Does innovation lead to performance? An empirical study of SMEs in Taiwan

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Abstract

Purpose – This study attempts to probe within a multi-dimensional perspective the nature and type of daily innovation practices of small- and medium-sized enterprises (SMEs) located in Taiwan. The relationship between innovation and organizational performance will also be explored.

Design/methodology/approach – Data of interest were collected through a telephone survey. From the 2000 Directory of Manufacturing and Service Industries in Northern Part of Taiwan, companies with a total employee number less than 200 (the definition of an SME in Taiwan) were the population. Telephone calls to 877 firms were successfully completed with a response rate of 87 per cent.

Findings – Eighty per cent of the surveyed companies conducted some sort of innovation, the two major types of innovations were technological and marketing innovations. Innovation has a weak link with company sales. Administrative innovations have surfaced to be the most crucial factor in explaining sales rather than technological innovations.

Practical implications – Creating a successful innovation platform to serve as a base for non-technology-related innovations may prove to be the most critical catalyst to capitalize on innovation efforts. The research results also provide some insights for companies that are not sure how to integrate innovation into their business operations.

Originality/value – This study unveils the innovation practices of this novel economy and particularly focuses on the less explored SMEs in an Asian context.

Keywords Innovation, Organizational performance, Small-to medium-sized enterprises, Taiwan

Paper type Research paper

Introduction

Innovation has been a dominant factor in maintaining worldwide competitiveness. It fuels organizational growth, drives future success, and is the engine that allows businesses to sustain their viability in a global economy (Gaynor, 2002). For companies pursuing excellence in this era of hyper competition, restructuring, lowering costs, and enhancing product or service quality are no longer sufficient. Porter and Stern (2001) argued that companies must be able to create and commercialize a stream of new products and processes that extend the technology frontier, while at the same time keeping a step or two ahead of their rivals. Peter Drucker succinctly stated that every organization needs one core competency: innovation (Gaynor, 2002; McDermott and Sexton, 1998).

Innovation pressures apply to large companies as well as small- and medium-sized enterprises (SMEs) (Vrakking and Cozijnsen, 1997). Scholars have noted that SMEs are often more fertile than larger firms in terms of innovation (Afuah, 1998). Their comparative advantages over large firms in innovation are their flexibility and speed of response (Acs and Audretsch, 1990; Dodgson, 1993). As a result, SMEs generally make a valuable economic and social contribution because of their innovative capacities.

SMEs in Taiwan, which constitute about 97.8 per cent of business establishments (White Paper Book, 2005), are ideal targets for innovation study. Porter and Stern (2001) said that Taiwan has made substantial investments in upgrading its innovative
capacities over the past decade and achieved large increases in patenting rates. The statement was supported by the Industrial and Development and Investment Center, Ministry of Economic Affairs (2004) reports that in 2003, Taiwan ranked fourth globally in the number of US patent grants received, up from 11th place a decade earlier and was surpassed only by the USA, Japan and Germany. Exploring innovation practices of SMEs in Taiwan may have academic as well as practical value.

Innovation is a multi-faceted effort. Maravelakis et al. (2006) measured organizational innovations based on product, process, and administrative innovations. Wolff and Pett (2004) and Walker (2005) both compared the effects of product and process innovations on firm performance. Han et al. (1998) explored two components of organizational innovations (technical administrative). Brown and Eisenhardt (1995) found that the majority of research in the innovation domain focuses on product innovation in a manufacturing context. However, with increasing business dynamics, more and more researchers are challenging this uni-dimensional approach (Miller, 2001).

From an organizational perspective, real innovation success resides in the marketplace. Devising innovative marketing measures is essential to help organizations transform good ideas and good products into sales revenue and profit. Changing the rules of the game type strategic innovation has been found to be the key of many successful market leaders (Markides, 1997). In addition, a company must also strive to institutionalize innovation by establishing an appropriate culture, structure, incentives, systems, and processes that facilitate innovation to occur as part of daily business. Therefore, a multi-dimensional investigation of innovation, including technological, marketing, administrative, and strategic innovation should be on the research agenda.

Plenty of research have investigated different natures of innovations via probing different levels of innovation adoption, for example, radical vs incremental, evolutionary vs. revolutionary, discontinuous vs continuous, and so on (Garcia and Calantone, 2002). Leifer et al. (2001) provided some evidence about the radical innovation-performance linkage. Deowar and Dutton (1986) and Ettlie et al. (1984) examined radical and incremental innovations. Therefore, the nature of innovations would be a dichotomous categorization, encompassing radical and incremental innovations.

This study attempts to combine and probe the nature and type of the daily innovation practices within SMEs in Taiwan from integrated and multi-dimensional perspectives. The relationship between innovation and organizational performance will also be explored. A potential contribution of this study is to unveil the actual innovation practices of a recognized innovative economy – that of Taiwan – in the hope of providing some insight for companies that are not sure how to integrate innovation into their business operations. Another attribute of this research focuses on the less explored SMEs characteristics in an Asian context.

**Literature review**

What is innovation? From a micro point of view, innovation is management discipline: it focuses on the organization’s mission, searches for unique opportunities, determines whether they fit the organization’s strategic direction, defines the measures for success, and continually reassesses opportunities (Gaynor, 2002). Gaynor (2002) commented that innovation does not require genius, but it does require a system-wide dedication to pursue unique opportunities. Drucker (1998) is very explicit in stating that innovation is work rather than genius; successful innovation requires hard, focused, and purposeful work. Since successful innovation is achieved through everyday work, this
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In general, innovation research can be approached from the perspectives of an individual, an organization, and a nation, focusing on personal traits, innovation management, and a nation's source of competitiveness, respectively. Scholars from various disciplines have explored innovation from different perspectives. They have enriched this area of study and enabled other researchers to gain a better understanding of the nature of innovation. A review of the relevant literature reveals that organizational level innovation studies can be grouped into four research streams. The first stream is concerned with types of innovation, including innovation typology, its comparison (for example, Garcia and Calantone, 2002; Zaltman et al., 1973), and illustrations of various types of innovation. Examples of the latter involve technological innovation (for example, Cardinal, 2001; Damanpour and Evan, 1984), administrative innovation (for example, Ravichandran, 2000), strategic innovation (for example, Turock, 2001), and process and product innovation (for example, Bagchi-Sen, 2001; Trott, 1998). The second stream examines issues related to the diffusion of innovations from various sources (for example, O’Neill et al., 1998). The third stream investigates the antecedents or determinants of organizational innovations, such as the influence of structures, processes, and people on the development and marketing of new products (for example, King, 1990; Sorensen and Stuart, 2000; Trott, 1998). The fourth stream adopts a consequence or result approach and explores the relationship between innovation efforts and firm performance (for example, Damanpour and Evan, 1984; Damanpour, 1991; Li and Atuagene-Gima, 2001; Roper and Love, 2002). This research focuses on the first and fourth streams stated above. The rationale is that the innovation typology approach helps to portray daily innovation practices in a more effective way for the purposes of this study. In addition, organizational performance tends to be the ultimate goal of implementing innovation.

Innovation activities are generally categorized as either incremental or radical. The distinction between these two different types illustrates how organizations approach innovation in different ways. A cumulative series of minor changes or introducing something similar to previous organizational practices is called an incremental or routine innovation, whereas an abrupt major change or doing something markedly different from what the organization had done before is called a radical innovation (Nord and Tucker, 1987; Urabe et al., 1988; West and Farr, 1990). Although there has been debate over which type of innovating activity is more important and effective, the more astute managers understand the necessity for both. James (2002) said that timing the introduction of radical innovations to stay ahead of competition, while simultaneously utilizing incremental innovations to maximize profits is a major challenge for contemporary business managers. Hamdouch and Samuelides (2001) also reported that in the service industry, the innovation process is both cyclic and cumulative, combining radical innovations and introducing incremental innovations to fill the gap between two radical innovations.

In addition to the dichotomous categorization of innovations, Damanpour (1987) suggested the inclusion of various types of innovation such as technological, administrative, and ancillary innovations. Although technological innovation drives most organizations, the proof of technological innovation resides in the marketplace, which requires facilitating marketing and administration measures. Technological innovation without comparable levels of innovation from all sectors of an organization significantly reduces the benefits of investing in innovation (Gaynor, 2002; Miller,
Although not all firms should be innovative in the same manner, several scholars have suggested that innovation needs to be directed at new products or services, new organizational structures or administrative systems, new process technologies or new programs pertaining to organizational members for these typically occur simultaneously (Drejer, 2002; Garcia and Calantone, 2002; Johannessen et al., 2001; Trott, 1998). In addition to the above-mentioned factors, some scholars placed special emphasis on the importance of strategic innovation, because it may change the direction of the company and even the rules of the game in an industry (Markides, 1997; Turock, 2001).

Examining how companies actually practice innovation may unveil the black box of innovation and help translate it from a mere concept into action and competitiveness (Drejer, 2002; Gaynor, 2002; Hussey, 1997). We first surveyed two layers of innovation classification. The first layer examined the nature of innovation, for example, incremental and/or radical. The second layer further probed four different types of innovation, namely technological, marketing, administrative, and strategic innovations for both incremental and radical innovations. The definitions of these four different types of innovation will be provided in the “Measurement” section to avoid redundancy.

Furthermore, we investigated the relationship between innovation and organizational performance. Previous studies of this link indicated mixed results, some positive, some negative, and some showed no relationship at all (Capon et al., 1990; Chandler and Hanks, 1994; Li and Atuagene-Gima, 2001). Damanpour (1990) argued that the association between innovation and firm performance depends on the performance measurement and the characteristics of a given organization. That is, the utilization of objective or subjective performance indicators such as sales or self-reported performance may lead to different research results. In addition, different types or different combinations of innovation, such as technological innovation alone or the combination of technological and marketing innovations may also result in divergent organizational performances.

According to Pratali (2003), incremental technological innovations help improve company competitiveness with the ultimate aim of increasing company value. Incremental market innovation is about new ways of reading and serving current markets, which ensures firms to provide appropriate offers and yields greater avenues (Johne and Davies, 2000). In addition, Williams (1999) reported that innovative marketing aims at increasing product consumption and has a positive influence on firm sales. Furthermore, continuous work process innovation was regarded as the most important action for improving the short-term profitability (Soderquist, 1996). Terziovski (2000) also reported that an incremental strategy is the major driving force behind any improvement effort. Apparently, incremental innovation leads to the accumulation of day-by-day improvements and is the backbone of organizational performance. Therefore, we predict that:

\[ H1. \] Incremental innovation is positively related to organizational performance of SMEs.

Adopting radical innovation has mixed results. Various scholars commented that radical or breakthrough innovations provide the engine for long-term growth (Leifer et al., 2001). Many small companies also succeeded in introducing more radical innovations because of their genetic makeup (Stringer, 2000). However, some argue that the linkage of radical innovation and performance is an S-curve shape because of diminishing research effort and resource inefficiencies (Foster, 1986). In many cases, the
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creative destruction effect of radical innovation may not be shown in a short term horizon and even release a negative impact on firm performance (for example, Freel and Robson, 2004). Although the current research is on relatively resource constrained SMEs, we take an optimistic view and hypothesize that:

**H2.** Radical innovation is positively related to organizational performance of SMEs.

**Methodology**

Obtaining systematic information from SMEs is a big challenge for researchers, especially in Taiwan. Our past experience showed that in general, SMEs respond to questionnaire surveys with great reluctance because lean staffing ties their employees up and sometimes they do not understand the academic terminology in attempting to respond to questions. To ensure sample representation, having been provided with a government grant, we launched a large-scale telephone survey to collect the data of interest and verbally explained the question items with a standard protocol.

According to Frey (1989), the advantages of data gathered by telephone far outweigh any disadvantages. Lavrakas (1993) also reported the specific advantages of a telephone survey: it is cost efficient, it speeds up the gathering of data, and it provides the opportunity of controlling the quality of data. A major disadvantage is its limitation on the complexity and length of the interview, because it is not easy to keep an average person on the telephone for longer than 20 minutes (Lavrakas, 1993). To facilitate the telephone survey process, we have limited the questionnaire items to about 15 minutes of answering time, conducted 50 pilot surveys to detect potential problems, hired business school students with a business sense as the telephone interviewers, trained interviewers, and provided supervision to interviewers and answered questions as they arose. All interviews were tape recorded and numbered to control the quality of the survey and process (Groves *et al.*, 1988).

**Sample and data collection**

Our target companies for investigation are SMEs. The definition of SME in Taiwan is a company with less than 200 employees or capital less than 2.5 millions US dollars (White Paper Book, 2000). Based on the Year 2000 Directory of Manufacturing and Service Industries in Taiwan with less than 200 employees, we have successfully telephone interviewed 877 companies out of 1,000 attempts by computer-assisted random sampling. As a result, the response rate is 87.7 per cent. This paper presents a partial study of a large project sponsored by the Taiwan SME Administration. To the best of our knowledge, this is the first large-scale survey of its kind in Taiwan.

**Measurement**

*Innovation.* This study adopted the dichotomous incremental and radical innovation as the first layer classification, and named it the “nature” of innovation. Each nature of innovation was further categorized into technological, marketing, administrative, and strategic innovations based on the literature review. These four were named as the “types” of innovation. Technological innovations were defined as introducing changes in product, process, or service technology. Marketing innovations included a new brand, new market, and new sales approach. Administrative innovations referred to changes in the organization’s structure or administrative processes (Afuah, 1998; Damanpour, 1990). Strategic innovations focused on measures to produce a sustainable
competitive advantage and reinvent the rules of competition (Turock, 2001), such as strategic alliances with competitors.

To facilitate responses, interviewees were first asked to indicate (yes or no) whether their companies had ever adopted incremental and/or radical innovations (the definitions of these two natures were briefly explained to the interviewees). If yes, the types of innovation (technological – rated as 1, marketing – rated as 2, administrative – rated as 3, and strategic – rated as 4) were further presented. Cues of each of the four types of innovation were provided to facilitate respondents’ answers. Please refer to the appendix for the standard protocol of the two innovation natures and four innovation types used in this study. Respondents were then asked to point out the two most frequently used innovations in their companies. The rationale for selecting two out of four is to balance data richness and distinctiveness. Our past experience shows that one answer limits the respondents’ selection. However, if we allow for all the four answers, our respondents would likely select them all without putting too much thought on it to save the trouble and thus bias the results. Since the aim of this government sponsored research is to collect a set of base-line data probing the general practices of innovations in Taiwan and innovation is a continuous task (Hargadon and Sutton, 2000), we have phrased our question as “whether your company had EVER innovated”. In addition, it can remedy the time lag problem using telephone interview. In other words, we are concerned more on the recency of idea, product or service rather than the time factor.

Organizational performance. Researchers generally use either respondent’s self-reported performance or objective data such as sales, return on equity, assets, investments (ROE, ROA, ROI), and profit to reflect organizational performance. For this research, an objective indicator is deemed to be more appropriate as financial gain is the ultimate concern of SMEs in Taiwan. However, most of the SMEs in Taiwan are companies without public offering; therefore, their ROE, ROA, and ROI are not available. As for profit, in Taiwan, it is regarded as a company secret which cannot be revealed. Therefore, we adopted “company sales” of the surveyed year as the indicator of organizational performance.

Control variables. Four organizational variables are also examined in this study as control variables, namely: company size, company age, R&D source, and overseas investment. We are aware that firm size and firm age may be the antecedents of organizational performance (Cummings and Paramita, 1977; Delaney and Huselid, 1996; Huselid, 1995; Kalleberg and Leicht, 1991; Smith et al., 1986), at this time we would like to explore them as controls to see whether they can be held constant as they affect both innovation and performance according to the literature. Although some scholars observed that SMEs are more innovative because of their flexibility and speed of response (Acs and Audretsch, 1990; Afsah, 1998; Dodgson, 1993), some claimed that larger firms are more innovative (Damanpour, 1996; Nord and Tucker, 1987), apparently with more resources. Cummings and Paramita (1977) stated that the larger the size of an organization, the greater the efficiency and effectiveness, and the relationship enhanced organizational performance. Nevertheless, Hanna and Freeman (1984, 1989) reported that large companies accumulate inertia which discourages organizational change and competitiveness.

With respect to company age, “younger companies are more innovative” has been well-documented (for example, Hurley and Hult, 1998). However, researchers also reported that established SMEs have the propensity to accumulate innovative knowledge and engage in more innovations than the younger ones (Garvin, 1983; Sorensen and Stuart, 2000). In addition, Kalleberg and Leicht (1991) have noted that
organization’s age is generally positively related to its performance. Apparently, there exist divergent arguments about the relationship between firm size, firm age, innovation, and organizational performance.

The rationales for selecting R&D source and overseas investment include that R&D is an important resource facilitating innovation (Acha et al., 2005) and competing in an international platform may require more innovative measures to gain competitive advantage (Mytelka and Barclay, 2004; Petit and Sanna-Randaccio, 1998).

In this study, company size refers to the total number of employees and company age is the tenure of a company. R&D source inquires about whether a company mainly adopts an in-house R&D, outsourcing R&D, or both. Overseas investment explores whether a company has already had overseas investment, intend to invest or no intention at all. R&D source and overseas investment are coded as dummy variables.

**Results and discussion**

**Sample profile**

As shown in Table I, 63.6 per cent of the responding companies are from manufacturing and 36.4 per cent are from service industries. Persons responding to the telephone survey were top level managers (40.2 per cent) (for example, owner, president, and general manager), middle level managers (15.9 per cent), the key staff member in a general manager’s office (31.2 per cent), and others (12.7 per cent) including accountant, sales manager, and engineer. Generally, people of the first three categories and accountants are highly involved in company operations. Engineers in manufacturing and sales manager in service settings are influential and generally involved in routine management meetings in Taiwan SMEs. Therefore, this data set can be deemed reliable and valid for further analyses. Other company respondent characteristics include 57.3 per cent companies with less than 20 employees, 87 per cent of the companies with over 11 years of history, and 40 per cent of companies had less than US$1.5 millions annual sales. More than half of the companies had “in-house R&D,” whereas about 40 per cent outsource their R&D. As for overseas investment, 56.8 per cent had already invested in overseas operations. The demographic information shows that our samples are typical of SMEs in Taiwan, in terms of their small number of employees and sales.

**Nature of innovation**

Table II shows that about 80 per cent of the surveyed companies engaged in some kind of innovation. Among them, 53.5 per cent had implemented both incremental and radical innovations, 21.2 per cent had incremental innovations only, and 5.1 per cent had radical innovations only. About 20 per cent (177 companies) of the surveyed companies had never implemented any kind of innovation. For the innovation-performance linkage, we have dropped these 177 companies from this analysis and focused on the remaining 700 companies.

The stages of economic development in Taiwan may explain the nature of SME innovations reported above. The evolution of Taiwanese SME manufacturers largely follows the path of original equipment manufacturing (OEM), original design manufacturing (ODM), and original brand manufacturing (OBM). Decades ago, hundreds of thousands of small companies supported the center-satellite manufacturing system in Taiwan (Chang, 2001; Lin and Zhang, 2005). Each small firm had its own specialty and collaborated with other firms under the direction of a large center company. At the OEM stage, the key to staying in business for a given company was focusing on its own products to make itself competitive in terms of quality, price
and delivery. Innovation in various aspects was embedded in routine continuous improvement. Over the years, some companies had been able to advance to the ODM stage and came to design their own products. For those that excelled at the ODM stage, original brand manufacturing and marketing their own brand products constituted the

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>475</td>
<td>63.6</td>
</tr>
<tr>
<td>Service</td>
<td>272</td>
<td>36.4</td>
</tr>
<tr>
<td>Positions of the respondents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top-level managers</td>
<td>352</td>
<td>40.2</td>
</tr>
<tr>
<td>Middle-level managers</td>
<td>139</td>
<td>15.9</td>
</tr>
<tr>
<td>Key staff</td>
<td>273</td>
<td>31.2</td>
</tr>
<tr>
<td>Others</td>
<td>111</td>
<td>12.7</td>
</tr>
<tr>
<td>Number of employees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>275</td>
<td>31.5</td>
</tr>
<tr>
<td>11-20</td>
<td>276</td>
<td>25.9</td>
</tr>
<tr>
<td>21-30</td>
<td>105</td>
<td>12.0</td>
</tr>
<tr>
<td>31-100</td>
<td>205</td>
<td>23.5</td>
</tr>
<tr>
<td>101+</td>
<td>63</td>
<td>7.2</td>
</tr>
<tr>
<td>Firm age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-5</td>
<td>14</td>
<td>1.6</td>
</tr>
<tr>
<td>6-10</td>
<td>101</td>
<td>11.5</td>
</tr>
<tr>
<td>11-15</td>
<td>300</td>
<td>34.3</td>
</tr>
<tr>
<td>16-20</td>
<td>296</td>
<td>33.8</td>
</tr>
<tr>
<td>21+</td>
<td>164</td>
<td>18.7</td>
</tr>
<tr>
<td>Firm sales (in US$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-0.6 millions</td>
<td>120</td>
<td>19.6</td>
</tr>
<tr>
<td>0.6-1.5 millions</td>
<td>126</td>
<td>20.5</td>
</tr>
<tr>
<td>1.5-3 millions</td>
<td>110</td>
<td>17.9</td>
</tr>
<tr>
<td>3-15 millions</td>
<td>202</td>
<td>33</td>
</tr>
<tr>
<td>&gt;15 millions</td>
<td>55</td>
<td>9</td>
</tr>
<tr>
<td>Source of R&amp;D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-house R&amp;D</td>
<td>498</td>
<td>56.8</td>
</tr>
<tr>
<td>Outsourcing</td>
<td>348</td>
<td>39.7</td>
</tr>
<tr>
<td>Both</td>
<td>31</td>
<td>3.5</td>
</tr>
<tr>
<td>Overseas investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investing</td>
<td>514</td>
<td>56.8</td>
</tr>
<tr>
<td>Intend to invest</td>
<td>90</td>
<td>10.3</td>
</tr>
<tr>
<td>No investments</td>
<td>273</td>
<td>31.1</td>
</tr>
</tbody>
</table>

Table I. Profile of the responding SMEs

Table II. Distribution of the nature of innovation adopted by SMEs in Taiwan

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Involved</th>
<th>Not involved</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental innovation only</td>
<td>186</td>
<td>-</td>
<td>186 (21.2%)</td>
</tr>
<tr>
<td>Radical innovation only</td>
<td>45</td>
<td>-</td>
<td>45 (5.1%)</td>
</tr>
<tr>
<td>Both incremental and radical</td>
<td>469</td>
<td>-</td>
<td>469 (53.5%)</td>
</tr>
<tr>
<td>No innovation</td>
<td>-</td>
<td>177</td>
<td>177 (20.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>700</td>
<td>177</td>
<td>877 (100%)</td>
</tr>
</tbody>
</table>
next step. ODM and OBM enterprises required more radical innovation than those of OEM. A similar pattern “OEM-ODM-OBM” progression was also observed in service industries. Many service firms copied the business model of foreign companies (similar to OEM), such as food stores, apparel stores, and various service companies. At the initial stage, most of them were very small in a local area. As business grew, companies developed their own unique services (similar to ODM). At this stage, generally service lines were expanded and sometimes branches were set up, first in the same city and afterwards in adjacent cities. Usually when a business expanded, competitors followed the successful path and came to represent a threat. At a certain stage, marketing and branding (similar to OBM) became concerns and more innovations were needed for a national and international competitiveness. The composition of innovation exhibited in Table II reflects actual innovation practices in Taiwan.

Types of innovations
In addition to the nature of innovation, we also probed the contents of innovation to see the most commonly practiced types of innovation among technological, marketing, administrative, and/or strategic innovations. Table III displays the frequency of different types of innovation for both incremental and radical innovations. For incremental innovations, the frequency ranking was technological, marketing, administrative, and strategic innovations. In terms of radical innovations, the ranking was similar, except administrative and strategic innovations were tied. Although more incremental than radical innovations were practiced, the ranking of each was similar, indicating that as a whole SMEs in Taiwan place more emphasis on technological and marketing innovations. Technological innovations represent 41.3 per cent and 41.5 per cent of incremental and radical innovations, respectively. In Taiwan, technological innovation is generally perceived as more important, more urgent, and more tangibly shows a return on investment. In addition, in the past, a very high percentage of Taiwanese SME owners have technological backgrounds, which increases the likelihood of the occurrence of technological innovation. Government statistics indicated that from 1981 to 2003, every year higher education institutes in Taiwan had consistently produced around 40 per cent of graduates with engineering and mathematics majors (Statistical Yearbook of the Republic of China, 2003). This big pool of manpower was the source of SME owners in the manufacturing booming stage in Taiwan.

Marketing innovations are 28.7 per cent and 34.3 per cent of incremental and radical innovations, respectively. The higher frequency of radical marketing innovations may explain that new brands and new markets require non-traditional marketing measures to attract consumers’ attention. As mentioned earlier, marketing is becoming

<table>
<thead>
<tr>
<th>Category type</th>
<th>Incremental innovation</th>
<th>Radical innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Percent</td>
</tr>
<tr>
<td>Technological</td>
<td>416</td>
<td>41.3</td>
</tr>
<tr>
<td>Marketing</td>
<td>289</td>
<td>28.7</td>
</tr>
<tr>
<td>Administrative</td>
<td>164</td>
<td>16.3</td>
</tr>
<tr>
<td>Strategic</td>
<td>138</td>
<td>13.7</td>
</tr>
<tr>
<td>Total responses</td>
<td>1,007</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes: Respondents were asked to choose no more than two out of the four types of innovation. Frequency count based on 700 companies
increasingly important as Taiwanese firms gradually evolve into the ODM and OBM stages of production or service. A government report further supports this finding that Taiwanese SMEs consider strengthening their marketing abilities as a first priority (White Paper Book, 2001, pp. 64-5). The result that marketing is gaining stature is also reported by Motwani (1999) that French SMEs were increasing innovations in marketing strategies. Yet, it is contrary to Huang et al.’s (2002) finding that Australian SMEs frequently undertake production- or technology-related innovations, while marketing innovations are their least practiced innovation. Varied research results may reflect various innovation needs for different products, different industries, and companies in different organizational life cycles.

Administrative innovations undertaken by Taiwanese SMEs are 16.3 per cent and 12.6 per cent for incremental and radical innovations, respectively. More incremental administrative innovation is understandable, as radical administrative innovation is not likely to happen unless organization-wide uprooting structural or process changes occur. Strategic innovations are the least occurring type undertaken by Taiwanese SMEs. Eppink (1997) observed that companies occasionally employ strategic innovations to enforce their market strategy, such as re-positioning and differentiation through acquisitions, mergers, joint ventures or strategic alliances. Strategic innovation is usually costly, involves a great deal of risk and communication, and should only be taken when necessary. Therefore, its minimal frequency is expected. A promising sign of this finding is that at least strategic innovation is on the agenda and has gained some recognition.

The rankings of these four types of innovation are in concert with previous reasoning about the evolution of economic development in Taiwan. Traditionally, Taiwanese companies care most about technology or service advancement. When advancing into the stages of ODM and OBM, marketing innovation takes on added importance. Once companies become more and more independent and rely increasingly on their own design and own brand product, administration and strategic innovations become primary concerns.

**Innovation and organizational performance**

To answer the questions on whether innovation predicts company sales and what types of innovation have more explaining power, we conducted hierarchical regression analyses. Since our samples are from both manufacturing and service companies, we first employed a t-test. Data analysis indicated that there is no significant difference on the investigated variables between the two groups. Table IV exhibits two regression models based on the retained 700 samples. The first model ($R^2$ square 0.383) indicates that larger companies and companies with investments overseas have more sales. Model 2 adds four types of incremental innovations and radical innovations to Model 1. The $R^2$ square 0.411 is slightly higher than that of Model 1. The exhibited difference shows that both “incremental administrative innovation” and “radical administrative innovation” significantly explains “company sales” at the 0.05 and the 0.01 level, respectively. The slight $R^2$ square increase of 0.028 of Model 2 imply that innovation has less impact on company sales than firm size and overseas investments. In addition, contrary to the expectation that technological innovation may be the main source of sales revenues, only incremental and radical administrative innovations positively explain company sales. Generally speaking, hypothesis 1 and 2 have some support.

Although the rationale for our cross-sectional data has been explained earlier, we know that dealing with the time lag problem may benefit to this study. Therefore, we have exerted our best effort and tried to collect 2005 company sales with a five-year lag.
Does innovation lead to performance?

As predicted, the follow up telephone calls (without the endorsement of Taiwan SME Administration) resulted in poor responses, adding to the fact that “sales” is regarded as a secret by more and more companies due to increasing competition over the five years. In total, we have been able to collect 2005 sales from 37 companies only. The correlation between 2000 and 2005 company sales of these 37 SMEs is 0.703 at the 0.001 level. The result provides us with some confidence that the problem of time-lag may not be serious in this study.

In addition to previous studies (Capon et al., 1990; Li and Atuagene-Gima, 2001), this research provides another piece of evidence that innovation does not necessarily result in better company sales. This empirical result based on the bottom line criterion of sales clearly indicated that innovation is not a panacea. Companies that have fantasies about innovation need to face the reality that when all is said and done, the key may be a system-wide dedication to hard, focused, and purposeful work achieved through administrative innovation.

Conclusion and implications

Supported by a government grant, this study launched a large-scale telephone survey and unveiled SME innovation practices of a recognized fast-growing and innovative economy – that of Taiwan. This research approached the topic from a more

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model 1</th>
<th>Model 2</th>
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<tr>
<td><strong>Control variables</strong></td>
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<tr>
<td>Firm size</td>
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<td>Proposed direct effects</td>
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<td><strong>Incremental innovations</strong></td>
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<td>Incremental-administrative</td>
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<td><strong>F value</strong></td>
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<tr>
<td><strong>R²</strong></td>
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<tr>
<td>Adjusted R²</td>
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<tr>
<td>F change</td>
<td>41.739*</td>
<td>2.419**</td>
</tr>
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</table>

Notes: N = 700; dependent variable: firm sales; *p < 0.001; **p < 0.05; ***p < 0.01, +p < 0.1

Table IV. Hierarchical regression analysis results
comprehensive perspective by investigating different natures and different types of innovation and their relationships with company sales. The research findings of this study provide partial answers to the questions mentioned earlier on about how to fit innovation into business operations.

Research result indicates that about 80 per cent of the surveyed companies implemented some sort of innovation. It seems that innovation has become a way of life in Taiwan. The innovation efforts may explain why Taiwan ranked fourth globally in the number of US patent grants received. Our data analyses reveal that a successful innovation does not necessarily require a radical change.

The most unexpected finding of this research is the role administrative innovation plays in relation to company sales. This finding provides evidence of Drucker’s (1998) comment that a system-wide involvement of all departments is essential to prevent innovation failure. Another important finding is that “firm size” appears to explain a major portion of company sales (Table IV). This result overruled our speculation that by holding firm size constant, we would have a clearer picture about how various types of innovation contribute to company sales. Since eight types of innovation together only increase 0.028 explaining power, we have concluded that firm size should be treated as an antecedent in future relevant research. With the comparatively large sample size, this result provides a concrete addition to the extant literature that firm size is a strong antecedent of company sales even in an Asian context.

In answering how to fit innovation into business operations, variables investigated in this study have the capacity to be easily implemented in company routines. Three managerial implications may be derived from the research findings as follows.

*Pay more attention to administrative innovation*
When innovation becomes a way of life, companies are not competing in terms of innovations per se, but are competing for company-wide devotion to transfer that innovation into competitiveness. Regression analyses within this study disclosed that among various types of innovation, only administrative innovations in both incremental and radical categories show their predicting power on company sales. Furthermore, radical administrative innovation at the 0.01 significant level is more powerful than that of the incremental one. This finding further supports the emphasis of various scholars that innovation requires hard, focused, and purposeful work (Drucker, 1998; Gaynor, 2002; Hargadon and Sutton, 2000). System-wide dedication promoted through administrative innovation may play a key role in reaping the ultimate benefits of innovation – real sales. Measures may include innovations in facilitating relationships between people to accomplish the relevant innovative work (King, 1990), innovative ways to drive an effective system-wide implementation of policies and procedures, innovative leadership, communication, peer coaching, and structural change.

*Innovation through overseas investment*
In this study, SMEs which had overseas investment perform better in terms of sales. Competing in an international arena challenges the company to become more innovative, because it is the key to stay competitive nowadays. Going global is a daunting task for some SMEs that generally lack sufficient manpower, financial resources, language ability, and international perspective. The finding that almost 60 per cent of the surveyed SMEs in Taiwan have already had overseas operations and achieved better performance is very encouraging for those who intend to go overseas.
Consider alliance to increase organizational size
Since "size" is the most powerful predictor of company sales, "alliance" may present a new avenue for SMEs to increase the firm size and maintain a certain degree of autonomous at the same time. The disadvantages of small companies have been well documented (Rothwell, 1989; Roper, 1997), yet the main reasons that economic entities in Taiwan remain relatively small include first, a majority of the SMEs are family enterprises which generally choose to stay small and staffed by family members only; second, the concern over handing over controlling power to outsiders when company grows and goes for public offering. With alliances, SMEs should be able to reach an economic scale as a group and maintain internally autonomous as well. This research finding provides a direction for the interested parties to pursue development that fit their needs and vision.

There is no doubt that the 21st century will be credited as the century of innovation. The most revealing findings of this research are that innovation has a weak link with company sales and administrative innovations have surfaced to be the most crucial factor in explaining sales rather than technological innovations. This finding conveys a strong message that innovation management has to be viewed differently. Creating a successful innovation platform to serve as a base for non-technology related innovations may prove to be the most critical catalyst of success.

As with every social science study, this study has research limitations. First, to facilitate a successful telephone survey, many items were designed as “yes-no” polar questions in place of a scale. Valuable information may have been lost with such simple answers. Second, respondents’ subjective perceptions on the innovation practices of their organizations are unavoidable. Third, with a large-scale quantitative survey, we were unable to cover this topic as trenchantly as we would have liked due in part to resource constraints.

However, this large-scale survey provides us with valuable information and posits additional avenues for future research. First, further investigations on companies with “no innovation at all” are worthy of pursuit. Principles derived from traditional Chinese business philosophy to stay small, refrain from change when the present practice works, and avoid risk may be very different from the innovation concepts held by large companies in the West. Second, the perception of time as a factor on innovation is also an interesting approach to see how time plays a role in the innovation journey. Third, innovation comparisons between SMEs and large companies may provide some insight into this field of study. Fourth, country comparison in terms of innovation should most definitely prove to be of great value.

Innovation is one of the core competencies of today’s business world. Those companies that embrace it are more likely to excel in the ever-increasing competitive business environment; those that are indifferent to it may gradually lose their ground while competitors come to surpass them. This study disclosed the actual innovation operations in a fast growing and SME-dominated economy. Hopefully, the finding that the underemphasized non-technology innovations are even more crucial may draw companies’ attention to reap the real benefits of innovation.

References


Does innovation lead to performance?


Does innovation lead to performance?


Further reading


Appendix: A standard protocol – definitions of innovation natures and innovation types

**Radical innovation**

Radical or revolutionary innovation means a firm produces thoroughly new patterns of organizational practices, or a firm makes a large-scale change to form novel innovativeness comparing with previous practices.

**Incremental innovation**

Incremental or improved innovation focuses on making current organizational practices better. New and improved organizational practices resulting from those small magnitude improvements are similar with previous management actions.
Technological innovation
Technological innovation encompasses product, service and process innovations. Product innovation indicates improvements or changes of a product features, a product function, modeling, material quality and packing. Service innovation is the delivery of new and improved services distinct from products. Innovative service content and attitudes are also included. Process innovation relates to operational processes of a firm, such as process reengineering, process reduction or combination, and innovative production.

Marketing innovation
Marketing innovation includes new brands and extension of new markets. For example, brand building, brand alliance, market reposition, market expansion, and so on.

Administrative innovation
Changes or improvements of organizational structures and administrative processes pertain to the areas of administrative innovation. For example, innovative benefit policies, modification of current company structure, transformation of management systems and so on.

Strategic innovation
Strategic innovation is concerned with organizational strategies which exert continuous competitive advantages for companies. The components of strategic innovation include alliances with competitors, alliances across industries, alliances with suppliers, outsourcing, and relocation of a firm’s core competence.

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