d.f} = 596.4$ to $\chi^2_{324\ d.f} = 2784.5$) when comparing a single-factor model to one in which items were loaded onto their respective constructs, provided further evidence of the absence of common method bias.

RESULTS

Measurement Model

The two-step approach (Anderson and Gerbing (1988) was used to test the measurement model prior to testing the structural model. To improve construct validity, only scale items with factor loadings in excess of 0.70 on their respective constructs were retained in the measurement models ((Hair et al., 2005) (Table 4). Values of Cronbach's α for each construct exceeded 0.80, providing evidence of construct reliability ((Nunnally and Bernstein, 1994). In addition, all constructs had values of CFI in excess of 0.90 in a single factor Confirmatory Factor Analysis (CFA) model, thus satisfying uni-dimensionality requirements (Bentler (1986). Measures of overall model fit ($\chi^2_{242\ df.} = 587.307$, χ^2 /d.f. = 2.427, RMR = 0.039, RMSEA = 0.070, CFI = 0.925, TLI = 0.915, IFI = 0.926) suggested the data fit the model (Hu and Bentler, 1999). The single factor model including all the retained items provided poor fit ($\chi^2_{253\ df.} = 2417.764$, χ^2 /d.f. = 9.556, RMR = 0.136, RMSEA = 0.170, CFI = 0.532, TLI = 0.490, IFI = 0.534) suggesting that the items did not load on a single common factor. AMOS modeling software was used to carry out the analysis.

Insert Table 4 here

Values of average variance extracted (ρ_{vc} or AVE) in excess of 0.50 provided evidence of the convergent validities of all constructs (Fornell and Larcker, 1981) (Table 5). To test for discriminant validity, the correlation between each pair of constructs was set to 1, and the value of chi-square for the measurement model compared to the value derived from an unconstrained model (Segars and Grover, 1993). Significant differences in the values of chi-squared ($p < 0.01$, change in one degree of freedom) provided evidence of discriminant validity.

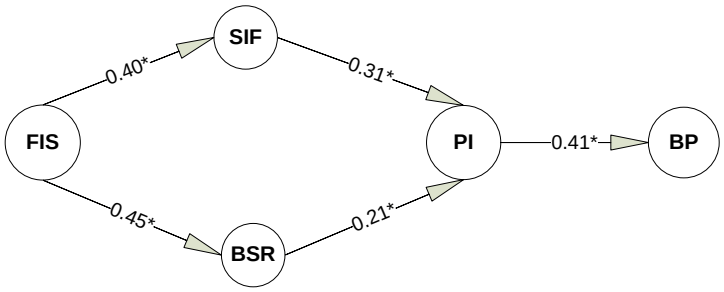
Insert Table 5 here

There is precedent in the literature for using data sets that combine samples from multiple countries (e.g., Yang et al. (2011) and Samson and Terziovski (1999)). In the context of the Indian subcontinent specifically, Malik and Kotabe (2009) used a combined sample from Pakistan and India to study the relationships of organizational learning, reverse engineering, and manufacturing flexibility with performance. To confirm that the samples in the present study were homogeneous and could thus be combined, t-tests of responses from a random sample of 25 respondents from each sample to the same questions used to test for non-response bias were carried out. Differences in responses to 13 of the 15 questions were not significant, validating the combining of the two samples.

In addition, measurement invariance of all the constructs was tested using the confirmatory factor analysis approach used by Steenkamp and Baumgartner (1998) and Oliveira and Roth (2012). The unconstrained CFA model was first run with two groups in the AMOS model corresponding to the two samples. Values of the fit indices ($\chi^2_{484\ df.} = 947.364$, χ^2 /d.f. = 1.957, RMR = 0.049, RMSEA = 0.057, CFI = 0.897, IFI = 0.898) indicated satisfactory fit. All factor loadings were above 0.70 and significant ($p < 0.01$) with the exception of one item in the SIF construct whose loading was 0.49 in the India group but still significant ($p < 0.01$). It can thus be concluded that all constructs exhibited configural invariance across the samples. Second, the χ^2 test was used to test whether $\Delta\ \chi^2$ between the constrained and unconstrained multi-group CFA models was significant. For the constrained CFA model, regression weights for all items were fixed between the two groups. This yielded $\chi^2_{512\ d.f..} = 998.735$, thus $\Delta\ \chi^2$ is significant ($\Delta\chi^2_{\Delta\ df\ =\ 28} = 51.371$, $p = 0.005$). Based on the values of other fit indices, model fit did not decrease. Further analysis of modification indices indicated that the significant increase in the value of χ^2 was due primarily to the one item in the SIF mentioned earlier whose factor loading was 0.490 for the India group but 0.883 for the Pakistan group. To test for partial metric invariance, the regression weight for this item was allowed to vary. The value of χ^2 for the constrained model improved to $\chi^2_{511\ df.} = 981.863$, thus $\Delta\chi^2_{27\ \Delta df.} = 34.499$ which is insignificant ($p = 0.152$). As such, there is evidence to suggest partial metric invariance (with only 1 of 24 items invariance constraints relaxed), and thus support for combining the two samples.

Structural Model and Moderation Test Results

The full structural model (hypotheses H_1–H_4, H_6) including the control variables (company age, percentage of revenue from exports, number of employees, foreign collaboration, and annual revenue) exhibited good model fit (χ^2/d.f. = 2.354, CFI = 0.905, TLI = 0.889, IFI = .907, RMSEA = 0.068). Figure 2 shows path estimates and their significance.



* P-level = 0.01

Figure 2 Full Structural Model Estimates

The results provide support for hypotheses H_1 and H_3 that a firm's strategic focus on innovation positively influences supplier innovation focus and the buyer-supplier relationship. They also provide support for hypotheses H_2 and H_4, that supplier innovation focus and the buyer-supplier relationship have a positive impact on product innovation. Product innovation in turn has a positive impact on business performance, thus hypothesis H_6 is supported.

To test whether the buyer-supplier relationship positively moderates the impact of supplier innovation focus on product innovation (H_5), multi-group moderation using AMOS, and interaction moderation using SPSS were carried out. Multi-group moderation was carried out following the examples of Wiengarten et al. (2014) and de Búrca et al. (2006). Based on the weighted average score of the buyer-supplier relationship construct from the CFA component score coefficient matrix, the data was split into high and low buyer-supplier relationship groups. The moderation test was then run in two steps. First, the full structural model (including control variables) was run while holding the path parameter from supplier innovation focus to product innovation equal across the groups. This generated an estimated covariance matrix for each group, and an overall value of χ^2 for the structural model. The full structural model (including control variables) was then run without constraining the path parameter to have equal values across the groups, thereby generating an unconstrained value of χ^2 for the structural model. The difference between the two values of χ^2 was insignificant ($\chi^2_{104\ df.} = 1.614$, $\chi^2_{102\ df.} = 1.421$, $p > 0.05$) providing evidence to reject the multi-group moderation effect of the buyer-supplier relationship (Byrne, 2013), and thus hypothesis H_5.

The interaction moderation approach (Baron and Kenny, 1986) was carried out using SPSS. Weighted average values of the supplier innovation focus (predictor), buyer-supplier relationship (moderator), and product innovation (outcome) constructs were derived from the component score coefficient matrix of the CFA. Step-wise linear regression was carried out in four steps. Initially, only the control variables used in the structural model were included in the regression model. At successive steps, the supplier innovation focus variable, buyer-supplier relationship variable, and the product of the supplier innovation focus and buyer-supplier relationship variables, respectively, were introduced. Results are presented in Table 6.

Insert Table 6 here

The addition of the supplier innovation focus variable (step 2) and the buyer-supplier relationship variable (step 3) increased the extracted variance associated with the dependent variable product innovation. However, the addition of the interaction term (supplier innovation focus x buyer-supplier relationship) did not increase the extracted variance. Moreover, none of the three model components are significant predictors of product innovation. Supplier innovation focus and buyer-supplier relationship are however significant predictors of product innovation in the absence of the interaction term, as illustrated in Figure 1. This provides additional evidence that Hypothesis H_5 is not supported.

Impact of Demographic Variables on Product Innovation

The literature on product innovation argues that contextual variables including the extent of foreign collaboration, company age, current exports, annual revenue, and number of employees impact product innovation (Craighead *et al.*, 2009; Kok and Biemans, 2009; Lau et al., 2010; Zhou and Wu, 2010). However, empirical evidence of the impact of these variables on product innovation in emerging economies is limited. To address this gap, forward hierarchical regression was used to examine the impact of the variables (Table 7). Coefficients for the product innovation measurement scale were derived from the component score coefficient matrix of the CFA of product innovation scale items.

Insert Table 7 here

Company age, foreign collaboration, and export sales explained 18.8 percent of the variance in product innovation (Table 8), and each variable significantly increased the explained variance when included in the regression model (Models 1–3, $p < 0.01$). Moreover, as Table 8B illustrates, coefficients for model 3 are all significant. In contrast, the number of employees and revenue do not significantly increase the explained variance in product innovation when included in the regression model (Models 4-5). When product innovation is regressed on each of these variables in isolation, model coefficients are not significant.

Insert Table 8 here

DISCUSSION

Theoretical Implications

The results provide evidence that a firm's strategic orientation towards innovation, and, more importantly, its strategic alignment with suppliers, are precursors of innovation outcomes and competitiveness. Consistent with the resource dependent perspective, they suggest that firms rely on supply chain partners to complement their, the buyer's, capabilities and resources (Oke *et al.*, 2013; Pfeffer and Salancik, 2003). Firms with a strategic focus on innovation will partner with like-minded suppliers who are motivated to work collaboratively towards shared innovation goals. This in turn suggests that they will be in a position to positively influence suppliers with regard to

innovation (H_1). As support for hypothesis H_3 suggests, the findings build on earlier research which argued that efforts to influence suppliers are contingent on the buyer-supplier relationship being based on a shared vision, clearly articulated roles and responsibilities, and equitably distributed risks and rewards (Thomas, 2013; Yan and Dooley, 2013). They also complement prior literature that has focused on tactics that enable cooperation and collaboration. Execution must be characterized by open and timely communication and information sharing, and trust. Recognizing these precursors of effective innovation, firms will put into place structures that enable cooperation and collaboration.

As prior literature suggests, suppliers represent a key input to a buyer's product innovations (Wagner, 2012). However, the value that a supplier offers cannot be effectively leveraged absent the right conditions, both from a strategic and an operational perspective. When these conditions exist, they enable buyers to produce offerings that represent new sources of value to customers, and to do so in a timely manner that gives the firm an advantage over competitors with a weaker ability to respond to changing market needs (H_2, H_4). The present study thus extends prior work by providing evidence of a direct link between strategic buyer-supplier alignment in the context of product innovation, and innovation outcomes.

The lack of support for hypothesis H_5 suggests that the buyer-supplier relationship has a positive influence on product innovation irrespective of whether a supplier is strategically focused on innovation. This speaks to the broader significance of the buyer-supplier relationship (Carr and Kaynak, 2007). More importantly, it implies that suppliers with a strategic orientation towards innovation will have a positive influence on product innovation irrespective of the nature of the buyer-supplier relationship. While a somewhat surprising result, it suggests that suppliers with a focus on innovation will independently seek to create value for buyers. This is presumably a reflection of their commitment to innovation and of the motivation of the buyer in choosing to partner with them.

Managerial Implications

The findings offer several insights for practice. First, they highlight the importance of innovation focused organizations identifying and developing the right suppliers to help achieve innovation goals. This in turn implies a need to define those goals, for example incremental versus more substantive innovation, or innovation with a primary focus on domestic versus international markets. In developing countries such as India and Pakistan, an additional consideration is whether to focus on fast-growing price sensitive market segments and thus affordable innovation, or on higher value market segments. This has important ramifications for partner selection, the level and type of competition faced, and the level of investment needed to support innovation. Access to capital in developing countries may also influence product innovation outcome (Story et al., 2015).

A related issue is that organizations should not only select suppliers that have complementary resources to support innovation goals, they should ensure that the necessary supporting infrastructure is in place. In developing countries in which the manufacturing sector is still maturing, this can place an increased burden on organizations to not only develop suppliers but communicate the importance of strong relationships. This may in turn requiring overcoming cultural barriers to inter-organizational communication, information sharing, and trust.

The analysis of demographic variables also yields important insights. Older companies are able to innovate more effectively than newer ones. This may be a reflection of the time it takes for firms to develop the knowledge, resources, and relationships that positively impact product

innovation. Scarcity of resources and a lack of efficient, transparent structures for resource allocation, both common problems in emerging markets, give older companies an advantage over newer ones that lack the networks, both business and political, needed to acquire resources. The lack of formal, transparent market structures may also make it possible for older firms to establish entry barriers to newer market entrants. The implication for younger firms is that they may need to target market segments in which more mature firms are less entrenched. For companies seeking to innovate through partnerships with suppliers in India and Pakistan specifically, and emerging markets generally, older companies, even if perceived as being more bureaucratic and less responsive than younger firms, may possess intangible assets that make then more effective partners.

Foreign collaboration is the second strongest predictor of product innovation. Foreign collaboration brings investment, and new technologies and management processes that can enable product innovation. This result is consistent with that of a prior study, based in India, that found that the greater the international orientation of a firm, the higher was the tendency to adopt advanced business tools (Lal, 2002). Moreover, foreign collaboration brings with it a different mindset with regard to innovation, competition, and the need to respond to changing customer preferences. Higher levels of innovation are also associated with higher levels of export sales. To compete against products of domestic origin, and in particular, products of developed country competitors, firms in India and Pakistan, as well as those from emerging economies in general, need to offer products of greater value to customers than if they were competing only in their domestic market. One path to achieving this is through offering more innovative products, and responding to changing market needs in a timely manner.

CONCLUSION

Although supply chains in emerging markets in general, and India and Pakistan in particular, are potential sources of product innovation, little is known about them or what enables them to function effectively. The current study thus makes several important contributions to the literature. First, it demonstrates using resource dependence theory that the strategic alignment of buyer and supplier around product innovation is an important precursor of innovation and broader performance outcomes. While the role of suppliers in the innovation process is well documented, the issue of strategic alignment is not. This work thus contributes to the literature on supply chain innovation in general, and to that on supply chain management and innovation in emerging markets specifically. Second, it identifies several organizational factors that influence innovation in the context of India and Pakistan. These factors are important in that they shed light on the potential of suppliers as partners in innovation. While care must be taken in generalizing the findings, they offer insights that may apply to other emerging markets.

The study is, however, not without limitations. The samples were relatively small. Moreover, they were somewhat unbalanced with regard to variables that may have influenced the findings (number of employees, age, foreign collaboration). The relatively small number of younger, potentially more entrepreneurial companies in particular, may have affected the findings. Larger samples would have also made it possible to explore nuances across industry sectors.

The sampling frames themselves are a potential limitation of the current study. Lists of firms on stock exchanges (Pakistan) and Chambers of Commerce (India) were used to identify survey participants as opposed to, for example, membership lists from professional organizations

in the supply chain domain. However, this highlights a common challenge associated with survey research in emerging economies, identifying suitable sources of survey data.

Additional opportunities exist to extend the current work. Examining how and how long suppliers have been engaged by a buyer would enable a more nuanced analysis of the impact of buyer-supplier alignment and innovation outcomes. Longitudinal analysis within countries and industries can facilitate an understanding of whether the evolution and maturity of supply chain innovation processes and supply chain relationships follow or differ from those observed in developed economies. It would also be meaningful to examine how environmental factors such as culture and government policies impact innovation behavior. More granular analysis of the demographic variables is needed to better understand what makes certain organizations effective innovation partners. It would, for example, be informative to know if it is experience, access to resources, networks, or other factors that make older firms more effective partners, and the implications for younger entrepreneurial firms. Finally, expanding the analysis to a wider range of emerging economies would allow patterns and differences in the evolution of supply chain innovation practices across environments to be identified.

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Authors	Perspective	Context	Method	Key independent variable(s)	Key dependent variable(s)	Pertinent key findings (→ implies positive effect)
Lettice *et al.* (2010)	Buyer/supplier	Global buyer-supplier partnerships	Interview	Buyer-supplier partnership	Product design, development performance	Clarity of expectations needed to get most out of the partnership.
Wagner (2010)	Buyer/supplier	Swiss firms	Survey	Supplier-customer homophily	NPD effectiveness and efficiency	Homophily → NPD effectiveness, efficiency.
Wagner and Bode (2013)	Buyer/supplier	German manufacturing firms	Survey	Relationship specific investment (RSI), relationship age, cooperation	Product innovation sharing	Relationship age, cooperation → supplier tendency to share innovation.
Wong *et al.* (2013)	Buyer/supplier	Thai automotive industry	Survey	External integration	Product innovation	External integration → product innovation
Yan and Dooley (2013)	Buyer/supplier	US based NPD Projects	Survey	Communication intensity	Goal congruence	Communication intensity → project performance under high task or relational uncertainty
Yeniyurt *et al.* (2013)	Buyer/supplier	North American automotive industry	Longitudinal time-series	Buyer-supplier working relations, co-innovation behavior	Innovation performance	Supplier involvement in buyer NPD → innovation performance
Lau *et al.* (2010)	Buyer	Hong Kong manufacturing firms	Survey	Product co-development with suppliers	Product innovativeness, and Product performance	Product co-development with supplier → product innovation → product performance
Lawson et al. (2009)	Buyer	UK manufacturing organizations	Survey	Supplier product development outcomes	Product development performance	Supplier contribution to outcomes improves buyer product development process.
Oke *et al.* (2013)	Buyer	Australian manufacturing firms	Survey	Supply chain partner innovativeness, strategic relationships	Innovation performance	Supply chain partner's innovativeness →innovation performance
Thomas (2013)	Buyer	US manufacturing firms	Survey	Knowledge exchange, relationship duration	NPD and market performance	Knowledge exchange → buyer NPD performance → buyer market performance
Tomlinson (2010)	Buyer	UK manufacturing firms	Survey	Buyer-supplier cooperation	Product innovation	Co-operation improves product innovation performance.
Un *et al.* (2010)	Buyer	Manufacturing firms in Spain	Survey	R&D collaboration with suppliers	Product innovation	Supplier collaboration has greater impact than collaboration with competitors, customers, universities.

Wagner (2012)	Buyer	Manufacturing firms	Survey	Supplier integration in fuzzy front end	NPD project performance	Integration has positive impact on NPD project performance.
Jean et al., 2014	Supplier	MNE suppliers of Chinese car manufacturers	Survey	Supplier involvement in co-design, trust	Product innovation	Knowledge protection, trust, technological uncertainty → supplier innovation
Inemek and Matthyssens (2013)	Supplier	Turkish suppliers	Survey	Joint product development, cooperative ties	Supplier innovativeness	Joint product development → supplier innovativeness, cooperative ties → supplier innovativeness.
Ellis *et al.* (2012)	Supplier	US suppliers (manufacturing)	Survey	Supplier involvement, relational reliability	Technology access	Positive impact of supplier involvement, relational reliability on supplier access to technology

Table 1: Key recent research

Table 2: Literature used in scale development

Construct	**Source**
Firm innovation strategy	Alegre-Vidal et al. (2004), Alegre-Vidal et al. (2004); Qi et al. (2009); Roh *et al.* (2011); Saleh and Wang (1993); Sánchez and Pérez (2005)
Supplier innovation focus	Henke Jr and Zhang (2010), Dobni (2008), Ahmed (1998), Roy et al. (2004), Martins and Terblanche (2003)
Buyer-supplier relationship	Flynn *et al.* (2010); Hoegl and Wagner (2005); Swink et al. (2005)
Product innovation	Alegre-Vidal *et al.* (2004); Li et al. (2006); Prajogo and Sohal (2003); Wang and Ahmed (2004)
Business performance	Brah and Chong (2004); Kim and Lee (2010); Kristal et al. (2010); Sila and Ebrahimpour (2005)

Table 3: Demographic profile of respondents

Number of Employees	**Frequency**
<50	10
51-100	23
101-200	32
201-500	71
501-1500	42
>1500	118
Company Age (years)	**Frequency**
0-5	33
6-10	33
11-15	66
>15	164
Foreign Collaboration	**Frequency**
Local	198
Joint venture (JV)	33
Foreign	65
Position of Respondents	**Frequency**
Top Managers	45
Senior Managers	180
Middle Manager	40
Others	31

Industrial sector	**Frequency**
Automobile	31
Chemical/process plants	48
Engineering Manufacturing	59
FMCG	27
Pharmaceuticals	15
Textile	35
Telecom/IT	31
Others/ Not reported	50
Revenue ($ million US)	**Frequency**
<0.6	13
0.61-6	80
7-10	57
11-60	54
>60	92
Functional Area of Respondents	**Frequency**
Operations and Production	106
SCM	68
CEO/Managing Partner/GM	32
R&D and Product Development	31
QA/QC	18
Others	41

Table 4: Measurement Items and Factor Loadings (Loadings > 0.70)

Construct	Scale Items (Likert scale 1-5) [a]	Factor loading (Error variance)
Firm Innovation Strategy (FIS)	Top management believes that	
	Delivery of latest technology products/services to our customers is essential.	0.74 (0.501)
	All supply chain partners should maximize quality for the end customer.	b
	All members of our supply chain should team up to maximize value for the end customer.	b
	Our supply chain should be capable of developing new products ahead of competitors.	0.81 (0.393)
	Our supply chain proactively adjusts to satisfy customers' newer needs rather than being reactive.	0.84 (0.293)
	Suppliers are sources of innovation in products/services.	0.76 (0.288)
	We spend more than the competition average on R&D.	0.74 (0.373)
Supplier Innovation Focus (SIF)	Top management of our key suppliers wants to continuously introduce innovative products/services.	0.79 (0.244)
	Our key suppliers express that the continuous introduction of innovative products/services is a source of competitive advantage.	0.70 (0.338)
	Employees of our key suppliers stress the continuous introduction of innovative products/services during meetings.	0.77 (0.269)
	Our key suppliers have R&D facilities.	b
	Our suppliers have developed new products/processes for us in recent years.	0.77 (0.249)
Buyer-Supplier Relationship (BSR)	Our firm	
	Does not involve suppliers in new product development processes. [c]	b
	Includes suppliers in teams made for resolving supply chain issues.	0.78 (0.344)
	Develops long-term relationships with key suppliers.	0.80 (0.303)
	Meets frequently with key suppliers to discuss supply chain issues.	0.85 (0.242)
	Evaluates suppliers' capabilities to manage supply chain challenges during the supplier selection process.	0.76 (0.303)
	Considers supplier issues in the long term strategy development process.	b
Product Innovation (PI)	Newness and uniqueness of our products/services	0.83 (0.251)
	Customer orientation of our new products/services	0.87 (0.174)
	Frequency of introduction of new products/services	b
	Contribution of our products/services in expanding market size (number of end customers)	0.81 (0.237)
	Value for customers in our products/services	0.83 (0.253)
	Market share	0.77 (0.330)

Business Performance (BP)	Market share growth rate	0.77 (0.286)
	Brand acceptance	0.75 (0.344)
	Revenue growth	0.85 (0.201)
	Overall profitability	0.84 (0.217)
	Return on assets	0.80 (0.232)
	Return on sales	0.85 (0.195)

a: Likert scales for FIS, SIF, BSR: Strongly Disagree – Strongly Agree. Scales for PI, BP: Below Competition Average - Above Competition Average.
b: Items deleted to improve scale validity/reliability.
c: Reverse coded item

Table 5: Correlation table, Cronbachs' alpha, CFI, R^2, AVE

Construct	**Alpha/CFI**	**R^2**	**FIS**	**BSR**	**SIF**	**PI**	**BP**
FIS	0.885/0.944	0.613	*0.607*				
BSR	0.875/1.000	0.547	0.469	*0.637*			
SIF	0.844/0.984	0.320	0.449	0.22	*0.575*		
PI	0.902/0.999	0.452	0.308	0.315	0.429	*0.698*	
BP	0.928/0.907	0.544	0.199	0.225	0.249	0.507	*0.648*

Diagonal values: Average variance extracted (AVE)

CFI: Comparative fit index

Table 6: Step-wise regression for testing moderation effect

6A: Extracted variance

Step	R	R Square	Adjusted R Square	Change Statistics		
				R Square Change	F Change	Sig. F Change
1	0.437	0.191	0.177	0.191	13.690	0.000
2	0.525	0.276	0.261	0.085	33.978	0.000
3	0.545	0.297	0.280	0.021	8.682	0.003
4	0.551	0.303	0.284	0.006	2.481	0.116

6B: Coefficients of variables in step 4

Variables	Unstandardized Coefficients		Standardized Coefficients	t-stat	Sig.
	B	Std. Error	Beta		
Control variables	-	-	-	-	-
Supplier Innovation Focus	-0.135	0.269	-0.125	-0.502	0.616
Buyer-Supplier Relationship	-0.213	0.239	-0.224	-0.890	0.374
Supplier Innovation Focus * Buyer-Supplier Relationship	0.094	0.059	0.647	1.575	0.116

Table 7: Measurement of Demographic Variables

Variable	Measurement process/scale
Age (years)	< 5: 1, 6-10: 2, 11-15: 3, > 15: 4
Foreign collaboration	Locally Owned: 1, Joint venture: 2, Foreign Owned: 3
Export sales	Current export sales as % of total sales
Number of employees	≤ 50: 1, 51-500: 2, 501-1000: 3, 1001-5000: 4, ≥ 5000: 5 = 5
Revenue (Million US$)	≤ 0.6: 1, 0.61 – 6: 2, 7 – 10: 3, 11 – 60: 4, ≥ 60: 5
Product innovation	$0.291*X_1 + 0.284*X_2 + 0.282*X_4 + 0.281*X_5$

X1, X2, X4, and X5 are the retained items from the product innovation scale (Table 3)

Table 8: Regression of Demographic Variables to Predict Product Innovation

A: Step-wise summary of extracted variance of product innovation

Model	R Square	Change Statistics		
		R Square Change	F Change	Sig. F Change
1	0.096	0.096	31.291	0.000
2	0.164	0.068	23.929	0.000
3	0.188	0.023	8.349	0.004
4	0.191	0.003	1.083	0.299
5	0.191	0.000	0.106	0.745

1. Predictors: (Constant), Age
2. Predictors: (Constant), Age, Foreign collaboration
3. Predictors: (Constant), Age, Foreign collaboration, Current exports
4. Predictors: (Constant), Age, Foreign collaboration, Current exports, Number of employees
5. Predictors: (Constant), Age, Foreign collaboration, Current exports, Number of employees, Revenue

B: Coefficients of variables in model 3

Model 3 Parameters	Unstandardized Coefficients		Standardized Coefficients	t-stat	Sig.	R Squared
	B	Std. Error	Beta			
(Constant)	02.804	0.165		16.951	.000	0.188
Company Age	0.222	0.045	0.263	4.931	.000	
Foreign collaboration	0.279	0.056	0.267	5.006	.000	
Export Sales	0.005	0.002	0.153	2.889	.004	