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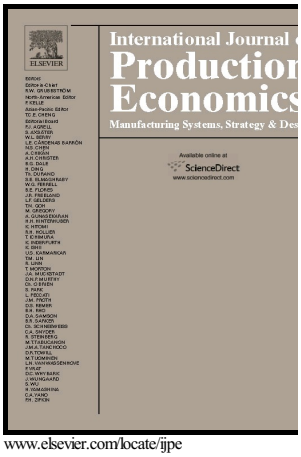

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Daniel I. Prajogo

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The strategic fit between innovation strategies and business environment in delivering business performance

Daniel I. Prajogo

Department of Management, Monash Business School

Monash University, Australia

Email: daniel.prajogo@monash.edu

All correspondence regarding this paper should be addressed to Daniel Prajogo at:

Department of Management

Monash University

PO Box 197, VIC 3141, Australia

Tel: 61 3 9903 2030

Fax: 61 3 9903 2718

Email: daniel.prajogo@monash.edu

Abstract

This paper examines the role business environments (in terms of dynamism and competitiveness) as contingency factors which affect the effectiveness of different types of innovation strategies (in terms of product and process) in delivering business performance. Using the data of 207 manufacturing firms in Australia, this study shows that dynamic environments strengthen the effect of product innovation on business performance. Competitive environments, on the other hand, weaken the effect of product innovation on business performance, but strengthen the effect of process innovation on business performance. Overall, this study demonstrates the strategic fit between dynamism and product innovation strategy as well as between competitiveness and process innovation strategy. On the other hand, competitiveness also shows a strategic mismatch with product innovation. The theoretical and practical implications are discussed.

Keywords: *innovation strategies, business environment, strategic fit, business performance*

Introduction

Most studies on innovation have been focused on understanding how internal organizational factors including top management, human resources, technological capabilities, and organizational culture, affect innovation (Aragón-Correaa et al., 2007; Bhattacharya and Bloch, 2004; Canto and Gonzalez, 1999; Damanpour, 1987; Herzog and Leker, 2010; Murat Ar and Baki, 2011; Oke et al., 2013; Subramanian and Nilakanta, 1996). This is because innovation is seen as an activity that is within the control of a firm which management can control or manipulate. In contrast, less is known about the effect of external factors on innovation. Firm's actions including their innovative activities are contingent upon and are sometimes driven by external factors including customer (market) demand, competitors' actions, or even government's legislations (Caruana et al., 2002; Corrocher and Zirulia, 2010; Tao et al., 2010; Tripsas, 2008; Yalabik and Fairchild, 2011). In this study, we focus on the effect of dynamic and competitive environments on innovation strategies (Lumpkin and Dess, 2001; Tidd et al., 2005).

Innovation itself as a concept is multi-dimensional comprising various types. Product innovation is defined as the development or use of new components, features and technologies to produce new products. Product innovation has attracted a significant amount of attention in the literature (Carranza, 2010; Corsino and Gabriele, 2010; Danneels, 2002; Fintana and Nesta, 2009; Kusiak, 2009; Page, 1993; Verhees and Meulenberg, 2004; Wren et al., 2000), and studies have shown its direct effect on firms' business performance (Bhaskaran, 2006; Calantone et al., 1995; Damanpour and Evan, 1984; Georgellis et al., 2000; Hall and Bagchi-Sen, 2002; Kayhan et al., 2006; Rauch et al., 2009; Wiklund and Shepherd, 2003; Wiklund and Shepherd, 2005). Process innovation is defined as the improvement to production processes technologies required to produce a product. Because process innovation typically occurs within the internal operations of a firm, less is known

about process innovation; its antecedents and consequences, compared to product innovation (Bonanno and Haworth, 1998; Clark and Stoddard, 1996; Kraft, 1990; Reichstein and Salter, 2006; Weiss, 2003). Despite the fact that both product and process innovation have a positive effect on business performance (Prajogo and Ahmed, 2007), the understanding of the external market conditions or characteristics under which these two different forms of innovation more or less beneficial is limited.

While innovation studies have shown the effectiveness of innovation as a competitive strategy, they also suggest that such effectiveness is influenced by the environmental context in which the firm operates and competes (Barney, 2001; Jansen et al., 2006; Katila and Shane, 2005; Tsai and Yang, 2013). This is because the innovation strategies which are effective in improving performance in certain environments may not be as effective in other environments. As a result, managers must seek the fit between firms' innovation strategies and the conditions of its environment as external environment can moderate the relationship between firms' innovation strategies and their performance. In other words, the return generated from innovation is the result of the interaction between business environment and firms' innovation strategies and capabilities (Kerin et al., 1992). However, so far not many studies have been focused on examining the moderating effect of business environment on the impact of innovation strategies on firms' performance (Zahra, 1996). Therefore, the primary objective of this study is to examine the moderating roles of dynamic and competitive environments on the effectiveness of product and process innovation in delivering business performance.

Several past studies on innovation have shown the driving roles of dynamic and competitive environments on both product and process innovation, thus, treating business environments as antecedents of innovation strategies (see for example, Damanpour (2010); Jayaram et al. (2014); Ozsomer et al. (1997)). This study is different from the previous ones

in terms of positioning business environment and innovation strategies as it considers business environment as the contextual or moderating variables of innovation strategies which influence the effect of the innovation strategies on business performance. This is because while we agree with the notion that business environment could drive strategies; however, from a strategic choice perspective, firms still can choose the particular strategies they want to implement apart from the business environment wherein they operate. As such, firms can exercise their strategic choice in pursuing specific strategies regardless the business environments where they operate. The question asked, therefore, is whether firms' strategic choice will be effective in delivering business performance considering the external context of the firms (i.e. business environment), and this study seeks to address this question with respect to product and process innovation strategies. Specifically, this study addresses the questions how effective product and process innovation strategies in delivering business performance in different levels of dynamism and competitiveness of the environment where firms operate.

Theoretical background, hypotheses, and research framework

Product and process innovation strategies

Since Schumpeter's (1934) concept on "creative destruction", innovation has been recognized as one of the effective competitive strategies in business markets today; indeed, it is considered as a viral strategy not only for building competitive advantage but also sustaining it (Tidd, 2001). Innovation strategies can be defined as successful implementation of creative ideas within organizations which deliver values to customers (Hurley and Hult, 1998). In the light of Resource Based Theory (RBT), successful innovation strategies could deliver superior performance as innovation delivers value to customers, different from competitors (rare) and difficult to be imitated, and cannot be substituted (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984). A number of studies have used RBT as a theoretical lens in

showing the competitive value of innovation strategies in terms of business performance (Cheng et al., 2014; Terziovski, 2010; Wang, 2014).

As mentioned earlier, innovation can be implemented in different forms, and this study considers two major types of innovation: product innovation and process innovation. These two types of innovation have dominated most discussions and empirical studies on innovation since they have significant strategic values in delivering competitive advantage for organizations (Abernathy and Clark, 1988; Ettlie et al., 1984; Goedhuys and Veugelers, 2012; Huiban and Bouhsina, 1998; Jiang et al., 2013; Kraft, 1990; Shu et al., 2012; Tidd et al., 2005; Tushman and Nadler, 1986). The categorization of innovation dimensions as product and process is also important because it relates to the specific organization strategy that a firm adopts to respond to market demand and opportunities by capitalizing on organizational capability and competence. Managers often encounter strategic choice problems where they have to choose between advancing knowledge or technology and embodying them in new products or pursuing higher return by exploiting the return of current products by more efficient production system. This problem stems from the choice between product and process innovation which is driven by the competitive environment where firms operate (Filipini and Martini, 2010).

Generally product innovation draws a greater attention in the studies of innovation than process innovation; most probably because it is considered as more visible to customers and have a potential of opening of new markets, especially in manufacturing sectors. In essence, product innovation offers customers with various values other than the “newness” or “novelty” itself. New products could improve sales because they have a better performance (e.g. reliability or durability), better features (e.g. integrated facilities), others (including aesthetic) compared to the existing products offered by competitors in the market (Xin et al.,

2010). One aspect of competitive advantage of product innovation is that customers can see the values relatively clear which could drive them into the purchasing decision.

H1: Product innovation strategy has a positive relationship with business performance

While product innovations offer strategic advantages in the marketplace, process innovations are equally important sources of competitive and strategic advantages. Indeed, process innovations have an advantage over product innovations since they are often hidden internally within organizations which make them difficult to be imitated by competitors (Maine et al., 2012). Therefore, firms that are focused on process innovations in their strategies may not be aggressive in developing new products to the markets. Instead, they may compete in established (mature) markets where the state of the arts of the products are already well established, and the primary focus of the strategies is to make and deliver products (which could be similar to competitors) to customers in higher values, such as faster, more flexible, or cheaper (Congden and Schroeder, 1996; Ittner and Larcker, 1997; Klingenberg et al., 2013; Schroeder, 1990). Furthermore, firms can employ process innovations (in the form of new process technology) as a strategic scheme to increase entry barriers for competitors; hence, protecting the firms' markets advantage (Porter, 1985). These values could also be easily communicated and promoted to customers to affect their purchasing decisions. By and large, both product and process innovation can be used as competitive strategies to offer customers with greater values, hence, improving firms' business performance. Accordingly, we hypothesise:

H2: Process innovation strategy has a positive relationship with business performance

Environmental Dynamism and Competitiveness as Contingent Factors

The characteristics of business environment have been conceptualized in many ways, but most of them can be rooted back to the work by Dess and Beard (1984). In this study, we

focus on two environmental constructs which have been commonly examined in the past studies of innovation: dynamism and competitiveness (Covin and Slevin, 1989; Khandwalla., 1977; Ozsomer et al., 1997; Ward et al., 1995; Zahra, 1996). As we have noted, dynamic environments are characterized by constant rate of change and flux that open up opportunities and market niches. In such environments, firms will strive to innovate in products to satisfy changing customer preferences and secure competitive advantage (Lumpkin and Dess, 2001). In contrast, competitive or hostile environments represent the degree of threat to firms caused by fragmented and intense competition due to scarce resources and tighter profit margins. Firms operating in this kind of environments commonly put more attention to the conservation of resources and focused more on economical competitive strategies (Miller and Friesen, 1983).

Business environment has been recognized as one of the contingency factors in strategic management research as the universal relevance of competitive strategies has been replaced by contingency view in determining the effectiveness of the strategies (Hambrick and Lei, 1985; Miller and Friesen, 1983; Venkatraman and Prescott, 1990). For example, Miller (1988) in examining the contingency view of Porter's generic strategies suggested that differentiation strategies would fit better to dynamic or growing environments while cost leadership strategies would be more suitable for mature or stable environments. In assessing the role of business environment as a contingency factor (moderator), this study takes contingency theory of organizations as the theoretical lens (Donaldson, 2001) which suggests that firms' strategies or capabilities must be aligned with the characteristics of the environment in which it operates in order to deliver competitive advantage (Donaldson, 2001; Lawrence and Lorsch, 1967; Powell, 1992). Literature on RBT also supports the contingency theory and suggests that the effectiveness of firms' strategies and capabilities is influenced by

the characteristics of industries and markets where the firms operate (Barney, 2001; Priem and Butler, 2001).

This contingency theory is also applied to the case of innovation strategies in the sense that to what extent innovation strategies will flourish depend on the conditions of business environment where they are implemented. For example, Calantone (1994) argues that to be effective, innovating firms should define their strategic posture (aggressive versus passive) in contingent to their competitive environment. Past studies have shown that the effectiveness of a strategic orientation (including innovativeness) depends on environmental factors (Cao et al., 2011; Lumpkin and Dess, 2001). For example, the study by Auh and Menguc (2005) shows that the level of competitiveness of business environment moderates the effectiveness of innovation orientations in predicting firms' effectiveness and efficiency performance. Similarly, the study by Lumpkin and Dess (2001) demonstrates how different aspects of entrepreneurial orientation has different impact on firms' performance in different types of environments. The study by Jansen et al. (2006) shows the moderating effect of environmental dynamism and competitiveness on the relationship between different types of service innovation orientation (exploratory and exploitative) and financial performance. Despite these handful studies, little is known about the moderating roles of external environmental factors on the effectiveness of a firm's product and process innovation strategies in terms of their effect on business performance. This issue is worth considering as the relationship between the characteristics of business environment (including competition) and innovation strategies (in general) could be different when product and process innovations are treated separately (Santos, 2009). As such, this study does not consider innovation as a single construct; rather it is multidimensional (i.e. product and process) based on the notion that each of the dimensions, while related, has distinctive characteristics which would fit (and be effective) to different environments.

Literature has recognized that more dynamic business environments creates a driving force for innovations (Baron and Tang, 2011; Freel, 2005; Huse et al., 2005; Lee, 2011; Miller and Friesen, 1982; Wang and Chen, 2010). This is because in such environments customer tastes or preferences change quickly, and firms need to respond by offering product innovations which fit to the new needs of the market (Tidd, 2001; Tripsas, 2008). Such products are typically superior in the sense that they are capable of generating rent and capturing market share (Levinthal and March, 1993; Lewin et al., 1999; Miller and Friesen, 1983). The combination of rapid technological changes and knowledge diffusion in dynamic environments not only drive firms to invest in their innovative capabilities (including R&D) but also strengthens their competitive position which results in profitability and market share gain (Zahra and Bogner, 1999). Therefore, more volatile and dynamic environment would reward the need for firms to produce winning products that are capable of impacting the firms' business performance compared to less volatile and dynamic environments. Accordingly, we hypothesise:

H3: Environmental dynamism positively moderates the relationship between product innovation and business performance such that the higher the dynamism the stronger the relationship between product innovation and business performance.

Similarly, dynamic environments also propel firms to conduct process innovations. One of the reasons is that product innovations commonly require process innovations as firms need to adopt new methods or technologies to develop new products in response to changing demands in dynamic environments (Daim, 2013). In other words, product innovations would naturally drive process innovations. For example, new product developments would need innovations in process technology or new ways of producing and delivering the products faster to seize emerging new markets (Lumpkin and Dess, 2001; Miller and Friesen, 1983). Furthermore, in highly dynamic environments firms need all kinds of strategies, particularly

innovative strategies that can positively impact their business performance and give them an increased financial leverage to compete more effectively in such environments. For example, new technologies and processes contribute towards financial leverage and business performance through higher quality products and improved speed of product delivery (Huse et al., 2005). Thus, highly dynamic environments are more likely to goad firms to innovate more in impactful and rent generating process innovations compared to environments with low dynamism. Taken together, we propose to test the following hypotheses.

H4: Environmental dynamism positively moderates the relationship between process innovation and business performance such that the higher the dynamism the stronger the relationship between process innovation and business performance.

Literature has noted that highly competitive environments will cause difficulties for firms to compete on the basis of product innovation as a result of high number of firms offering similar products competing in the markets (Zahra and Bogner, 1999). The difficulties in differentiating the products from the competitors' require greater efforts and resources to develop new products as customers have become experienced and knowledgeable on their expectations from the products offered in markets. This results in high costs of creating the differentiation values, and, consequently, firms might not gain significant profits from new products innovation (Iansiti, 1998). On top of this, competitors would be able to easily match the new products, thus, further eroding the profits expected from the new products (Porter, 1980). Therefore, competitive environments where price war is dominant will not reward product innovation strategies; indeed, they may hurt the return of investment in this strategy (Buzzell and Gale, 1987). In support, Miller and Friesen (1983) argue that strong emphasis on product innovation can be perilous when the competitiveness of the market intensifies. The implication is that although product innovation is related to improved business performance, in highly competitive environments (markets), less rent can be generated from

product innovation due to competitors' matching (Levinthal and March, 1993). Accordingly, we offer the following hypothesis:

H5: Environmental competitiveness moderates the relationship between product innovation and business performance such that the higher the competitiveness the weaker the relationship between product innovation and business performance.

As mentioned above, competitive environments are often characterized with price war where the combination of tight profit margins and cash flows are dominant. The price war is caused by the fact that customers are no longer able to determine significant qualitative differences among competing products and, therefore, emphasise prices in their purchasing decisions. In this situation, firms' strategic responses will typically be focused on reducing costs (so as to offer lower prices to customers). In addition, tight cash flows in competitive environments also force firms to be more focused on conserving their limited financial resources. As a result, competitions on costs which comes from process innovation would be more dominant than competitions on product innovations (Covin et al., 1999). This is because such innovations are typically hidden from competitors and through them firms are able to achieve financial conservation that may be vital to survival and offering of highly competitively priced products in such environments (Friar, 1995; Hambrick, 1983; Zahra and Covin, 1993). From product or technological life cycle perspective (Klepper, 1996) (Utterback and Abernathy, 1975), in a mature industry, larger firms have greater incentives by focusing on process innovations to serve the existing customer base. This is because the value of process innovation is increasing proportionally to the volume of the outputs produced by the firm (based on economies of scale). In addition, process innovations can positively affect business performance through cost savings in production technology and processes (Crespi and Pianta, 2008). Therefore, the effectiveness of process innovation in

terms of its effect on business performance increases in more competitive environments. Taken together, we posit the following hypothesis:

H6: Environmental competitiveness moderates the relationship between process innovation and business performance such that the higher the competitiveness the stronger the relationship between process innovation and business performance.

In terms of conceptual framework, this study adopts the concept of "fit as moderation" proposed by Venkatraman (1989a). This concept is based on the contingency perspective whose the premise suggests that no strategy is universally superior regardless the environmental or organizational context. As mentioned earlier, the general axiom held in strategic management research suggests that no strategy is universally superior; thus, researchers have used a contingency perspective which is operationalized in a moderation (interaction) relationship models. The contingency perspective has an underlying theory which suggests that "the impact of the predictor (e.g., strategy) varies across the different levels of the moderator (e.g., environments). In this regard, the fit between the predictor (i.e. strategy) and the moderator (i.e. environment) determines the criterion variable (i.e. performance) as the moderator will affect the direction or the strength of the relation between the strategy and performance" (Venkatraman, 1989a, p. 424). The research model and the hypotheses tested in this study are presented in Figure 1 below.

Insert Figure 1 about here

Methods

Sample and procedures

This cross-sectional study is based on mailed survey of a sample of Australian manufacturing firms which cover various sectors, including food, electronics, wood, textiles, plastics, metal, and pharmaceutical. In administering the mail survey, we explained clearly in

the cover letter of the survey that the questionnaire should be directed to middle and senior managers who have primary responsibilities on strategic operations of the firms. Out of 1,000 surveys that were mailed out, 207 usable responses were received, accounting for 20.7% response rate.

Measures

The measures used in this study were all based on those used in previous studies on similar topics in order to ensure their content validity. The details of the measures used in this paper are presented in Table 1. The measures of uncertainty (dynamism) and hostility (competitiveness) were derived from the study by Jansen et al. (2006). The scale for environmental dynamism comprises five items which reflect continuous and significant changes in the market as well as customers' demands or new products. The measure for environmental competitiveness comprises four items and reflects the intensity of competition in the market brought by strong competitors with one of the hallmarks being price war.

The scales for product innovation and process innovation strategies were derived from Prajogo and Sohal (2006), Gunday et al., (2011), and Akgün et al. (2009). Specifically, we measure the extent to which the innovation strategy is implemented in the organizations through certain innovative practices. For product innovation strategies, we measure the implementation of these strategies in terms of new materials, new components, new technologies, and new features which are embedded in the new products. Similarly, we measure process innovation strategies by measuring the implementation of these strategies in terms of the degree of improvements of reliability and efficiency in the production process, including the use of advanced technologies which are ahead of competitors.

The business performance scale comprises of three items: sales, profit, and market share, based on previous studies on operations strategies and performance (da Silveira, 2005; Li et

al., 2006; Ward and Duray, 2000; Yamin et al., 1997). Respondents were asked to provide their perceived rating of the three performance measures of their firm relative to the industry average. Past studies have shown that that the use of perceptual measure for performance still has an acceptable degree of consistency when compared to objective performance or external secondary data (Curkovic et al., 2000; Forker et al., 1996; Tan et al., 2002; Tracey et al., 2005).

Results

Scale validity and reliability

Confirmatory factor analysis (CFA) was employed to simultaneously validate the five variables used in this study, and the result is presented in Table 1. The model's fit support the unidimensionality of the constructs and the items' loadings to their respective constructs support the convergent validity for the measures (Bagozzi et al., 1991; Bollen, 1989). The Average Variance Extracted (AVE) values provides further support for convergent validity as the value for each scale is close or above 0.5 recommended by Fornell and Larcker (1981). The result shows that the Cronbach's alphas for the five constructs pass the cut-off point of 0.7. Table 1 presents the results of the validity and reliability tests.

Insert Table 1 about here

Discriminant validity

Discriminant validity was checked by comparing the constrained and unconstrained pairs for the five constructs in this study, following the method suggested by Venkratraman (1989b). The difference of the chi-square values ($\Delta\chi^2$) between the models were calculated, and the $\Delta\chi^2$ values greater than 6.64 support the discriminant validity between the two constructs (Ahire et al., 1996). With the five scales included in this study, ten discriminant tests were run, and the results (as presented in Table 2) show that all tests met the criterion for discriminant validity.

Insert Table 2 about here

Common method bias test

Since the data set was drawn from a single respondent in the organization, we tested the data to ensure that it had no major problem with response-bias. We used Harman's single-factor test by creating a measurement model which loaded all 19 items into one latent factor (Podsakoff and Organ, 1986). The result produced poor fit (χ^2 = 1402.15; df = 168; RMSEA = 0.189), and most items showed poor factor loadings (< 0.5). These results suggest that common method variance was not a significant problem in the data set.

Composite scores

Following the validity and reliability tests, the composite score was generated from the five constructs based on their mean scores (Hair et al., 2006). Since the composite scores will be used for regression analysis, the underlying assumption of normality was checked based on their skewness and kurtosis, and the results show that the values fall within the acceptable range (± 1 and <7, respectively) recommended by Curran et al. (1996).

Bivariate correlations

Pearson's zero order bivariate correlations are performed as a preliminary analysis on the relationship among the variables in this study, and the results are presented in Table 3. Most coefficient correlations (*r*) reflect low to medium values; thus, do not raise major concern on the potential multicollinearity among these variables.

Insert Table 3 about here

Both dynamism and competitiveness show positive correlations with both product and process innovation although the correlation coefficients (*r*) and the significance level (*p-value*) indicate slight differences as dynamism shows a relatively stronger correlation with

product innovation, while competitiveness shows a relatively stronger correlation with process innovation.

Hierarchical moderated regression analysis

A hierarchical moderated regression analysis was run to test the hypotheses, following Venkatraman's (1989a) suggestion that this method is suitable if the model specifies that the performance outcome (business performance) is jointly determined by the interaction of the predictor (innovation strategies) and the moderator (business environment). The result is presented in Table 4. For the baseline model, both product and process innovation show a positive effect on business performance ($\beta = 0.23$ at $p<0.01$; $\beta = 0.20$ at $p<0.01$ respectively). These findings support H1 and H2.

Insert Table 4 about here

The moderating effects of environmental dynamism and competitiveness on product and process innovation were tested by creating the product terms between these variables using their standardized scores. The findings show that environmental dynamism strengthens the relationship between product innovation and business performance ($\beta = 0.18$ at $p<0.05$), but the same is not applied to process innovation ($\beta = -0.07$ at $p>0.05$). Therefore, H3 is supported, but H4 is not supported. Environmental competitiveness, on the other hand, weakens the relationship between product innovation and business performance ($\beta = -0.24$ at $p<0.01$), but strengthens the relationship between process innovation and business performance ($\beta = 0.23$ at $p<0.01$). Therefore, both H5 and H6 are supported. The results of collinearity diagonistic test on the regression model show that the Variance Inflation Factor (VIF) values range between 1.06 and 2.15 (well below 10); thus, confirming the absence of multicollinearity problems in the dataset. The interaction plots of H3, H5, and H6 are presented in the figures below.

Insert Figure 2 about here

Insert Figure 3 about here

Insert Figure 4 about here

Discussion of the findings and conclusions

Our findings show that both product and process innovation are effective sources of competitive advantage (H1 and H2). However, we also find that their effectiveness is influenced by the characteristics of business environment. Our findings show that dynamism positively moderates the link between product innovation and business performance (H3). In other words, the impact of product innovation on business performance is stronger in more dynamic environments than in less dynamic environments. Dynamic environments open up market niches and firms strive to deliver products that can generate rents for the firm by capturing and satisfying customer demand in those niches. Our study reveals that environmental competitiveness positively moderates the link between process innovation and business performance (H6) but negatively moderates the link between product innovation and business performance (H5). In other words, process innovations are more beneficial in high competitive environments than in low competitive environments. Process innovation offers an alternative way of generating rent for firms in highly competitive environments since it enables financial conservation through cost reduction and cannot be easily imitated by competitors. As such firms are likely to put more effort into process innovations in highly competitive environments. In contrast, the effect of product innovation on business performance is weakened in a highly competitive environment suggesting that product innovations are less beneficial in such environments. Due to the preponderance of competition, there are typically many innovative products and substitutes products in highly competitive markets (Huse et al., 2005; Zahra and Bogner, 1999) such that the rent

generating potential of firms' product innovations is weakened. In support, Adner and Levinthal (2001) suggested that generally, in competitive environments, markets are saturated with equal quality of product offerings, and therefore, further innovation on product design would not likely attract new customers, thus limiting rent generating potential of product innovation.

Theoretical implications

Through the lens of contingency theory and RBT, our study underscores the importance of achieving strategic fit or alignment (Hambrick and Lei, 1985; Venkatraman and Prescott, 1990) between business environment and firms' strategies in maximizing business performance in the innovation context. While in the light of RBT, both product and process innovation are shown to be effective strategies in achieving competitive advantage, in highlighting the role of business environment as a moderator, our findings demonstrate the contingency theory which suggests that the effectiveness of firms' strategies in producing competitive advantage is influenced by the organizational context, including the business environment (Ward et al., 1996). By integrating RBT and contingency theory, the competitive values of different innovation strategies in different kinds of environments are appropriated. To the best of our knowledge, this is the first study which empirically examines the strategic fit (match and mismatch) between different characteristics (dynamism and competitiveness) of business environment and different strategies of innovation (product and process).

Managerial implications

Our study also offers some implications for managerial decision making. First, our student demonstrates the effectiveness of both product and process innovation as competitive

strategies in delivering business performance. Therefore, building and integrating both innovation strategies and capabilities would equip firms in facing different kinds of environments, indeed, navigating through the changing conditions of business environments (e.g. due to industry maturity or product life cycle). Secondly, the increasing turbulent business environment means that firms are constantly faced with either dynamic and/or competitive environments. In this regard, our study further highlights the need to emphasize both product and process innovations in dynamic environments as these may be needed to enable the firm to seize market niches that may open up in such environments. Similarly, managers need to emphasize process innovations in competitive environments as they are more protected from competitors' imitations. We found no moderating effect of competitiveness on the relationship between product innovation and business performance. However, rather than taking this finding as a given we argue that in practical terms, managers need not necessarily abandon product innovation activities in competitive environments. This is because "individual firms still perceive opportunities for market share gains to be had by offering consumers better products. Because each firm evaluates its development options with regards to its rival's existing rather than potential product, each firm believes that market share gains will ensue if it offers a better product than was previously available to consumers. As a result, despite the reduction in willingness to pay for improvement on the part of consumers, firms, driven by competitive pressures, engage in significant levels of product innovation" (Adner and Levinthal, 2001, p. 612). The implication of the moderating role of competitiveness on the links between process innovation and business performance is the need to focus on cost effective and rent generating process innovations in highly competitive environments as managers may be left with limited options to achieve competitive advantage in such environments. In contrast, our finding showing that competitive environments negatively moderate the impact of product innovation on business

performance highlights the need for managers to look for ways of making product innovation work for their firms even in highly competitive environments. Finally, the finding that dynamic environment positively moderates the impact of product innovation on business performance highlight the need to for managers to continue to focus on developing new products in dynamic environments to be able to fill the gaps that may open up in such environments and capture the niche market segments.

Limitations and future research direction

Given the research design, this study has a number of limitations which we observe below as well as some recommendations for improvements in future research. First, this study resorted on perceptual measures for measuring product innovation, process innovation, and business performance. While this is still acceptable, future studies can improve this area by using real metric and objective data wherever available. As in the cases of other cross-sectional studies, it is cautious to claim true cause and effect between variables examined in this paper. Therefore, future research should consider the use longitudinal data to improve the findings of the study, especially in capturing the dynamic change in the environment as the industry grows into maturity.

This study is also based on cross-sectoral industries given its position as one of the early studies of this topic. We therefore recommend that future studies be focused on a single industry where the pattern of innovation could be more homogeneous in order to produce sharper understandings and inferences.

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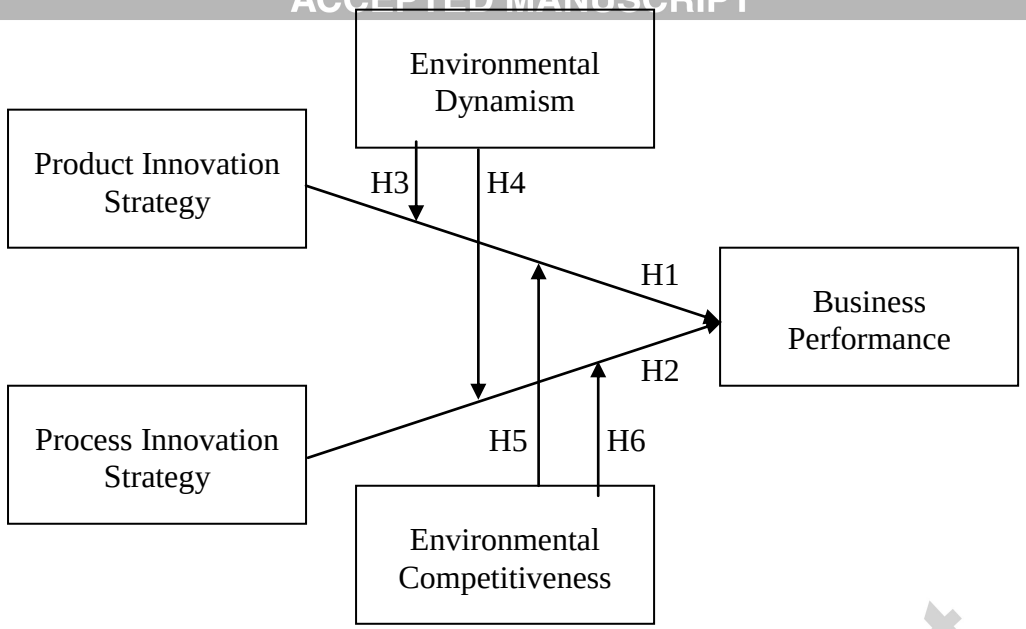

Figure 1 Research Model

Table 1 Scale validity and reliability

Scales	Items	Factor Loading	Cronbach's alpha
Product innovation strategy	We develop or use new components	.74	.85
	We develop or use new materials	.68	(.59)
	We develop or use new technologies in our products	.81	
	We develop or use new product features	.82	
Process innovation strategy	We improve the reliability of our production processes and technologies	.67	.81
	We improve the speed and efficiency of our production processes	.76	(.50)
	We use advanced technologies in our production processes	.63	
	We strive to keep our production processes ahead of competitors	.76	
Environmental dynamism	Environmental changes in our market are intense	.55	.82
	Our clients regularly ask for new products and services	.65	(.49)
	In our market, changes are taking place continuously	.83	
	In a year, our market has changed significantly	.75	
	In our market, the volumes of products and services to be delivered change fast and often	.69	
Environmental competitiveness	Competition in our market is intense	.82	.86
	Our organizational unit has relatively strong competitors	.84	(.64)
	Competition in our market is extremely high	.95	
	Price competition is a hallmark of our market	.54	
Business performance	Sales growth	.69	.75
	Profitability	.72	(.50)
	Market share	.70	

χ^2 = 287.99; df = 158; RMSEA = 0.063; NFI = 0.909; NNFI = 0.943; CFI = 0.952

* The values of Average Variance Extracted (AVE) are in bracket

Table 2 Discriminant validity

Test #	Construct	Unconstrained χ^2_a	Constrained χ^2_b	$\Delta \chi^2_{b-a}$
	Dynamism with			
1	Competitiveness	57.310	394.581	337.271
2	Product innovation strategy	101.963	348.923	246.960
3	Process innovation strategy	133.187	480.468	347.281
4	Business performance	107.385	488.601	381.216
	Competitiveness with			
5	Product innovation strategy	33.254	393.050	359.796
6	Process innovation strategy	84.461	468.857	384.396
7	Business performance	54.354	474.728	420.374
	Product innovation strategy with			
8	Process innovation strategy	109.464	283.139	173.675
9	Business performance	69.763	381.386	311.623
	Process innovation strategy with			
10	Business performance	116.469	419.149	302.680

Table 3 Mean, standard deviation, and bivariate correlations

		Mean	S.D	1	2	3	4
Product innovation	1	4.83	1.13	1.00			
Process innovation	2	5.04	1.07	.48**	1.00		
Environmental dynamism	3	4.87	1.15	.32**	.20*	1.00	
Environmental competitiveness	4	5.63	1.08	.16*	.21**	.28**	1.00
Business performance	5	4.77	1.01	.33**	.31**	.10	-.05

* $p<0.05$ ** $p<0.01$

Table 4 Hierarchical moderated regression analysis

	Business Performance	
Firm Profile		
Size	.04	.06
Innovation		
Product innovation	.23**	.23**
Process innovation	.20**	.26**
Business environment		
Dynamism	-	-.01
Competitiveness	-	-.13
Interaction		
Product innovation × Dynamism	-	.18*
Process innovation × Dynamism	-	-.07
Product innovation × Competitiveness	-	-.24**
Process innovation × Competitiveness	-	.23**
R^2	.14	.22

* p<0.05, ** p<0.01

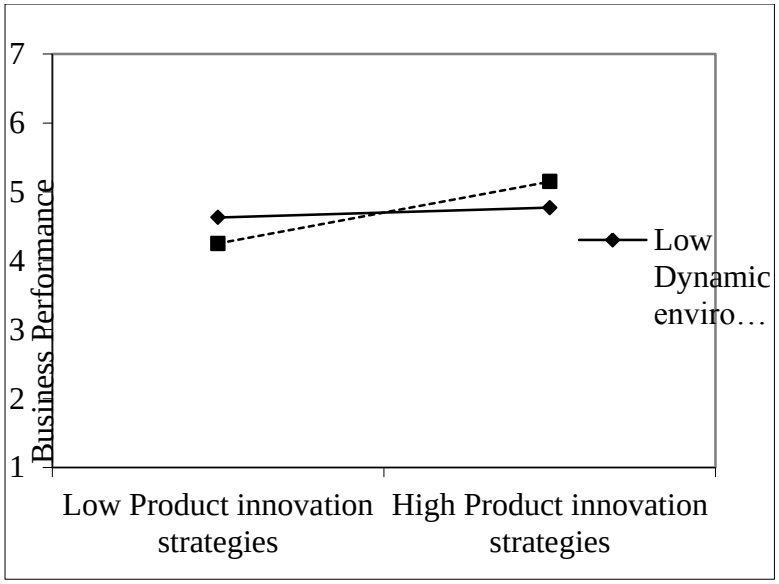

Figure 2 Interaction between product innovation and environmental dynamism

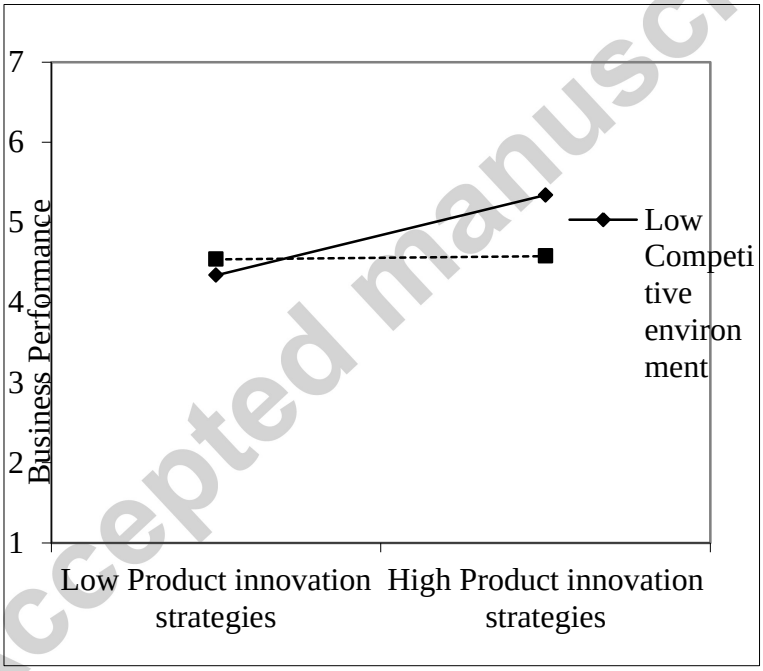

Figure 3 Interaction between product innovation and environmental competitiveness

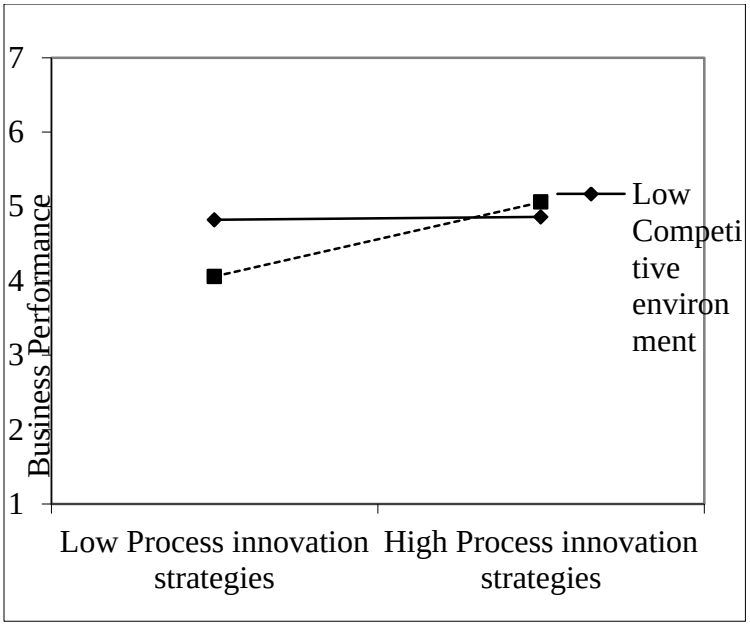

Figure 4 Interaction between process innovation and environmental competitiveness