SME innovation – Case studies of two Philippine firms

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ABSTRACT

Very few scholars have studied the innovation practices of SMEs in the Philippines, limiting the knowledge base from which local firms can derive useful lessons for their own attempts at upgrading their products / services and organizational processes. Most of these studies are descriptive in nature, and do not attempt to scrutinize the dynamics of organizational innovation. To understand how organizational dimensions of Philippine firms and their innovation practices are linked, we asked the following research questions: How do Philippine small- and medium-size enterprises (SMEs) innovate? Is there a relationship between these SMEs' organizational characteristics (i.e. organization strategy, organization structure, and organization culture) and their innovation activities?

Utilizing the multiple case study method, we described how two Philippine SMEs—one engaged in food manufacturing and the other engaged in audio engineering services—innovate, and what the drivers and barriers of innovation are in these two companies. Our study showed that both companies follow the coupling model process of innovation, where both technology and the market are influential factors. Both companies have adopted product and process innovations over the years, as a response to market and regulatory conditions.

These two cases also provide empirical evidence that support the findings of Damanpour (1991), whose highly-cited work identified several structural, cultural, resource and process variables as determinants of organizational innovation. Our study shows that, in these two firms, the following variables are positively related to innovation: specialization, professionalism, managerial attitude towards change, technical knowledge resources, slack resources, and external and internal

communication. However, only in the food manufacturing business is functional differentiation a key determinant.

Additional insights generated by this study are the following: (a) that companies are likely to adapt their strategies or to restructure their organizations depending on internal and external conditions, and that these changes could result in different forms of innovation; and (b) that individual, organizational, and environmental factors would affect innovation activities depending on the organization's stage in its life cycle, which supports an earlier contention made by Aguado, et. al. (2010).

JEL Classification: L00, M1

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INTRODUCTION

Doing business in the Philippines has become increasingly tough. This is the realization of many Philippine firms that face strong competition by companies from countries such as China, India, and Vietnam, which are able to significantly bring down the prices of their goods because of extremely low production costs. For many Filipino firms, especially those in traditional industries such as garments, footwear, furniture, and handicrafts, competing on the basis of price alone have just become impossible, what with the high cost of production inputs (i.e. labor, raw materials, and electricity, among others). Many of these firms have, in fact, decided to fold up either because margins have become too thin or because continuing business operations have become an unprofitable proposition.

Some Philippine firms, however, have remained viable in spite of stiff foreign competition. This is largely because of their ability to offer differentiated, higher-end products that are valued both in domestic and international markets. Those that engage in technological upgrading have also enhanced their productivity and overall efficiency, consequently improving their ability to compete.

Indeed, innovation has become critical in enhancing the capability of firms to adjust to rapid changes in the business environment. This means not only remaining economically competitive but also being responsive to social and environmental imperatives. Without a doubt, "[u]nless organizations are prepared to renew their products and processes on a continuing basis, their survival chances are seriously threatened" (Tidd, Bessant and Pavitt, 1997).

However, very few studies on the innovation practices of firms in the Philippines have been undertaken (Beng Hui, et. al., 2005; Habaradas, 2005; Habaradas & Tolentino, 2010; and Macapanpan, 1999; as cited by Ancog & Aquino, 2007), effectively limiting the knowledge base from which local firms can derive useful lessons for their own attempts at upgrading their products / services and organizational processes. Even fewer are published studies that focus on the innovation practices of small- and medium-enterprises (SMEs) in the Philippines, which comprise the bulk of businesses in the country, employ more than two-

thirds of the country's total workforce, and contribute about one-third of the national output (Habaradas, 2009). Most of these studies are descriptive in nature, and do not attempt to scrutinize the dynamics of organizational innovation. Therefore, there is a need to undertake empirical studies that show how organizational dimensions of Philippine firms and their innovation practices are linked. This led us to ask the following questions: How do Philippine small- and medium-sized enterprises (SMEs) innovate? Is there a relationship between these SMEs' organizational characteristics (i.e. organization strategy, organization structure, and organization culture) and their innovation activities?

RESEARCH FRAMEWORKS

To describe the innovation process undertaken by the firms we examined, we utilized the five models identified by Rothwell (1994, as cited by Smith, 2006), namely the technology-push model, the demand-pull model, the coupling model, the integrated model, and the network model.

We also used as my guide the highly-cited work of Damanpour (1991), who conducted a meta-analysis of previous organizational innovation research. In his study, Damanpour examined the relationships among 13 variables identified from previous studies that were theoretically identified as determinants of innovation (see Figure 1). These included structural, cultural, resource, and process variables, which largely correspond to the organizational characteristics we mentioned above.

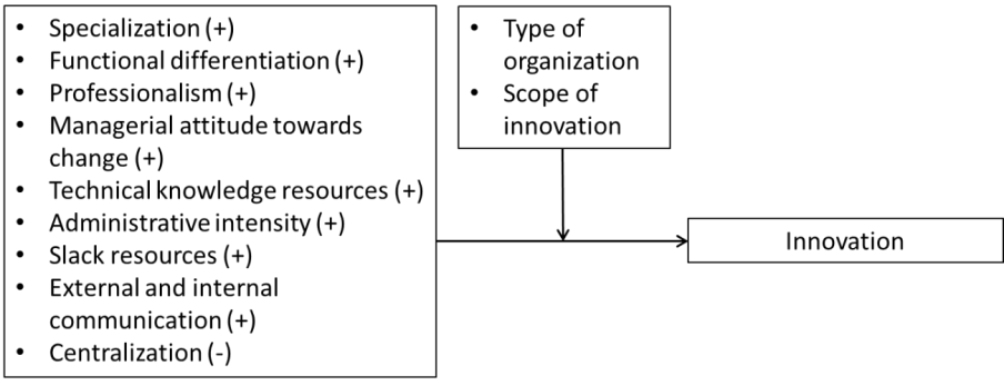

Figure 1. Determinants of innovation based on Damanpour's (1991) meta-analysis

Listed below is a description of how the above-mentioned variables influence innovation in organizations, and how these could be operationalized.

Table 1. Explanation and indicators of variables that influence innovation in organizations

Variable	Apriori	Explanation	Indicators
Specialization	+	A variety of specialists provides	Number of different occupational

Variable	Apriori	Explanation	Indicators
		greater access to knowledge and new ideas, products, and techniques.	types or job titles in an organization
Functional differentiation	+	Combined professional formed into different units can influence change in the systems.	Total number of units under top management level
Professionalism	+	Brings to the organization people that have experience, self-confidence, additional inputs from external sources and a psychological commitment to go beyond the status quo, which are all conducive for innovation.	Number or percentage of professional staff members with certain educational backgrounds or index reflecting degree of professional training of organizational members
Managerial attitude towards change	+	The favourable attitude of managers towards change can lead to a climate that is conducive to innovation.	Battery of items assessing managers' values that favor change or historical account of innovations introduced by managers
Technical knowledge resources	+	Greater technical expertise aids in the understanding	The presence of technical group or technical personnel

Variable	Apriori	Explanation	Indicators
		of new technical ideas and corresponding processes	
Administrative intensity	+	A higher proportion of managers would facilitate the successful adoption of innovation, which depends largely on the support, leadership, and coordination that they provide.	Ratio of managers to total employees in the organization.
Slack resources	+	Allow the organization to purchase innovations, absorb failures and bear costs associated with instituting innovations.	Changes in an organization's budget and sources of finance; changes in the expenditure for the organization's main activity.
External communication	+	Environmental scanning and extra-organizational professional activities of employees can bring in new ideas.	Degree of involvement of the organization's members and their participation professional activities outside of the organization.
Internal communication	+	Facilitates the diffusion of ideas within an organization,	Number of committees that exist in an

Variable	Apriori	Explanation	Indicators
		increasing the diversity of ideas of its members, creating an environment that is receptive to innovation.	organization, the frequency of committee meetings, or the number of times employees come in contact with people of the same and different levels.
Centralization	-	Concentrating the decision making authority prevents the firm from utilizing innovative solutions	Degree of organizational members' participation in decision making; degree of authority and freedom that organizational members have in making their own decisions.

Adapted from Aguado, et. al. (2010).

METHODOLOGY

To provide additional empirical evidence to validate Damanpour's findings, we utilized the case study research method, which is most appropriate for understanding complex contemporary phenomenon with some real-life context. Moreover, the case study method allows researchers to retain the holistic and meaningful characteristics of real-life events – such as organizational and managerial processes (Yin, 2009). We also adopted a multiple-case design because the analytic conclusions that independently arise from at least two cases are more powerful than those coming from just a single case. Also, because the contexts of multiple cases are likely to differ to some extent, arriving at a common conclusion in spite of the varied circumstances "will have immeasurably expanded the external generalizability" (Yin, 2003, p.53) of one's findings compared to those of a single case.

For this study, we largely depended on data provided by key informants during in-depth interviews, since the two companies we studied did not have

annual reports, minutes of meetings, or other documents that could be examined. After the interviews were transcribed, we proceeded to analyze the data using the above-mentioned frameworks as our guide.

REVIEW OF RELATED LITERATURE

This section contains a review of the extant literature on innovation. It touches on innovation models, factors that influence innovation, innovation in SMEs, barriers to SME innovation, and overcoming these barriers by harnessing organizational culture and through open innovation.

Innovation

McAdam and Armstrong (2001) define innovation as "the harnessing of creative ability within individuals and the workforce in response to change, by doing things differently or better across products, processes or procedures." Their definition is an attempt to integrate previous definitions derived from literature (Mogee and Schact, 1980; Drucker, 1985; Mole and Elliot, 1987; and Gobeli and Brown, 1994).

Specifically, technological innovation activities are all those scientific, technological, organizational, financial and commercial steps that actually, or are intended to, lead to the implementation of new or improved products and processes. The main activities involved are the acquisition of knowledge (patents, licenses, technical services, etc.), the acquisition of machinery and equipment, and various other preparations for production delivery, including tooling up, staff training, marketing, and R&D (Virasa and Tangjitpiboon, 2000).

Tidd, Bessant and Pavitt (1997) offer a useful framework for determining the type of innovation adopted by firms. They said that innovation can be reckoned in terms of what is changed (i.e. product, service, or process) and of the perceived extent of change (i.e. incremental transformation and radical transformation). A similar classification scheme utilized by Kaplinsky and Morris (2003) and by Humphrey and Schmitz (2003) identified four trajectories that firms can adopt in pursuing the objective of technological upgrading: process upgrading, product upgrading, functional upgrading, and chain (or inter-sectoral) upgrading. These categories, according to Humphrey and Schmitz (2003) “are finding rapid acceptance in the international debate”, and suggest that firms can, indeed, follow a hierarchy of upgrading as suggested by Gereffi (1999).

Drawing from the literature, Lee, et. al. (2010) also identified other types of innovations, such as systemic innovation and component innovation; technology-push and market-pull; and closed innovation and open innovation.

Innovation models

Gudmundson, et. al. (2003) concluded that “the innovation process is complex,” an observation shared by other innovation scholars such as Tidd, et. al. (1997), who said that “technological opportunities and threats are often difficult to identify, innovation strategies difficult to define, and outcomes difficult to predict.” This is due to the large number of variables that have been associated with innovation in a number of studies such as those undertaken by Damanpour

(1991), Link and Bozeman (1991), and Scherer (1991). In fact, there are several innovation models that attempted to explain the innovation process within organizations. Rothwell (1994, as cited by Smith, 2006), for example, identified five models of the innovation process, namely the technology-push model, the demand-pull model, the coupling model, the integrated model, and the network model.

The *technology-push process* model is the traditional perspective on the process of innovation, which is seen as largely driven by developments in science and technology. According to Smith (2006), "the model is naïve as far as the process itself is concerned" since it tells very little about the nature of the innovation process.

In the *demand-pull process* model, the role of the market is central, i.e. the market forms the source of ideas for new innovations. Knowledge of consumer requirements is seen as driving research and development rather than the other way around.

In the *coupling model process* model, both technology and the market are influential. Technology enhances the state of knowledge within the broader scientific and technological community, while the market works to express wider consumer needs and expectations. New ideas are the product of both. The crucial difference between this model and earlier ones is the presence of feedback loops (Smith, 2006).

The *integrated model process* model, according to Smith (2006), promotes the notion of concurrent or parallel development, which, when applied to new product development, implies an end to strictly linear and sequential processes. Under such arrangements, the different functional areas (through project teams) are brought into the new product development process from the start; therefore, issues such as manufacturability are considered early in the process rather than near the end.

The *network model process* model is described by Rothwell (1994) as a 'fifth-generation' innovation process. It reflects the way in which some organizations increasingly rely not on their own internal resources for innovation, but instead draw on external resources through alliances, agreements and contracts with third-party organizations. According to Smith (2006), the use of networks reflects continuing developments in computing and communications that have facilitated the transfer of information and have facilitated outsourcing arrangements, whereby organizations focus on their core activities and simply obtain the services of other companies for non-core activities.

Factors that influence innovation

In Damanpour's (1991) highly-cited meta-analysis of previous organizational innovation research, he examined the relationships among 13 variables identified from previous studies that were theoretically identified as determinants of innovation. Significant positive relationships were found between innovation and specialization, functional differentiation, professionalism, managerial attitude towards change, technical knowledge resources, administrative intensity, slack resources, and external and internal communication. On the other hand, a significant negative relationship was found between innovation and

centralization, which is consistent with the findings of Link and Bozeman (1991) and Scherer (1991), who said that innovation is driven by an organizational environment free of bureaucratic constraints (cited by Audretsch, 2004). The study also concluded that type of organization and scope of innovation had a significant moderating effect on the relationships between these variables and innovation.

A more recent study by Gudmundson, et. al. (2003) summarized several innovation models that attempted to explain the innovation process. These include the models developed by West and Farr (1989), by Woodman, Sawyer, and Griffin (1993), and by Hauser (1998).

The model of West and Farr (1989) dwelt on individual innovation at work. In this model, facilitators of innovation included characteristics that were intrinsic to the job, group factors, relationships at work, and organizational factors. The relationship between these variables and innovation was moderated by individual characteristics. The model developed by Woodman, et. al. (1993), which is referred to as an interactionist model of organizational creativity, included various individual, group, and organizational characteristics and portrayed their theoretical relationship to creativity. Finally, the conceptual model of the innovation process, as developed by Hauser (1998), suggested that organizational culture plays a key role in the innovation process.

Innovation in SMEs

Acs and Audretsch (1987, 1988, 1990, as cited in Audretsch, 2004) said that the differences between the innovation rates of large and small firms can generally be explained by (1) the degree of capital intensity, (2) the extent to which an industry is concentrated, (3) the total innovative intensity, and (4) the extent to which an industry is comprised of small firms. In particular, the relative innovative advantage of large firms tends to be in industries that are capital intensive, advertising intensive, concentrated, and highly unionized. Small firms, on the other hand, have a relative innovative advantage in industries that are highly innovative and where small firms do not have a high employment share.

According to Tidd, et. al. (1997), small innovating firms have similar objectives as compared to large innovating firms. They both develop and combine technological and other competencies to provide goods and services that satisfy customers better than alternatives, and that are difficult to imitate. The difference lies in terms of organizational structure, and technological capabilities / resources.

Smaller firms have certain relative strengths such as “ease of communication, speed of decision-making, degree of employee commitment and receptiveness to novelty”, which is why small firms often do not need the formal strategies that are used in large firms to ensure communication and coordination. However, “smaller firms only have a specialized range of technological competencies, are unable to develop and manage complex systems, and are unable to fund long-term and risky programs” (Tidd, et. al., 1997). As Todtling and Kaufmann (2002) put it, “SMEs innovate in a different way than larger firms and they usually face more barriers. They apply less resources for R&D and they undertake less systematic market research or technology monitoring.”

Barriers to SME innovation

Beise and Licht (1996), as cited by Audretsch (2004), identified the following barriers to innovation: (a) too long a gestation period required for innovative activity, (b) legal restrictions and restrictive government policies, (c) long drawn-out processes for obtaining government approval for a new product, (c) shortage of financial capital, (d) lack of competent employees, and (e) very high levels of risk. Also worth mentioning is the study by Caputo, Cucchiella, Fratocchi, Pelagagge, and Scacchia (2002), which identified several obstacles to SME innovation: (a) high innovation costs, (b) high risks related to innovation activities, (c) absence of financial resources, (d) absence of skilled workers, (e) organizational constraints, (f) regulations and technical standards, (g) low customer interest in product innovation, (h) absence of information on technology, and (i) absence of market information.

Lee, et. al.'s (2010) fairly recent study of Korean firms revealed the following as the top innovation barriers among SMEs: (a) difficulties in finding suitable manpower in the labor market, (b) shortage of suitable manpower within the firm, (c) market uncertainty in innovative products, (d) imitation possibilities of technology innovation, (e) shortage of ability in R&D planning and management, (f) lack of technological information, (g) funding difficulties due to high risk from technological uncertainty, (h) funding difficulties due to high innovation and commercialization costs, (i) lack of market information, and (j) frequent turnover of human resources (usually for R&D).

In summary, the obstacles or barriers to innovation could be classified in terms of the nature of innovation, internal constraints, and external conditions (see Table 2).

Table 2. Obstacles / barriers to innovation

Nature of innovation	Internal constraints	External conditions
• High innovation costs • High commercialization costs • High levels of risks related to innovation • Long gestation period required	• Absence or shortage of financial resources • Absence of skilled workers / lack of suitable manpower within the firm and in the labor market • Frequent turnover of technical human resources • Other organizational constraints	• Low customer interest in product innovation • Market uncertainty in innovative products • Absence of information on technology • Absence of market information • Restrictive government policies; legal restrictions • Bureaucratic red tape for product approvals

Sources: Beise and Licht (1996), Caputo, et. al. (2002), and Lee, et. al. (2010)

Harnessing organizational culture to promote innovation in SMEs

A study by McAdam and Armstrong (2001) on the symbiosis of quality and innovation in SMEs shows that quality in SMEs is more suited to structured continuous improvement than large organization quality models, such as the business excellence model and ISO, which were found to be "overly bureaucratic and inflexible. Higher scoring SMEs linked large-scale innovation to their quality efforts, and considered quality to be both a catalyst and a foundation for more radical innovation efforts.

The study also showed that encouraging employees to be creative and to generate knowledge led to increased empowerment, risk taking, and experimentation, ultimately leading to innovation. Furthermore, quality efforts aimed at getting feedback from the customer lead to a source of outside knowledge for use in devising innovations. Finally, there was clear evidence that a culture of continuous improvement, linked to organizational goals, was a "good foundation on which larger scale innovation could be established and developed." However, the study also concluded that "quality and innovation cannot be quickly incorporated in SMEs," and that "there must be a careful and systematic development program" (McAdam and Armstrong, 2001).

According to Caputo, et. al. (2002), the diffusion of innovation within firms is reduced because of high costs and the resulting risks related to innovation activities, fear of changes that accompany innovations, and modest information about public and private incentives for innovation. These factors especially affect SMEs because of the moderate knowledge base they own, the little time an entrepreneur may dedicate to innovation activities, because of other daily demands of the job; modest financial resources, and diffused aversion to realize partnerships with potential innovation suppliers.

To overcome these limitations, Caputo, et. al. (2002) proposed a model for innovation transfer to SMEs, the main features of which are as follows:

- Networked architecture, which contributes to interaction of the different involved actors in order to increase transfer's success chances
- Introduction of an organizational unit – innovation center (IC) – which collects knowledge on innovations and financial – fiscal subsidies' availability
- Proposition of an organizational actor – innovation promoter (IP) – who is the main interlocutor of the enacted SME willing to realize an innovation transfer

However, for the proposed framework to be successful, the involved SME must be sincerely interested in receiving and implementing innovations. Moreover, the SME must follow a step-by-step approach starting with an incremental low-cost pilot project, which is meant for the entrepreneur to gain trust in the innovation transfer process; consequently, more radical and systemic innovation transfers will be realized only when pilot projects are successfully implemented. Finally, the innovation promoter (IP) must be able to operate within the SME and to gain the trust of the entrepreneur; this becomes more likely if the IP possesses both adequate technical skills and ample ability to establish effective interpersonal relationships, which he or she needs to interact with key people within the firm, particularly at the innovation center (IC) level.

Caputo, et. al.'s study supports the earlier findings of Woodman, et. al. (1993), and Hauser (1998), both of which point to organizational culture as factors that influence innovation in business organizations. It is also consistent with a subsequent study of Gudmundson, et. al. (2003), which indicate that initiation and implementation of innovation in small businesses are related to aspects of culture and ownership, and that organizational support was found to be more important for implementation rather than for initiation of innovation. Family businesses, in particular, were found to have unique characteristics positively related to implementation of innovation.

Overcoming constraints through open innovation

According to conventional wisdom, firms inherently have a deficit of knowledge assets, burdening them with a clear and distinct disadvantage in generating innovative output. However, there is increasing evidence that entrepreneurial small firms are making a crucial contribution to innovative activity and technological change (Audretsch, 2004).

There are two possible reasons for this, according to Audretsch (2004). First, the measurement of innovative output and technological change has greatly improved. With the development of measures that focus on innovative output, rather than just on inputs into the innovative process, "the vital contribution of small firms became more prominent." Second, it is possible that the new view of the innovative capacity of small firms emerged not because of measurement improvements, but because the economic and social environment actually changed in such a way as to shift the innovative advantage more towards smaller enterprises, which are less bureaucratic, and therefore, more flexible in dealing with changes in the business environment.

Moreover, smaller firms have overcome size-specific barriers by relying on innovation partners (e.g. major suppliers or buyers), by their involvement in industrial clusters, and through the support provided by regional or national innovation systems (Todtling and Kaufmann, 2002).These are evidence that SMEs have begun to adopt the open innovation model, which is driven by "the increasing availability and mobility of knowledge workers, the flourishing of the internet and venture capital markets, and the broadening scope of possible external suppliers" (Chesbrough, 2003, as cited by Lee, et. al., 2010, p.290). Since few SMEs have sufficient resources and capacity to manage the whole innovation process by themselves, "this encourages them to collaborate with other firms" (Edwards, et. al., 2005, as cited by Lee, et. al., 2010, p. 291).

COMPANIES' PROFILES

The companies that we selected for this study are small- to medium-sized firms that come from two different industries, namely food manufacturing and audio engineering services (see Table 3).

The first company is Grain Food Corporation [Note: name of company and its owners and managers are disguised upon the request of the owners], a medium-sized, family-owned and operated noodle-manufacturing firm. Located in Bulacan, a province north of Manila, the company manufactures several types

of rice sticks or noodles (*bihon* and *palabok)* for both the local and international markets. In the Philippines, it is a toll manufacturer for big companies selling well-known instant-noodle brands. The company also carries its own brands, which it sells to wet markets and to lower-end small-scale retailers.

Table 3. Company profile

	Grain Food Corporation	Wild Sound
Year established	• 1986	• 2003
Location	• Bulacan	• Metro Manila
Form of ownership	• Corporation	• Corporation
Owners	• Mr. Johnny Chua and family	• Mr. Albert Michael Idioma • Mrs. Teresa Idioma • Ms. Pia Manalastas
Number of regular employees	• 70	• 10
Industry	• Food manufacturing	• Audio engineering services
Major products / services	• Rice sticks / rice noodles • (bihon, palabok) • Toll manufacturing	• Rental of audio equipment for use during principal photography • Audio post-production (e.g. mixing, dubbing, etc.)
Major customers / clients	• Large companies with established noodle brands • Wet markets	• Film producers • TV producers • Advertising agencies

The company was incorporated in 1986 when Johnny Chua acquired the business from his uncle. Chua and four of his friends, who also had experience in noodle manufacturing, took over the business when it still utilized the traditional sun-drying method and manual conversion of rice to noodle strands. Several years later, some of the original incorporators sold their shares to the Chua family, which has since run the business. Three of Johnny's children successively served as the company's general manager over the past two decades, even as Johnny himself continued to be actively engaged in sales and finance.

The second company is Wild Sound, which was founded in 2003 by award-winning sound engineer Albert Michael "Mike" Idioma and his wife Teresa "Timi" Idioma. It started operations in the Idioma's home. In the early days, the company's main clients were production houses that make TV and radio commercials.

The company initially offered the rental of equipment that allowed film makers "to shoot in the wild" (e.g. outdoors) and still generate studio-quality sound. Wild Sound was able to acquire the said equipment (which cost more than a million pesos) through the help of Timi's cousin Pia Manalastas, who agreed to be a co-investor. Like most start-up companies, the spouses did most of the work. Mike, with the help of a few technicians, handled the technical / operations side of the business in the evenings and on weekends, while Timi handled the administration, marketing and accounting / financing duties.

The company later transferred to an existing recording studio in Makati City, the country's financial capital, where it stayed for a couple of years. However, the company later moved to Quezon City, where the Philippines' two major broadcasting companies are located.

In 2008, Wild Sound started offering audio post-production after Mike left Road Runner (an ABS-CBN subsidiary engaged in post-production services) and started to work full-time for his own company. The business took off quickly since then because film producers knew where the talent was, and wanted the quality of work that Mike could give. When Road Runner closed down in 2011 because of the declining output of the Philippine move industry, this worked in favor of Wild Sound, especially since many of those who availed of Road Runner's services were Mike's former clients.

Innovation activities of the two companies

Grain Food Corporation and Wild Sound implemented a mix of product and process innovations of an incremental nature over their respective business life cycles (see Table 4 for a summary of these innovation activities).

Table 4. Innovations of the two companies

Company	Innovation activities	Product or process?	Radical or incremental?
Grain Food Corporation	• Acquisition of equipment that allowed for a semi-automated production process	• Process	• Incremental
	• Introduction of HR information system and payroll system	• Process	• Incremental
	• Acquisition of charcoal-fed boiler	• Process	• Incremental
	• Small improvements in work processes	• Process	• Incremental
	• New noodle	• Product	• Incremental

Company	Innovation activities	Product or process?	Radical or incremental?
	variants		
Wild Sound	• Acquisition of equipment that allowed film makers "to shoot in the wild"	• Both product and process	• Incremental
	• Assembly of post-production equipment using parts of old equipment acquired from e-Bay	• Process	• Incremental
	• Offering of product bundle (i.e. from production equipment up to audio post-production services)	• Product	• Incremental
	• Offering of film previews (private cinema service) in Wild Sound premises	• Product	• Incremental
	• Dolby Atmos sound technology	• Produce	• Incremental

Grain Food Corporation

The first major innovation of Grain Food Corporation happened in 1986 when the original incorporators pooled their resources to invest in a machine that allowed the company to cook the noodles faster and more efficiently. By utilizing the blower-dryer technology, they were able to produce noodles regardless of weather conditions, since noodle-drying could already be done indoors. However, because of the shift to partial automation, the workers had to experiment with the amount of time to cook the noodles, the speed by which the dough must pass through the dye, the amount of dough that can be cooked at a particular point, etc. These experiments lasted for about two years (Habaradas and See, 2014).

Several years later, Johnny Chua decided to acquire from a Malaysian supplier a new machine designed to reduce water usage and raw material wastage. He discovered this machine while attending an international exposition. He took on a new loan to finance the purchase of this new technology, which

until then has not been used in the Philippines. Just like its initial experience with a new machine, the company could not immediately produce noodles of satisfactory quality. It took another year for them to formulate the appropriate mix of cooking time, raw materials usage, water and steam content before they got everything right. Part of the problem was the quality of cornstarch, which changed depending on the supplier. The company later dropped suppliers that provided substandard cornstarch and used whatever stocks were left to produce noodles for the "D" market. Fortunately, this investment was originally meant to augment the company's existing product line, and, therefore, did not adversely affect regular operations (Habaradas and See, 2014).

Over the years, the company also introduced improvements in various aspects of its operations. This includes the setting up of a formal human resource (HR) information system, which facilitated the efficient assignment of factory personnel across work shifts, the monitoring of work hours rendered (including absences and tardiness), and the administration of payroll. Likewise, the company began organizing its production records and sales records, including customer files. It also introduced minor changes in work processes (as suggested by a plant supervisor), which resulted in the speedier movement of raw materials and goods-in-process (Habaradas and See, 2014).

In 2012, the company had to deal with tighter environmental regulations. Due to the strict enforcement of the log ban by the Department of Environment and Natural Resources (DENR), the company found it difficult to source firewood and sawdust to support its operations. Therefore, the company had to invest about PHP2 million in a furnace that could accommodate coal. However, the heat generated by the coal-fed furnace could not meet the factory's requirements, thus slowing down production. Since the company had to cut down its production hours per day due to fuel shortage, it now needs three to four days of lead-time to meet the orders of its industrial customers (Habaradas and See, 2014).

Because of these large investments coupled by current constraints in production capacity, the company could not, at the moment, engage in product diversification (e.g. production of chips and other snack food) even if informal research points to a demand for such products. At this point, the company is focusing its attention on meeting the requirements of its current customers.

Wild Sound

Wild Sound started with an innovative product that was the first in the country. It offered audio services using equipment that allowed filmmakers "to shoot in the wild" and still generate studio-quality sound. Wild sound (or wild track) refers to sound recorded on location, which requires the services of a boom operator and of a cable guy that mounts wireless microphones during principal photography for a film (or a commercial). At that time, Wild Sound did several TV commercials that were 'price sensitive' and therefore typically shot one day. Because of wild-sound technology, talents did not have to be brought back to the studio for dubbing, saving the producers a lot of money during post-production. Back then, the company worked on the ads of Petron Corporation and of several multinational companies. It also did a lot of campaign materials for political candidates during election years.

When the company eventually ventured into audio post-production, it could not afford to buy new equipment. Therefore, co-owner Mike Idioma, using his technical knowledge, assembled equipment (i.e., sound mixer) using parts of old equipment acquired from e-Bay. He also downloaded applications from various sources to make the equipment functional. This saved the company a lot of money.

Realizing that film producers, especially producers of 'independent films ('indies'), have limited budgets, Wild Sound came up with a product bundle that enabled these producers to avail of both audio production and post-production services for a discounted price. On the part of the company, this meant added business.

The company later expanded its services to include film previews in Wild Sound for those who want to show their films to a small audience after these have undergone post-production in the company. Wild Sound built a small private theatre within its premises for this purpose. More importantly, this theatre enables Wild Sound to offer Dobly Atmos sound technology to its clients, the first company to do so in the Philippines. It used to be, when producers wanted their movies in Dolby, sound engineers had to go to either Thailand or South Korea, where there were Dolby studios. Getting access to Dolby Atmos technology in the country means not only savings for producers but the opportunity for Filipino films to offer a "completely new listening experience with enveloping sound that brings the stories on screen more fully to life" (http://www.dolby.com/us/en/technologies/dolby-atmos/dolby-atmos-next-generation-audio-for-cinema-white-paper.pdf).

Innovation drivers and barriers

For both companies, the owners' ability to spot technologies that can be adopted by their companies is clearly a driver of innovation.

For Grain Food Corporation, Johnny Chua's familiarity with technological developments, coupled by his entrepreneurial spirit, served the company well in terms of acquiring machinery that had kept it ahead of competitors. For example, the company ventured into partial automation when manual noodle production was still the norm in the Philippines. It was also the first in the country to invest in a machine designed to reduce water usage and raw material wastage. Fortunately, the company had been able to acquire a bank loan to finance these major investments.

In the case of Wild Sound, Mike Idioma's extensive experience in the field of audio engineering allowed him to spot the latest technologies, thus the acquisition of the wild-sound equipment, the first of its kind in the country, for audio production work. However, financial constraints prevented the company from purchasing brand new audio post-production equipment when Mike decided to work full-time in Wild Sound. Fortunately, Mike's technical knowledge allowed him to assemble equipment and software he and his team needed for their audio post-production work.

Another common driver of innovation for both firms is the desire to meet the requirements of current and potential customers. In the case of Grain Food Corporation, the company invested in equipment that allowed them to produce

noodles according to the specifications of a major industrial customer. According to its General Manager John Chua, "when it was mentioned that they were looking for something like that, my dad invested in the machines" (personal communication, April 23, 2013). The company also adopted the blower-dryer technology in favor of the sun-dried routine because it did not want dust in the noodles. Since the company is striving for export-quality noodles, "we have to make sure that the products are clean."

In the case of Wild Sound, the acquisition of wild-sound equipment and the offering of product bundles were largely a response to film producers' desire to bring down the cost of producing a movie. Bringing Dolby Atmos sound technology to the country has also worked in favor of its clients. Given the range of services offered by the company, it can give clients a discount if they avail of a package from live-sound shooting to post-production.

Table 5. Innovation drivers and barriers of the two companies

Company	Innovation drivers	Innovation barriers
Grain Food Corporation	• Access to capital • Owner's extensive network • Managerial transitions • Customer requirements • Regulatory requirements • Higher cost of raw materials	• Financial constraints – loans still being paid
Wild Sound	• Owners' technical knowledge and previous work experience • Owners' commitment to raise industry standards • Technological developments • Customer requirements • Competitive pressures	• Financial constraints • Lack of incentives from government • Small local market for audio engineering

Other innovation drivers and barriers

A major driver of innovation for Grain Food Corporation is managerial transition. For example, Johnny's eldest daughter Carla, during her managerial stint in the company from 2000 to 2004, reorganized the factory and instituted operational procedures, even as she underwent the painstaking task of consolidating support within the company. Her younger sister Ellie later took over as general manager, and put her qualifications as an engineer to good use. Building on the work done by her elder sister, she further improved the record keeping and filing systems of the company. She also undertook time-and-motion studies that allowed management to determine production capacity (i.e., the quantity that repackers can actually produce per hour or per day). The results of

this study are still being used up to now to allocate production time (Habaradas and See, 2014).

Other innovations are mostly a response to external conditions. For example, Grain Food decided to acquire a charcoal-fed boiler because of a tighter regulatory environment that caused the shortage of firewood, which consequently raised its price. In the case of Wild Sound, the technological developments in audio engineering industry prompted the Idioma couple to invest in new equipment that opened up opportunities for their business. The declining output of the Philippine movie industry, however, has resulted in stiffer competition among industry players, which now include unregistered backyard operations that undermine both quality and price standards. This led Wild Sound to come up with more creative approaches (e.g. product bundles) that enabled them to keep their clientele.

For both companies, financial constraints have prevented them from expanding as quickly as they have wanted.

Innovation models of Grain Food Corporation and Wild Sound

Using Rothwell's typology, we see some evidence of the coupling model process coming into play (see Table 6). While it is a fact that the availability of technology that allowed both companies to upgrade their product offerings and processes, it is really the business owners' sense of how these equipment matches the market demand that led to their adoption of these technologies.

Table 6. Innovation processes of Grain Food and Wild Sound

Models of innovation process	Grain Food Corporation	Wild Sound
Technology-push process	No	No
Demand-pull process	No	No
Coupling model process	Yes	Yes
Integrated model process	No	No
Network model process	No	No

As stated by Smith (2006), the crucial difference between the coupling model process and earlier ones (i.e. technology-push and demand-pull) is the presence of feedback loops. A good illustration is how Johnny Chua of Grain Food Corporation decided to buy a certain piece of equipment only when he was certain about the specific requirements of a potential industrial customer. In the case of Wild Sound, Mike Idioma's close interaction with his clients eventually gave him the idea of building a small private theatre within the Wild Sound's premises to allow for previews of films that underwent post-production in the company.

Determinants of innovation in the two companies

After examining these two cases, we found evidence to support most of the theorized relationships revealed by Damanpour's meta-analysis (see Table 8). Let us begin, though, by explaining why certain determinants do not apply. For example, the relatively small sizes of these firms mean that they don't have layers of bureaucracy that could impede decision-making. Thus, centralization does not apply to both cases. In addition, functional differentiation does not apply to Wild Sound, which does not yet divide the organization into separate functional areas. Finally, the concept of administrative intensity seems out-of-place in small firms since leadership is largely provided by the business owners, who do not typically encounter resistance when they make major decisions.

A closer examination of the remaining variables showed how these are really closely linked to each other. For example, in the case of Grain Food Corporation, Johnny Chua's openness to adopt new technology (managerial attitude towards change) is a function of his technical expertise and his wide network of contacts (external communication) built over his entrepreneurial career. And while the company's resources are largely used as working capital, he could easily get a bank loan for capital investments (slack resources).

The same is true in the case of Wild Sound. Mike Idioma's skills and experience in audio engineering (technical knowledge resources) allowed him to spot opportunities brought about by new technological developments. And while the company does not have enough money to buy brand new equipment, it was able to assemble equipment using second-hand parts due Idioma's expertise. Recently, Wild Sound has been able to generate business and acquire some smaller equipment due to the entry of a new investor in the person of businessman Tony Tuviera, who is also a technology-buff and who is a believer of the quality of work produced by Mike Idioma and his team of sound engineers (professionalism).

Table 7. Determinants of innovation in Grain Food Corporation and Wild Sound

Variables	Theorized relationship	Grain Food Corporation	Wild Sound
Specialization	(+)	Yes	Yes
Functional differentiation	(+)	Yes	Not applicable
Professionalism	(+)	Yes	Yes
Managerial attitude towards change	(+)	Yes	Yes
Technical knowledge resources	(+)	Yes	Yes
Administrative intensity	(+)	Not applicable	Not applicable
Slack resources	(+)	Yes	Yes
External and internal	(+)	Yes	Yes

communication			
Centralization	(-)	Not applicable	Not applicable

CONCLUSIONS

The empirical evidence we generated from the two case studies described above supports the contentions of Tidd, et. al. (1997) and Gudmundson, et. al. (2003) that "innovation is a complex process" and that "technological opportunities and threats are often difficult to identify; innovation strategies difficult to define; and outcomes difficult to predict." However, these case studies provide additional empirical support to the findings of Damanpour (1991), which scholars can still use as a take-off point for understanding the innovation activities of SMEs.

Table 8. Answers to research questions

Research questions	Conclusions
How do Philippine small- and medium-size enterprises (SMEs) innovate?	The two companies examined indicate that they follow the coupling model process, where both technology and the market are influential factors. Both companies have adopted product and process innovations over the years, as a response to market and regulatory conditions.
Is there a relationship between these SMEs' organizational characteristics (i.e. organization strategy, organization structure, and organization culture) and their innovation activities?	Yes, there is a relationship between SMEs organizational characteristics, consistent with the findings of Damanpour (1991). However, companies are likely to adapt their strategies or to restructure their organizations depending on internal and external conditions. These changes could result in different forms of innovation.

Worth highlighting, though, is the finding of Aguado, et. al. (2010), who found that individual, organizational and environmental factors would affect innovation activities depending on the organization's stage in its life cycle. According to them, innovations occurring among businesses in their introductory stage are largely dependent on the business owner; thus individual factors are more prominent than organizational and environmental factors; as the business moves along into the growth to maturity stage, organizational factors become more relevant. Finally, from the maturity to saturation stages, environmental factors take the lead role. This model recognizes the dynamic nature of organizations. Future studies on the innovation of SMEs can test the validity of this model's assumptions.

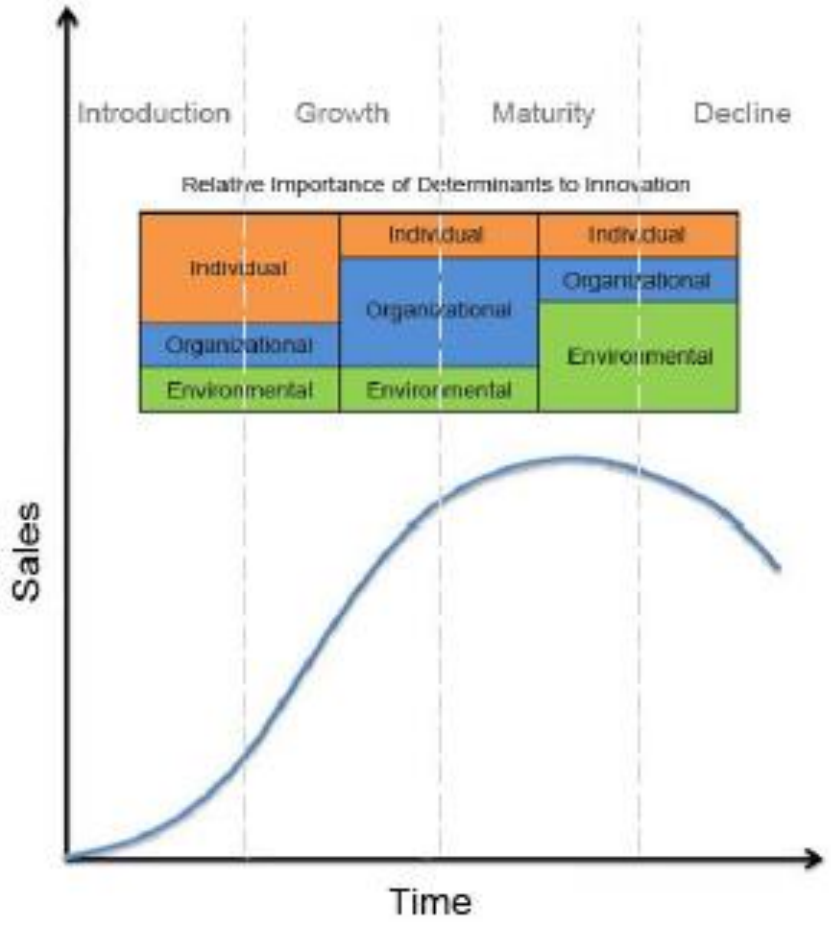

Figure 2. Proposed relationship between innovation factors and business life cycle (Aguado, et. al., 2010)

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