

Why some firms innovate and why others do not

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Jn recent years, there has been mounting interest in studying innovation (Mytelka and Smith 2001; Gonzales and Yap 2011), including the factors that influence it, with the recognition that innovation is a major driver of economic output, productivity, and competitiveness (Macasaquit 2008, 2011; Llanto 2010). Various studies have pointed to the Philippines' meager expenditures on research and development (R&D) activities (Cororaton et al. 1998; Macapanpan 1999; Patalinghug 2003), especially when viewed vis-a-vis those of its neighboring countries. Innovation, however, is not just confined to inventions and R&D. From an economics standpoint, an innovation must increase value, whether customer value or producer value. Innovation activities in a firm involve the implementation of new or significantly improved products or processes (technological

innovation), or new marketing or organizational methods (nontechnological innovation). Knowledge and information flows are at the core of an innovation system. These flows are multidirectional. In an innovation system, four major categories of factors relate to innovation, namely: (a) the R&D institutions; (b) "firms;" (c) processes involved in the transfer and absorption of technology, knowledge, and skills; and (d) the surrounding context and environment of institutions, legal arrangements, macroeconomic settings, and other conditions that exist regardless of whether or not innovation takes place.

In order to understand the dynamics of innovation with economic growth as well as

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to provide indicators for benchmarking national performance, the Department of Science and Technology (DOST) planned for the conduct of the 2009 Survey on Innovation Activities (SIA). The SIA was conducted by the Philippine Institute for Development Studies (PIDS), the National Statistics Office (NSO), and the DOST, with funding support from the International Development Research Centre (IDRC), and was meant to be a systems-oriented and policy-relevant survey on innovation.

This *Policy Notes* presents the highlights of the SIA and puts forward the policy issues attendant to promoting, strengthening, and institutionalizing the system of innovation within Filipino firms.

About the SIA

The SIA involved the targeting and survey of 500 establishments across four study areas: Quezon City, Metro Cebu (Cebu City, Lapu-lapu City, and Mandaue City), Davao City, and the Philippine Economic Zone Authority (PEZA) areas in Cavite and Laguna. The choice of these study areas was purposive and meant to provide a semblance of a national picture, with the areas representing the nation's

capital and a balance of Luzon, Visayas, and Mindanao. The survey covered three major industries: (a) food manufacturing, (b) electronics manufacturing, and (c) information and communication technology. In the sampling frame used by the NSO, 1,824 establishments are covered across the three major industries in the four study areas. Target establishments were stratified into food and nonfood industry clusters with a 40:60 distribution.

As in other establishment surveys, target respondents for the SIA were the owners and managers of the sampled establishments. Reference period for the SIA was set from January 2009 to June 2010. The SIA was self-administered and following best practices in measuring the innovative behavior and activities, the SIA questionnaire was adapted from the European Union's Community Innovation Survey Version 4, with some refinements to consider the Philippine setting. Of the 500 establishments targeted for the SIA, 474 establishments provided valid responses (for an effective response rate of 94.8%). Effective response rate is 100 percent for Cebu and Davao, 97.5 percent for Cavite, 94.8 percent for Quezon City, and 80.0 percent for Laguna.

Sampled firms are relatively young (Figure 1). About half of the firms were established during the past ten years. This is especially true among microestablishments (63%). For medium and large firms, about 80 percent were established in the past twenty years.

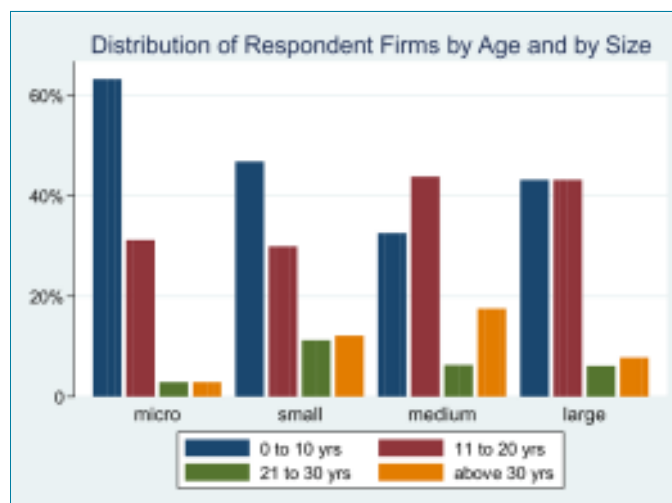
The geographic markets to which the responding establishments sold goods or services from January 2009 up to the survey period vary by study area (Figure 2). Overall, about half of the surveyed firms have local markets, a third have national markets, nearly three in twenty have markets in other ASEAN countries, while a third have markets in countries outside the Association of Southeast Asian Nations (ASEAN). The latter region is the dominant market for establishments in the PEZA zone. Firms in PEZA also had other ASEAN countries as the next dominant geographic market. In contrast to the PEZA firms, Cebu, Davao, and Quezon City establishments largely have local or national markets. In particular, about three out of five establishments in Davao have local markets, as compared to Quezon City (half) and Cebu (two in five).

Innovation activity

Innovation occurs in a firm when new knowledge is put to work in the production process. An establishment is considered to be innovation-active if it is:

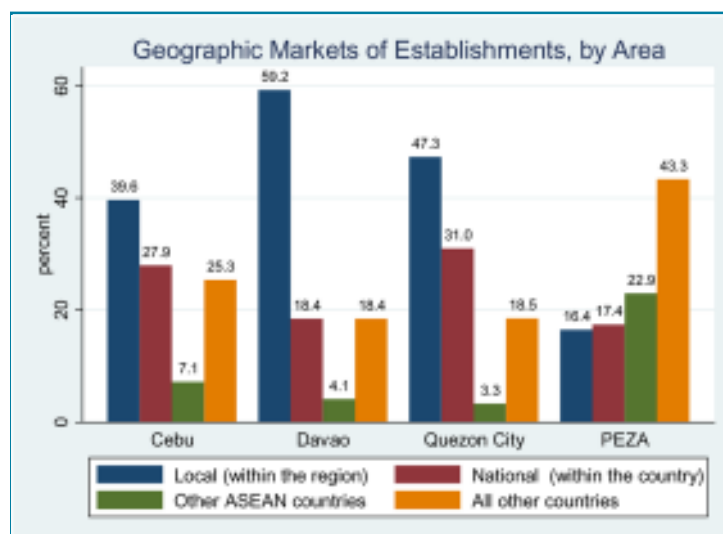
- a product innovator that introduced new or significantly improved products, i.e., goods and/or services;
- a process innovator that introduced (a) new or significantly improved methods of manufacturing or producing goods or services; (b) new or significantly improved logistics, delivery, or distribution methods for inputs, goods, and services; and (c) new or significantly improved supporting activities for processes such as maintenance systems or

Figure 1. Distribution of establishments by number of years since establishment and by size of establishment



Source: 2009 Survey of Innovation Activities (SIA)

Figure 2. Percentage of establishments in each study area by geographic market



Source: 2009 SIA

operations for purchasing, accounting, or computing;

- engaged in innovation projects that are either not yet complete or abandoned; and
- engaged in expenditure of innovation

Table 1. Key statistics on innovation activity by size of establishments

	Micro	Small	Medium	Large	All Firms
Proportion of establishments that are/have:					
Innovation active (%)	34.0	48.6	65.0	65.2	54.4
Product innovators (%)	23.6	32.7	42.5	46.4	37.6
Of which share with					
new-to-market products (%)	60.0	57.1	73.5	53.6	59.0
Process innovations (%)	23.6	38.3	50.0	56.4	43.9
Of which share of those that developed					
process innovation within the					
establishment or enterprise (%)	84.0	92.7	90.0	92.2	90.9
Both product and process innovators (%)	17.0	25.2	33.8	42.0	31.2
Either product or process innovator (%)	30.2	45.8	58.8	60.8	50.2
Ongoing innovation activities (%)	24.5	36.4	43.8	51.9	40.9
Abandoned innovation activities (%)	6.6	10.3	20.0	13.8	12.4
Innovation-related expenditure (%)	20.8	37.4	43.8	51.9	40.3
<i>Memo Note</i>					
Average annual expenditures for					
innovation activities (in PHP '000)	51.2	2955.9	3227.3	30168.2	12367.6
Proportion of establishments that have/are:					
Public financial support for innovation (%)	0.0	1.9	7.5	4.4	3.4
Innovation co-operation (%)	46.2	32.5	16.7	38.9	34.5
Organizational innovations (%)	38.7	52.3	70.0	66.9	57.8
<i>Memo Note</i>					
Average percentage of employees					
affected by establishment's					
organizational innovations (%)	68.7	63.2	46.5	54.3	56.7
Proportion of establishments that are/with					
Marketing innovators (%)	43.4	50.5	53.8	53.0	50.4
With knowledge management practices (%)	46.2	55.1	71.3	71.8	62.2
With government support or assistance					
to innovation (%)	15.1	15.0	28.8	26.0	21.5

Source: 2009 SIA

activities for internal or outsourced R&D, training, acquisition of external knowledge machinery, equipment, or software linked to innovation activities, market introduction of innovations, and other preparations to implement innovations.

Table 1 provides key statistics on innovation activity by firm size. Overall, more than half

(54%) of the sampled establishments were classified as being innovation-active during the period January 2009–June 2010.

Both medium and large establishments are observed to be more likely to engage in some sort of innovation activity, with about two-thirds being innovation-active, as compared to a third for microestablishments and half for

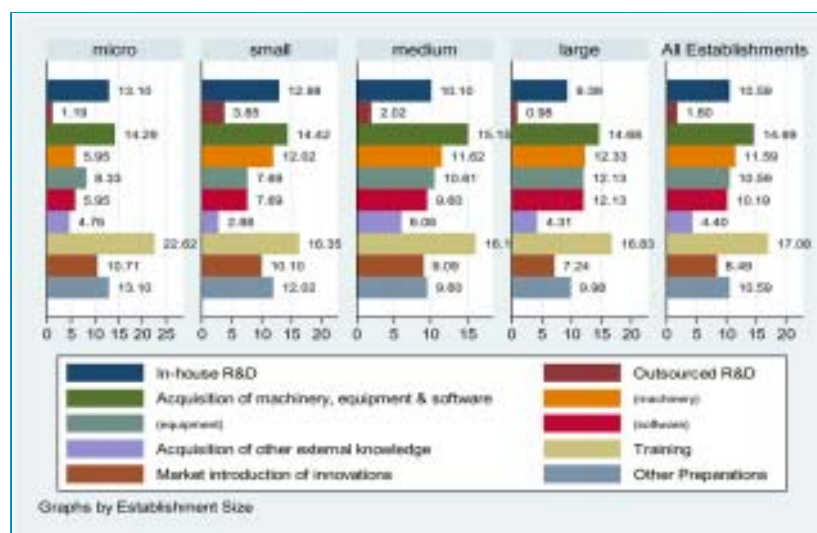
small establishments. About two in five establishments were product innovators (38%), and this rate is about similar to the proportions of process innovators (44%). About one in ten establishments had projects to develop product or process innovations which had to be abandoned between January 2009 and the survey period, while about two out of five establishments had innovation projects that were ongoing up to the end of 2009. Only one in twenty establishments mentioned public support for their innovations, with the rate highest among medium-sized firms. For wider forms of innovation like marketing innovation, about one in five had some form of government support. A bigger share of medium-sized firms reported to have government support for marketing innovation than small and microestablishments.

The larger the establishment, the more likely it innovates. Even average expenditures in innovation rise with the size of establishments. Microestablishments only spend an average of PHP 50,000 in a year, small and medium establishments both have average annual innovation expenditures at PHP 3 million, while large establishments spend an average of PHP 30 million. Forty percent of establishments had some innovation-related expenditure in 2009. As shown in Figure 3, the most commonly reported activities were investment in training, followed by acquisition of computer software and

hardware, in-house R&D, and other preparations.

Innovation can transcend the development or use of technology or other forms of product or process change. There is a wider sense of innovation, particularly when firms change their behavior or marketing and business strategies to make themselves more competitive, either often in conjunction with product or process innovation or also as an independent means of improving competitiveness. Responding firms in the national innovation survey (NIS) were asked if they had made major changes in their organizational structure and business practices in the reference period. The key results are summarized in Table 2. As might be expected, a greater proportion of large firms engaged in one or more of these changes (83% of large firms compared to 71%

Figure 3. Breakdown of innovation activities in establishments by size of establishment



Source: 2009 SIA

Regression results suggest that the practice of knowledge management is a good determinant of product innovation, process innovation, and being an innovator, in general. Employment size also matters, but only significantly for process innovation: the larger the firm, the more likely it is a process innovator.

of SMEs). As far as marketing innovation, large-size firms in food manufacturing (70%) take the lead in implementing marketing innovation.

Determinants of innovation

To examine factors that may influence innovative behavior among firms, a probit regression on the 2009 SIA data is employed to identify whether a target variable helps explain innovative behavior. Variables examined in the probit regression model to explain how likely establishments are to be product innovators, process innovators, and innovators include

- employment size (in logarithmic form),
- age of the firm,
- geographic market (in particular, whether or not the firm's geographic market is limited to the local market only),

- share of foreign capital participation,
- share of female employment,
- major industry (whether the firm is in the food manufacturing, electronics manufacturing, or IT sectors),
- location (whether the firm is located in Cebu, Davao, Quezon City, or PEZA), and
- whether or not the firm is engaged in knowledge management.

Regression results suggest that the practice of knowledge management is a good determinant of product innovation, process innovation, and being an innovator, in general.

Employment size also matters, but only significantly for process innovation: the larger the firm, the more likely it is a process innovator. Consistent with findings in the literature, the results likewise show that location matters: firms in PEZA, all other things being equal, are more likely to be innovators than firms in other areas. The evidence is strongest for product innovation and innovation activity, in general, when comparing PEZA with Cebu firms. While it seems that having a geographic market limited to the local market puts the firm at risk of not being a product innovator and innovator, in general, the evidence, however, is rather weak. A gender disparity indicator such as the share of women employees to total employment likewise does not contribute to explaining innovative behavior. All other things being equal, firms across sectors appear to be equally likely to innovate. Age of the firm also does not matter as far as

Table 2. Percentage of establishments that introduced wider forms of innovation by size of establishment

	SME	Large	All firms
Wider form of innovation (any of the changes below)	71.0	82.9	75.5
Changes to organizational structure or business strategy	52.2	66.9	57.8
Changes to marketing concepts or strategies	48.8	53.0	50.4
Changes in knowledge management	56.3	71.8	62.2

Source: 2009 SIA

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Table 3. Percentage of establishments that regarded potential barriers to innovation as “high” by size of establishments

Factors Hampering Innovation Activities		Micro	Small	Medium	Large	All firms
1. Cost factors	a. Lack of funds within establishment or enterprise	34.9	22.4	20.0	19.3	23.6
	b. Lack of finance from sources outside enterprise	23.6	17.8	12.5	8.8	14.8
	c. Innovation costs too high	30.2	28.0	22.5	21.6	25.1
2. Knowledge factors	a. Lack of qualified personnel	16.0	14.0	12.5	6.1	11.2
	b. Lack of information on technology	13.2	11.2	12.5	7.2	10.3
	c. Lack of information on markets	11.3	13.1	8.8	6.1	9.3
	d. Difficulty in finding cooperation partners for innovation	16.0	6.5	11.3	8.3	10.1
3. Market factors	a. Market dominated by established enterprises	21.7	16.8	13.8	7.2	13.7
	b. Uncertain demand for innovative goods or services	12.3	13.1	8.8	7.2	9.9

Source: 2009 SIA

innovative behavior is concerned. Neither does the share of foreign capital participation appear to explain significantly the propensity to innovate.

Barriers to innovation

In terms of barriers to innovation, they can refer to obstacles within the establishment such as human and financial resources or external factors that prevent innovation. Cost factors were commonly identified by the establishments as significant barriers to innovation (Table 3). About one out of four responding establishments associated a high degree of importance to high direct costs of innovation. A similar proportion of establishments also mentioned lack of funds within the establishment or enterprise as a barrier to innovation. While cost factors were the most commonly reported significant

barrier to innovation among all establishments, about one in ten establishments also reported knowledge and market factors as significant barriers to innovation. Note that perceptions on barriers to innovation did not depend on whether or not the firm innovates. Establishments engaged in innovation activity were equally likely to perceive barriers as being highly important compared to those that did not attempt to innovate.

Across sectors, noninnovators cite market conditions slightly more as the reason for no innovations. About three in twenty (13%) of responding noninnovative establishments felt they did not need to innovate due to market conditions. A slightly smaller proportion felt they did not need to innovate due to prior innovations (Table 4).

Table 4. Reasons for no innovation activity by major sector (noninnovators only)

Major Sector	Reasons Not to Innovate	
	No Need Due to Prior Innovations	No Demand for Innovations
Food manufacturing (%)	8.91	13.86
Electronics manufacturing (%)	6.67	13.33
IT (%)	6	12
All noninnovative firms (%)	7.41	12.96

Effects of innovation

Firms cite product-related effects more often than process (cost) effects, especially among large firms. About three-fifths (60%) of innovation-active firms rated improving the quality of goods or services as highly important. Increasing the range of goods or services was also a widely reported product-related effect, particularly in the food manufacturing industry. The least commonly reported effect was reducing materials and energy per unit output.

Even for organizationally innovative firms, quality ranked highest across size and industries, confirming a strongly customer-focused approach to innovation. Across firms, the least commonly reported effect of organizational innovation appears to be improved employee satisfaction and/or lower employee turnover. As far as firms that engaged in marketing innovations are concerned, the most highly ranked effect is customer-related, i.e., improved customer satisfaction or strengthened customer relationship.

Sources of information and cooperation

Introducing innovation is an increasingly complex process that requires coordination of multiple inputs. Firms can gain technical advice, guidance, or even some inspiration for their prospective innovation activities from a variety of sources of information. It is essential to know how far firms engage with external sources of technology as well as other innovation-related knowledge and information. Firms reported internal and market sources (especially clients) as most important for information on innovation (Table 5). This suggests that establishments tend to rely on their own experience and knowledge coupled with information from suppliers, customers, and clients. The institutional sources, especially government or public research institutes, were considered to be of lowest importance.

Policy issues

The survey results suggest the need to further strengthen the policy framework for innovation and aggressively pursue the country's innovation strategy "Filipinnovation," fostering knowledge sharing and dissemination by academe and industry. It is also important to articulate the innovation strategy to firms which seem to be generally of the view that government and research institutions are not key partners in their innovative practices. Information dissemination on programs available to assist firms may need to be improved.

Table 5. Establishments rating information sources as of “high” importance by size of establishment

Information Source		Micro	Small	Medium	Large	All Firms
1.Internal	a. Within establishment or enterprise	61.5	70.0	66.7	75.0	70.7
2.Market source	a. Suppliers of equipment, materials, components, or software	30.8	57.5	55.6	49.0	49.5
	b. Clients or customer	65.4	62.5	66.7	67.7	66.2
	c. Competitors or other enterprise in the sector	38.5	45.0	36.1	35.4	37.9
	d. Consultants, commercial laboratories, or private R&D institutes	11.5	27.5	19.4	21.9	21.2
3.Institutional source	a. Universities or other higher education institutions	7.7	12.5	11.1	9.4	10.1
	b. Government or public research institutes	3.9	12.5	5.6	6.3	7.1
4.Other sources	a. Conferences, trade fairs, exhibitions	34.6	37.5	13.9	14.6	21.7
	b. Scientific journals and trade/technical publications	15.4	22.5	16.7	14.6	16.7
	c. Professional and industry associations	19.2	17.5	16.7	13.5	15.7

Source: 2009 SIA

Firm size is a determinant to innovation. Barriers and bottlenecks faced by small and medium enterprises (SMEs) to innovate are not similar to large firms. SMES need to be strengthened, with the aim of having them grow and develop into larger firms. SMEs have continued to face the same major development constraints such as access to finance, technology, and skills and difficulties with product quality and marketing. Public interventions to encourage innovation have to be adapted to the specific needs of firms. Innovation varies across study areas. With firms in PEZA being more innovative than firms in other areas, there is something to learn from the business climate and incentive structures in PEZA that may be leading firms there to innovate more than in other areas.

Knowledge and cooperation networks, especially at the local areas, will have to be developed. Once they are developed, they need to be strengthened to promote innovation. The scope for partnerships to promote innovation is wide. Given the shift toward a more open system of innovation and the importance of knowledge management practices as a determinant of innovation, the government must promote the free exchange of ideas and flow of knowledge from outside the companies. Improving networking, linkages, and collaboration between the government, industry associations, and universities and research institutions must be pursued. Firms also need to be stimulated to cooperate for innovation, rather than being averse to networking with their competitors.

Firms currently do not identify business associations, research and public institutions as a source of cooperation and information for innovation. Most firms appear to be of the mindset that they are left on their own to implement innovation activities, with very little support from networking arrangements.

The national government and local government units (LGUs) need to work in tandem with academe and the business sector to advocate for innovation, providing more leadership, bringing people and institutions together.

Cost factors have been cited by firms as barriers to innovate. These cost factors can be brought down with partnerships strengthened across national and local governments as well as with business associations.

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Given the limited resources available, it may be wise for government to prioritize the firms that could be supported by public resources. It is also important to monitor the extent of innovation activities being undertaken on a regular basis. After all, innovation system management cannot be effectively done if what is being managed is not being measured. 📄

References

- Cororaton, C., T. Caparas, R. Yacat, J. Cuenca, R. Casas, and M. Galvan. 1998. Survey of activities in research and development. Makati City: Philippine Institute for Development Studies.
- Macapanpan, T.H. 1999. Private sector activities on research and development. PIDS Discussion Paper Series No. 1999-19. Makati City: Philippine Institute for Development Studies.
- Macasaquit, M. 2008. Sources of innovation of Philippine firms: production, logistics, and knowledge networks. ERIA Research Project Report 2008 No. 4-1. Economic Research Institute for ASEAN and East Asia. <http://www.eria.org/research/y2008-no4-1.html>.
- . 2011. Strengthening sources of knowledge/technology to promote innovation: the case of CALABARZON. PIDS Policy Notes No. 2011-09. Makati City: Philippine Institute for Development Studies.
- Mytelka, L. and K. Smith. 2001. Innovation theory and innovation policy: bridging the gap. DRUID Conference, Aalborg, 12–15 June.
- Organisation for Economic Co-operation and Development. 1997. http://www.oecd.org/document/23/0,3746,en_2649_34409_35595607_1_1_1_1,00.html.
- Patalinghug, E. 2003. The Philippine innovation system: structure and characteristics. PIDS Research Paper Series No. 2003-04. Makati City: Philippine Institute for Development Studies. <http://dirp4.pids.gov.ph/ris/rps/pidsrp0304.pdf>.