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**Working Paper**

## Results of the 2009 Survey of Innovation Activities (SIA)

PIDS Discussion Paper Series, No. 2011-15

**Provided in Cooperation with:**

Philippine Institute for Development Studies (PIDS), Philippines

*Suggested Citation:* Aldaba, Rafaelita M.; Albert, Jose Ramon G.; Quimba, Francis Mark A.; Yasay, Donald (2011) : Results of the 2009 Survey of Innovation Activities (SIA), PIDS Discussion Paper Series, No. 2011-15, Philippine Institute for Development Studies (PIDS), Makati City

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*Jose Ramon G. Albert, Rafaelita Aldaba,  
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August 2011

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# **Results of the 2009 Survey of Innovation Activities (SIA)**

**Prepared**

**by**

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## **Abstract:**

In this paper, results of the 2009 Survey of Innovation Activities are described and discussed. The term innovation, traditionally associated with research and development, has evolved to mean the implementation of new or significantly improved goods and services, production process, marketing or organizational methods in a firm. Innovation data gathered in the survey help better understand innovation and its relation to economic growth, and provide indicators for benchmarking national performance. Results of the survey suggest that more than half of sampled firms are innovators, with larger firms innovating more than smaller ones. Firms vary in innovation activity by study areas. Effects of innovation are largely customer-driven. Firms suggest cost factors to be the most important barrier to innovation. Government support is found to be limited, particularly for product innovations, to medium-sized firms. Knowledge and cooperation networks for innovation are rather weak. Firms do not access technical assistance from the government and research institutions. Cooperation is also low between the establishments and academe. Firms tend to cooperate more with establishments within their enterprise, their customers and suppliers. The results point to the need to articulate the innovation strategy to firms, and to improve information dissemination on programs available to assist firms. Networking, linkages and collaboration among the government, industry associations, and universities and research institutions must be also be further enhanced.

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## 1. Introduction

The term innovation is associated with improvement and novelty. Traditionally, innovation was equated with inventions, so that the measurement of innovation involved estimating scientific or technological outputs through expenditures in research and development (R&D). The most commonly used indicators to monitor the resources devoted to R&D are given by the gross domestic expenditure on R&D and R&D intensity measured by the percentage of GDP devoted to R&D. Table 1 presents these two indicators for the Philippines along with its neighbors in Southeast Asia. Research intensity is low in the Philippines with investment in R&D declining from 0.15% in 2002 to 0.12% in 2005. Singapore is the most research intensive as its ratio almost doubled between 1996 and 2007 from 1.37 to 2.61, respectively. In terms of R&D expenditures per capita, the Philippines and Indonesia registered the lowest figures with these expenditures in the Philippines declining from PPP\$4 in 2002 to PPP\$3 in 2005.

**Table 1: R&D as percentage of GDP and R&D per capita in Selected ASEAN countries**

Gross Domestic Expenditure on R&D as a percentage of GDP												
Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PHIL	...	...	...	...	...	...	0.15	0.14	...	0.12	...	...
SING	1.37	1.48	1.81	1.90	1.88	2.11	2.15	2.11	2.20	2.30	2.31	2.61
THAI	0.12	0.10	...	0.26	0.25	0.26	0.24	0.26	0.26	0.23	0.25	...
MAL	0.22	...	0.40	...	0.49	...	0.69	...	0.60	...	0.64	...
INDO	...	...	...	...	0.07	0.05	...	...	...	0.05	...	...
Gross Domestic Expenditure on R&D per capita (in PPP\$)												
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PHIL	...	...	...	...	...	...	4	4	...	3	...	...
SING	384	440	520	578	632	696	747	764	882	996	1104	1342
THAI	6	5	...	12	12	13	13	15	16	16	18	...
MAL	18	...	32	...	45	...	67	...	66	...	80	...
INDO	...	...	...	...	2	1	...	...	...	2	...	...

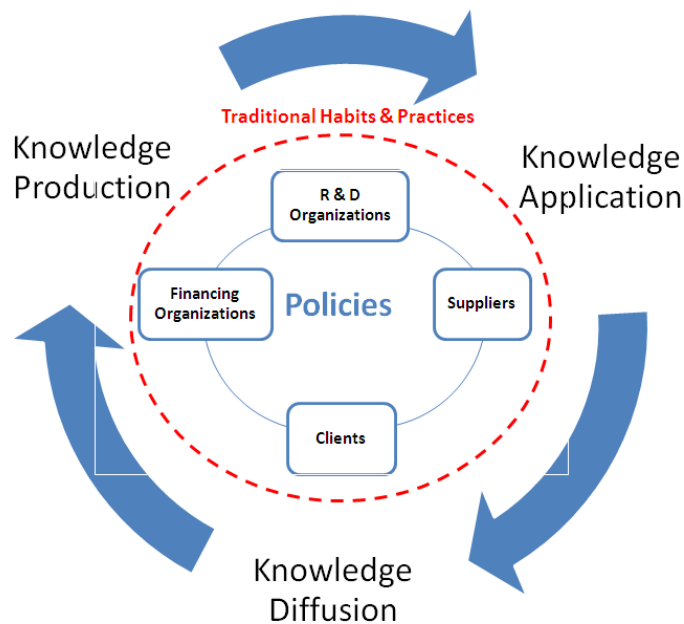
Source: UNESCO Institute for Statistics

Expenditure data on R & D from the private sector are sourced in the Philippines from a Research and Development (R&D) Survey on Expenditures and Personnel conducted by the National Statistics Office (NSO) for the Department of Science and Technology (DOST). The R&D Survey is conducted as a rider to the NSO's Annual Survey of Philippine Business and Industry (ASPBI). Information from this survey complements expenditure information on R&D generated from a similar survey of government and higher education institutions.

The current view of innovation is not confined to being a global first (i.e., the introduction or application of technology for the first time in the world), but rather includes the introduction or application of technology for the first time in a new environment (OECD Secretariat 2007). This process is commonly called as adoption, absorption and adaptation of new or significantly improved products (goods and services), production processes, marketing or organizational

methods in a firm. That is, innovation is viewed as “the application of (new) knowledge in production.” See, e.g., Nelson & Winter (1982); Lundvall (1988); Freeman: 1995; Mytelka and Smith, 2001). This knowledge might be acquired through learning, research or experience, but until that new knowledge is applied in the production of goods or services, it cannot be considered innovation.

Measuring innovation requires a framework, explicit or not, which makes it possible to organize and understand the data collected. It presupposes ideas about the nature of innovation, its essential features, and what is important and what is not. An innovation system involves pioneers in the application of new knowledge, whether individuals or R&D organizations, may be followed by others, and when this new knowledge is diffused well, the traditional habits & practices may be revised, influenced, or replaced. Innovative companies will typically be working on the new knowledge and emerging technology that will eventually replace current technologies. The whole process of innovation thus starts from the origination of the new knowledge to its transformation into something useful, to its implementation; and to its diffusion on the entire production system, with the policy environment at the core of an innovation system (see Figure 1).



**Figure 1. Innovation System**

More concisely, innovation can be viewed as “good ideas put to work.” 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 (a) the R& D institutions; (b) “firms”, (c) processes involved in the transfer and absorption of technology, knowledge and skills, as well as (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 an innovation system, firms and other economic agents, with institutions and policies that influence their innovative behavior and performance, bring new products, new processes and new forms of organization into economic use. Innovation may either be supply-pushed (based on new technological possibilities) or demand-led (based on client needs and market requirements). How innovation results may not only depend on demand and supply side factors, but also on the processes that links many different “actors” together in an innovation system. It is thus crucial to understand dynamics in organizations and economies that influence innovative behavior and the performances of the “actors” in order to create a climate that is conducive to innovative behavior.

In many areas of life, something better must be substantially different to be considered innovative. From an economics standpoint, an innovation must increase value, whether the customer value, or the producer value. Innovations comprise both radical changes and many small improvements in (a) product design and quality, (b) production processes or the way in which production is organized, and (c) management, marketing or maintenance routines that collectively, modify products and processes, bring costs down, increase efficiency, enhance welfare and ensure environmental sustainability. Innovation activities thus go beyond R&D; they involve the implementation of new or significantly improved product or process (technological innovation), or new marketing or organizational methods (non-technological innovation).

As Gonzales and Yap (2011) point out “the development of new technology and new products (and new knowledge) is an internally driven process that is endogenous to every economy.” That is, when firms innovate, these innovations become successful when the innovations involve lessening costs of production, responding to client demands, improving product quality, as well as upgrading into higher value added production. Such innovations undoubtedly yield increased output and productivity for firms. In the aggregate, innovation is a major driver of the economy, especially when innovations result in new product categories or in increasing productivity. There has been much interest in studying determinants of innovation as well as bottlenecks to innovation (Macasaquit, 2008; Llanto, 2010; Gonzales and Yap, 2011; Macasaquit, 2011). A proper policy environment can clearly stimulate innovation, and result in increased economic growth, which, in turn, can reinforce the climate for innovation.

Recognizing that innovation is a major driver of economic output, productivity and competitiveness, a number of representatives of government, academe, and industry formulated a national innovation strategy called “FILIPINNOVATION.” This national strategy involves developing partnerships toward making the Philippines competitive with its Asian neighbors and at par with innovation leaders in the region (Villafania, 2007; Velasco, 2009). Goals include (a) strengthening human capital; (b) supporting business incubation and acceleration (c) Regenerating the innovation environment; (d) upgrading the Filipino mindset (to be open to new ideas). While there is thus much interest in promoting a climate inductive to innovation since innovation promotes economic growth and competitiveness, there is, however, scant information regarding innovation activities in the Philippines. Studies have pointed to the meager

expenditures on R&D activities (Cororaton et al., 1998; Macapanpan, 1999; Patalinhug, 2003) and the lack of innovation among small and medium enterprises (SMEs), especially due to the SMEs' lack of financial capital (Llanto, 2010) required for engaging in innovation.

About two decades ago, Macapanpan (1999) looked into innovative activities of Filipino firms engaged in food processing, textile and garments, metals and metal fabrication, chemicals, and electronics and electrical goods. Among the firms that responded, about two thirds claimed to have conducted some form of innovation activities and half of the responding firms reported to have high-technology types of innovation activities. Many of these innovators were large firms, considered as industry leaders, with large assets. A majority of these firms also suggested that government standards, regulations, and environmental concerns were not important drivers for innovation activities; in addition, government research institutions were rated poorly as sources of innovation ideas, and were also perceived to be lagging even in monitoring technology developments. Responding firms identified financial constraints such as risk and rate of return, lack of financing and taxation as barriers to innovation; they also mentioned that Philippine schools do not provide the requisite technical and technological skills and knowledge to meet demands. Firms that practice innovation, however, employ only college graduates or lower to conduct their innovation activities

Macasaquit (2008; 2011) discusses the results of a survey of 205 manufacturing establishments across the CALABARZON (Cavite, Laguna, Batangas, Rizal, and Quezon) area conducted in 2008 by the National Statistics Office for the Philippine Institute for Development Studies (PIDS) under the auspices of ERIA. Macasaquit highlighted the weak linkages between industries and R&D generating institutions such as universities, technology resource centers, government agencies, and the private institutions; she pointed out that though the institutional structures exist and the legal and policy frameworks are in place, the process of diffusion, technology transfer and adaptation remains wanting. Why this may be happening warrants investigation.

In recognition of the need for innovation data that will provide indicators for benchmarking national performance as well as describe innovation and its relation to economic growth, the Department of Science and Technology (DOST) planned for the conduct of the 2009 Survey on Innovation Activities (SIA), a systems-oriented and policy-relevant survey on innovation. The 2009 SIA, conducted by the National Statistics Office (NSO) in collaboration with the DOST with funding support from the International Development Research Center (IDRC), was aimed at generating information on innovative behavior of establishments in selected areas and industries in the Philippines. In particular, the objectives of the SIA are to (a) describe the types of innovations engaged in by firms; (b) provide information regarding the environments in which these innovative activities are conducted; (c) determine the factors that drive their innovation performance, the barriers to innovation, and the effects of innovation on the firms.

The major data items collected from SIA include: (1) type of products/process innovation; (2) expenditures by type of innovation activity; (3) sources of information and cooperation for

innovation activity; (4) effects of innovation activity; (5) factors hampering innovation activity; (6) intellectual property rights for goods; (7) type of organizational/marketing/ knowledge management innovation introduced; (8) response to government innovation-related policies; (9) general information about the establishments, including total turnover, employment by sex, capital participation; and the like.

## 2. Sampling Scheme

The SIA involved targeting 500 establishments to be surveyed 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. Choice of these study areas was purposive, but meant to provide a semblance of a national picture with these areas representing the nation’s capital, balance Luzon, Visayas, and Mindanao. The survey covers three major industries: (a) food manufacturing, (b) electronics manufacturing, and (c) information and communication technology, The latter industry includes IT manufacturing, ICT trade, software publishing, telecommunications services, hardware consultancy, other software and consultancy supply, other computer related activities, data processing, hosting and related activities, database activities and online distribution of electronic content, repair of computers and communication equipment, publishing activities, animated films and cartoons production, motion picture, video and television program production, sound recording and music publishing activities, call center, and medical transcription activities.

In the sampling frame, 1824 establishments are covered across the three major industries in the four study areas. Target establishments were stratified into food and non-food industry clusters with a 40:60 distribution. The distribution of 474 responding establishments by major sector and by area is provided in Table 2.

**Table 2. Distribution of Sample Establishments by Major Sector**

AREA	MAJOR SECTOR			
	Food Manufacturing	Electronics Manufacturing	IT	All Sectors
<b>Cebu</b>	71	6	52	129
<b>Davao</b>	35	0	10	45
<b>Quezon City</b>	75	6	82	163
<b>PEZA</b>	10	30	97	137
<b>All Areas</b>	191	42	241	474

As in standard establishment surveys, target respondents for the SIA were the owners and managers of the sampled establishments. Reference period for the SIA was set at January 2009 to June 2010. The survey was self-administered.



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 ([http://www.oecd.org/document/2/0,3343,en\\_2649\\_34451\\_40132674\\_1\\_1\\_1\\_37417,00.html](http://www.oecd.org/document/2/0,3343,en_2649_34451_40132674_1_1_1_37417,00.html)), with some refinements to consider the Philippine setting.

Pre-testing of the SIA instrument was conducted to determine whether the questions were easily understood by respondents, and examine if the question sequence is in order (to avoid confusion in the full conduct of the survey). Ten days after distributing the questionnaires, 13 successful pretested questionnaires were obtained (from 2 micro, 1 small, 3 medium and 7 large establishments), but there were also 2 refusals ( 1 food manufacturing establishment and 1 Motion Picture Production establishment) and 3 questionnaires to be collected.

Training activities were conducted to ensure consistency in the collection of information from the respondent establishments, and uniformity in applying the data quality checks in data editing. A total of 65 field personnel in the four study areas were provided training on staggered dates

**Table 3. Summary of NSO Field Personnel Training**

Study Area	Date	Venue	Number of Participants
Quezon City	21 June 2010	NCR –Regional Office, Manila	13
CALABARZON (Cavite and Laguna)	5 July 2010	Region IV-A Regional Office, Lipa City	10 (Cavite) ; 9 (Laguna); 3 (RO)
Metro Cebu	17 July 2010	Region VII, Regional Office, Cebu City	18
Davao City	17 July 2010	Region XI, Regional Office, Davao City	12

The full set of SIA questionnaires were distributed and collected from August to November 2010. The distribution of targeted samples was set to cover more of medium and large enterprises (80%), than small (10%) and micro (10%) establishments. By definition, micro establishments have employment size less than 10; while employment size for small, medium and large establishments range from 10 to 99, 100 to 199, 200 and above, respectively. Table 4 presents the distribution of responding establishments by size and by sector.

**Table 4. Distribution of Sample Establishments by Size and by Major Sector**

SIZE	MAJOR SECTOR			
	Food Manufacturing	Electronics Manufacturing	IT	All Sectors
<b>Micro</b>	76 (39.8)	2 (4.8)	28 (11.6)	106 (22.4)
<b>Small</b>	62 (32.5)	6 (14.3)	39 (16.2)	107 (22.6)
<b>Medium</b>	23 (12.0)	15 (35.7)	42 (17.4)	80 (16.9)
<b>Large</b>	30 (15.7)	19 (45.2)	132 (54.8)	181 (38.2)
<b>Total</b>	191 (100.0)	42 (100.0)	241 (100.0)	474 (100.0)

Note: Column Percentages in Parentheses.

Establishments not responding received follow-up communications, from NSO field offices. Aside from non-responses, there were others problems encountered in field operations, viz., closures of firms, particularly micro-sized ones, cases of “cannot be located” due to transfers outside of the survey area, outright refusal, consolidated reporting. These problems led the NSO to further select 45 replacement establishments, with the following prioritization:

- Replacement would be located in the same city and engaged in the same industry stratum or employment size;
- Replacement would be located in the same city, but engaged in another industry stratum or employment size

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% for Cebu and Davao, 97.5% for Cavite, 94.8% for Quezon City and 80.0% for Laguna.

The accomplished questionnaires underwent manual editing and verification by NSO staff before data entry. Completeness and consistency checks were undertaken before tabulation (based on tabular plans developed from the questionnaire). Figures generated in this report were not weighted owing to the purposive nature of the survey. Data evaluation by the NSO was finalized in late December of 2010, while submission of micro-data files to DOST was done by 25 January 2011.

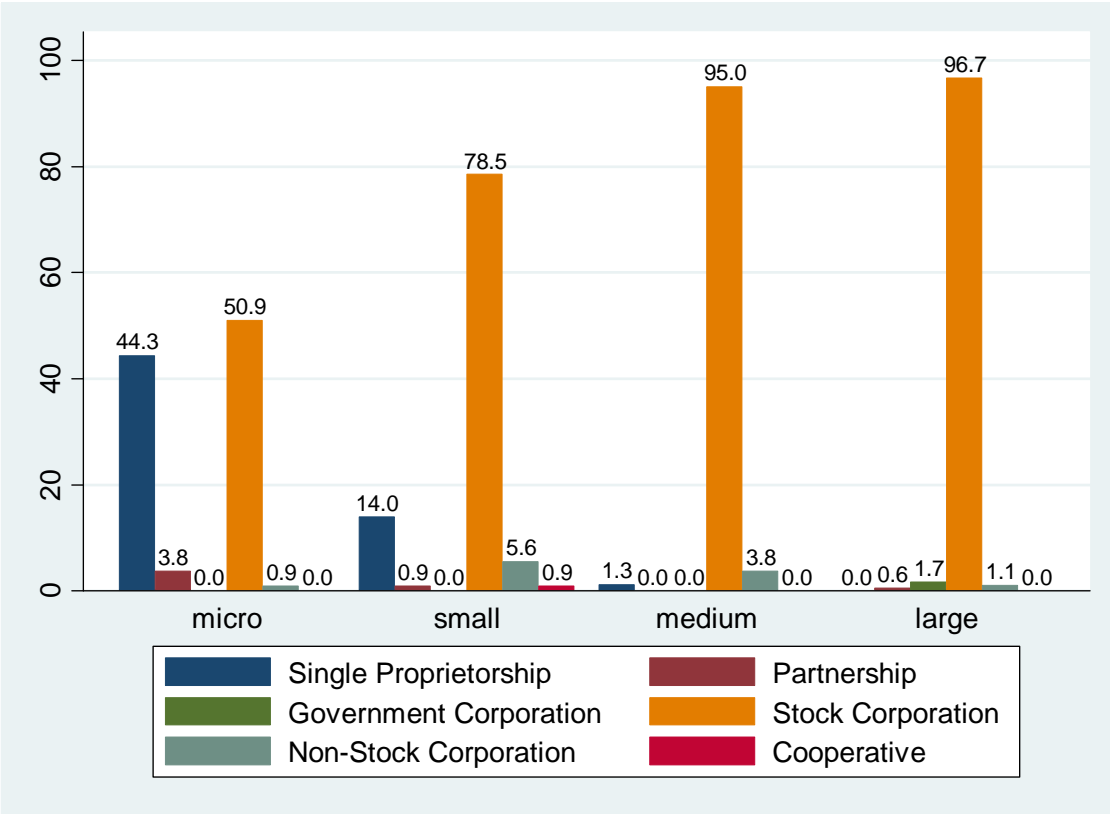
Given its vast experience in the conduct of policy-oriented studies on innovation, the PIDS was tasked to assist the DOST in summarizing the results of the 2010 SIA, in the hope of providing empirical basis for designing innovation policies consistent with Filipinnovation as well as to help mainstream an innovation-system approach in national policy-making. The PIDS was also tasked to come up with survey results pertaining to two sites, viz., Quezon City and PEZA. For Cebu and Davao, the DOST Regional Offices selected a local consultant from a research/academic institution to analyze the survey results and to advocate for innovation issues

at the local sites. Local experts had writeshops for data familiarization, for standardizing the design of survey tabulation formats, and survey data analysis. Local steering committees were also convened in Quezon City, Cebu and Davao with the local chief executive as chair of these committees. For PEZA, the DOST requested PEZA management to encourage sampled firms in the zone to cooperate in the conduct of the survey. The coordination efforts were also meant to advocate for local interventions aimed at promoting innovation activities. Results of the survey were also presented before focus groups to obtain views regarding the survey toward improving the measurement of innovation in the future.

In order to monitor innovation activities in the country, and measure the impact of innovation policies over time, the DOST is aiming to have the SIA institutionalized and conducted at a regular basis, as is currently done in some countries. Toward this end, the results of this pilot 2010 survey, including the questionnaire used, will have to undergo some review in order to ensure that innovation is measured well and consistently across time.

### **3. Profile of Establishments**

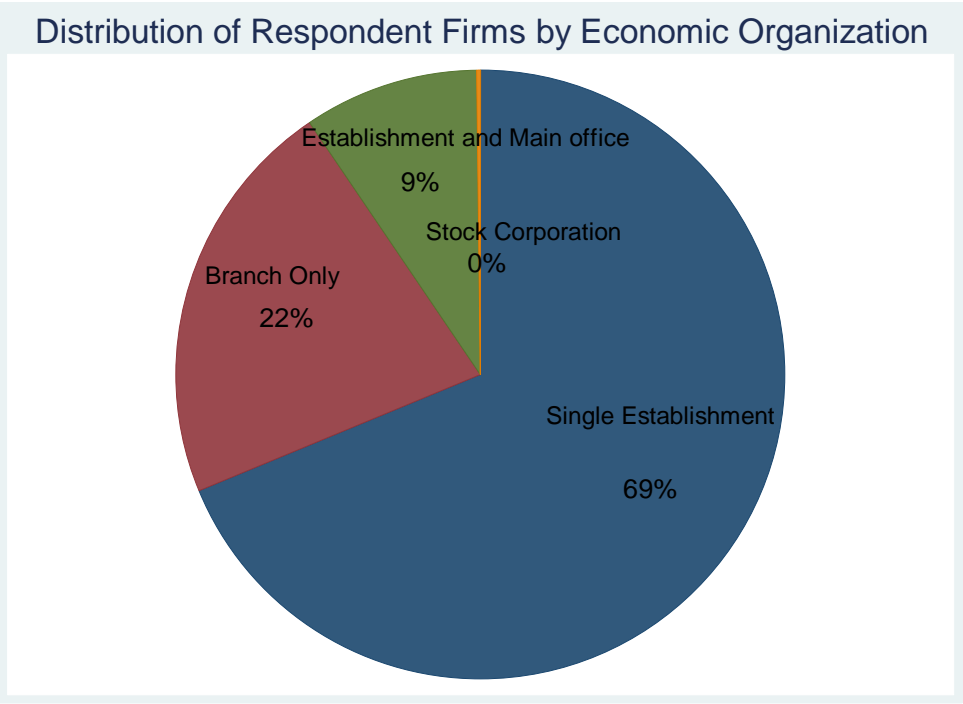
About four in five of the 474 responding establishments in the SIA are stock corporations. Among micro (small) establishments with 9 or fewer employees (10 to 99 employees), slightly over 50% (around 80%) are stock corporations, while single proprietorships rank next: about 45% (15%). For medium and large firms that have employment size 100 to 199, and 200 and above, respectively, about 19 in 20 are stock corporations. (See Figure 2).



**Figure2. Percentage Distribution of Sample Establishments by Size and by Legal Organization**

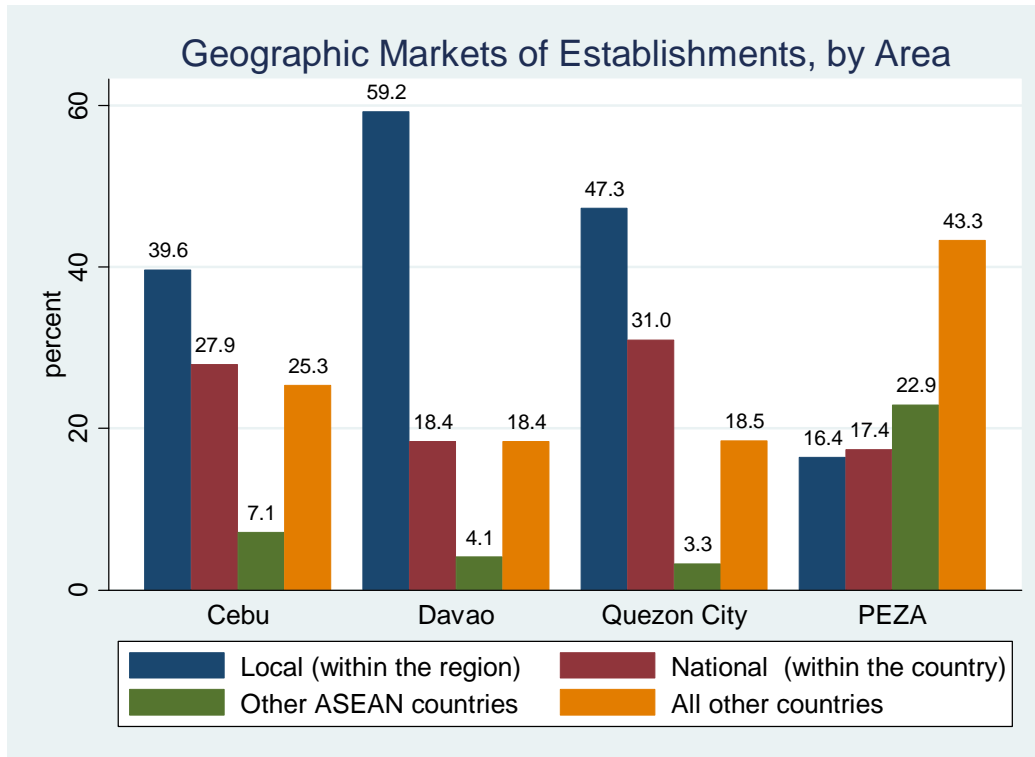
**Note: Percentages across size of establishment.**

About two thirds of respondent establishments are single establishments (see Figure 3), with the share of establishments that are single establishments varying by industry: food manufacturing (slightly over half), electronics (about four fifths), and in IT (close to three fourths).



**Figure3. Sampled Establishments by Economic Organization.**

Geographic markets that responding establishments sold goods or services to from January 2009 up to the survey period vary by study area (Figure 4). 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 ASEAN. The latter region is the dominant market for establishments in the PEZA zone. Firms in PEZA had other ASEAN countries as the next dominant geographic market. In contrast to 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).



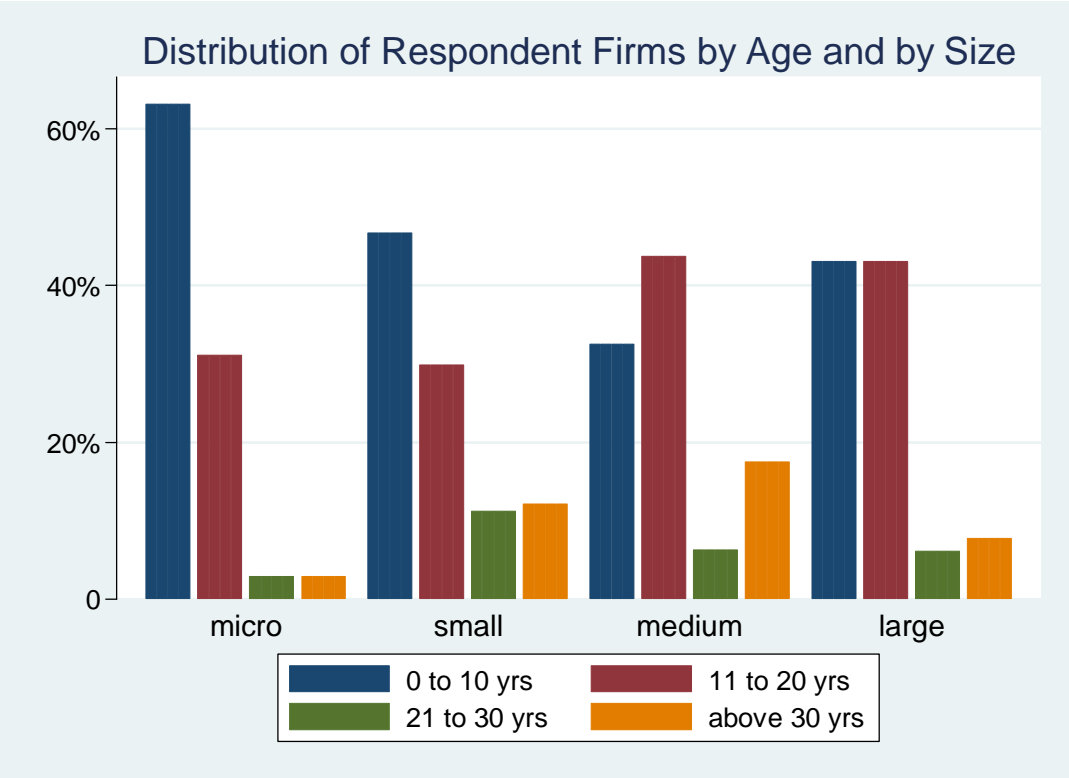
**Figure4. Percentage of establishments in each study area by geographic market.**

As indicated in Table 5, the biggest concentration of capital/equity of the surveyed establishments is from local investors. In the PEZA zone, however, the average share of capital participation across the establishments among local investors is only about 25%, with Japanese investors having double the share of local investors. Among micro establishments, capital participation practically comes from local investors. Among small establishments, local investors still dominate capital participation, but across areas, the distribution varies: in Cebu, Filipinos have about 90% share of capital while Americans practically have the remaining 10%; in PEZA, the dominant nationalities are Filipinos (about two thirds), Koreans (about a fourth), and Japanese (about a tenth); in Davao and Quezon City, practically all small firms are capitalized by local investors. Among medium establishments, the dominant investors are Filipinos, Japanese and Americans with the Japanese outranking the locals in PEZA, and the Americans having similar shares to Japanese in Cebu. Among large firms, Filipinos and Japanese have the largest share of capital overall, but when examining distributions across areas as well, we find Americans having similar capital shares with Filipinos in Cebu, Filipinos having the majority shares in Davao but with considerable shares from Americans, British, and Chinese, Filipinos and Americans dominating Quezon City shares, while in PEZA, Japanese have half the share, while about thirty percent is equally shared by Filipinos and Koreans.

**Table 5, Capital participation across Nationality, by size of establishment and by area.**

SIZE	NATIONALITY	AREA				
		Cebu	Davao	Quezon City	PEZA	Total
Micro	Filipino	94.81	96.88	99.14		97.49
	American	1.25	0.00	0.00		0.38
	British	0.00	0.00	0.00		0.00
	Chinese	0.00	3.13	0.86		0.94
	German	0.00	0.00	0.00		0.00
	Japanese	0.00	0.00	0.00		0.00
	Korean	0.81	0.00	0.00		0.25
	Singaporean	0.00	0.00	0.00		0.00
	Taiwanese	0.00	0.00	0.00		0.00
Others	3.13	0.00	0.00		0.94	
Small	Filipino	83.03	95.79	96.05	64.20	88.16
	American	9.60	0.00	2.63	0.00	4.52
	British	0.00	2.11	0.00	0.00	0.37
	Chinese	0.00	0.00	1.32	0.00	0.47
	German	0.00	0.00	0.00	0.00	0.00
	Japanese	2.48	0.00	0.00	9.90	1.85
	Korean	0.00	2.11	0.00	25.90	2.79
	Singaporean	0.00	0.00	0.00	0.00	0.00
	Taiwanese	0.00	0.00	0.00	0.00	0.00
Others	4.90	0.00	0.00	0.00	1.83	
Medium	Filipino	41.00	100.00	85.21	34.34	54.08
	American	18.09	0.00	0.01	3.23	6.23
	British	2.31	0.00	0.00	0.00	0.64
	Chinese	2.27	0.00	0.00	1.61	1.25
	German	0.00	0.00	0.00	3.22	1.25
	Japanese	22.63	0.00	4.35	45.24	25.01
	Korean	0.00	0.00	4.35	9.61	4.98
	Singaporean	0.00	0.00	0.00	2.58	1.00
	Taiwanese	0.00	0.00	6.09	0.00	1.75
Others	13.69	0.00	0.00	0.16	3.83	
Large	Filipino	35.66	35.00	69.31	19.89	35.45
	American	35.92	20.00	16.72	3.22	13.38
	British	0.00	16.50	0.01	0.00	0.55
	Chinese	2.86	16.67	0.00	0.00	1.10
	German	1.71	1.67	2.27	1.98	1.99
	Japanese	11.43	6.83	0.00	49.45	28.67
	Korean	0.00	1.67	0.09	14.86	7.96
	Singaporean	0.00	1.67	1.59	0.97	0.96
	Taiwanese	2.86	0.00	4.52	4.33	3.95
Others	9.56	0.00	5.49	5.29	5.99	
All sizes	Filipino	65.93	88.44	88.40	26.39	64.37
	American	16.12	2.67	5.13	2.99	7.27
	British	0.39	3.09	0.00	0.00	0.40
	Chinese	1.16	3.33	0.61	0.36	0.95
	German	0.47	0.22	0.61	2.12	0.97
	Japanese	7.73	0.91	0.61	45.61	15.58
	Korean	0.20	1.11	0.64	14.48	4.57
	Singaporean	0.00	0.22	0.43	1.26	0.53
	Taiwanese	0.78	0.00	2.08	3.04	1.80
Others	7.22	0.00	1.48	3.74	3.56	

Sampled firms are relatively young (See Figure 5). About half of the firms were established during the past ten years, this is especially true among micro-establishments (63%). For medium and large firms, about 80 percent were established in the past twenty years.



**Figure 5. Distribution of establishments by number of years since establishment and by size of establishment.**

Overall, the share of female employment among sampled establishments is practically equal to that for males (see Table 6) though, variations exist across area, size of the establishment and major industry. Sampled establishments engaged in food manufacturing (except for micro establishments in Davao) employ substantially fewer females than males. Micro-establishments in the electronic manufacturing industry located in Quezon City employ about four fifths of females among their total employment, large firms in either electronic manufacturing industry or IT located in the PEZA also employ a considerable proportion of females. This is the only sex-disaggregated information that can be generated from the SIA.



**Table 6. Share of Female Employment to Total Employment across areas by Major Industry and by Size of Establishment**

MAJOR INDUSTRY	AREA and SIZE				
	Cebu				
	micro	Small	medium	Large	Total
Food Manufacturing	48.81	39.16	29.52	35.67	40.79
Electronics Manufacturing		21.21	21.59	46.13	29.71
IT	42.86	50.54	59.25	54.51	52.86
Total	47.51	42.41	41.95	48.11	45.14
MAJOR INDUSTRY	AREA and SIZE				
	Davao				
	micro	small	medium	Large	Total
Food Manufacturing	61.10	42.77	13.52	31.03	44.01
Electronics Manufacturing					
IT	47.50	33.22	42.86		41.32
Total	56.85	40.76	20.86	31.03	43.42
MAJOR INDUSTRY	AREA and SIZE				
	QC				
	micro	small	medium	Large	Total
Food Manufacturing	34.70	42.95	32.93	40.19	37.22
Electronics Manufacturing	80.00	41.67	16.51		41.86
IT	37.09	43.14	39.99	46.61	43.07
Total	36.92	43.00	34.47	45.59	40.33

MAJOR INDUSTRY	AREA and SIZE				
	PEZA				
	micro	Small	medium	Large	Total
Food Manufacturing		63.64	33.47	18.57	27.55
Electronics Manufacturing		32.39	40.18	74.56	58.62
IT		70.63	65.32	70.26	69.31
Total		54.63	54.94	67.79	63.92
MAJOR INDUSTRY	AREA and SIZE				
	All Areas				
	micro	Small	Medium	Large	Total
Food Manufacturing	43.16	41.65	29.13	32.38	39.29
Electronics Manufacturing	80.00	32.07	31.73	71.57	52.10
IT	40.39	48.11	56.10	61.01	55.67
Total	43.12	43.47	43.78	57.37	48.75

## 4. Innovation Activity

As indicated in the introduction of this report, innovation occurs in establishments when new knowledge is put to work in the production process. The SIA asks a sufficient range of questions to probe on the activities conducted by firms, the level effort employed and the achievement of new or improved products and/or processes. Establishments are defined as innovation active if they are

- product innovators that introduced new or significantly improved products , i.e., goods and/or services;
- process innovators that introduced (i) new or significantly improved methods of manufacturing or producing goods or services.(ii) new or significantly improved logistics, delivery or distribution methods for your inputs, goods and services; (iii) new or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing;
- engaged in innovation projects that are either not yet complete or abandoned;
- engaged in expenditure of innovation activities for
  - (i) internal or outsourced R&D;
  - (ii) training;
  - (iii) acquisition of external knowledge machinery, equipment or software linked to innovation activities;
  - (iv) market introduction of innovations; and,
  - (v) other preparations to implement innovations.

Tables 7, 8 and 9 provide key statistics on innovation activity by size, by major sector, and by study area, respectively. Overall, more than half (54%) of sampled establishments were classified as being innovation active during the period January 2009 to 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 micro-establishments, and half for small establishments. About two in five establishments were product innovators (38 per cent), and this rate is about similar to the proportions of process innovators (44 per cent). Of those establishments that had product innovations, a bigger share had also process innovations as well than those that only had product innovations. Similarly, among those that had process innovations, a smaller share of these establishments had process innovations alone. About one in ten establishments had projects to develop product or process innovations that had to be abandoned between January 2009 to 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, that include marketing innovation, about one in five had some form of government support. A bigger share of medium sized firms report government support for marketing innovation than small and micro establishments.

**Table 7. Key Statistics on Innovation Activity by Size of Establishments**

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

The larger the establishment, the more likely that it innovates. Even average expenditures in innovation rise with the size of establishments. Micro establishments only spend an average of 50 thousand in a year, small and medium establishments both have average annual innovation expenditures at 3 million pesos, while large establishments spend an average of 30 million pesos.

Across industries, establishments in electronics manufacturing and IT are the most innovation active. In addition, average expenditures in innovation activities are also highest for electronics manufacturing at 25 million pesos, in contrast to food manufacturing where innovation expenditures averages only 2.7 million pesos.

**Table 8. Key Statistics on Innovation Activity by Major Industry**

<b>Proportion of establishments that are/have:</b>	<b>Food Manufacturing</b>	<b>Electronics Manufacturing</b>	<b>IT</b>	<b>All firms</b>
<b>Innovation Active</b>	47.1%	64.3%	58.5%	54.4%
<b>Product Innovators</b>	33.5%	50.0%	38.6%	37.6%
<b>Of which share with new-to-market products</b>	65.6%	66.7%	52.7%	59.0%
<b>Process innovations</b>	37.2%	54.8%	47.3%	43.9%
<b>Of which share of those that developed process innovation within the establishment or enterprise</b>	93.0%	87.0%	90.4%	90.9%
<b>Both product and process Innovators</b>	26.7%	42.9%	32.8%	31.2%
<b>Either product or process Innovator</b>	44.0%	61.9%	53.1%	50.2%
<b>Ongoing Innovation activities</b>	35.1%	45.2%	44.8%	40.9%
<b>Abandoned Innovation activities</b>	13.1%	2.4%	13.7%	12.4%
<b>Innovation-related expenditure</b>	34.0%	45.2%	44.4%	40.3%
<b>Memo Notes</b>				
<b>Average annual expenditures for innovation activities (in '000 PHP)</b>	2646.7	25494.6	18385.2	12367.6
<b>Proportion of establishments that have/are</b>				
<b>Public financial support for innovation</b>	1.0%	4.8%	5.0%	3.4%
<b>Innovation co-operation</b>	32.4%	26.3%	37.4%	34.5%
<b>Organizational innovations</b>	47.1%	66.7%	64.7%	57.8%
<b>Memo Note</b>				
<b>Average percentage of employees affected by establishment's organizational innovations</b>	63.5%	49.5%	54.1%	56.7%
<b>Proportion of establishments that are/with</b>				
<b>Marketing Innovators</b>	49.7%	45.2%	51.9%	50.4%
<b>With Knowledge Management Practices</b>	51.3%	73.8%	68.9%	62.2%
<b>With Government Support or Assistance to Innovation</b>	19.9%	21.4%	22.8%	21.5%

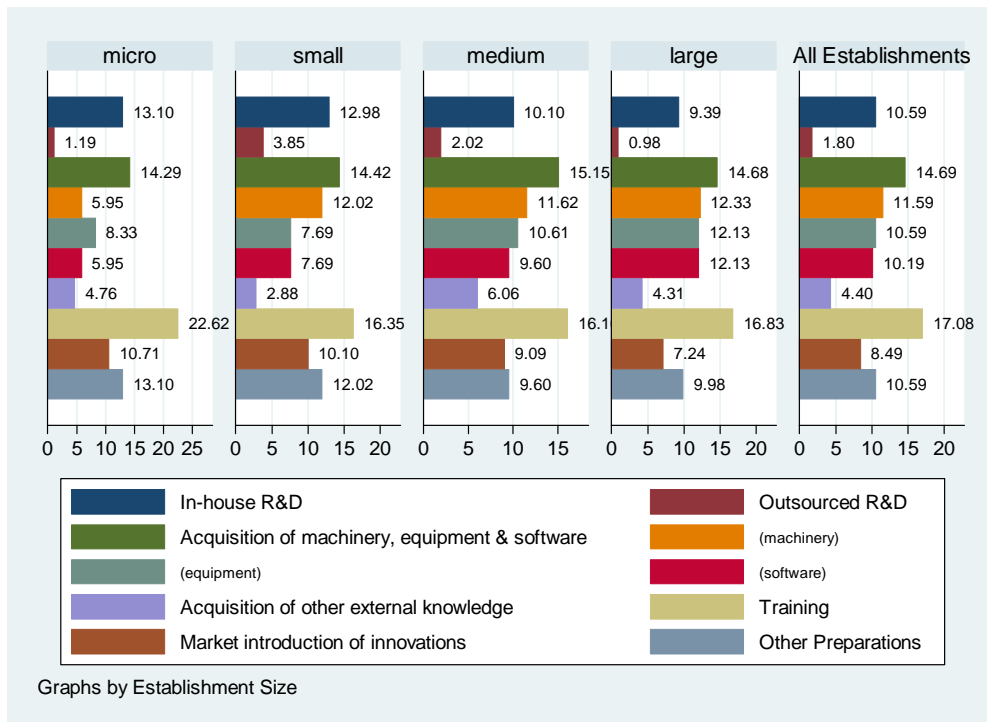
**Table 9. Key Statistics on Innovation Activity by Area**

<b>Proportion of establishments that are/have:</b>	<b>Metro Cebu</b>	<b>Davao</b>	<b>QC</b>	<b>PEZA</b>	<b>All firms</b>
<b>Innovation Active</b>	55.8%	42.2%	42.3%	71.5%	54.4%
<b>Product Innovators</b>	38.0%	33.3%	26.4%	51.8%	37.6%
<b>Of which share with new-to-market products</b>	81.6%	53.3%	53.5%	47.9%	59.0%
<b>Process innovations</b>	47.3%	31.1%	30.7%	60.6%	43.9%
<b>Of which share of those that developed process innovation within the establishment or enterprise</b>	91.8%	85.7%	94.0%	89.2%	90.9%
<b>Both product and process Innovators</b>	33.3%	24.4%	18.4%	46.7%	31.2%
<b>Either product or process Innovator</b>	51.9%	40.0%	38.7%	65.7%	50.2%
<b>Ongoing Innovation activities</b>	47.3%	26.7%	29.4%	53.3%	40.9%
<b>Abandoned Innovation activities</b>	18.6%	6.7%	8.0%	13.9%	12.4%
<b>Innovation-related expenditure</b>	43.4%	28.9%	29.4%	54.0%	40.3%
<b>Memo Notes</b>					
<b>Average annual expenditures for innovation activities (in ‘000 PHP)</b>	13701.1	47.6	5655.7	25612.8	12367.6
<b>Proportion of establishments that have/are</b>					
<b>Public financial support for innovation</b>	2.3%	6.7%	0.0%	7.3%	3.4%
<b>Innovation co-operation</b>	30.6%	61.5%	29.2%	36.5%	34.5%
<b>Organizational innovations</b>	61.2%	51.1%	44.8%	72.3%	57.8%
<b>Memo Note</b>					
<b>Average percentage of employees affected by establishment’s organizational innovations</b>	57.20%	53.3%	69.2	47.80%	56.7%
<b>Proportion of establishments that are/with</b>					
<b>Marketing Innovators</b>	55.0%	46.7%	44.2%	54.7%	50.4%
<b>With Knowledge Management Practices</b>	69.0%	51.1%	49.7%	74.5%	62.2%
<b>With Government Support or Assistance to Innovation</b>	21.7%	28.9%	12.3%	29.9%	21.5%

Across study areas, establishments in the PEZA zone lead in innovation activity, with an average expenditures in innovation activities at 25.6 million pesos. Quezon City and Davao

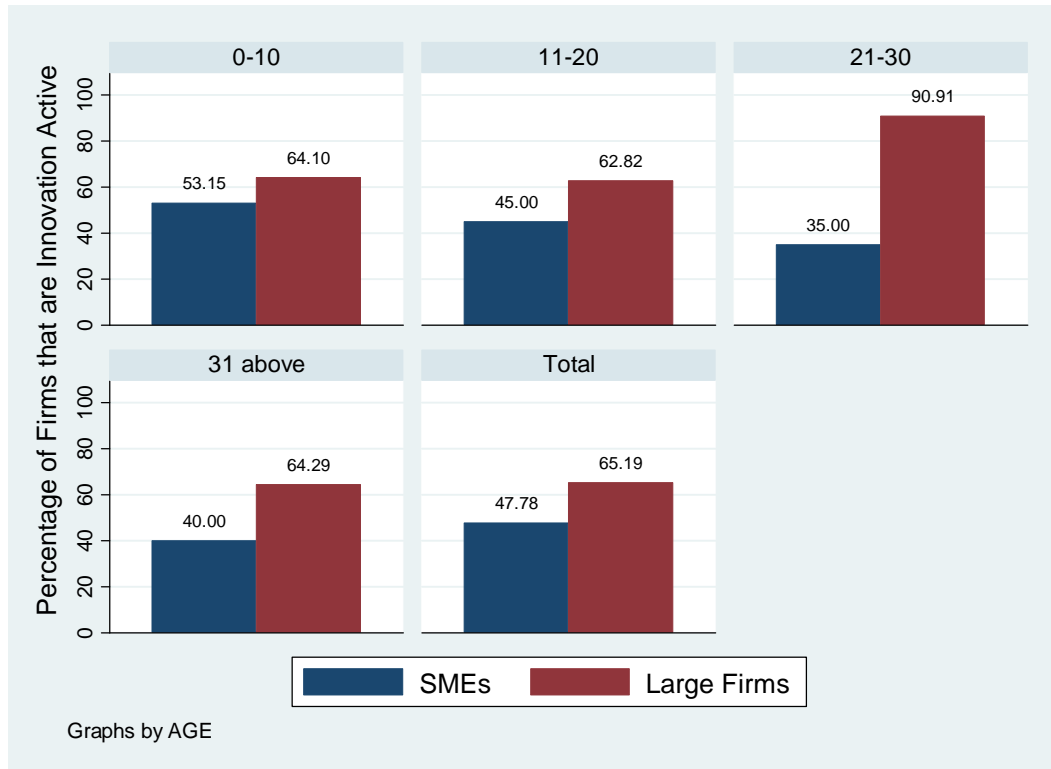
establishments have the least innovation activities, with average innovation expenses at 5.7 million pesos and 47 thousand pesos, respectively. Davao though leads in innovation cooperation. None of the establishments in Quezon City are provided public financial support in innovation, although one out of ten received government support or assistance to wider forms of innovation.

Forty per cent of establishments had some innovation-related expenditure during 2009. As shown in Figure 6, the most commonly reported activities were in investment in training, followed by acquisition of computer software and hardware, in-house R&D, and other preparations.



**Figure 6. Breakdown of innovation activities in establishments by size of establishment.**

Innovative behavior varies across the size of the establishment and age since its establishment (see Figure 7). Among large firms, those that have been established within 21 to 30 years are the most innovative, while among establishments that are not large (SMEs), those fairly young (which were established in the last ten years or so) appear to be the most innovative.



**Figure 7. Innovation activity by age and size of establishment.**

As shown in Table 10, innovation active firms varied considerably across industry groups. Sixty-seven per cent of firms in IT manufacturing were innovation active, compared with 33 per cent of enterprises in the publishing activities and motion picture industry, and 47 percent in food manufacturing. Large firms tend to be more innovation active than small firms, except in the publishing activities and motion picture industry where the rates are practically similar. joy

**Table 10 Distribution of Establishment by Innovation Activity Across Industry Group and Size of Establishments**

Industry Group	SME*	Large	All Establishments
Food Manufacturing	42.9%	70.0%	47.1%
Electronics Manufacturing	56.5%	73.7%	64.3%
IT	53.2%	62.9%	58.5%
IT Manufacturing	58.1%	70.1%	66.7%
ICT Service Industries	61.4%	56.3%	60.0%
Publishing activities and motion picture	34.8%	30.0%	33.3%
Business process outsourcing	45.5%	58.6%	55.0%
<b>Total</b>	<b>47.8%</b>	<b>65.2%</b>	<b>54.4%</b>

\*SME= micro, small and medium establishments



About one in innovation active firms filed for intellectual property rights (IPRs), especially in registering a trademark. The filing of IPRs is three to four times better among innovation active establishments than among firms that did not innovate. (see Table 11)

**Table 11 Percentage of Establishments that filed for Intellectual Property Rights, by Innovation Activity Status**

Intellectual Property Rights	Innovators	Non-innovators	All firms
Apply for a patent	10.1%	2.3%	6.5%
Register an industrial design	7.8%	2.3%	5.3%
Register a trademark	14.7%	4.6%	10.1%
Claim a copyright	6.2%	2.3%	4.4%
At least one of the above	21.7%	5.6%	14.3%

## 5. Determinants of Innovation and Constraints on Innovation

While the profile obtained in the previous section from cross-tabulations and/or figures provides meaningful information about factors that may influence innovative behavior among firms, they do not account for effects of these factors in the presence of other factors. In order for government to formulate and implement evidence-based policy interventions, it is important to examine more carefully the determinants of innovation as well as understand the barriers and bottlenecks to innovation. Toward this end, it is helpful to employ an econometric model, such as a (binary) probit regression, that enables us to identify whether a target variable helps explain innovative behavior. Variables examined in a probit regression model to explain how likely are establishments to be product innovators, process innovators, and innovators, in general, 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
- engaged in knowledge management.

The latter variable, however, may be an endogenous variable, that is, innovation may itself be causing knowledge management practices. To handle such endogeneity issues, we use a standard econometric tool, the use of an instrumental variable. We use as our instrument in the probit model an indicator on whether or not the firm receives some kind of government support. This variable, by itself does not explain innovation activity, and does not itself belong in the explanatory equation but it is correlated with the endogenous explanatory variable (the indicator on whether or not the firm is engaged in knowledge management practices, conditional on the other covariates).

Table 12 shows the regression results. We find that the practice of knowledge management practices is a good determinant of product innovation, process innovation and being an innovator, in general. Employment size matters, but only significantly for process innovation: The larger the firm, the more likely it is a process innovator. Location matters: firms in PEZA, all other things 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. This result is consistent, with what is found in the literature, that firms within economic zones are more likely to be innovators. 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 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 innovative behavior is concerned. Neither does the share of foreign capital participation appear to explain significantly the propensity to innovate.

\

**Table 12 Determinants of Product Innovation, Process Innovation and Innovation Activity**

Variable	Remarks	PRODUCT INNOVATOR	PROCESS INNOVATOR	INNOVATOR
Km	Indicator Variable whether or not firm engages in knowledge management	2.007017***	2.0708336***	2.2958185***
localmarketonly	Indicator Variable whether or not firm's geographic market is only local market	-0.12314	0.109687	-0.0917
Foreign	Share of foreign capital participation in establishment	-0.00267	-0.00179	-0.00267
fem_share_emp	Share of women employment to total employment	0.001187	-0.0008	0.000483
Age	In years since establishment of firm	-0.00369	0.001258	-0.00139
sectorgp1	Whether or not firm in Food Manufacturing (base)	0.262935	0.273028	0.392788
sectorgp2	Whether or not firm in Electronics Manufacturing			
sectorgp3	Whether or not firm in IT	-0.09802	0.016801	0.074976
logsize	Log of employment size	0.043169	.10081286*	0.056978
loc1	Whether or not located in Cebu	-.33721563*	-0.3039	-.3972632*
loc2	Whether or not located in Davao	-0.18589	-0.41769	-0.3576
loc3	Whether or not located in Quezon City	-0.24872	-0.33312	-0.25011
loc4	Whether or not located in PEZA (base)			
_cons		-1.2176161***	-1.487917***	-1.03412***
Diagnostics				
Number of data		474	474	474
Overall chisquare				
Wald chi2(11)		175.44	164.53	356.52
p-value		0.0000	0.0000	0.0000
Wald test of exogeneity pvalue		0.0017	0.0264	0.0009
Probit Classification from using predicted probabilities to classify innovation activity using a threshold of 50%				
sensitivity	Proportion of innovation active firms correctly classified	83.15%	85.58%	82.95%
specificity	Proportion of non-innovation active firms correctly classified	52.36%	56.39%	62.50%
correctly classified		63.92%	69.20%	73.63%

Legend: \* p<.05; \*\* p<.01; \*\*\* p<.001

Barriers can be obstacles within the establishment, such as human resources, financial resources, or external factors that prevent innovation. The SIA asked establishments, both innovators and non-innovators, about a wide range of issues that constrain their ability to innovate. The human, financial bottlenecks could be removed by policy interventions, coupled with cooperation of various stakeholders in the national innovation system.

Tables 13 and 14 show the proportion of responding establishments (by size, as well as across innovators and non-innovators by sector, respectively) that gave a 'high' rating to some potential constraints. Cost factors were commonly identified by the responding establishments as significant barriers to innovation.

Direct costs of innovation were viewed as being too high (one out of four responding establishments associated a high degree of importance to this, this is especially among true 30% of micro establishments and 28% of small establishments). 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. That is, establishments engaged in innovation activity were equally likely to perceive barriers as being highly important compared to those who did not attempt to innovate.

**Table 13 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
<b>1. Cost factors</b>	a. Lack of funds within your establishment or enterprise	34.9%	22.4%	20.0%	19.3%	23.6%
	b. Lack of finance from sources outside your 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%
<b>2. Knowledge factors</b>	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%
<b>3. Market factors</b>	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%

**Table 14 Percentage of Establishments that Regarded Potential Barriers to Innovation as “High”, Among Innovators and Non-Innovators by Major Sector**

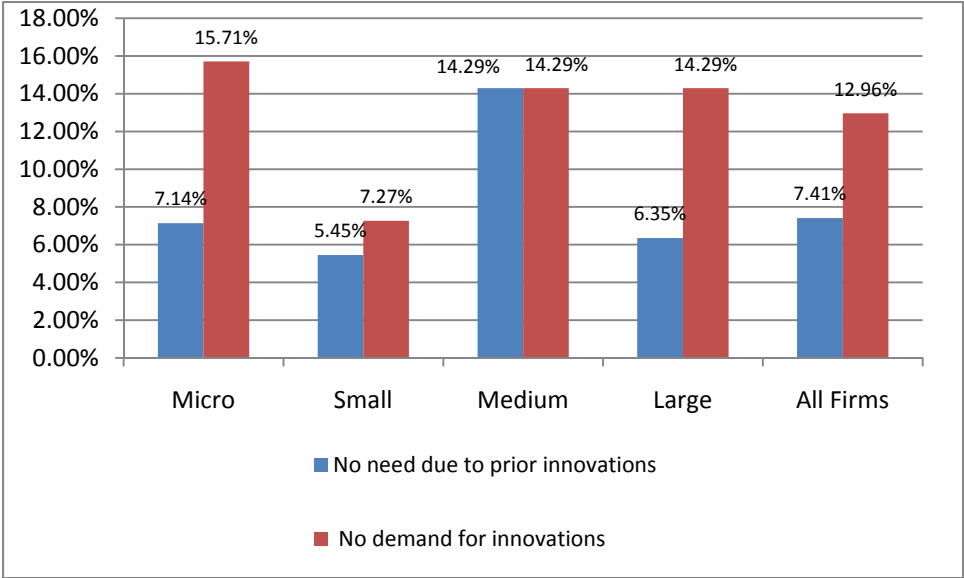
Factors Hampering Innovation Activities		Food Manufacturing			Electronics Manufacturing			IT			All firms
		Non innovator	Innovator	All firms	Non innovator	Innovator	All firms	Non innovator	Innovator	All firms	
<b>1. Cost factors</b>	a. Lack of funds within your establishment or enterprise	32.7%	30.0%	31.4%	20.0%	7.4%	11.9%	19.0%	19.9%	19.5%	23.6%
	b. Lack of finance from sources outside your enterprise	23.8%	13.3%	18.8%	6.7%	3.7%	4.8%	13.0%	13.5%	13.3%	14.8%
	c. Innovation costs too high	29.7%	23.3%	26.7%	26.7%	11.1%	16.7%	21.0%	28.4%	25.3%	25.1%
<b>2. Knowledge factors</b>	a. Lack of qualified personnel	14.9%	13.3%	14.1%	6.7%	11.1%	9.5%	7.0%	10.6%	9.1%	11.2%
	b. Lack of information on technology	11.9%	8.9%	10.5%	20.0%	3.7%	9.5%	8.0%	12.1%	10.4%	10.3%
	c. Lack of information on markets	8.9%	8.9%	8.9%	6.7%	11.1%	9.5%	9.0%	9.9%	9.5%	9.3%
	d. Difficulty in finding cooperation partners for innovation	15.8%	3.3%	9.9%	0.0%	0.0%	0.0%	10.0%	13.5%	12.0%	10.1%

Factors Hampering Innovation Activities		Food Manufacturing			Electronics Manufacturing			IT			All firms
		Non innovator	Innovator	All firms	Non innovator	Innovator	All firms	Non innovator	Innovator	All firms	
<b>3. Market factors</b>	a. Market dominated by established enterprises	18.8%	14.4%	16.8%	20.0%	18.5%	19.0%	9.0%	11.3%	10.4%	13.7%
	b. Uncertain demand for innovative goods or services	13.9%	5.6%	9.9%	13.3%	14.8%	14.3%	9.0%	9.2%	9.1%	9.9%

Across sectors (see Table 15), non-innovators cite market conditions slightly more as the reason for no innovations. About three in twenty (13%) of responding non-innovative 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. The difference in rates is most evident among large firms (see Figure 8).

**Table 15 Reasons for No Innovation Activity by Major Sector (Non-innovators 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 Non-innovative firms	7.41%	12.96%



**Figure 8. Percentage of Non-Innovating Establishments that Regarded Potential Reasons not to Innovate as “High”, by Establishment Size.**

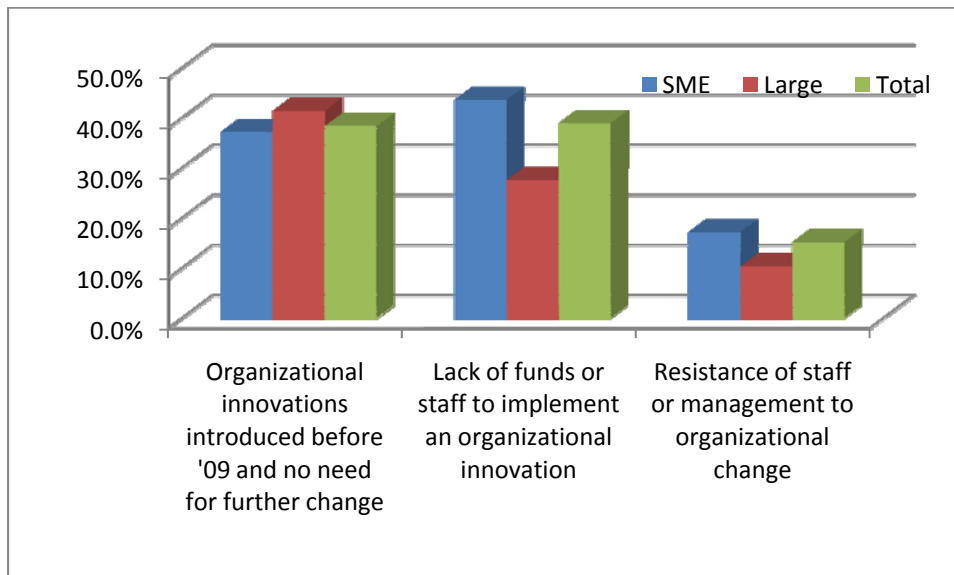
## 6. Wider Forms of Innovation

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, often in conjunction with product or process innovation, but also as an independent means of improving competitiveness.

Responding firms in the NIS were asked whether they had made major changes to their organizational structure and business practices in the reference period. Key results are summarized in Tables 16. As might be expected, a greater proportion of large firms engaged in one or more of these changes (83 per cent of large firms compared to 71 percent of SMEs). In IT, though, the difference between the rates of SMEs and large establishments that have introduced a wider form of innovation is not as big as the other two sectors. In electronics manufacturing and IT firms, much of the changes implemented in wider forms of innovation are in the realm of knowledge management systems and organizational innovation. As far as marketing innovation, large-size firms in food manufacturing (70%) take the lead in implementing marketing innovation.

Among establishments that signified that they did not conduct organizational innovation, about half (43%) of SMEs reported funding issues, as compared to a much smaller rate (28%) for large firms. About half of firms, both SMEs and large firms, reported no need for current organizational innovation as a result of innovations conducted before 2009. Only about one in ten non-innovators mention human resource problems as a reason for not engaging in organizational innovation (see Figure 9).

**Figure 9. Reasons for No Organizational Innovation, by Establishment Size (among Non innovating Firms only).**





**Table 16. Percentage of Establishments that Introduced Wider Forms of Innovation, by Major Industry and by Size of Establishment**

	Food Manufacturing			Electronics Manufacturing			IT			All Industries		
	SME	Large	All firms	SME	Large	All firms	SME	Large	All firms	SME	Large	All firms
<b>Wider Form of Innovation (any of the changes below)</b>	64.6%	76.7%	66.5%	73.9%	84.2%	78.6%	79.8%	84.1%	82.2%	71.0%	82.9%	75.5%
Changes to Organizational Structure or Business Strategy	44.1%	63.3%	47.1%	60.9%	73.7%	66.7%	62.4%	66.7%	64.7%	52.2%	66.9%	57.8%
Changes to Marketing Concepts or Strategies	46.0%	70.0%	49.7%	47.8%	42.1%	45.2%	53.2%	50.8%	51.9%	48.8%	53.0%	50.4%
Changes in Knowledge Management	49.7%	60.0%	51.3%	65.2%	84.2%	73.8%	64.2%	72.7%	68.9%	56.3%	71.8%	62.2%

## 7. Effects of Innovation

The NIS sought information about the effects of innovation on the establishment. Respondents were asked to rank a number of likely effects of innovation on a scale from 'not relevant' (4), through 'low' (3), 'medium' or 'high' perceived effects. Table 17 provides the proportion of innovation active respondents who answered 'high' in each category. Corresponding percentages of firms engaged in organizational innovation, and marketing innovation are found in Tables 18 and 19, respectively.

Product related effects were more often cited than process (cost) effects, especially among large firms. About three fifths (60 per cent) of innovation active firms rated improving the quality of goods or services as highly important. Increasing the range of goods or services was also 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, the most highly ranked effect is customer-related, i.e. improved customer satisfaction or strengthened customer relationship.

**Table 17 Percentage of Innovation Active Establishments rating Effects of the Product and Process Innovation as ‘high’**

Effects of the Product and Process Innovation		Food Manufacturing			Electronics Manufacturing			IT			All establishments
		SME	Large	All firms	SME	Large	All firms	SME	Large	All firms	
<b>Product oriented effects</b>	Increased range of goods or services	60.0%	73.3%	62.9%	37.5%	36.4%	36.8%	38.5%	47.1%	44.0%	50.0%
	Entered new markets or increased market share	40.0%	73.3%	47.1%	37.5%	36.4%	36.8%	38.5%	44.3%	42.2%	43.4%
	Improved quality of goods or services	56.4%	80.0%	61.4%	75.0%	72.7%	73.7%	46.2%	62.9%	56.9%	60.1%
<b>Process oriented effects</b>	Improved flexibility of production or service provision	47.3%	73.3%	52.9%	50.0%	63.6%	57.9%	41.0%	52.9%	48.6%	51.0%
	Increased capacity of production or service provision	47.3%	73.3%	52.9%	37.5%	63.6%	52.6%	41.0%	47.1%	45.0%	48.5%
	Reduced labor costs per unit output	27.3%	46.7%	31.4%	25.0%	45.5%	36.8%	28.2%	40.0%	35.8%	34.3%
	Reduced materials and energy per unit output	32.7%	40.0%	34.3%	12.5%	27.3%	21.1%	20.5%	34.3%	29.4%	30.3%
<b>Other effects</b>	Reduced environmental impacts or improved health and safety	43.6%	53.3%	45.7%	25.0%	45.5%	36.8%	25.6%	47.1%	39.4%	41.4%
	Met regulatory requirements	50.9%	66.7%	54.3%	12.5%	27.3%	21.1%	33.3%	54.3%	46.8%	47.0%

**Table 18 Effects of Organizational Innovation by Major Sector and by Size of Firm (Organizational Innovators only)**

Effects of Organizational Innovation	Food Manufacturing			Electronics Manufacturing			IT			All establishments
	SME	Large	All firms	SME	Large	All firms	SME	Large	All firms	
Reduced time to respond to customer or supplier needs	37.1%	68.4%	43.8%	42.9%	50.0%	46.4%	33.8%	39.8%	37.2%	40.3%
Improved quality of goods or services	57.7%	78.9%	62.2%	57.1%	64.3%	60.7%	52.9%	63.6%	59.0%	60.2%
Reduced costs per unit output	29.6%	63.2%	36.7%	35.7%	35.7%	35.7%	29.4%	45.5%	38.5%	37.6%
Improved employee satisfaction and/or lower employee turnover	33.8%	57.9%	38.9%	28.6%	28.6%	28.6%	35.3%	29.5%	32.1%	33.9%
Improved communication or information sharing	39.4%	68.4%	45.6%	42.9%	35.7%	39.3%	45.6%	43.2%	44.2%	44.2%
Increased ability to develop new products or processes	32.4%	78.9%	42.2%	42.9%	57.1%	50.0%	29.4%	35.2%	32.7%	37.6%
Others	80.0%	0.0%	66.7%	100.0%			29.4%	35.2%	32.7%	34.5%

**Table 19 Effects of Marketing Innovation by Major Sector and by Size of Firm (Marketing Innovators only)**

Effects of Marketing Innovation	Food Manufacturing			Electronics Manufacturing			IT			All establishments
	SME	Large	All firms	SME	Large	All firms	SME	Large	All firms	
Sales growth for your goods and services	31.1%	52.4%	35.8%	45.5%	50.0%	47.4%	29.3%	41.8%	36.0%	36.8%
Increased visibility of products or business	35.1%	66.7%	42.1%	36.4%	37.5%	36.8%	25.9%	37.3%	32.0%	36.4%
Strengthened relationships with customers	45.9%	66.7%	50.5%	72.7%	37.5%	57.9%	37.9%	55.2%	47.2%	49.4%
Improved customer satisfaction	52.7%	71.4%	56.8%	72.7%	37.5%	57.9%	44.8%	58.2%	52.0%	54.4%

## 8. 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. To gain understanding about sources of information and cooperation on innovation, establishments were asked to rank a number of potential information sources on a scale from ‘no relationship’ to ‘high importance’. The proportion which answered ‘high’ in each category is shown in Table 20. These sources are:

- Internal: from within the establishment itself or from other establishment within the enterprise;
- Market: from suppliers, customers, clients, consultants, competitors, other businesses, commercial laboratories or private research and development institutes;
- Institutional: from the public sector such as government research organizations and academia; or
- Other sources: from conferences, trade fairs, exhibitions, scientific journals, trade/technical publications, professional or industry associations or technical, industry or service standards.

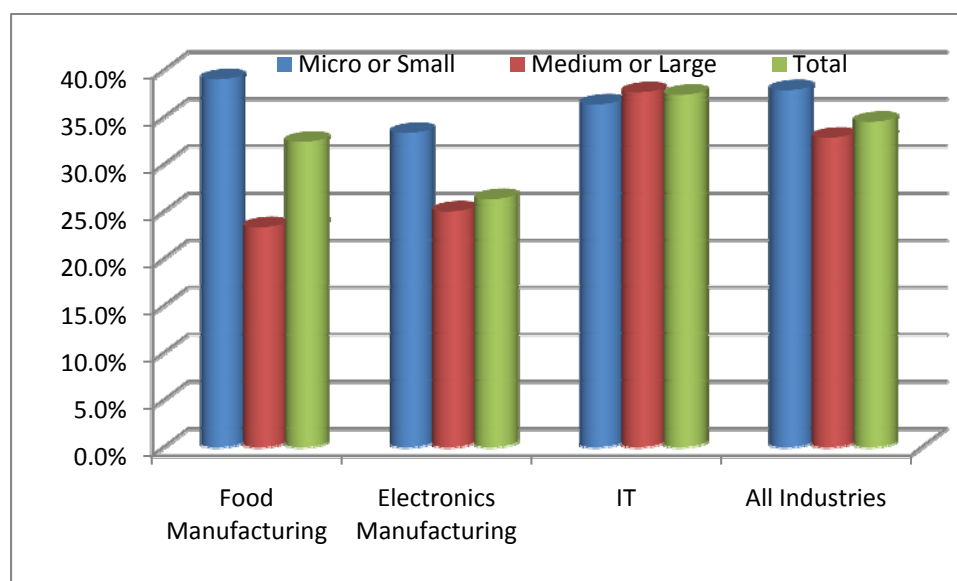
**Table 20. Establishments rating information sources as of ‘high’ importance, by size of establishment**

Information Source		Micro	Small	Medium	Large	All Firms
1.Internal	a. Within your 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 your 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

Firms reported internal and market sources (especially clients) as most important for information on innovation. 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.

About a third (34.5 %) of innovation active firms had cooperation arrangements on innovation activities (see Figure 10). Cooperation is higher among smaller firms in the food manufacturing and electronics manufacturing industries.

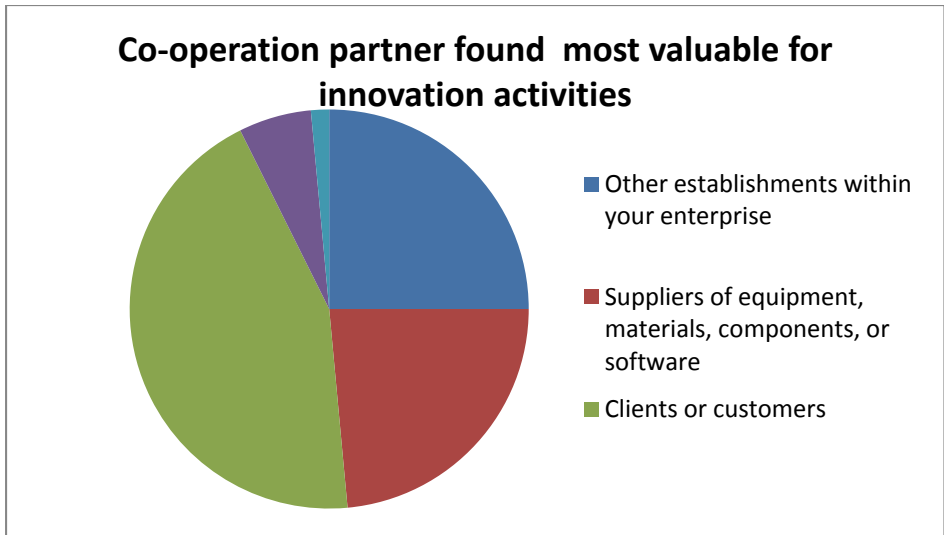


**Figure 10. Percentage of Establishments with cooperation arrangements on Innovation Activities, by Size of Establishment, and by Major Industry.**

Among innovation active collaborators, most had agreements that operated at a local/regional level, firms were least likely to cooperate on an other ASEAN level. As shown in Table 21, the most frequent partners for co-operation among innovation active firms were clients (94 per cent), followed by suppliers (93 per cent) and other establishments within the enterprise (91 per cent). The least likely co-operation arrangement was with universities (47 per cent) and government organizations (50 per cent). Clients are also found to be the most valuable co-operation partner for innovation (see Figure 10).

**Table 21 Co-operation partners (innovation active, collaborative establishments only)**

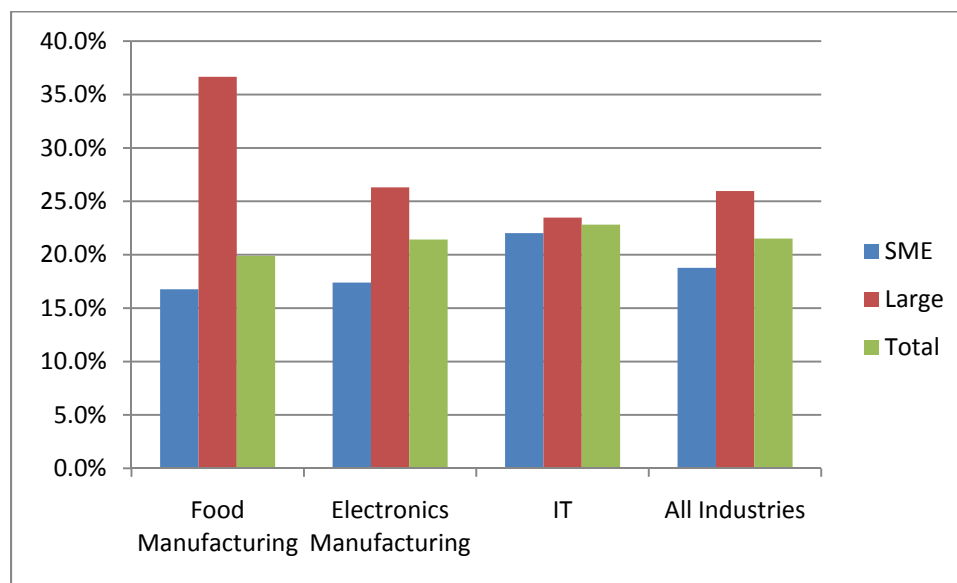
Type of Cooperation Partner	Local	Other ASEAN*	All other countries	Any
Other establishments within your enterprise	77.9%	10.3%	23.5%	91.2%
Suppliers of equipment, materials, components, or software	73.5%	16.2%	42.6%	92.6%
Clients or customers	69.1%	16.2%	45.6%	94.1%
Competitors or other establishments in your sector	58.8%	4.4%	14.7%	67.6%
Consultants, commercial laboratories, or private R&D institutes	57.4%	0.0%	10.3%	64.7%
Universities or other higher education institutions	45.6%	0.0%	1.5%	47.1%
Government or public research institutes	50.0%	0.0%	1.5%	50.0%



**Figure 11. Cooperation partner found most valuable for innovation (innovation active, collaborative establishments only)**

## 9. Policy Issues and Key Findings of Survey

Only about one out of every five firms availed of government support or assistance in its innovation activity since January 2009, with the rate highest among large firms in the Food Manufacturing industry (see Figure 12). Table 22 illustrates that micro and small firms tend to consider technical support and training to be very important government programs, while large firms value training, tax rebates and infrastructure support. Programs least cited to be highly important include R & D funding, subsidies, and loans and grants.



**Figure 11. Proportion of Firms that Availed of Public Support for their Innovation Activities, by Major Industry and by Size of the Establishment.**

**Table 22 Percentage of firms that considered government support programs that they received highly important for innovation, by establishment size.**

Government Support Programs	Micro	Small	Medium	Large	All firms
R&D funding	33.33	0	0	17.39	14.71
Training	33.33	50	16.67	34.78	32.35
Subsidies	0	0	0	17.39	11.76
Tax rebates	33.33	0	16.67	34.78	29.41
Technical support/advice	33.33	50	0	43.48	35.29
Infrastructure support	33.33	0	0	26.09	20.59
Loans and grants	33.33	0	0	17.39	14.71

In summary, the 2009 SIA suggests that innovations are taking place in selected firms in the country, especially in a wider sense. Key findings include:



- Major determinants to innovative behavior, include whether or not the firm engages in knowledge management practices, the size of the firm, and the location. Firms in PEZA appear to be more likely than firms in other areas to be innovators. The evidence for this is strongest for product innovation, and innovation activity, in general, for PEZA firms versus Cebu firms.
- Effects of innovation are largely customer-driven.
- Firms suggest cost factors to be the most important barrier to innovation. Government support is found to be limited, particularly for product innovations, to medium-sized firms.
- Knowledge networks are rather weak. Firms do not access technical assistance from the government and research institutions. Cooperation is also low between the establishments and academe. Firms tend to cooperate more with establishments within their enterprise, their customers and suppliers. This suggests that firms tend to rely more on those they have easy access and long term relations with.

The survey results described here suggest the need to further strengthen the policy framework for innovation and aggressively pursue Filipinnovation, fostering knowledge sharing and dissemination by academe and industry. It is also important to articulate the innovation strategy to firms, who 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.

Firm size is a determinant to innovation. Evidently, barriers and bottlenecks faced by 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 firm there to innovate more than in other areas.

Knowledge and cooperation networks, especially at the local areas, will have to be developed and when they exist, strengthened to promote innovation. The scope for partnerships to promote innovation is wide. Given the shift towards 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. Likewise, information should be disseminated through effective use of information communication technology (ICT). Firms also need to be stimulated to cooperate for innovation, rather than being averse to networking with their competitors. The national government and local government units (LGUs) need to work in tandem with academe and the business sectors 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 business associations. 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.

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 at a regular basis after all, innovation system management cannot be effectively done if we do not measure what we manage.

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