European Journal of Business and Management
ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)
Vol.8, No.1, 2016


# Does Supplier And Customer Involvement In New Product Development Enhance The Performance Of Product? Evidence from Pakistani Banking Sector

Rana Muhammad Shahid Yaqub

Department of Management Sciences, The Islamia University of Bahawalpur, Rahim Yar Khan Campus

Muhammad Awais Javaid

The Islamia University of Bahawalpur, Rahim Yar Khan Campus

Muhammad Tariq Sharif

Department of Management Sciences, The Islamia University of Bahawalpur, Rahim Yar Khan Campus

Fahad Javed Baig

Department of Management Sciences, The Islamia University of Bahawalpur, Rahim Yar Khan Campus

**Abstract**
The objective of this research is to find the impact of supplier and customer involvement on new product development. This study aims to explore what factors affect supplier and customer involvement altogether and how such involvement affects new product performance. The study is about the empirical survey data from 190 questionnaires distributed in three private banks of Pakistan. The study found that modular design, product innovation, and internal coordination are positively correlated with the supplier and customer involvement. Such involvement and product innovation leads to better new product performance. The study is limited to the use of cross-sectional data

The study not only provides new empirical evidence to support the importance of supply chain management in product development, but also extends existing literature to identify new contextual factors for such involvement.
**Keywords:** Product development, Supplier involvement, Customer involvement, Modularity, Innovativeness

## Introduction:

Previous studies indicate that performance of organization is enhanced if we build relationship with supplier and customers in development of new product. Management & data system literature indicates that continuous research is being conducted for highlighting the importance of customer and supplier involvement in new product development from 1998 to date (Willis, 1998; Koh et al., 2007; Lin et al., 2010). For competing & getting edge over competitors organizations have to focus more and more on suppliers and customers. IT and other advance technologies play key role in development of supplier and customer relation with the organization. Different IT applications help the organization to integrate supplier and customer in new product development. In the development of new product organization receive knowledge and other resources externally from supplier and also from customer involvement. These practices enhance the operational and innovative capabilities of an organization (Law et al, 2009). But this involvement is affected by different elements like product sale, power and trust and supply chain management (Leger et al, 2006). Research indicates that there is little knowledge available regarding the involvement of customer and supplier involvement in new product development, there are different contextual factors that are important for supplier and customer involvement. Therefore it is necessary for understanding comprehensive factors that play important role; otherwise it may be possible that this involvement may cause wastage of time and resources. For example Parker (2000) describes in his research

that ineffective supply chain management and misalignment of expectation effect the relation of suppliers with organization and in this situation involvement play a negative role for new product development. To avoid these losses organizations have to conduct research to identify these factors that affect the customer and supplier involvement in new product development. This study identifies the factors that influence the supplier and customer involvement in new product development. Research hypotheses of this study were tested on a banking sector of Pakistan. A total of 190 responses from the banks were collected and data was analyzed by comprehensive statistical tools, Different statistical tool are used in this study like factor analysis & correlation analysis. This study relates the three different contextual factors that play a key role in the development of new product. These factors are product innovativeness, product modularity and internal coordination that influence the new product development. This study indicates the influence of three factors in banks of Pakistan also provide generalized thought of supplier and customer involvement in new product development. This study indicates the different level and process that are necessary for development of product. It also influences the innovation capabilities of banks. Contextual factors that are studied in this research enhance the general body of literature and also emphasize on finding of new factors that play key role in new product development.

**Literature Review**

Current academic literature indicates that if organization involve the supplier and customer in the development of new product, it enhance the performance of organization overall by strengthening the supply chain also chain (Zhao et al., 2011; Tsai, 2009). Supplier and customer involvement (SCI) also help the organization in problem solving of product (Brown and Eisenhardt, 1995), it also strengthen the relationship. We are living in global village where knowledge is key source for innovation and new product development, and external supplier are also source of knowledge. It also enhances the knowledge application in new product development (Grant, 1996). Previous researches also (using meta analysis) indicates that customer involvement has no significant impact on product performance. In other studies result confirmed the positive relation between SCI and new product development. Some other studies confirmed that supplier involvement reduces the developmental cost of new product, reduces the structural changes and enhance the product quality (Bonaccorsi & Lipparini, 1994). Customers provide low value ideas that cause poor performance of innovation. Studies also confirm that too much involvement of customer creates confusion and problem that cause the poor performance of product (Bonner, 2010). Previous studies confirmed that statistical variation exist in SCI that create problem in implementing the SCI strategies in new product development. That has direct impact supply chain management which influence on new product performance. This research describes that contextual factors play key role in the implementation of SCI in new product development. Product modularity, innovativeness and internal coordination, these factors has positive impact on new product. Organization require technology and marketing capability for the success of new product, therefore organization keep core capability in its own and outsource non-core capabilities. In previous studies contextual factor of this study has been examined separately. A new product with high PI requires NPD processes with better risk management, whereas a new product with low PI is better for sequential NPD processes. PM affects the product complexity, leading to different NPD processes (Baldwin and Clark, 2000). SI is considered as an important element for new product success (Song and Benedetto, 2008). It includes designing product jointly, engineering process and operation of production with key suppliers (Fliess & Becker, 2006). It is also important to involve customer's input in developing new product (Brown & Eisenhardt, 1995). Products are new to a firm when the firm has little experience and marketing and technological know-how of the products. Products are new to the customer and industry when the customer and industry have little experience and technological/marketing knowledge of them (Garcia & Calantone, 2002).

Researchers defines PM as a "continuum of describing separateness" (Schilling, 2000), specificity (Schilling, 2000; Ulrich, 1995) and transferability (Starr, 1965) of new product in same product system (Lau et al., 2010). Product modularity is also related to compatibility of product parts and components, its use by other same product system. These parts can be reassembled and combined into new product having the same functionality. (Schilling, 2000) describes in his research that modularized components of product have clear and unique function when they transfer in product system.

As the product has high modularized characteristics, it has an ability to fit and adjust in separate module of product system. Personal computers are examples of high modularized product. These modularized product have compatibility to fit and transferred in same of different product lines.

Conversely, if the product has low modularized characteristics, parts and components of these products are highly integrated and not fit and transferred to product system. It also measure the firm ability to produce series of product for enhancing the new product development process and commercialization of products.

As the product modules and parts are purchased from external source, role of SI becomes more important for designing and producing modularized items. Different marketing, production and technological information shared previously by suppliers need to be verified in development of new modularized products for future integration (Kotha, 1995). Sabel & Zeitlin( 2004) describes in their study development of new modularized product need a process of coordination and integrated activities with suppliers to developed new product.

Different case studies have indicated that much involvement with suppliers is need for modularized product designing (Brusoni and Prencipe, 2001). After product modules are to be reused for the future product development projects, CI helps manufacturers anticipate changes in customer needs in the future (Kotha, 1995). When modular products are developed, manufacturers can coordinate with their customers for the objective of developing customized products and learning from the customers (Lau, 2009). Mass customization literature show that after modular design is adopted, the product modules are specified that enables customers to customize certain part of product design and development (Salvador et al., 2004; Pine, 1993). Under a pre-defined form of modular product architecture, manufacturers are able to involve the customers to gather intensive customer knowledge on product preferences, modifying or co-creating products without worrying about that the customer's ideas are out of their ability to implement (Von Hippel, 2005). Different product development studies indicate that PI is positively correlated to NPP (Katz, 2003; Tidd et al., 2001). Using six case studies, McDermott and Handfield (2000) state that, to design innovative products, informal information exchange between key suppliers and internal development teams is essential. Von Hippel (2005) describes that customers and suppliers are the major sources of innovative ideas for stimulating new products. Using product life cycle concepts, Croteau et al. (2008) argue that high level of supply chain collaboration is required in product innovation as the product information shared is highly uncertain. Thus, when a really new product is developed, information sharing with suppliers and customers become critical. Bozdogan et al. (1998) found that through mutually beneficial commitments, firms can gain innovation in product design by proactively involving suppliers early. CI is one way of conducting face-to-face discussion throughout the product design and development processes. It reduces ambiguity during the product development. The manufacturer may need to meet with supplier and customer frequently to understand the product development processes early. Thus, this study argues that, to make a product with high level of innovativeness, successful firms tend to pursue SCI in order to assimilate their information and knowledge into the product development. IC is important for effective supplier and customer integration (Koufteros et al., 2005; Hillebrand & Biemans, 2004; Takeishi, 2001). In the context of this study, external integration refers to SCI in product development (Chen et al., 2010). Internal partners may assimilate external uncertainties and linkages and, subsequently, extends IC practices to supplier and customer integration (Zhao et al., 2011; Tan & Tracey, 2007; Droge et al., 2004). Resource-based theory also suggests that a manufacturer needs to integrate a supplier in product development, to be able to use the supplier's resources and capabilities to improve product development performance, generates new ideas, solve design problems, better articulate customer needs, and induces better customer satisfaction (Mishra & Shah, 2009; von Hippel, 2005; Verona, 1999; Eisenhardt and Tabrizi, 1995). The manufacturer can then identify potential design problems and solutions in advance, which reduces product development time and cost. Integration between the R&D department and customer has a direct, positive effect on product performance (Souder et al., 1998). It helps recognize design problems early, select ideas effectively, reduce design changes in later stages of the product development, and suggest methods to realize them (Tan & Tracey, 2007). Less SI is suggested in product development under conditions of technological uncertainty (Eisenhardt & Tabrizi, 1995) or high levels of product newness (Swink, 1999).

After comprehensive literature following hypothesis has been developed.

H 1: Product innovativeness has positive impact on supplier & customer involvement.

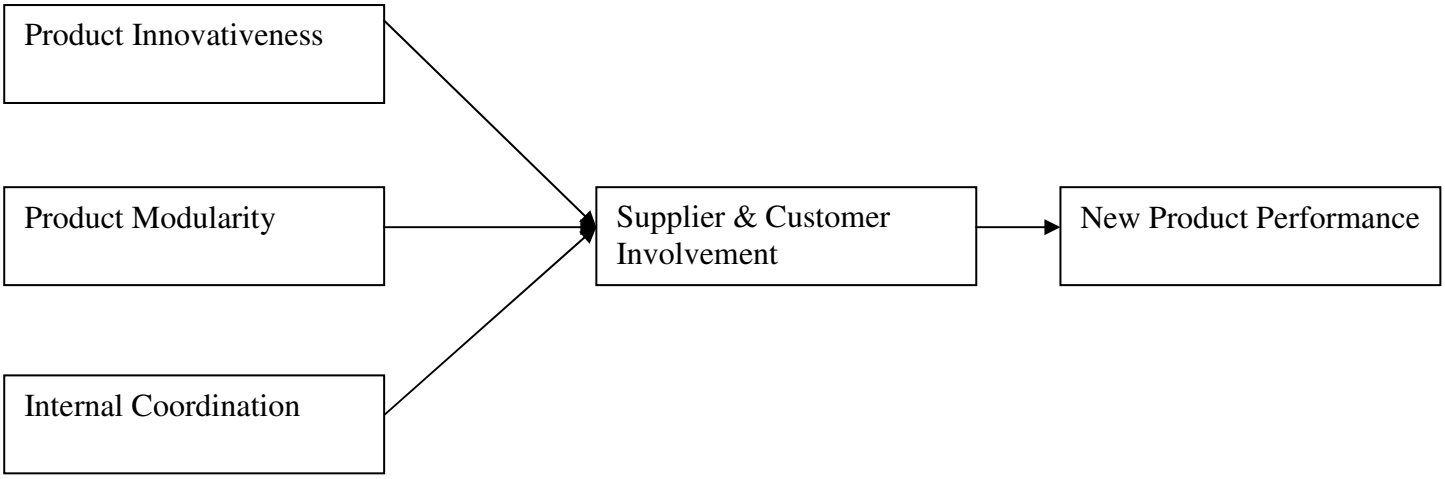
H 2: Product modularity has positive impact on supplier & customer involvement.

H 3: Internal coordination has positive impact on supplier & customer involvement.

H 4: Supplier & customer involvement has positive impact on new product performance.

**Proposed Research Model:**




**Methodology:**

After conducting the comprehensive literature review, a comprehensive methodology was developed to fill the gap between theory and practice. Five point likart scale was used in this study for collection the responses from employees of the banks. Questionnaire that is used in this study for measuring and analyzing in data about supplier and customer involvement in new product development was adapted from previous studies of (Lau et al. 2010, Narasimhan and Kim 2002, Frohlich and Westbrook 2001. Questionnaire of product innovation was adapted Garcia and Calantone 2002, Danneels and Kleinschmidt 2001. New product performance facets are customer satisfaction and volume of sales. Simple correlation and factor analysis is used in this study as statistical tools. Data was collected from Three different private banks. 250 Questionnaire were distributed and 190 respondents returned the questionnaire which was sufficient sample size to analyze the data. Respondent of this study are managers of banks. Purposive sampling technique was use in this study for data collection.
The measurements of the research items were putted in different parts of the scale for achieving psychological and methodological separations. The respondents were allowed to be anonymous to prevent the respondents' evaluation apprehension. This study adopted existing measurement items from literature and conducted two analyses carefully verify the scale items to reduce item ambiguity and keep questions precise. SPSS was used as software for analyzing the data.

**Discussion & Analysis**

After collecting the data, it was tested in SPSS and AMOS. Different statistical tools are used in this study for analyzing and interpreting the data. All construct of the questionnaire entered in SPSS for principal component analysis. As suggested by Podsakoff et al. (2003), both method factors and traits were tested in this study. Reliability test was conducted for measurement of Cronbach's Alpha of every question. Result of reliability indicates that all values are greater than 0.70 which indicates the good result (Johnson and Wichern, 1998).

**Reliability of Instruments**

| | *Number of Items (N=39)* | |
|---|---|---|
| **Dimension** | **No of Items** | **Cronbach Alpha** |
| Supplier & Customer Involvement | 08 | 0.776 |
| Product Modularity | 06 | 0.800 |
| Product innovativeness | 09 | 0.814 |
| Internal Coordination | 11 | 0.767 |
| New Product Performance | 05 | 0.779 |

Above mention table describes the value of Cronbach Alpha.

**Correlation Matrix among the variable**

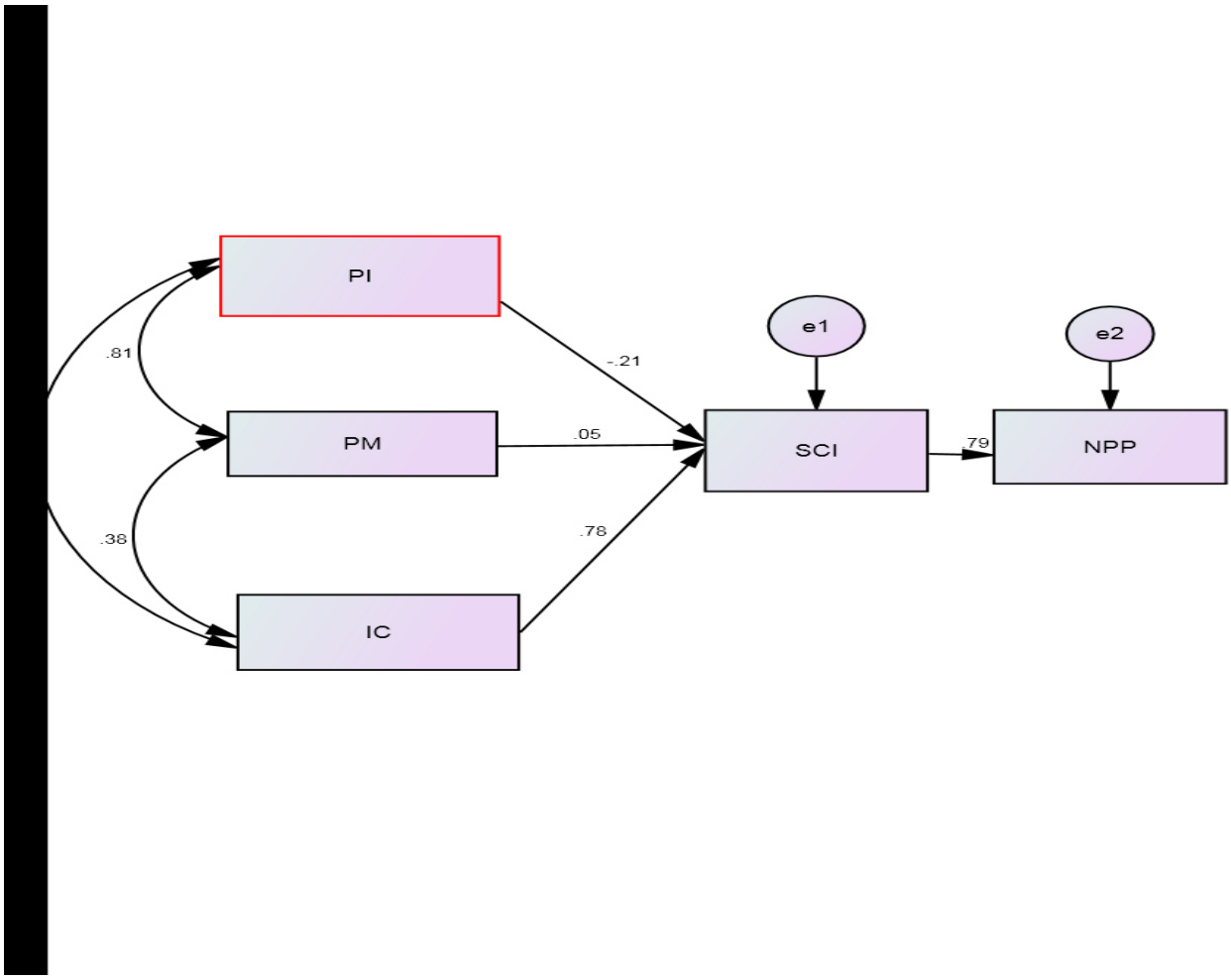
| Variables | Mean | SD | PI | PM | IC | NPP | SCI |
|---|---|---|---|---|---|---|---|
| PI | 3.6175 | .76199 | 1 | | | | |
| PM | 3.6798 | .81504 | .700** | 1 | | | |
| IC | 3.2297 | .48984 | .411** | .576** | 1 | | |
| NPP | 3.2263 | .82702 | .135 | .467** | .763** | 1 | |
| SCI | 3.1987 | .49867 | .245** | .158* | .538** | .547** | 1 |

Note: **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Above table describes the correlation matrix between the variables. Values indicate that there is positive correlation between variables.

Measuring the validity confirmatory factor analysis was used in this study. Content validity is normally judged by experts and the content validity of this research is very good because sale was adapted from previous literature and it is confirmed later by measuring the convergent and discriminate validity.

## Structural Equation Modeling




Note: Result are significant at P- value <0.1*, < 0.05**, < 0.01***, over all model fit: X/df = 0.84, P- value = 0.573, NFI = 0.97, CFI 1.00, IFI = 1.00, RMSEA .000. Error terms are omitted for clarity.

Hypothesis and model of this study was tested by structural equation modeling using AMOS. For the analysis of model likelihood estimation & standardized regression weighting are used as indices for interpretation of result.

**Regression Weight and Hypothesis testing of Structure Equation Model**

| Variables | | | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| SCI | ← | PI | -.210 | .097 | -1.420 | *** | Supported |
| SCI | ← | PM | .055 | .095 | .408 | *** | Supported |
| SCI | ← | IC | .780 | .106 | 9.597 | *** | Supported |
| NPP | ← | SCI | .792 | .101 | 8.974 | *** | Supported |

Table describes the regression weight and hypothesis. Hypothesis 1 referred to Product innovativeness has positive impact on supplier & customer involvement is rejected and positive. Value of standardized estimate Product innovativeness and supplier & customer involvement is .463 and p value < .05 which indicates that H1 is rejected. H2 product modularity has positive impact on supplier & customer involvement is accepted because standardized estimate value is .372 which is acceptable and p-value <.05. H 3 Internal Coordination has positive impact on supplier & customer involvement is accepted having estimate value of.245 with the p value < .05. H4 supplier & customer involvement has positive impact on new product performance is also accepted because it has significant positive estimated value .273 and p value <.05. The findings are consistent that product modularity, innovativeness and internal coordination influence the new product development.

**Conclusion & Recommendation**

Prior research indicates that SCI has important and consistent role in new product development. Result of this study indicates that SCI has positive impact on the new product development in the respondent banks (Chen et al., 2010; Nieto and Santamaria, 2007). When an organization builds relations with supplier it also provides foundation for involvement in new product. It is important to discuss that supplier involvement meet the supply side of the product with respect to knowledge and customer involvement meet the demand side. If organization integrates both terms it enhances the new product performance. Result also indicates that product modularity, and internal coordination have significant impact on customer and supplier involvement for the better performance of product. But it also indicates that product modularity has negative impact on supplier and customer involvement. It also support the contingent view that it is SCI depends on situation and different contextual factors play key role in different situation (Bonner, 2010; Parker et al., 2008; van Echtelt et al., 2008). This research examines only three contextual factor product modularity, innovativeness and internal coordination.

**Academic and managerial implications**

This study provides comprehensive road map both for managers and academia. This research contributed in the literature of new product development. Learning from supplier and customers enhance the performance of product (Gupta & Thomas). Finding of the study indicates that this research provides guideline for managers to involve customers and suppliers in new product development in banks. Organization involves the suppliers and

customer at early stage in new product development. For this firms have to build strong relation with its customer and supplier.

**Limitations and future research ideas**

Like the other studies this study also has some limitation. Correlation and factor analysis as statistical tools are used in this research but other statistical tools can improve the result of this study. Data was collected from only three banks; in future number of banks can be increased for better and more sufficient results. These contextual factors can also be tested in other financial organization and manufacturing sector also.

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