

Effects of Innovation Types on Firm Performance: an Empirical Study on Pakistan's Manufacturing Sector

Masood Ul Hassan (Corresponding Author)
Department of Commerce, Bahauddin Zakariya University, Multan, Pakistan
E-mail: masood@bzu.edu.pk

Sadia Shaukat
M. Phil Scholar, Department of Commerce, Bahauddin Zakariya University
Multan, Pakistan
E-mail: sadiashoukat55@gmail.com

Muhammad Saqib Nawaz
M. Phil Scholar, Department of Commerce, Bahauddin Zakariya University,
Multan, Pakistan
E-mail: Saqibnawaz09@gmail.com

Saman Naz
Lecturer, Institute of Management Sciences, Bahauddin Zakariya University,
Multan, Pakistan
E-mail: saman_naz19@yahoo.com

Abstract

The main purpose of this study is to explore the effects of innovation types including product, process, marketing and organizational innovation on different aspects of firm performance such as innovative, production, marketing and financial performance in Pakistani manufacturing companies. Data were collected through survey questionnaires from 150 respondents mainly from production, R&D and marketing departments of manufacturing companies. With the help of SPSS, data were analyzed by factor, reliability, correlation, and regression analysis. The results reveal the positive effects of innovation types on firm performance. Theoretical and managerial implications along with limitations for future research have also been discussed.

Keywords: Innovation types; firm performance; manufacturing sector; Pakistan.

1. Introduction and Literature Review

Manufacturing sector is playing a crucial role in the growth of the economy of Pakistan. After service and agriculture, it is the third largest sector of Pakistan. The share of manufacturing sector in GDP of Pakistan is 18.7%. Manufacturing sector of Pakistan posted a growth rate of 3.56% during the fiscal year 2011-2012 with investments reaching Rs. 1485.0 billion. Industrial Policy 2012 of Pakistan claims at least 8% annual

growth and more than 100% value addition in manufacturing sector (Ministry of Finance, 2012). This planned increment in value addition can only be attained with the help of innovation practices. The organizational researchers are of the view that adoption of innovation is a main vehicle for organizational adaptation and change to improve firm performance especially under the conditions like scarce resources, dynamic business environment, intense competition and changing customer demands for better quality (Jansen et al, 2006; Roberts & Amit, 2003). To the best knowledge of the authors of this study, especially within Pakistan's manufacturing context, little or no attention has been given to examine the effects of innovation types on firm's performance. There is a strong need of such kind of research in Pakistan as it is the most neglected area yet most important. As Hitt et al. (1991) argue that strategic competitiveness can best be achieved by firms through developing new technologies. Therefore, the only way for a firm to gain a sustainable competitive advantage is invariably upgrade its processes and activities through innovation (Porter, 1990; Drew, 1997). Even if innovation do not get direct rewards by market, it can be used to generate dynamic capabilities to manage changes in the organization's environment (Teece et al, 1997) and to gain first-mover advantages (Lieberman & Montgomery, 1998) or react speedily to market changes (Cohen & Levinthal, 1990). The significance of innovation can also be observed in the study of Fagerberg et al, 2004 which states that innovative countries had higher levels of productivity and income than less-innovative ones. Innovation has been defined in many different perspectives by various scholars. Damanpour & Gopkrishnan, 2001 defined innovation as 'the acceptance of any idea or conduct related to a product, service, system, device, policy or program that is new to the adopting organization'. In the same context, Nohria & Gulati, 1996 defined innovation as 'the inclusion of any policy, program, structure, process or any market or product that a manager perceives to be true'. Thompson, 1965 defined innovation as 'the generation, acceptance & implementation of new ideas, products, processes or services'. Amabile et al, 1996 put forward a brief definition of innovation which is the successful implementation of creative ideas within an organization. In short, the core of innovation is the newness of an idea that in turn improves organizational performance (Camisón-Zornoza et al, 2004). This definition provides basis for this research as the focus of this study is to examine the relationship among different types of innovation and different dimensions of organizational performance. All the innovative activities do not relate with performance in the same way hence researchers have categorized them accordingly (Damanpour, 1991). Damanpour & Evan, 1984 proposed the general categorization of innovation which includes product, process and administrative innovation and the category proposed by Henderson & Clark, 1990 includes incremental; architectural or radical innovation. In this research, OECD Oslo manual (2005) which is the international basis of guidelines for collecting and interpreting technological innovation data has been used as primary reference source for description and classification of innovation types. Four types of innovation has been used in this research namely product, process, marketing and organizational innovation. One of the main research areas in innovation literature aspires to find out relationship between innovation types and firm performance. In spite of the fact that there are numerous conceptual studies regarding this, empirical and analytical studies are limited in terms of numbers and level of analysis. The empirical studies focused on relationship between few aspects of innovation types and a single performance aspect (Günday et al, 2011). This study aims to examine the relationships among four types of innovation (product,

process, marketing & organizational) and four different dimensions of organizational performance (innovative, production, market & financial) in manufacturing companies of Pakistan listed in Karachi Stock Exchange (KSE). As Prajogo (2006) found that innovation in manufacturing industry is more radical and has a stronger impact on performance than that in service sector, therefore this research is conducted in manufacturing sector. This study also explores the inter-relationship of innovation types and dimensions of organizational performance.

In the following discussion, this paper reviews the theoretical background which leads to a number of research hypotheses. This is immediately followed by a detailed specification of the research methodology. Thereafter, the empirical results are presented and discussed. The final part of the paper presents the discussions on the basis of the research findings, managerial implications, outlines some inherent limitations and provides some directions for future research.

2. Theory and Hypotheses

2.1 Product Innovation

Product innovation means introducing the new products/services or bringing significant improvement in the existing products/services (Polder et al, 2010). For product innovation, the product must either be a new product or significantly improved with respect to its features, intended use, software, user-friendly or components and material. The first digital camera and microprocessors are the examples of the product innovation. Change in design that brings significant change in the intended use or characteristics of the product is also considered as product innovation (OECD, 2005). The product innovation has many dimensions. First, from the perspective of the customer, product is new to the customers. Second, from the perspective of the firm, the product is new to the firm. Third, product modification means bringing product variation in the existing products of the firm (Atuahene-Gima 1996). Firms bring product innovation to bring efficiency in the business (Polder et al. 2010). In highly competitive environment of today, firms have to develop new products according to customer's needs (Olson et al. 1995). The aim of product innovation is to attract new customers. Firms introduce new products or modify the existing products according to needs of the customers (Adner & Levinthal, 2001). Shorter product life cycle of the products forces the firms to bring innovation in the products (Duranton & Puga, 2001). In the competitive environment firms bring product innovation to compete in the market. The product innovation face the low competition at the time of introduction and that is why it earns high profit (Roberts, 1999). Ettlíe & Reza (1992) stated that firms bring product innovation to compete with other firms in the markets. Firms bring product innovation to satisfy their customers. Product innovation is reflected by the functional performance (Olson et al. 1995). Product innovation is one of the key factors that contribute to success of an organization. New product development and product innovation is an important strategy for increasing the market share and performance of the business. The studies showed that new product development has positive impact on the performance of the firm (Ettlíe & Reza 1992)

2.2 Process Innovation

Process innovation means improving the production and logistic methods significantly or bringing significant improvements in the supporting activities such as purchasing, accounting, maintenance and computing (Polder et al., 2010). OECD (2005) defined the

process innovation as implementation of the production or delivery method that is new or significantly improved. Process innovation includes bringing significant improvement in the equipment, technology and software of the production or delivery method. Firms bring novelties in the production and delivery method to bring efficiency in the business. The new method must be at least new to the organization and organization had never implemented it before. The firm can develop new process either by itself or with the help of another firm (Polder et al., 2010). Firms bring process innovation to produce innovative products and amendments are also brought in their processes to produce the new products (Adner & Levinthal, 2001). To decrease the production cost, firms go for bringing process innovation. The process innovation is reflected by the cost of the product (Olson et al. 1995). Firms adopt new process to compete with other firms; they have to bring the process innovation to satisfy their customers. The process innovation, especially in the manufacturing organizations, can have significant impact on the productivity of the firms. The historical case studies showed that bringing automation in the production methods has increased the efficiency and productivity of the organizations (Ettlie & Reza, 1992).

2.3 Marketing Innovation

Marketing innovation is defined as implementing new marketing method that involve significant changes in the packaging, design, placement and product promotion and pricing strategy. The objective of marketing innovation is to increase the sales and market share and opening new markets. The distinctive feature for the marketing innovation from the other types of innovation is the implementation of new marketing method that the firm has never been implemented before. The product design, that only changes the appearance of the product and does not change the features and functionality of the product, is also marketing innovation (OECD, 2005). Marketing innovation is non technological innovation. Firms bring innovation in their marketing methods to bring efficiency in their business (Polder et al., 2010). Marketing innovation is developing new techniques, methods for marketing. Developing new techniques, methods and tools for marketing have significant role in success of the organizations. The example of marketing innovation is 'changed ways for collecting customer's information'. Firms now use computer software to collect customer information. The new formats of trading, like online store is also example of marketing innovation (Chen, 2006)

2.4 Organizational Innovation

Organizational innovation is defined as introduction of new practices of doing business, workplace organizing methods, decision making system and new ways of managing external relations(Polder et al., 2010). OECD (2005) defined the organizational innovation as implementing new ways of organizing business practices, external relations and work place. Organizational innovation is new ways of organizing routine activities. For organizational innovation firms change the method of organizing that firm has not implemented before. Organizational innovation can increase the performance of the organization by decreasing the transaction cost and administrative cost. Firms bring organizational innovation to bring efficiency in the business. The new organizational method must be at least new to the organization and new method can be developed by the firm itself or with the help of third party (Polder et al., 2010). Organizations bring changes in their organizational setup. They change the ways of organizing things to compete with their competitors and satisfy the customers (Ettlie & Reza 1992).

2.5. Organizational performance (production, market, innovative and financial)

Production, market, innovative and financial performance measures for organizational performance have been used in this study. Financial performance is the objective of the performance of the organization. It includes the financial measures such as increase in profit, return on investment, and return on assets (Gopalakrishnan, 2000). The innovative performance can be analyzed by its indicators. The indicators of innovative performance are R&D inputs, new product announcement, patent citation and patent count (Hagedoorn & Cloudt, 2003). Innovative performance is reflected by the new product success. Innovation performance in the organization leads to the other types of performance as marketing, production and financial performance. Marketing performance is reflected by increase in sales, market share and profitability (Atuahene-Gima, 1996). Production performance is the combination of achievements in all elements of the production performance. The elements of production performance are quality improvement, cost efficiency, speed to production and flexibility in production. Finally, the production performance is the organizational achievement with respect to cost reduction, improving quality, speed to market and production flexibility. The production performance leads the organization directly to profitability (Gunday et al. 2011).

2.6. Linkage among innovation types

Enzing et al. (2011) study reveals that organizational practices affect the level of innovation in the organization. Furthermore, the researchers explored that firm's specific practices leads to product and process innovation by managing the resources. Walker (2004) concluded that innovation types influence each other and they should be implemented in conjunction. Staropoli (1998) emphasized that technical innovation can be enhanced by cooperative organizational rearrangements and coordination mechanisms. Similarly, Germain (1996) found the organizational restructuring as a predictor for process innovation which gives the meaning of relationship among organizational innovation and process innovation. Walker again in 2008 announced that marketing, product and organizational innovations are inter-related and that the additional research is needed to further clarify the findings. The empirical literature related to relationship among innovation types is limited (Gunday et al, 2011), hence the few conceptual studies above shown lead us to formulate the following hypotheses:

H_{1a}: *Organization innovation has a positive relationship with product innovation.*

H_{1b}: *Organization innovation has a positive relationship with process innovation.*

H_{1c}: *Organization innovation has a positive relationship with marketing innovation.*

H₂: *Process innovation has a positive relationship with product innovation.*

H₃: *Marketing innovation has a positive relationship with product innovation.*

2.7. Linkage between Organizational Innovativeness and Firm Performance

Jiménez-Jiménez & Sanz-Valle's (2010) study show the positive relationship between organizational learning, innovation and firm performance. The study provides extra evidence to previous literature that innovation has positive effect on performance. Same content is supported by the study of Calantone et al. (2002). The consideration shows that learning orientation has positive relation with firm innovativeness and firm performance. Learning orientation which is related to knowledge management is essential for firm innovation capability and performance. Gopalakrishnan's (2000) study linked two

dimensions of innovations (speed & magnitude) with the firm performance. The study concluded positive relationship between speed of adoption of innovations and firm performance. Damanpour et al. (2009) study examined the outcomes of adoption of innovation types and found the positive impact of innovativeness on firm performance. Hence, concluded that cumulative adoption of innovation types over time has a positive relation with firm performance. Once again, the relationship between innovativeness and future performance has been examined by Bowen et al. (2010). Researchers concluded direct and significant relationship between innovation and future performance of the firm. In the same way, Subramanian & Nikalanta's (1996) study put some additional evidence in the support of positive effect of innovation on firm performance. They analyzed the relationship between firm innovativeness, their organizational characteristics and organizational performance. The conclusion drawn is the direct association of formalization and centralization with administrative innovation which in turn relates positively with organizational efficiency. Cingoz & Akdogan's (2011) recent study proposed the positive linkage of expected positive performance outcomes with innovative behavior which is considered as an important resource that leads the organization to success in ever-changing business environment. Sok & O'Cass's (2011) study shows the positive relationship between innovation Resource-Capability (R-C) complementarity and innovation based performance. Innovation-based performance is not only the result of innovation resources or innovation capability but the consequence of R-C complementarity. This relationship is heightened via the ownership of increased learning capability. Naidoo's (2010) study sheds light on the relationship between market orientation, marketing innovation, competitive advantage and organizational performance. The study states market orientation as an accelerator for initiation stage of marketing innovation which is positively linked with competitive advantage. Competitive advantage (achieved as differentiation, cost leadership & focus strategies) in turn positively relates with the performance of the company. Baer & Frese's (2003) study proposed that climate for initiation acts as a positive moderator between process innovation and company performance. Not only innovation, but climate for initiation is also necessary to bring a firm to its full potential. Grawe et al. (2009) study focused on the relationship between customer orientation, competitor orientation, service innovation and market performance. Customer orientation and competitor orientation works as a catalyst for service innovation which in turn is positively related to market performance of the firm. Wang, Yeung & Zhang's (2011) recent study underscores the positive relationship between trust and innovation. Trust brings transparency in manufacturer-supplier relationship for collaborative innovation. The researchers suggest the managers who are interested in improving innovation performance and maintaining good supply chain relationship should rely heavily on trust. This relationship is strengthened with high environmental uncertainty. Lin et al. (2013) recently explored a different aspect of innovation which concludes that green product innovation that reduces the outcomes having negative impact on environment and prevents waste has a substantial positive relation with firm performance. Aragon-Correa et al. (2007) studied the relationship between organizational learning, transformational leadership, firm innovation & performance. The results show direct and strong relationship of organizational learning on firm innovation than of transformational leadership. Firm innovation in turn has a significant influence on firm performance. Camisón & Villar-López (2012) recently over refined the relationship of two types of innovation (product & process) with firm

performance. Researchers concluded positive relation of product innovation capabilities with performance and the relationship of process innovation and firm performance is mediated by the development of product innovation capabilities. Huang & Liu's (2005) study examines a non-linear relationship of innovation capital and information capital IT with firm performance. Findings reflect the positive effect of innovation capital on firm performance and IT capital has no significant impact on firm performance. But when the interaction between innovation capital and IT capital was considered, they showed positive relation with firm performance.

All these studies have statistically significant results ($p < .05$) with positive Pearson's correlation coefficient (r) ranging from .08 to .752 as shown in table 1. Although contexts of these studies vary from learning orientation, green innovation, innovation capital, trust and market orientation, however, it convey the message that organizational innovation has a positive relationship with firm performance (Gunday et al. 2011). Thus, the literature exposed above would lead us to formulate the following hypothesis:

H_{4a}: *Product innovation has positive relationship with innovation performance.*

H_{4b}: *Process innovation has positive relationship with innovation performance.*

H_{4c}: *Market innovation has positive relationship with innovation performance.*

H_{4d}: *Organizational innovation has positive relationship with innovation performance.*

2.8. Linkage among Organizational Performance

Robinson (1990) found the positive relationship between innovative performance and marketing performance by inter-relating the product innovation and market share. Product innovation serves as a driving force for marketing performance. The relationship between marketing performance and financial performance has been studied by Szymanski et al. (1993) and found that market share leads towards better business performance. Similarly, Alamdari & Fagan (2005) explored the relationship among production and financial performance. The researchers found that product delivery speed measuring production performance is positively associated with market share measuring market performance of the firm. Anderson, Fornell & Lehmann (1994) examined the relationship among the quality of the product being provided and customer satisfaction. The researchers are of the view point that better quality of the product brings more customer satisfaction which means that product innovation being made leads to innovative performance. The above conceptual studies lead us to formulate the following hypotheses:

H₅: *Innovative performance is positively related to marketing and production performance.*

H₆: *Production performance is positively related to financial and market performance.*

H₇: *Marketing performance is positively related to financial performance.*

Effects of Innovation Types on Firm Performance

Table 1: Research Examining Effects of Innovation Types on Firm Performance			
Study	Examining effects of innovative types on Firm Performance	Sig	correlation
Jiménez-Jiménez & Sanz-Valle (2011)	Organizational innovation has a positive relationship with firm performance.	p	0.34 to 0.54
	Organizational learning relates positively with firm performance.	p	0.38 to 0.41
	Organizational learning relates positively with organizational innovation.	p	0.25 to 0.59
Calantone et al. (2002)	Higher the learning orientation, higher will be the firm innovativeness.	p	0.31 to 0.40
	Higher the learning orientation, higher will be the firm performance.	p	0.18 to 0.45
	Higher firm innovativeness, greater will be the firm performance.	p	0.40
Gopalakrishnan (2000)	More the speed of adoption of innovations more will be the objective financial performance.	p	0.33
Damanpour et al. (2009)	The greater the cumulative adoption of innovation types overtime, the better an organization's performance.	p	0.13
	Consistency in adopting a similar composition of innovation types overtime, will positively affect organizational performance.	p	0.08
Bowen et al. (2010)	Innovation relates positively with future performance.	P	0.16
Subramanian & Nilakanta (1996)	High level of centralization and formalization will be associated with high levels of administrative innovativeness.	p	0.152 to 0.5178
Cingoz & Akdogan (2011)	Expected positive performance outcomes are positively related to innovative behavior.	P	0.489
Sok & O' Cass (2011)	Innovation R-C Complementarity is positively related to innovation-based performance.	p	0.60 to 0.66
Naidoo (2010)	The marketing innovation capability of a small-to-medium manufacturer is positively related to its competitive advantage.	P	0.10 to 0.24
	The competitive advantage of a small-to-medium manufacturer is positively related to its survival.	P	0.31 to 0.43
Baer & Frese (2003)	High level climate for initiative moderates the relationship between process innovation and company performance positively.	P	0.13 to 0.55
Grawe, Chen & Daugherty(2009)	Customer orientation is positively associated with innovation capability.	P	0.276
	Competitor orientation is positively associated with innovation capability.	P	0.186
Wang et al. (2011)	There is a positive relationship between trust and firms innovation performance.	P	0.492

Table 1: Continued			
Lin et al. (2013)	Green product innovation performance is positively associated with firm performance.	P	0.75
Aragon-Correa, Garcia-Morales & Cordon-Pozo(2005)	Organizational learning positively influences firm innovation. Transformational leadership positively influences firm innovation. Firm innovation will positively influence performance.	P P P	0.587 0.387 0.509
Camisón & Villar-López (2012)	The effect of process innovation capabilities on the firm performance is mediated by the development of product innovation capabilities.	P	0.65
Huang & Liu (2005)	The interaction between innovation capital and IT capital has a positive effect on firm performance	P	0.198 to 0.752
Ortt, van der Duin, (2008)	Organizational innovation will have a positive impact on firm performance	P	0.38

3. Research Framework

On the basis of the hypotheses, research framework has been shown in figure 1.

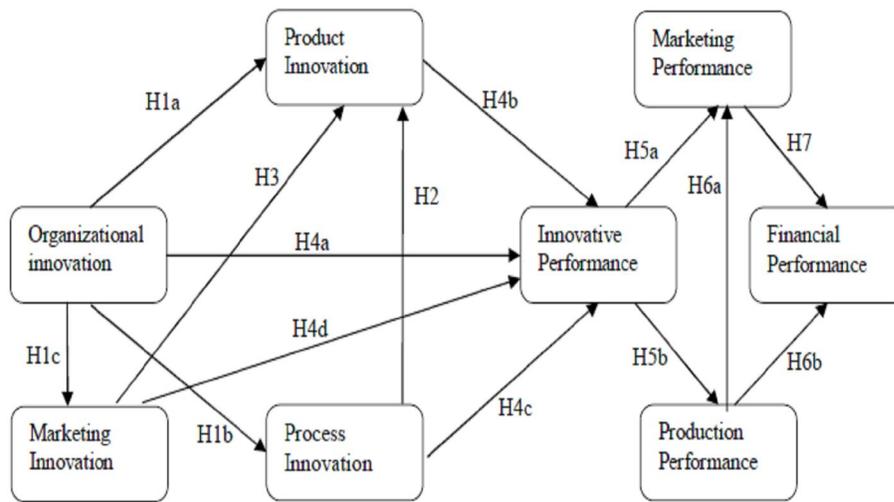


Figure 1: Research Framework

4. Data Collection and Measurement Scales

As this study aims to examine the effects of four types of innovation on four dimensions of firm performance, a survey questionnaire was followed developed by Gunday et al., 2011. The questionnaire consisted of 41 survey questions along with some company

demographic questions. The sample used for data collection included the manufacturing companies listed in Karachi Stock Exchange (KSE) Pakistan and it represented 9 main manufacturing sectors. A total of 250 manufacturing companies were selected from 9 manufacturing sectors. The companies from each sector were selected according to their proportion in total manufacturing firms listed in KSE. Hence the sample drawn is the true representative of each of nine sectors.

The questions represented four types of innovation (product, process, marketing & organizational) and four dimensions of organizational performance (innovative, market, production & financial). All the questions are shown to be reliable and valid in the previous research of Gunday et al. 2011.

The questionnaires were filled by marketing, production, R&D and general management executives working presently in KSE listed companies. 160 questionnaires out of 250 came back filled. Thus the response rate was found to be 64%. 10 out of 160 questionnaires were improperly filled thus excluded from further consideration. In this way actual response rate came out to be 60% which is sufficient for such kind of research.

The findings of Gunday et al. (2011) reflect the following factor solutions and reliabilities: Organizational innovation (9 items, alpha 0.896), marketing innovation (5 items, alpha 0.748), process innovation (5 items, alpha 0.89), product innovation (5 items, alpha 0.758), financial performance (4 items, alpha 0.930), innovative performance (6 items, alpha 0.816), production performance (4 items, alpha 0.711) and market performance (3 items, alpha 0.766).

In this study, with the help of SPSS version 17 (factor and reliability analysis), factor loadings and Chronbach's alpha of innovation types and dimensions of organizational performance have been produced individually and are shown in table 2. Product innovation containing 5 items showing Chronbach's alpha of 0.718. Total variance explained is 48.264% and Kaiser-Meyer-Olkin (KMO) stands to be 0.627. Process innovation containing 5 items explained 46.151% of total variance and alpha stood to be at 0.705. Moreover, the KMO for process innovation turned to be at 0.729. Marketing innovation having 4 items explained 58.225% variance while the KMO and alpha remained at 0.653 and 0.752 respectively. Finally, organizational innovation contained 9 items and explained 42.396% variance. KMO remained at 0.806 and alpha stood to be at 0.829.

Similarly Innovative performance with 7 items and alpha of 0.821 explained 48.88% variance and KMO of 0.776 respectively. Production performance with four items explained 53.326% variance and KMO remained at 0.628. Further, the Chronbach's alpha remained at 0.690. Market performance has 3 items with Chronbach's alpha of 0.757 and explained 68.478% total variance. KMO for market performance remained 0.606. In the end, financial performance had 4 items explaining 59.04% with KMO and alpha of 0.710 and 0.765 respectively.

Thus, Chronbach's alpha values for innovation types ranges from 0.705 to 0.829 and for dimensions of performance it ranges from 0.710 to 0.82 i.e. greater than 0.70 which is considered as reliable (Nunnally, 1978; Hair et al. 1998; Streiner, 2003). In the same way, factor loadings of most of the items relating to innovation types and dimensions of

performance ranges from 0.53 to 0.88 i.e. greater than the minimum acceptable level of 0.52 showing validity of the measures (Stevens, 1996).

Table 2: Factor Analysis and Alpha Values of Innovation Types and Firm Performance		
Factor & Items	Factor Loads	Alpha if item deleted
Factor 1: product innovations (KMO=.627, Variance explained=48.264%, Alpha=.718)		
Increasing manufacturing quality in components and materials of current products.	.568	.709
Decreasing manufacturing cost in components and materials of current products.	.493	.725
Developing newness for current products leading to improved ease of use for customers and to improved customer satisfaction.	.634	.699
Developing new products with technical specifications and functionalities totally differing from the current ones.	.873	.574
Developing new products with components and materials totally differing from current ones.	.826	.617
Factor 2: process innovations(KMO=.729, Variance explained=46.151%, Alpha=.705)		
Determining and eliminating non-value adding activities in production processes.	.586	.687
Decreasing variable cost components in manufacturing processes, techniques, machinery and software.	.588	.690
Increasing output quality in manufacturing processes, techniques, machinery and software.	.732	.631
Determining and eliminating non-value adding activities in delivery related processes.	.693	.654
Decreasing variable cost and/or increasing delivery related logistics processes.	.776	.608
Factor 3: marketing innovations(KMO=.653, Variance explained=58.225%, Alpha=.752)		
Renewing the design of the current and/or new products through changes such as in appearance, packaging, shape and volume without changing their basic technical and functional features.	.523	.795
Renewing the distribution channels without changing the logistics processes related to the delivery of the product.	.789	.667
Renewing the product promotion techniques employed for the promotion of current and/or new products.	.802	.687
Renewing the product pricing techniques employed for the pricing of the current and/or new products.	.888	.597

Effects of Innovation Types on Firm Performance

Table 2: Continued		
Factor 4: organizational innovations(KMO=.806, Variance explained=42.396%, Alpha=.829)		
Renewing the routines, procedures and processes employed to execute the firm activities in innovative manner.	.633	.815
Renewing the supply chain management systems.	.741	.799
Renewing the production and quality management systems.	.652	.811
Renewing the human resources management systems.	.553	.822
Renewing the in-firm management information system and information sharing practice.	.662	.811
Renewing the organization structure to facilitate coordination between different functions like marketing and manufacturing.	.701	.805
Renewing the organization structure to facilitate teamwork.	.636	.814
Renewing the organization structure to facilitate project type organization.	.620	.815
Renewing the organization structure to facilitate strategic partnerships and long-term business collaborations.	.646	.812
Factor 5: innovative performance(KMO=.776, Variance explained=48.885%, Alpha=.821)		
Ability to introduce new products and services to the market before competitors.	.722	.795
Percentage of new products in the existing product portfolio.	.743	.789
Number of new product and service projects.	.750	.789
Innovations introduced for work processes and methods.	.834	.768
Quality of new products and services introduced.	.695	.799
Number of innovations under intellectual property protection.	.581	.814
Renewing the administrative system and the mind set in line with firm's environment.	.517	.820
Factor 6: production performance(KMO=.631, Variance explained=54.420%, Alpha=.710)		
Conformance quality.	.755	.613
Production cost.	.645	.708
Production (volume) flexibility.	.794	.616
Production and delivery speed.	.748	.656
Factor 7: market performance (KMO=.606, Variance explained=68.478%, Alpha=.757)		
Customer satisfaction.	.680	.854
Total sales.	.908	.526
Market share	.877	.613
Factor 8: financial performance (KMO=.710, Variance explained=59.044%, Alpha=.765)		
Return on sales.	.714	.747
Return on assets.	.698	.752
General profitability of the firm.	.844	.648
Cash flow excluding investments	.808	.682

5. Results

5.1. Correlation

As already discussed in the theoretical part that the basic aim of this study is to examine the relationship among innovation types and firm performance; table 3, therefore, presents correlation matrix along with mean and standard deviation of study variables. The significant correlation results show (**correlation is significant at the 0.01) that each type of innovation is significantly correlated with each dimension of performance confirming initially all the hypotheses of this study.

Table 3: Variables and Correlation Matrix

Number	Mean	S.D	Prod Inno	Proc Inno	Mkt Inno	Org Inno	Inno Prf	Prod Prf	Mkt Prf	Fin Prf
Prod Inno	4.2107	.4814	1	.317**	.785**	.296**	.416**	.375**	.734**	.332**
Proc Inno	4.1213	.5517	-	1	.401**	.568**	.542**	.493**	.222**	.367**
Mkt Inno	4.1683	.6106	-	-	1	.454**	.468**	.359**	.704**	.480**
Org Inno	3.8948	.5554	-	-	-	1	.622**	.466**	.248**	.574**
Inno Prf	4.1086	.5677	-	-	-	-	1	.884**	.252**	.542**
Prod Prf	4.1633	.5124	-	-	-	-	-	1	.258**	.459**
Mkt Prf	4.1289	.6390	-	-	-	-	-	-	1	.372**
Fin Prf	3.7700	.7191	-	-	-	-	-	-	-	1

Note 1: **Correlation is significant at the 0.01 level (2-tailed)

Note 2: Prod Inno= Product Innovation; Proc Inno= Process Innovation; Mkt Inno= Marketing Innovation; Org Inno= Organizational Innovation; Inno Prf= Innovative Performance; Prod Prf= Production Performance; Mkt Prf= Marketing Performance; Fin Prf= Financial performance

5.2. Regression Analysis

Linear regression analysis has been carried out to analyze the effects of four dimensions of innovation on four dimensions of organizational performance. There are some major findings of regression analysis for each hypothesis of the study:

First, although, organizational innovation has significant positive effect on product, process and marketing innovation; however, its impact on process innovation is greater as compared to the other innovation types. The significant adjusted R² values as shown in Table 4 depict that organizational innovation explained 31.8%, 20%, and 8.2% of the variance in process innovation, market innovation, and product innovation respectively. Moreover, standardized coefficient β and T values are also significant ($p < 0.005$). Hence, H₁ is supported.

Second, process innovation has significant positive effect on products innovation. The significant adjusted R² value in Table 4 shows that process innovation explained 9.5% of the variance in product innovation. Furthermore, standardized coefficient β and T values are also significant ($p < 0.005$). Hence H₂ is confirmed.

Third, marketing innovation has significant positive impact on product innovation. The significant adjusted R² value as shown in Table 4 reflects that marketing innovation explained 61.3% of the variance in product innovation. Moreover, standardized coefficient β and T values are also significant ($p < 0.005$) which confirms H₃.

Effects of Innovation Types on Firm Performance

Fourth, although, all types of innovation have positive significant impact on innovative performance; however, impact of organizational innovation on innovative performance is greater as compared to the other innovation types. The significant adjusted R^2 values as shown in Table 4 depict that organizational innovation, process innovation, marketing innovation and product innovation respectively explained 38.7%, 28.9%, 21.4% & 17.3% of the variance in innovative performance. Furthermore, standardized coefficient β and T values are also significant ($p < 0.005$). Hence, H_4 is supported.

Fifth, innovative performance accounts for major variation in production performance as compared with marketing performance. The significant adjusted R^2 values as shown in Table 4 depict that innovative performance explained 77.9% & 5.7% of the variance in production and market performance respectively. Furthermore, standardized coefficient β and T values are also significant ($p < 0.005$). Hence, H_5 is supported.

Sixth, although, production performance has significant impact on market and financial performance; however, its impact on financial performance is greater as compared to the market performance. Table 4 shows the significant values of adjusted R^2 which depict that production performance explained 20.5% & 6.7% of the variance in financial and market performance. In the same way, standardized coefficient β and T values are also significant ($p < 0.005$). Hence, H_6 is confirmed.

Finally, market performance has significant positive impact on financial performance. Table 4 shows the significant value of adjusted R^2 which depicts that market performance explained 13.2% of the variance in financial performance. In the same way, standardized coefficient β and T values are also significant ($p < 0.005$). Hence, H_7 is confirmed.

Table 4: Regression Analysis

Hypotheses	P	Adj. R^2	β	t
H1 a. Organizational innovation → Product innovation	.000	.082	.296	3.776
H1 b. Organizational innovation → Process innovation.	.000	.318	.568	8.386
H1 c. Organizational innovation → Marketing innovation.	.000	.201	.454	6.195
H2. Process innovation → Product innovation	.000	.095	.317	4.073
H3. Marketing innovation → Product innovation	.000	.613	.785	15.404
H4 a. Organizational innovation → Innovative performance	.000	.387	.622	9.670
H4 b. Product innovation → Innovative performance	.000	.173	.416	5.564
H4 c. Process innovation → Innovative performance	.000	.289	.542	7.852
H4 d. Marketing innovation → Innovative performance	.000	.214	.468	6.446
H5 a. Innovative performance → Market performance.	.002	.057	.252	5.249
H5 b. Innovative performance → Production performance	.000	.779	.884	22.964
H6 a. Production performance → Market performance.	.001	.067	.258	3.250
H6 b. Production performance → Financial performance.	.000	.205	.459	6.283
H7. Market performance → Financial performance.	.000	.132	.372	4.870

6. Conclusion and Discussion

The paper accounts for the study of innovativeness, identifying the relationship among innovation types (product process, marketing and organizational) and dimensions of firm

performance (innovative, market, production and financial) in the manufacturing sector of Pakistan. The sample drawn was 150 companies listed in KSE. The findings of study support the title that higher performance can be achieved better from increased innovativeness in manufacturing firms. All the hypotheses of the study are supported. Four types of innovation also associate with one another. The study found that the effect of organizational innovativeness on process innovation is stronger than on other innovation types, as organizational innovativeness explained a larger proportion of process innovation (31.8%). This study also found that marketing innovation leads to product innovation, while product innovation is essential for process innovation. All four types of innovation have direct association with innovative performance. As compared to other innovation types, organizational innovation explained a larger proportion of innovative performance (38.7%), followed by process, marketing and product innovation (28.9%, 21.4% & 17.3%). Innovative performance in turn explained a larger proportion of production performance (77.9%) than market performance (5.7%). Finally as compared to market performance, production performance has a more significant impact on financial performance explaining 20.5% of its variance. The results of this study are in accordance with many previous researchers. As Hurley & Hult (1998) found that to create an environment which is friendly to innovation and learning, organizational innovation is very essential. Camisón & Villar-López (2012) also concluded that organizational innovativeness leads to financial performance. Similarly Gunday et al. (2011) found the organizational innovativeness to be the strongest driver of innovative performance. Firms stand to benefit from investing in their capacity for product and process innovation (Mol & Birkinshaw 2009). The findings of Damanpour, Walker and Avellaneda (2009) also revealed that distinctive competencies, organizational capabilities and outcomes can be attained with the help of certain innovation types. Overall positive relation between innovation and organizational performance has been identified by Bowen et al. (2010).

The results show that all hypotheses of study are empirically supported.

6.1. Theoretical Implications

The previous researchers examined the relationship between innovation types and firm performance but most of these studies are conceptual (see e.g. Enzing, Batterink, Janszen & Omta, 2011; Walker, 2004; Robinson, 1990). In line with the research work of Gunday et al., (2011), this study provides empirical relationship between innovation types and firm performance. Also, previous studies considered the general innovation and firm performance (Bowen et al., 2009); however, this study further considers four types of innovation and four dimensions of performance. Hence, this study is the empirical evidence of many previous conceptual studies which proposed that innovation types are positively related with firm performance. In addition, this study fills the research gap in this particular area in Pakistan's manufacturing sector.

6.2. Managerial Implications

In order to sustain a competitive edge in today's market, corporate managers have a twofold mission of continuously generating extra value for their customers whilst thriving to cut costs and increase their productivity. To make this mission possible, the results of this study suggest that business leaders of the manufacturing firms should give additional importance to different types of innovations for attaining high organizational

performance. Moreover, the results of this study also suggests that business leaders should: first allocate responsibility down the organization, second recognize their pivotal role in managing or orchestrating innovation engagement themselves and third ensure the organization structure is fully in place to implement well-articulated innovation strategy. Therefore, firms which are empowered with resources to increase their innovation capabilities are more likely to increase their market and production performance. Production and quality, human resources and organizational structures would lead to larger number of new products and service projects. Managers should pay more attention to organizational innovation as it not only significantly relates with other innovation types but also has a stronger positive impact on innovative performance. Innovative performance is the main vehicle to convey the positive effects of innovation types to market, production & financial performance. Market performance in shape of customer satisfaction, sales and market share can be enhanced through innovative performance, hence, it should be given due importance. Findings of this study support the fact that innovativeness is the only way for a firm to gain a sustainable competitive advantage and to raise its performance (Porter, 1990; Drew, 1997). Product innovation is also crucial as it is the main driver for process innovation which successively heightens the innovative performance. In short, managers should appreciate investments for bringing innovation capability to sustain the competitive advantage and increase the profitability of the firm.

6.3. Limitations and Future Research

The limitations of this study would become the focus of future studies. Innovation and innovative performance in organizations vary with sector to sector (Damanpour, 1996; Vega-Jurado et al, 2008). Furthermore, Evangelista et al. (1997) stated that organizational innovation not only varies with sector but also with size of the firm which is overseen in this present research. Therefore, there is a need of comparative research on the basis of size and sector. Secondly, there is a significant role of environment on the innovation adoption (Olavarrieta & Friedmann, 2008; Calantone et al, 2003) which is not considered in this present research and finally there is a need for future research considering the cross cultural differences.

REFERENCES

- Adner, R., & Levinthal, D. (2001). Demand heterogeneity and technology evolution: Implications for product and process innovation. *Management Science*, 47(5), 611-628.
- Alamdari, F., & Fagan, S. (2005). Impact of the adherence to the original low-cost model on the profitability of low-cost airlines. *Transport Reviews*, 25(3), 377-392.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39(5), 1154-1184.
- Anderson, E. W., Fornell, C., & Lehmann, D. R. (1994). Customer satisfaction, market share, and profitability: findings from Sweden. *The Journal of Marketing*, 58(3), 53-66.

- Ar, I. M., & Baki, B. (2011). Antecedents and performance impacts of product versus process innovation: Empirical evidence from SMEs located in Turkish science and technology parks. *European Journal of Innovation Management*, 14(2), 172-206.
- Aragon-Correa, J. A., Garcia-Morales, V. J., & Cordon-Pozo, E. (2007). Leadership and organizational learning's role on innovation and performance: Lessons from Spain. *Industrial Marketing Management*, 36(3), 349-359.
- Atuahene-Gima, K. (1996). Market orientation and innovation. *Journal of Business Research*, 35(2), 93-103.
- Baer, M., & Frese, M. (2003). Innovation is not enough: climates for initiative and psychological safety, process innovations, and firm performance. *Journal of Organizational Behavior*, 24(1), 45-68.
- Bowen, F. E., Rostami, M., & Steel, P. (2010). Timing is everything: A meta-analysis of the relationships between organizational performance and innovation. *Journal of Business Research*, 63(11), 1179-1185.
- Calantone, R., Garcia, R., & Dröge, C. (2003). The effects of environmental turbulence on new product development strategy planning. *Journal of Product Innovation Management*, 20(2), 90-103.
- Calantone, R. J., Cavusgil, S. T., & Zhao, Y. (2002). Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, 31(6), 515-524.
- Camisón-Zornoza, C., Lapiedra-Alcamí, R., Segarra-Ciprés, M., & Boronat-Navarro, M. (2004). A meta-analysis of innovation and organizational size. *Organization Studies*, 25(3), 331-361.
- Camisón, C., & Villar-López, A. (2012). Organizational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of Business Research* [article in press].
- Chen, Y. (2006). Marketing innovation. *Journal of Economics & Management Strategy*, 15(1), 101-123.
- Cingöz, A., & Akdoğan, A. A. (2011). An empirical examination of performance and image outcome expectation as determinants of innovative behavior in the workplace. *Procedia-Social and Behavioral Sciences*, 24, 847-853.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1) 128-152.
- Damanpor, F. (1996). Bureaucracy and innovation revisited: effects of contingency factors, industrial sectors, and innovation characteristics. *The Journal of High Technology Management Research*, 7(2), 149-173.
- Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, 34(3), 555-590.
- Damanpour, F., & Evan, W. M. (1984). Organizational innovation and performance: the problem of organizational lag. *Administrative Science Quarterly*, 29(3), 392-409.
- Damanpour, F., & Gopalakrishnan, S. (2001). The dynamics of the adoption of product and process innovations in organizations. *Journal of Management Studies*, 38(1), 45-65.

- Damanpour, F., Walker, R. M., & Avellaneda, C. N. (2009). Combinative effects of innovation types and organizational performance: A longitudinal study of service organizations. *Journal of Management Studies*, 46(4), 650-675.
- Drew, S. A. W. (1997). From knowledge to action: the impact of benchmarking on organizational performance. *Long Range Planning*, 30(3), 427-441.
- Durantón, G., & Puga, D. (2001). Nursery cities: Urban diversity, process innovation, and the life cycle of products. *American Economic Review*, 91(5), 1454-1477.
- Enzing, C. M., Batterink, M. H., Janszen, F. H. A., & Omta, S. W. F. O. (2011). Where innovation processes make a difference in products' short-and long-term market success. *British Food Journal*, 113(7), 812-837.
- Ettlie, J. E., & Reza, E. M. (1992). Organizational integration and process innovation. *Academy of Management Journal*, 35(4), 795-827.
- Evangelista, R., Perani, G., Rapiti, F., & Archibugi, D. (1997). Nature and impact of innovation in manufacturing industry: some evidence from the Italian innovation survey. *Research Policy*, 26(4-5), 521-536.
- Fagerberg, J., Mowery, D. C., & Nelson, R. R. (2006). *The Oxford handbook of innovation*: Oxford University Press, USA.
- Germain, R. (1996). The role of context and structure in radical and incremental logistics innovation adoption. *Journal of Business Research*, 35(2), 117-127.
- Gopalakrishnan, S. (2000). Unraveling the links between dimensions of innovation and organizational performance. *The Journal of High Technology Management Research*, 11(1), 137-153.
- Grawe, S. J., Chen, H., & Daugherty, P. J. (2009). The relationship between strategic orientation, service innovation, and performance. *International Journal of Physical Distribution & Logistics Management*, 39(4), 282-300.
- Günday, G., Ulusoy, G., Kılıç, K., & Alpkan, L. (2011). Effects of innovation types on firm performance. *International Journal of Production Economics*, 133(2), 662-676.
- Hagedoorn, J., & Cloudt, M. (2003). Measuring innovative performance: is there an advantage in using multiple indicators? *Research policy*, 32(8), 1365-1379.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & William, C. (1998). *Multivariate data analysis*: Upper Saddle River, NJ: Prentice Hall.
- Henderson, R. M., & Clark, K. B. (1990). Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35(1), 9-30.
- Hitt, M. A., Hoskisson, R. E., Ireland, R. D., & Harrison, J. S. (1991). Effects of acquisitions on R&D inputs and outputs. *Academy of Management Journal*, 34(3), 693-706.
- Huang, C. J., & Liu, C. J. (2005). Exploration for the relationship between innovation, IT and performance. *Journal of Intellectual Capital*, 6(2), 237-252.
- Hurley, R. F., & Hult, G. T. M. (1998). Innovation, market orientation, and organizational learning: an integration and empirical examination. *The Journal of Marketing*, 62(3), 42-54.

- Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661-1674.
- Jiménez-Jiménez, D., & Sanz-Valle, R. (2011). Innovation, organizational learning, and performance. *Journal of Business Research*, 64(4), 408-417.
- Lieberman, M. B., & Montgomery, D. B. (1998). First-mover (dis) advantages: Retrospective and link with the resource-based view. *Strategic Management Journal*, 19(12), 1111-1125.
- Lin, C. Y. Y., & Chen, M. Y. C. (2007). Does innovation lead to performance? An empirical study of SMEs in Taiwan. *Management Research News*, 30(2), 115-132.
- Lin, R. J., Tan, K. H., & Yong, G. (2013). Market demand, green product innovation, and firm performance: evidence from Vietnam motorcycle industry. *Journal of Cleaner Production*, 40, 101-107.
- Ministry of Finance, (2012). Economic Survey of Pakistan.
- Mol, M. J., & Birkinshaw, J. (2009). The sources of management innovation: When firms introduce new management practices. *Journal of Business Research*, 62(12), 1269-1280.
- Naidoo, V. (2010). Firm survival through a crisis: The influence of market orientation, marketing innovation and business strategy. *Industrial Marketing Management*, 39(8), 1311-1320.
- Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? *Academy of Management Journal*, 39(5), 1245-1264.
- Nunnally, J.C. (1978). *Psychometric Theory*. McGraw-Hill, New York.
- OECD (2005). *Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*. Paris.
- Olavarrieta, S., & Friedmann, R. (2008). Market orientation, knowledge-related resources and firm performance. *Journal of Business Research*, 61(6), 623-630.
- Olson, E. M., Walker Jr, O. C., & Ruekert, R. W. (1995). Organizing for effective new product development: The moderating role of product innovativeness. *The Journal of Marketing*, 59(1), 48-62.
- Ortt, J. R., & van der Duin, P. A. (2008). The evolution of innovation management towards contextual innovation. *European Journal of Innovation Management*, 11(4), 522-538.
- Polder, M., Leeuwen, G.V., Mohnen, P., & Raymond, W. (2010). *Product, process and organizational innovation: drivers, complementarity and productivity effects*: UNU-MERIT, Maastricht Economic and Social Research and Training Centre on Innovation and Technology.
- Porter, M. E. (1990). *The competitive advantage of nations: with a new introduction*, Free Press, New York.
- Prajogo, D. I. (2006). The relationship between innovation and business performance—a comparative study between manufacturing and service firms. *Knowledge and Process Management*, 13(3), 218-225.

- Roberts, P. W. (1999). Product innovation, product-market competition and persistent profitability in the US pharmaceutical industry. *Strategic Management Journal*, 20(7), 655-670.
- Roberts, P. W., & Amit, R. (2003). The dynamics of innovative activity and competitive advantage: The case of Australian retail banking, 1981 to 1995. *Organization Science*, 14(2), 107-122.
- Robinson, W. T. (1990). Product innovation and start-up business market share performance. *Management Science*, 36(10), 1279-1289.
- Sok, P., & O'Cass, A. (2011). Achieving superior innovation-based performance outcomes in SMEs through innovation resource–capability complementarity. *Industrial Marketing Management*, 40(8), 1285-1293.
- Staropoli, C. (1998). Cooperation in R&D in the pharmaceutical industry--the network as an organizational innovation governing technological innovation. *Technovation*, 18(1), 13-23.
- Stevens, J. (1996). *Applied multivariate statistics for the social science* (3rd ed). Mahwah, NJ: Lawrence Earlbaum Associates.
- Streiner, D. L. (2003). Starting at the beginning: an introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, 80(1), 99-103.
- Subramanian, A., & Nilakanta, S. (1996). Organizational innovativeness: exploring the relationship between organizational determinants of innovation, types of innovations, and measures of organizational performance. *Omega*, 24(6), 631-647.
- Szymanski, D. M., Bharadwaj, S. G., & Varadarajan, P. R. (1993). An analysis of the market share-profitability relationship. *The Journal of Marketing*, 57(3), 1-18.
- Teece, D.J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Thompson, V. A. (1965). Bureaucracy and innovation. *Administrative Science Quarterly*, 10(1), 1-20.
- Vega-Jurado, J., Gutiérrez-Gracia, A., Fernández-de-Lucio, I., & Manjarrés-Henríquez, L. (2008). The effect of external and internal factors on firms' product innovation. *Research Policy*, 37(4), 616-632.
- Walker, R. M. (2004). Innovation and organizational performance: Evidence and a research agenda. *Advanced Institute for Management Research Working Paper*, WP No: 002 - June.
- Walker, R. M. (2008). An empirical evaluation of innovation types and organizational and environmental characteristics: Towards a configuration framework. *Journal of Public Administration Research and Theory*, 18(4), 591-615.
- Wang, L., Yeung, J. H. Y., & Zhang, M. (2011). The impact of trust and contract on innovation performance: The moderating role of environmental uncertainty. *International Journal of Production Economics* 134(1), 114-122.
- Zeng, S. X., Xie, X., & Tam, C. (2010). Relationship between cooperation networks and innovation performance of SMEs. *Technovation*, 30(3), 181-194.