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Does Innovation Mediate Good Firm Performance?

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Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas

Does Innovation Mediate Good Firm Performance?

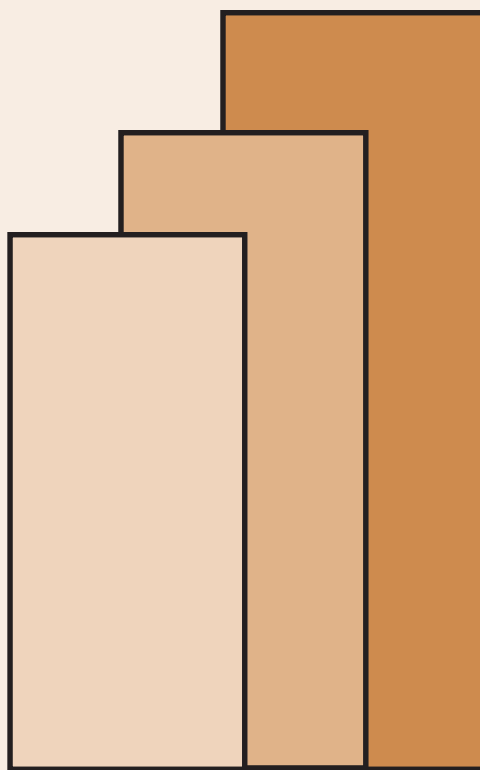
Gilberto M. Llanto and Fatima del Prado

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Does Innovation Mediate Good Firm Performance?

Gilberto M. Llanto and Fatima del Prado¹

Abstract

Private firms invest in physical capital and human resource but they are also advised to invest in innovations to be more productive and profitable. Innovations refer to the development, deployment, and economic utilization of new products, processes, and services. It is important for firms to know whether investment in innovations is investment well-spent. Our empirical results provided an affirmative response to the question raised in this paper: “does innovation mediate good firm performance?” Product and process innovations lead to increase in sales and profits and improve labor productivity. The paper also showed that firm size, age and foreign equity are important factors leading firms to innovate.

Key words: innovation, product innovation, process innovation, firm performance, small and medium enterprises

I. Introduction

It is commonly held that stimulating and expanding private investments are central to the sustained growth of an economy through higher outputs and value addition, and employment generation. Private firms invest in physical capital and human resource but they are also advised to invest in innovations to be more productive and profitable. Innovations refer to the development, deployment, and economic utilization of new products, processes, and services (OECD 1999). It is important for firms to know whether investment in innovations is investment well-spent. We follow the definition of Albert and others (2011) of innovation as activities in a firm involving the implementation of new or significantly improved products or processes (technological innovation), or new marketing or organizational methods (non-technological innovation). We refer to ‘technological innovation’ as product innovation and to ‘non-technological innovation’ as process innovation in this paper.

In designing development agendas, it is natural for policy makers, donors and the stakeholder community to consider the promotion of innovations as a tool to develop the capacity of small and medium enterprises (SMEs) to generate higher value addition and greater job opportunities. In fact, the Blueprint for the ASEAN Economic Community in 2015 has SME development as one its key pillars for integration and inclusive growth. The typical approach of

¹ Philippine Institute for Development Studies. The authors would like to thank Tina Ortiz for invaluable research assistance and ERIA for allowing use of the survey data. The paper was presented at the ADB-Asian Think Tank Development Forum 2014 on “Accelerating Innovation and Inclusion for a Prosperous Asia”, 20-21 November 2014, Seoul, Republic of Korea.

many governments is to provide financing instruments and create institutions that will promote innovations.

Providing access to and financing for innovations could be a significant policy instrument but there is a need for empirical evidence to show whether innovations matter for firm performance, and in particular what type of innovations, that is, product innovation or process innovation provides a positive impact on firm performance. In addition, in designing policies and interventions it is also important to know what factors lead to firm decisions to innovate.

Does innovation mediate good firm performance? This is an interesting question that has caught wide attention in the research community. In a survey of econometric studies of R&D and productivity at the firm level, Mairesse and Sassenou (1991) documented varying estimates of the contribution of R&D to productivity. Research and development (R&D) has been used as an indicator or measure of innovation but they are not really synonymous. Good research and development leads to innovation. Lin and Chen (2007) showed the positive impact of administrative innovation on firm-level profitability². A study in Viet Nam showed that innovations, reflected in terms of (i) 'new products', (ii) 'new product process,' and (iii) 'improvement of existing products', are deemed to be significant and positive determinants of small and medium enterprises' (SMEs) likelihood to export (Anh, N., et al., 2007)³. Hall et al. (2009) demonstrated the positive and statistically significant linkage between SME's innovations and productivity, profitability, and growth.

Vincent and others⁴ showed a close association between the level of profit and innovation for services as well as for manufacturing firms. However, they qualified their own conclusion citing some data limitations that might lead to an overstatement of the impact of innovation. Overall, while it seems that innovation is significantly and positively related to superior firm performance (Vincent and others) a recent review article (Loof and Heshmati (2002) indicated the lack of robustness of reported results. They pointed to the sensitivity of the estimated relationship between innovativeness and firm performance to different types of models, estimation methods, measures of firm performance, classification of firms, type of innovations and data sources.

There is scant research in the Philippines on innovations and firm performance. Albert and others (2011) showed that knowledge management is a good determinant of product innovation,

² Lin, C. and M. Chen [2007] "Does innovation lead to performance? An empirical study of SMEs in Taiwan", a Research paper in *Management Research Review*. Volume 30, Issue No. 2. Emerald Insights Publishing Limited. pp. 115-132.

³ Anh, N., et al. [2007] "Innovation and Export of Vietnam's SME Sector", a paper presented at UNU-MERIT Conference on Microevidence on Innovation in Developing Economies. Vietnam Economic Research Network and IDRC. May 15, 2007.

⁴ Vincent_ Does Innovation Mediate Firm Performance? A Meta-Analysis of Determinants and Consequences of Organizational Innovation https://smartech.gatech.edu/bitstream/handle/1853/10731/gt_tiger_does_innovation.pdf (Accessed March 11, 2014).

process innovation, and being an innovator, in general. Employment size and location in export processing zones also matter significantly for innovation⁵. In their study of a very small sample of 9 automotive firms, Quimba and Rosellon (2011) found that despite having an awareness of the importance of technology and upgrading, some of the automotive firms have not been able to use technology to their advantage. Llanto (2013) provided a descriptive analysis of several government financing and technology/innovation programs that can support innovative small and medium enterprises (SMEs) and outlined a few cases of successful private sector effort on using innovations to improve products and business processes⁶.

A research and policy issue worth investigating is the impact of innovation on the performance of small and medium enterprises (SMEs) but the basic question is whether SMEs innovate. The interest with SME performance is highlighted in the Philippine Development Plan wherein SME growth and development is expected to contribute significantly to economic growth and more importantly, to generate greater employment generation, thereby reducing poverty in the country. As noted in APO (2007) SMEs have the potential to become a powerful engine of manufactured export growth and upgrading in developing Asian countries⁷. By being able to develop and commercialize competitive new products and processes SMEs could significantly contribute to growth and employment (Llanto 2013).

The objectives of the paper are as follows: (a) determine the impact of innovation on firm performance and (b) identify factors that could lead firms to innovate. It is organized as follows. After a brief introduction, we discuss in Section II the survey methodology and the data used in the regression analysis. We report the survey results in Section III and the empirical results in Section IV. We provide concluding remarks in the last section.

II. Data and Survey Methodology

Scope and coverage

The data are survey results of the recently concluded 2013 Survey on Production Processes for Manufacturing Establishments. With technical and financial support from ERIA, PIDS commissioned the National Statistics Office (NSO) to administer the survey to

⁵ Albert, J. R. and others (2011), "Why Some Firms Innovate and Why Others Do Not," PIDS Policy Notes, September.

⁶ Llanto, G.M. "SME Financing for Innovation: Philippines," Paper submitted to the Asian Productivity Organization, Tokyo.

⁷ Asian Productivity Organization. 2007. *Entrepreneurial Development for Competitive Small and Medium Enterprises*. Tokyo: Asian Productivity Organization. More than 90% of enterprises in the Asian Productivity Organization (APO) member countries are small and medium enterprises. They account for about 75% of the Gross Domestic Product, compared to 50% in the rest of the world. They play an important role in economic and social life, and they generate a large number of non-agricultural jobs, exports, sales, and value-added.

manufacturing firms operating in the five (5) provinces of CALABARZON, namely, Cavite, Laguna, Batangas, Rizal and Quezon. Included in the sample are firms with average total employment of 20 workers and over, engaged in one or predominantly one type of economic activity and under single control or ownership. The survey was conducted from January to February 2014.

Sampling design

Sample establishments were systematically drawn, until a proportional allocation from different industries of various sizes within each province was reached. The sampling units are business establishments under the 1-digit level industry code of the 2009 PSIC for manufacturing, which may be organizationally classified as either a single establishment, a branch or an establishment and main office.

Sample size, sample allocation and selection

The sample size is 220⁸ plus a certain percentage for replacement purposes. Sample establishments were determined by proportionally allocating samples among the provinces. This was done by first arranging the establishments within each province according to their 5-digit PSIC classification, their employment size and by business name. Samples were then selected systematically and iteratively until the maximum sample size per province was attained and the required sample sizes were accomplished. In case of closure or non-availability of the respondent, replacement samples were drawn from the remaining establishments. Furthermore, in an effort to create a panel and establish links with the previous years' surveys, respondents from the FY2012 survey were used in the sampling frame.

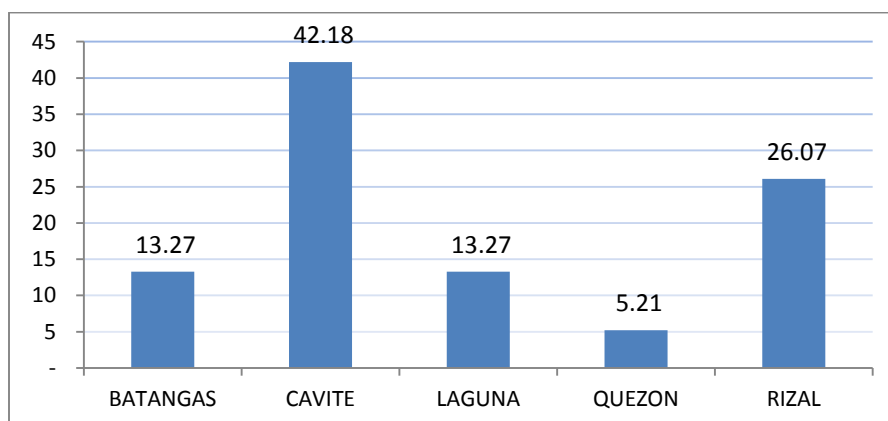
III. Summary of Survey Results

Profile of respondents

A total of 211 firms responded to the survey. **Figure 1** presents the distribution of respondents by area (province in CALABARZON). Eighty nine (89) of the 211 establishments (42.2 percent) are located in Cavite. Around 26 percent are located in Rizal province. Quezon had the least number of respondents that were surveyed (5.2 percent or 11 of 211 respondents).

⁸ Only 211 completed questionnaires were considered in this report. As of writing, additional seventeen (17) accomplished questionnaires are being verified.

Figure 1. Distribution of survey respondents by location (province)



Size of establishment

Establishment size may be determined either by the number of workers employed or total assets. In terms of employment, the majority or 72 percent of the respondents employ not more than 199 full-time employees, which in Philippines' standard, are considered micro, small and medium-sized companies (MSMEs) (**Figure 2**). In terms of assets, about 27 percent have total assets valued ranging from US\$100,000.00 to US\$499,999.00 while about 17 percent have over US\$10 million (**Figure 3**).

Figure 2. Respondents by employment size

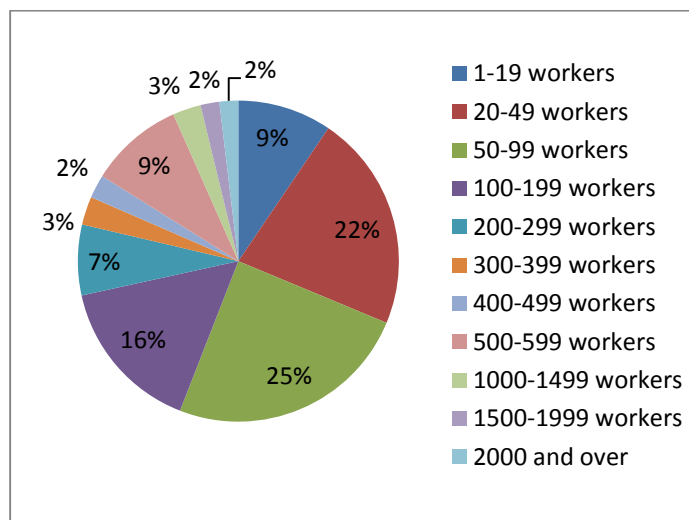
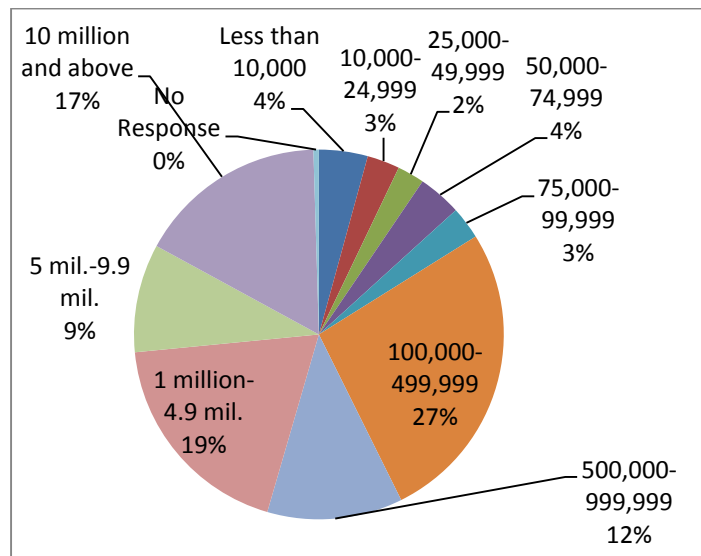


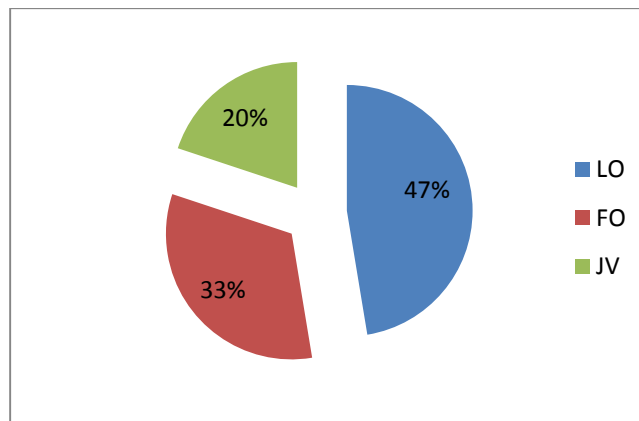
Figure 3. Respondents by total assets (US dollars)



Firm ownership

Figure 4 presents the respondents' ownership structure. Of the 211 surveyed establishments, 100 or 47 percent are local-owned; while 53 percent (111 establishments) of the surveyed firms have foreign ownership. Thirty three percent are purely foreign-owned while 20 percent are joint-venture firms. The CALABARZON region is home to several economic zones where many foreign-owned/joint venture firms are located, and so it not surprising to have a large share of foreign-owned firms in the survey sample.

Figure 4. Respondents by capital structure



Upgrading and introduction of new product

Out of the 211 firms surveyed, 113 firms introduced new products in the last 2 years (54 percent of respondents), most of which were from the plastic and rubber products sector and food, beverage & tobacco sector (**Table 1**).

Table1. Respondents that introduced new products in the last 2 years, by main business activity

Sector	Introduced new products	Did not introduce new products	NR	Grand Total
Food, Beverages and Tobacco	14	16		30
Textiles	2	2		4
Apparel, leather	12	9		21
Footwear		1	1	2
Wood, wood products	1	4		5
Paper, paper products, printing	4	3		7
Chemicals, chemical products	6	2		8
Plastic, rubber products	15	7		22
Other non-metallic mineral products	7	4		11
Iron, steel	3	2		5
Non-ferrous metals		4		4
Metal products	7	13		20
Machinery, eqpt, tools	10	5		15
Computers and computer parts	6	2		8
Other electronics and components	12	9		21
Precision instruments	2	3		5
Automobile, auto parts	6	6		12
Other transportation eqpt and parts	2	1		3
Handicraft	1			1
Others	3	4		7
Grand Total	113	97	1	211

In terms of ownership, survey results indicate that of the 113 firms that introduced new products in the last 2 years, 26 are joint-venture firms. On the other hand, across each category,

more than 60 percent of foreign-owned firms introduced new products, compared to about 44 percent of locally owned firms (**Table 2**).

Table 2. Respondents that introduced new products in the last 2 years, by capital structure

Capital structure	Introduced new products	Did not introduce new products	NR	Grand Total
LO	44	56		100
FO	43	26		69
JV	26	15	1	42
Grand Total	113	97	1	211

Meanwhile, 60 percent of firms that introduced new products in the last 2 years are micro-small and medium enterprises (MSMEs). However, looking at the MSMEs alone, firms that introduced new products composed only close to half of the MSMEs surveyed. Of the large firms, about 75 percent introduced new products in the last 2 years (**Table 3**).

Table 3. Respondents that introduced new products in the last 2 years, by employment size

Employment size	Introduced new products	Did not introduce new products	NR	Grand Total
1-19 workers	8	12		20
20-49 workers	15	31		46
50-99 workers	27	25		52
100-199 workers	19	14		33
200-299 workers	8	6	1	15
300-399 workers	4	2		6
400-499 workers	4	1		5
500-599 workers	17	3		20
1000-1499 workers	5	1		6
1500-1999 workers	3	1		4
2000 and over	3	1		4
Grand Total	113	97	1	211

Innovation measures

As for the type of upgrading or innovation, 71 firms made innovations such as introduction of a new product, redesigning packaging or significantly changing appearance or design of existing products; while 31 firms tried at least one of these activities. Firms with foreign equity were mostly the ones that made innovations and upgrading. In addition, relatively more firms from the food beverage and tobacco and plastic and rubber sectors successfully carried out upgrading or innovation activities (**Table 4**).

Table 4. Firms introducing a new product, redesigning packaging or significantly changing appearance design of the existing products of the establishment, by ownership and main business activity

Capital structure	Achieved	Tried	Not tried yet	NR	Grand Total
LO	27	12	4	56	99
FO	32	9	2	24	67
JV	12	10	5	15	42
Grand Total	71	31	11	95	208
Sector	Achieved	Tried	Not tried yet	NR	Grand Total
Food, Beverages and Tobacco	11	1	2	15	29
Textiles	1		1	2	4
Apparel, leather	3	6	3	9	21
Footwear		1		1	2
Wood, wood products	1			4	5
Paper, paper products, printing	2	2		3	7
Chemicals, chemical products	4	2		2	8
Plastic, rubber products	10	4	1	7	22
Other non-metallic mineral products	2	2	3	4	11
Iron, steel	3			2	5
Non-ferrous metals				4	4
Metal products	5	1		14	20
Machinery, eqpt, tools	8	2		3	13
Computers and computer parts	4	2		2	8
Other electronics and components	7	5		9	21

Precision instruments	2			3	5
Automobile, auto parts	4	2		6	12
Other transportation eqpt and parts	2			1	3
Handicraft		1			1
Others	2		1	4	7
Grand Total	71	31	11	95	208

Table 5 presents other innovation measures achieved or tried by the surveyed firms. About 35 percent or 73 out of 208 firms introduced a new product by significantly improving existing products while 16 percent at least tried it. About 28 percent of the firms also developed totally new products based on existing technologies while about 22 percent used new technologies.

Table 5. Product Innovation measures achieved or tried by respondents

Innovation measures	Achieved	Tried	Not tried yet	NR	Grand Total
• Introduced a new product, redesigning packaging or significantly changing appearance design of the existing products of the establishment	71	31	11	95	208
• Introduced a new product, significantly improving existing products with respect to capabilities, user friendliness, components, subsystems, etc	73	34	6	95	208
• Developed totally new product based on "existing" technologies	59	33	21	95	208
• Developed totally new product based on "new" technologies	45	37	31	95	208

Firm innovation activities are not limited to product innovation. They also undertake process innovations. There are wide forms of innovations particularly when firms adopt new production processes and/or introduce changes or improvements in production processes and operating facilities, marketing and business strategies to make themselves more competitive (Albert et al 2013).

As shown in **Table 6**, wider forms of innovations, manifested through adoption of new or improved business practices in production, procurement and similar activities are prevalent and widely practiced by surveyed firms. Over 70 percent of the firms surveyed have tried and achieved some form of process innovations between 2012 and 2013.

Table 6. Process and business management innovation measures achieved or tried by respondents

Innovation measures	Achieved	Tried	Not tried yet	Grand Total
• Production	89	86	35	210
• Procurement, outsourcing	74	82	54	210
• Business process re-engineering	58	74	78	210
• Sales promotion	57	80	71	208
• Sales management	63	78	67	208
• Inventory control	86	84	40	210
• Logistics	76	82	51	209
• Accounting	84	85	40	209

Improvement in business performance

The survey also sought information on improvement in business performance, which may be taken as probable or likely effects of product and process innovations. Respondents were asked to personally assess the impact of innovation activities to company productivity, specifically on revenue and production related measures. A 5-point narrative rating scale from satisfactory, moderate to significant increase or decrease was presented. Significant increase (decrease) would mean substantial or sizeable improvement (drop) in the suggested indicators, while moderate increase (decrease) connotes some improvement (decline) from the previous year's (2011-2012) performance measures. A satisfactory rating on the other hand, implies no detectable change between periods.

Table 7 suggests that only about 29-35 percent of the firms have reported moderate to substantial increases in sales, profit and export value, whereas 40-50 percent achieved moderate and significant profit and labor productivity growths in 2013. About 35-45 percent of the sampled firms reported a satisfactory rating, which indicates no significant changes in all performance measures.

Table 7. Improvement in business performance

Business performance measures	Significant increase	Moderate Increase	Satisfactory	Moderate Decrease	Significant decrease	Grand Total
• Sales	15	58	79	49	12	213
• Profit	16	45	83	52	17	213
• Export Value	8	30	57	28	8	131
• Labor productivity	20	66	89	31	5	211

IV. Determinants and Impacts of Innovations: Empirical Results

The view that firms' decision to undertake innovation activities, their inherent attributes and the impact of these activities on firm performance are systematically related is already well established in the literature. To some extent, the descriptive statistics obtained from the cross tabulations seem to support the notion that there is a link between innovation activities and economic performance of firms. They also indicate that firm characteristics such as size, foreign equity and industry sector are important factors in making innovations. To deepen our understanding of the determinants of innovations and their likely impact on firm performance, it will be helpful to employ an econometric model that identifies what factors explain firms' decision to innovate and whether this decision can lead to positive, desirable performance outcomes.

Empirical model

We distinguish two types of innovations: product and process innovation. Despite their close link, studies show that product and process innovations tend to have different determinants (Rasiah 2003). Product innovation typically involves the introduction of new product or service that often entails radical changes while process innovation would mean incremental or significant improvements in management or operating practices. The resources required in terms of time and investments are different. Small-sized firms or start-up companies for instance, may find it more challenging to do product innovation than process innovation while large companies could typically undertake product and process innovations as a matter of routine. Moreover, innovation may be inherently more pervasive in some sectors or industries than in others. The determinants of innovation are examined separately for product (PROD) and process (PROC) innovations.

A simplified probit regression model is used in the estimation to determine product and process innovation:

$$\text{Prod} (I_{jt} = 1 \mid X, Y) = \beta_0 + \beta_1 \text{AGE} + \beta_2 \text{SIZE} + \beta_3 \text{FOREIGN} + \beta_4 \text{HIGHTECH} + \mu$$

Innovative behavior (I_{jt}) is given by PROD (PROC) equal to 1 if a firm does product (process) innovation, 0 if not. Firm age (AGE) refers to the number of years that the firm has been operating in CALABARZON. Employment size is measured by the SIZE variable. It is equal to 1, meaning large, if it has over 200 employees, otherwise it is set to 0. Equity ownership meanwhile is represented by 'FOREIGN', in which 0 connotes domestically-owned firms and 1 if it is partial or fully owned by foreigners. To capture the differences in innovation practices across sectors, electronics and IT-related industries (HIGHTECH=1) are differentiated from primary or low technology sectors like food manufacturing, textile and related activities (HIGHTECH=0).

Probability of making innovations

Table 8 shows the regression results and estimated marginal effects of firm age, size, foreign equity and industry sector on the probability of undertaking product and process innovation in the last 2 years. Age, size of firm and foreign equity are statistically significant determinants of the probability of undertaking innovation and have the expected sign. The age of the firm matters to process innovation just as significantly as employment size, which is shown to influence both process and product innovation among surveyed firms.

Large and more mature firms seem to have a higher propensity to introduce process and product innovations than smaller and younger firms. The large firms are more established in the market and to maintain their competitiveness, they could be expected to invest in innovations. The knowledge and experience accumulated by mature firms over the years may have worked to their advantage as it increases their probability to do process innovation by 0.8 percent. On the other hand, it seems that the availability of more workers allow larger firms to innovate, and this evident in the estimated marginal effects which suggest that a bigger workforce is associated with 25 and 21 percentage points higher probability of carrying out product and process innovation activities, respectively. The talent pool for innovation is obviously larger than that in smaller firms and product and process innovations may be more easily teased out of firms with a larger workforce with the proper incentives or motivation.

Table 8. Probability of engaging in product and process innovation

	<u>Product Innovation</u>		<u>Process Innovation</u>	
	Coefficient	Marginal effects	Coefficient	Marginal effects
Age	0.007 (0.009)	0.003 (0.004)	0.021** (0.009)	0.008** (0.004)
Large	0.661*** (0.215)	0.251*** (0.076)	0.577*** (0.216)	0.215*** (0.075)
Foreign	0.316* (0.191)	0.125* (0.075)	0.177 (0.192)	0.069 (0.075)
Hightech	-0.001 (0.025)	-0.001 (0.010)	0.009 (0.024)	0.003 (0.010)
_cons	-0.379 (0.236)		-0.464* (0.239)	

se

note: *** p<0.01, ** p<0.05, * p<0.1

Among the surveyed firm characteristics, foreign capital participation is a very important predictor of product innovation. This is consistent with the strand of literature (Love and Ashcroft 1999; Michie and Sheehan 2003; Aghion, Van Reenen and Zingales 2009) cited in Becheikh, et al 2006) suggesting that foreign investors supply domestic firms with scientific and non-scientific resources including the latest technology, thereby, boosting the innovative capability of domestic firms.

Interestingly, the probability to do product and process innovation does not seem to be influenced by the type of technology (high or low) employed by firms. The assumption that high-tech industries are more predisposed to innovate is not validated in the present case. We surmise that probably process and product innovations in high-technology firms tend to be more capital-intensive and more advanced and take a longer time to complete. Hence, the gap or interval between innovations process-or-product-wise is longer perhaps than the two years indicated in the survey results.

The finding on employment size as an important determinant of innovation is consistent with the results of the 2009 Department of Science and Technology (DOST) Survey on Innovation Activities. The results, reported in Albert et al (2013) showed that employment size matters particularly for process innovation—the larger the firm, the more likely that it will engage in process innovations. The DOST survey covered about 474 establishments from food, electronics and ICT manufacturing sectors actively operating in four areas: Quezon City, Metro Cebu, Davao City and Philippine Economic Zone Authority (PEZA) areas in Cavite and Laguna. The report likewise found positive correlation between innovation and location in PEZA. This implies that location in an economic zone is a good predictor of innovations among firms. It found negative results for age and foreign equity, implying that while location in an economic zone is a good predictor of innovation, age and foreign equity are not.

Impact of innovation on firm performance

The impact of innovation activities on firm performance is not as well defined and straightforward as most are inclined to think. While there may be a growing body of theoretical literature that suggests innovation propels firm growth, empirical studies however, provide mixed results. Corsino (2008) pointed out that empirical investigations conducted at different levels of analysis have yielded significantly different estimates of the innovation-growth nexus.

In this paper, firm performance is indicated by increase (decrease) of sales, increase (decrease) of profits, and improvement (decline) in labor productivity. Data on sales, profit and labor productivity here are from the surveyed firms' response to the question of whether the product and process innovations introduced during the past 2 years correspond to moderate to substantial improvements in sales, labor productivity and firm profit. Our estimates suggest that incremental process innovations significantly affect firm performance as indicated by firm sales, profit and labor productivity.

Table 9 shows that process innovations undertaken by sampled business establishments for the past 2 years are estimated to increase sales by 19 percent and profits by 20 percent and raise labor productivity by 24 percent. Product innovation is also shown to have a positive, significant impact on sales and labor productivity. It has however, a fairly small impact on firms' sales and profit performance indicators compared to process innovation, which generally involve significant improvements in the managerial operations and production.

Table 9. Impact of innovations in firm performance

	Sales	Marginal Effects	Profit	Marginal Effects	Labor Productivity	Marginal Effects
Product	0.438** (0.182)	0.158 (0.253)	0.269 (0.186)	0.090 (0.249)	0.435** (0.178)	0.167 (0.259)
_cons	- 0.650*** (0.138)	-	- 0.716*** (0.140)	-	-0.469*** (0.132)	-
Process	0.530*** (0.185)	0.188 (0.252)	0.641*** (0.195)	0.205 (0.243)	0.635*** (0.183)	0.239 (0.256)
_cons	- 0.728*** (0.146)	-	- 0.967*** (0.157)	-	-0.614*** (0.142)	-

Se

note: *** p<0.01, ** p<0.05, * p<0.1

Product innovations generally exhibit certain degree of novelty, which may have two opposing effects on revenue streams. An inertia effect, which might cause slower market acceptance of extremely novel products, and an efficiency effect that ensure the rapid market penetration of new product offerings (Corsino 2008). The inertia effect may result in a temporary insignificant impact of innovations on firms' performance indicators. The latter case, that is, the efficiency effect is a desired state wherein rapid market penetration creates opportunities for higher sales and profits. In the present case, product innovation that leads to the commercialization of a new product or service translates to higher probability of increased sales and labor productivity, but in a much slower rate and probability than process innovations.

Large and more mature firms seem to have a higher propensity to introduce process and product innovations than smaller and younger firms. The large firms are more established in the market and to maintain their competitiveness, they could be expected to invest in innovations. The knowledge and experience accumulated by mature firms over the years may have worked to their advantage as it increases their probability to do process innovation by 0.8 percent. On the other hand, it seems that the availability of more workers allow larger firms to innovate, and this evident in the estimated marginal effects which suggest that a bigger workforce is associated with 25 and 21 percentage points higher probability of carrying out product and process innovation activities, respectively. The talent pool for innovation is obviously larger than that in smaller firms and product and process innovations may be more easily teased out of firms with a larger workforce with the proper incentives or motivation.

V. Concluding Remarks

Our empirical results provided an affirmative response to the question raised at the beginning of this paper: “does innovation mediate good firm performance?” Product and process innovations lead to increase in sales and profits and improve labor productivity. The paper also showed that firm size, age and foreign equity are important factors leading firms to innovate. Of particular importance to the Philippine development narrative is our finding on the role of foreign equity as a determinant of innovation. Removing regulatory and structural barriers to entry of foreign direct investments will be critical in attracting such investments to the domestic market. Foreign direct investments bring along new products, expertise, innovations, and a host of complementary institutions, for example, efficient global supply chains that are indispensable in playing a more substantial role in the ASEAN region that is marked for greater economic integration.

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