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Product and process innovation in the food processing industry: case study in Guangxi province

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Introduction

Recognizing that investment in knowledge and innovation is a driver of sustained long-term growth, developed economies have witnessed an increase in the volume of research and development with a focus on speeding up the development of new products and new processes (Earle and Anderson 1985). Governments have also recognized that investment in technology in particular can improve productivity and generate growth and employment. In the case of the food and agricultural sector, one example of government intervention in a developed economy is Australia's recent National Food Industry Strategy which was an initiative which sought to "create sustainable advantage through innovation all along the value chain" (National Food Industry Strategy Ltd 2006). The targeted outcomes of the Australian strategy included finding innovative solutions to lowering costs, differentiating products and services and developing strategic alliances between the industry stakeholders.

Innovation in the food sector is driven by trends in consumer demand for food products with emphasis on variety, quality, nutrition, convenience, safety, reasonable cost and environmental soundness (Barbosa-Cánovas and Gould 2000). Food companies naturally respond to such trends and increase their research efforts as part of this response and seek to gain a sustainable competitive advantage over other companies by exploiting new technologies and innovations (Traill and Meulenberg 2002, Lagnevik *et al*. 2003).

China's food processing sector has arrived at a critical stage and the challenges for the food industry including undergoing relevant structural adjustments are well documented (OECD 2000). The Chinese domestic economy continues to boom and living standards of

people continue to improve. Food processors need to adjust to increasingly diversified consumer demands and improve the quality and nutritional content of foods. The food industry also needs to enhance its international market access through product quality, variety, safety and other attributes of their food products. Product and process innovation has become one of the top driving forces for improving the competitiveness of China's food processing industry both domestically and internationally (OECD 2000).

This paper examines through case study analysis the response of several food processors in China to the changes in their external business environment and makes some assessment of their adoption or otherwise of innovative strategies. While relevant studies have been pervasive in Western countries, there is a dearth of analysis of such issues in China.

The case study focuses on innovation within a set of food processors situated in Guangxi, a southern province of China, which has agriculture as a major contributor to GDP (21.5%). The case study companies are considered to be successful food processors. The study does not attempt to generalize about the status of food processing in Guangxi, nor does it compare the innovation activities between successful and non-successful food processors. The research focuses on examining the innovative activities present in the case study companies, how such activities came to be and the contribution of innovation to business success.

Specifically, the case study addresses a range of questions. These include:

- Does management view innovation in its own right as being critical to the success of the food processing industry?
- What aspects of innovation are present in the case study firms?
- How does innovation contribute to these firms' competitiveness?
- What is critical to successful innovation implementation?
- What barriers to implementation exist?
- How is innovation formed in a strategic sense in these companies?

The paper reviews salient literature on the topic of innovation within the context of organisational performance.

Defining and measuring innovation

Rogers (1998) traces the attempts over time to understand the nature of innovation. He cites the development of the Oslo Manual (Guidelines for Collecting and Interpreting Innovation Data), a joint OECD and Eurostat initiative, as a significant milestone in capturing the key elements of innovation and its measurement. The main premise of the Oslo Manual (2005) is that "*... [i]nnovation is a continuous process. Firms constantly make changes to products and processes and collect new knowledge, and it is more difficult to measure a dynamic process than a static activity. With the objective of capturing this process, the Manual presents guidelines for collecting data on the general process of innovation (for example, innovation activities, expenditures and linkages), the*

implementation of significant changes in the firm (i.e. innovations), the factors that influence innovation activities, and the outcomes of innovation."

Rogers also examines the attempts to define and measure innovation, particularly at the firm level. The Oslo Manual defines innovation as *"… the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations." (p.46)* The definition captures changes that are first developed by a firm as well as those adopted from other firms. The Manual also suggests that innovation is consistent with the concept of novelty: newness to the firm, the market or the world. As a minimum, the innovation must be new to the firm. (p.58)

The significance of 'product versus process' innovation seems well understood within the food industry itself. Spencer (in Department of Agriculture, Fisheries and Forestry, 2007) states that *"..… [t]imelines to identify, test and prove new concepts are getting shorter and the need for refreshing and tailoring product offerings will be more compelling in the future. Examples of where innovation is apparent do not simply refer to product form but to a wider set of approaches to knowledge management and service solutions."*

The literature also suggests that firms first focus on product innovation in new markets or product variants and then once product opportunities are exhausted switch their attention to finding more efficient means of production (Abernathy and Utterback 1978, Klepper 1996, Petsas and Giannikos 2005). Grunert *et al.* (1997), on the other hand, demonstrated that firms engaged in process innovation may also develop a lot of imitation products or products with a low degree of newness. Mantovani (2005) proposed that product and process innovations are complementary and firms always prefer a simultaneous adoption. In other words, food processors which demonstrate product innovation may also demonstrate process innovation and vice versa.

One of the difficulties with innovation lies in its measurement, whether at firm, industry or national level. Rogers (1998) examines the complexities in establishing degrees of innovativeness and maps out the range of typical output and input measures (Table 1).

One of the difficulties in obtaining comparative statistics on innovation patterns and trends both within and between countries lies in the problems in obtaining suitable data. Reports such as "Patterns of Innovation in Australian Businesses" (ABS 2003) tend to be one-off and innovation activity tends to be categorized using localized industry classifications. The food sector is accordingly spread across a range of sectoral classifications with manufacturing being the predominant one.

While the output based measures tend to be the common measurement of innovation success, researchers such as Craig and Hart (1992) suggest that there are many problems associated with the rationale and practicalities in measuring the success or otherwise of innovation, and specifically new product development. Grunert *et al*. (1997) propose two dimensions to measure the innovation success, these being market acceptance and the extent of realization of companies' goals including sales and financial goals. While

market acceptance can be sales related, areas such as goal realization are not as easily measured.

Table 1: Output and input based measures of innovation (adapted from Rogers 1998)

Output based	Input based
Introduction of new or improved product(s) or process(es)	Research and development
Percentage of sales from new / improved product(s) or process(es)	Acquisition of technology from others (e.g. patents, licences)
Intellectual property statistics (e.g. patents, trade mark and design applications)	Intellectual property statistics
Firm performance (econometric techiniques to relate innovation indicators to firm performance)	Expenditure on tooling up, industrial engineering and manufacturing start-up associated with new products and processes
	Intangible assets
	Marketing expenditures for new products
	Training expenditures for new / changed products and processes
	Managerial and organisational change

Of the food industry data available, there is some evidence to suggest in Australia at least that food tends to be generally consistent with other manufacturing sectors. In 2003, 36.7% of Australian manufacturers in food, beverages and tobacco were classified as innovators compared to 39.5% within manufacturing as a whole. Since the early 1990's, the food sector has also seen increasing emphasis on improvements in operational processes and less on product innovation (ABS 2003). The pattern that emerges with Australian firms is that about 69% or the majority of innovation expenditure is made up of non-R&D expenditure; the balance (31%) coming from R&D (ABS 2003). Non R&D innovation expenditures comprise 1.7% of total business expenditure; 0.07% on the other hand was R&D related.

In a study of European firms, the Step Group (1997) found a wide range of results by both industry and country. Notably, in that study innovation inputs and intensity were measured relative to sales as opposed to expenditure. In terms of the food sector, the Step Group found that the innovative intensity across the food and beverage sector was about 7.9% (total innovation costs as a per cent of sales) for innovating firms and 2.62% for all firms. The high tech sector ranged from 12 – 15% for innovators. R&D expenditure typically comprised about 10% of the total innovation expenditure for the food sector. Step Group (1997) further claimed that the acquisition of new machinery and plant is the main source of technology (above 50% of total innovation expenditures) for most traditional sectors including food sectors.

Drivers of Innovation

According to researchers, there are various factors driving food processors' efforts to be innovative. New product development is likely to be hastened by firms expanding into new markets or trying to achieve market penetration and a greater market share of existing markets (Fuller 1994). Firms will continually seek to launch additional products and increase the range of goods and services in order to maintain their viability (Fuller 1994). Consumer consciousness over diet and health, food safety and nutrition also drives companies to improve the range and quality of goods (Traill and Grunert 1997).

Firms are also motivated to improve processes in order to reduce costs, expand their production possibilities and also to improve production flexibility and co-ordination. (Davies 1988, Tirole 1988, Davenport 1993). Environmental factors, regulations and standards have also become significant drivers of innovation in the food industry (Jongen and Meulenberg 2005).

Several studies have addressed the importance of innovation to firm performance. Zahra and Das (1993) examined a broad sample of manufacturing firms and concluded that there was a positive relationship between the internal innovation and financial performance, supporting the importance of innovation strategy as a determinant of company financial performance. Van Duren *et al* (2003) also found that innovation was rated as a top factor for success in the food processing industry by some successful food processors in Canada. Van Duren *et al*. (2001) also suggested that smaller food companies may be more likely to cite innovation as a success factor because they have neither the scale nor resources to compete with large competitors.

Market Orientation, Company Size and Ownership

There is a conflict of views among researchers on how the different markets that food processors serve can influence innovation. Krugman (1995) argues that competing in international markets is more demanding than competing locally, suggesting that export-oriented firms may be more innovative in order to survive. By contrast, Traill and Meulenberg (2002) in their research find that there is no significant evidence to suggest that the larger and more heterogeneous the market served by a firm, the more innovative it must be. The latter researchers based their research on food processors in Europe, where living standards are already quite high and demand for varieties and quality is already rigorous. Therefore, serving customers outside Europe may not be more exacting as serving those within Europe. The situations Chinese food processors face may be just the opposite: customers outside China are more demanding or need more diversification of products than those within China. Therefore, it can be expected that more innovation is required for export-oriented firms and overall, the larger the market served by a firm and the more export oriented, the more innovative it may be.

There are different views on the relationship between size and innovation. Rothwell and Dodgson (1994) believe that large firms have natural advantages as innovators. Large firms have the capacity to employ scientists and technicians, have easier access to

innovation loans and efficient distribution facilities for new products. Small-medium enterprises may lack the necessary management skills, information and know-how underlying innovation (Rothwell and Dodgson 1994; Staudt *et al*. 1992). Traill and Meulenberg (2002) found that except for very small and very large companies, there is no relationship between company size and innovation. Traill and Meulenberg (2002) did examine the relevance of firm ownership and claimed that successful family-based food processors often had a culture of product involvement. Jefferson *et al*. (2002) in their study of ownership and innovation in large and medium-size enterprises of China found no clear patterns in terms of innovation indicators such as of R&D intensity, R&D personnel / total employment ratio, new product sales / total sales and patent applications. However, they do suggest that as the role of state is declining, innovation activities are becoming more prevalent. In recent years, Chinese companies have started realizing the importance of intellectual property and have begun using patents and trademarks as means of protection and even profitability (Chen and Chen 2003). Meulen and Velde (2005) describe a patent as *" …. an exclusive right granted for an invention, which is a product or a process that provides a new way of doing something, or offers a new technical solution to a problem."*

Impediments to Innovation

West (2000) argues that successful innovation requires the capacity of the firm to make an accurate assessment of benefits and costs and implies a strong commitment of resources and a willingness to accept risk. Management's inability or unwillingness to take risks and organizational rigidities may hinder the innovation process. Other researchers (Roy 1997, Morck and Yeung 2001) cite lack of human capital as an important hindrance of innovation. Government regulations and standards, intellectual property right and other factors also impact innovations (Morck and Yeung 2001). Different surveys also show that various factors could constrain innovation of food processors (Agriculture and Agri-Food Canada 2006; Melbourne Institute of Applied Economic and Social Research 1996). For example, Canadian food processors rate lack of internally generated cash flow, long gestation period of innovation and insufficient flexibility in regulations and standards as the highest three hindrances.

Some research also examines some of the more general inhibitors to innovation. Of interest, is the examination of the effects of external knowledge, alliances and outsourcing activities on the innovation speed in small-medium enterprises (SMEs) by Kessler *et al.* (2007). In their view, use of alliances was found to slow down innovation speed for a range of reasons; one being the difficulties with managing operational issues across company boundaries.

Critical Successful Factors underlying Innovation

There is extensive literature on critical success factors (CSFs) on product innovation or new product development. For example, Poolton and Barclay (1998) identified six variables considered to be important factors underlying the success of new product development. Lester (1998) identified potential problems affecting new product

development outcomes. In addressing these problems, he observed fifteen CSFs in five areas of product innovation. Lynn *et al*. (1999) also discovered eleven key factors for product innovation by asking companies to identify the determinants of success of their new product development. Cooper (1995, 1999, 2001) at different stages also extracted a number of CSFs underlying product innovation. The factors identified by Cooper in 2001 are used in this research as the basis for exploring the relevant factors and influences underlying the food companies' product innovation.

Although the research surrounding CSFs has tended to focus on product innovation, Lager and Horte (2002) did examine the factors underlying process innovation. They interviewed managers of different sectors and identified 25 potential success factors operating at both company and project levels. They then used the candidate success factors to conduct a survey in the European processing industry. Their research found that success factors for process development and product development. They also differentiated process improvement and process innovation. Lager and Horte's 15 top-rated success factors for process innovation also underpin this study.

Managing Strategic Innovation

Much of the literature on innovation focuses on managing innovation in a strategic sense as a part of broader organisational strategy (Saren 1987; Starkey and Mckinlay 1988; Markides 1997, 2002). Omta and Folstar (2005) argue that in order to become innovative, firms have to attune the internal resources, competences and capabilities to external technological challenges and business opportunities. Tushman and Anderson (2004) also argue that it is an arduous task to build and run an organization that consistently generates innovation. In addition, there is no single best way to organize a company that succeeds at innovation and managers must maintain congruence among many different aspects of the organization. Some researchers have conceptualized such congruence as dynamic organizational capability (Teece and Pisano 1994, Lawson and Samson 2001, Eisenhardt and Martin 2000). One major challenge for researchers is to discover the components of such dynamic capability that serve as continuous drivers of corporate innovation.

Researchers have recently shown more and more interest in organizational learning (Cohen and Levinthal 1990, Teece and Pisano 1994, Eisenhardt and Santos 2002, Owen-Smith and Powell 2004). It is claimed that learning mechanisms can create and modify dynamic capabilities of an organization (Zollo and Winter 2002). In the field of strategic learning of organizations, absorptive capacity is a concept that is also attracting increasing attention. Zahra and George (2002) define absorptive capacity as *"a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability"*. They (2002) further argue absorptive capacity is an element of dynamic capability that influences the nature and sustainability of a firm's competitive advantage. The role of absorptive capacity in fostering strategic innovation has been confirmed by many researchers (Almeida *et al*. 2003, Styles and Goddard 2004). Pitt (1998) also argues that absorptive capacity is very closely related to strategic innovation. Tushman and Anderson (2004) argue that absorptive capacity can foster innovation that springs from the recombination of ideas that are developed in different settings. Firms may employ various forms to develop

absorptive capacity such as collaborative agreements or strategic alliances (Luke *et al*. 2004: Faem *at al.* 2005).

In addition to external relationships, some researchers argue that internal diffusion of knowledge and cross-functional information dissemination within an organization is equally important in fostering organisational learning and innovation (Bogner and Barr 2000, Martin and Grbac 2003). Almeida *et al*. (2003) argue that specific cross-functional mechanisms need to be established to enhance the internal communication critical to fostering innovation. Convergence of isolated knowledge from different parts of an organization can generate new insights, is essential in getting managers to be favorably disposed towards any specific innovation and it creates adaptive sense-making. Where researchers tend to differ is on how the cross-functional communication and exchange of knowledge should be conducted. Daft and Lengel (1986) and Hitt *et al*. (1998) stress the importance of formal mechanisms of communication. Hitt *et al*. (1998) argue that formal lateral mechanisms increase quality, quantity, depth and breadth of information shared across different functions within an organization. Other researchers highlight the importance of loose interaction and informal communication (Almeida *et al*. 2003; Tatikonda and Rosenthal 2000). Von Hippel (1998) argues that excessively formal communication hinders problem solving and cross-functional cooperation.

Some researchers argue that a cultural fit is very important for innovation and as a result top management should evaluate their corporate culture (Omta and Folstar 2005). According to Oden (1997), corporate culture is "the set of shared behaviors, artifacts, values, beliefs, and assumptions that a corporation develops as it learns to cope with the external and internal aspects of survival and success." Researchers also consider culture as a contributor to the corporate dynamic capability (Leonard-Barton 1992; Galunic and Eisenhardt 2001) and contributes to the creation and development of strategic innovation (Leifer *et al*. 2001). Various characteristics of culture have been identified by researchers and scholars, such as open-mindedness (Sinkula *et al*. 1997) and future orientation (Kitchell 1995). Risk taking tolerance is another element of culture. Damanpour (1991) argues that a risk taking attitude results in more managerial support for new ideas which is especially necessary in the implementation phases of an innovation. Berghman (2006) also argues that a risk taking culture can affect the entire absorptive capacity cycle. Han at al (1998) provide some evidence that market orientation facilitates an organization's innovativeness which in turn positively influences business performance. Matsuno *et al*. (2002) further contend that innovativeness has a positive effect on a firm's assimilation capacity.

Many researchers believe that a constant questioning attitude is also an important cultural value. For example, Hamel (1998) argues that companies need to challenge the orthodoxies ceaselessly. Markides (1998) also considers it necessary to constantly question the way the business is done at present.

It is also argued that organizational structure can promote or prevent innovation (Hage 1999; Miller 1993). There is strong support in the literature for organic structures, which imply decentralization of authority, flatter and more horizontal structure, greater individual authority, local autonomy, flexibility and adaptability (Bishop 2005).

Researchers contend that such a structure can contribute to the development of dynamic capabilities (Teece *at al.* 1997), facilitate strategic innovation and increase strategic actions (Hitt *et al.* 1998, Markides 1999). By contrast, a mechanistic structure features centralization and formalization of control and authority, obedience to supervisors, vertical communication links, rigidity and inflexibility (Volberda, 1996). Although this hierarchical structure may contribute to efficient decision making, it can limit the absorptive capacity and hinder the creation and development of strategic innovation in a company.

Rosenbloom (2000) concludes that leadership is a central element in the dynamic capabilities and can also provide impetus to actualize latent dynamic capabilities. Molin (n.d.) also argues that a firm possessing dynamic capabilities will need leadership. Tushman and Anderson (2004) further argue that organizations cannot fulfill their innovation drives without visionary and strong leadership. Reasons for this argument are many. For example, good leaders always keep a sense of urgency, value the necessity for reorientation and are able to fundamental breaking changes (Tushman at al 1986). In addition, they impart their vision that motivates their employees to pursue innovation (Tushman and Anderson 2004). Furthermore, they encourage non-traditional initiatives to transcend their firms' past and strengths (Tushman and Anderson 2004). Good leaders can surmount many organizational problems; structures and systems alone do not (Tushman and Anderson 2004).

There has been extensive literature on human resources as a critical factor in the development of innovation activities, since the human element is central to the innovation process (Vrakking 1990; Morcillo 1997; Darroch and McNaugton 2002). In recent years, more and more researchers consider human resource management as a strategic approach (Lundy and Cowling 2006; Salaman at al 2005; Armstrong 2006), aligning human resource management to the strategic goals of organizations. Therefore, human resource management becomes a dynamic capability to facilitate strategic innovation of a company. Some researchers focus on the whole HR system while others focus on isolated HRM practices (Jiménez-Jiménez and Sanz-Valle 2005). In addition, researchers often disagree on how different ways of some specific practices can generate innovation. For example, in respect of training, some propose a broad application of training (Mabey and Salaman 1995) while others support a narrow application of training (Miles and Snow 1984). Nor is there agreement on the issue of job security. Some (Sheppeck and Militello 2000) claim that the temporary employee strategy induces innovation while others (Jackson *et al*. 1989) find that job security favors innovation. On the whole, however, researchers do agree that HRM system and such individual HRM practices as recruitment and selection, employment security, job design, training, appraisal and reward system and career path have important linkages with innovation.

Case study

This research focuses on not only the innovation present in successful food processors in Guangxi but also the way such innovation contributes to the firms' competitiveness. In addition, it focuses on the factors or mechanisms to foster innovation in a strategic sense. The case design seeks a deeper understanding of the firms using both quantitative and

qualitative approaches (Stake 1995, Yin 1994 and Bryman 2004). The strategy and design for this research is summarized in Table 2.

Table 2: Research Approach

	Research Strategy	
	Quantitative (Survey)	Qualitative (Interviewing)
Case Study	1. Basic information of case study firms 2. CSFs in food processing and self-strength. 3. Innovation Activities present 4. Relevant CSFs and barriers	1. Managing strategic innovation 2. Further probing of some survey questions especially those concerning strengths of firms, CSFs, etc.

Guangxi Province was chosen as the focus of the case study firms by virtue of accessibility to the firms and its appropriateness as a developing centre for food processing. It is situated in the southwest of China, with an area of 230 thousand square kilometres and a population of people 49 million. It accounts for 2.4% (RMB588.59) of China's total GDP (RMB 24.66 trillion) (National Bureau of Statistics 2007). Although it accounts for a small percentage, Guangxi is quite a typical province ranked 18th of the 31 provinces. Almost all food processors in Guangxi may be characterized as small or medium in size in the sense that they are clearly distinguishable from the larger processors in China. The turnover figures of the 13 firms in survey group ranged from RMB 2100 million to RMB130 million. with a median of RMB 620 million. To put this into perspective, the largest meat and dairy processors in 2007 had turnovers of RMB 30 and 20 billion respectively.

According to the Guangxi Almanac (2004), there were 292 food processors in Guangxi in 2004. For the purpose of this study, 5 criteria were used for selecting companies suitable for case study analysis. The companies needed to be:

1. 'Successful'.
2. Chinese-owned or in joint venture with Chinese shares constituting at least 60%.
3. headquartered in Guangxi with major processing bases also in Guangxi.
4. independent in management instead of subsidiary of some other companies.
5. accessible and cooperative in terms of participating in the study.

A 'successful' food processor was defined for the purposes of the study as being one with annual sales growth of at least 8% over the last three years plus positive returns on assets and return on shareholder's funds. 13 food processors (Appendix 1), mainly represented by plant managers, completed the initial questionnaires and participated in follow-up

interviews. Five of the more innovative firms were chosen for further analysis using less-structured interviews with two representatives from each company.

Table 3 reports the innovation intensity (median 7.78%) of the 13 firms from Guangxi which appears at face value comparable to the STEP group benchmarks (8% for innovators). Innovation expenditure for the case study forms related mostly to acquisition of machinery and equipment, cooperation in research and development with external partners, training of personnel and internal or external marketing activities aimed at the introduction of their innovations.

Table 3: Innovation Expenditures and R&D Intensity

	R&D Expenditure / Sales	**Total Innovation Expenditure / Sales** **(Innovation intensity)**	**R&D / Total Innovation Expenditure**
	13 case study companies		
N = 13			
High	1.86%	11.28%	16.49%
Low	0%	0%	0%
Median	0.78%	7.78%	10.03%
Average	0.73%	6.26%	9.69%
Std Dev	0.006527	0.04003	0.052294
	5 innovators		
High	1.86%	11.28%	17.28%
Low	1.01%	9.27%	9.04%
Median	1.15%	9.32%	12.40%
Average	1.38%	9.98%	13.21%
Std Dev	0.004369	0.009483	0.035702

As a summary of their innovation effort over the 2004-2006 period, seven of the firms were simultaneously active in product and process innovation. One company highlighted in interview that one of their new products involved introducing new treatments of microbiology. Without the new associated process, the new product could not be produced. Product and process innovations in such cases go hand in hand. The product-oriented innovations were generally motivated by increasing the range of goods or services, opening new markets or increased market share and improving the quality of goods or services. The survey revealed that all the companies had at least 25% of their 2006 sales generated by new and significantly improved products. In one case this reached 65%. All but one claimed that the margins on their recent innovative products were higher than those earned on their traditional products.

Process-oriented innovations tended to address improving production flexibility, increasing capacity, creating the ability to produce new products and increasing productivity.

The firms were also grouped according to (i) firms with a with a national focus with a small portion of their sales for export, (ii) firms with local focus serving mainly customers at municipal or regional level with a small portion of their sales in other parts of China, and (iii) export-oriented firms selling a small portion of their products within China.

Table 4: Market Orientation and Innovation

	Firms with local focus	**Firms with national focus**	**Export-oriented Firms**
No of firms	3	5	5
Average product innovation number	0.7	4.2	1.2
New product sales ratio	14%	33%	17%
Average process innovation number	0.7	2.8	1.8
Percentage of firms with long-term innovation activities	33%	80%	60%
Percentage of firms with internal R&D	67%	100%	80%

Table 4 shows that there is possibly a link between the market size the companies serve and innovation activities as long as the market is within the periphery of China. Firms with national focus are strongest in all measures. It is surprising that export-oriented firms seem less innovative than firms with a national focus. In fact, the only one company without any innovation activities is an export-oriented one. This company explained that it has very established customers abroad. These customers have kept ordering the same products for the past several years but the volumes exported have significantly increasing. Innovation has not been a priority for this firm. The fact that the national focused firms are most innovative was not explored by the survey. It may be that the growing and diversified internal demand from the large Chinese population has tended to drive innovation toward meeting such demand. Table 4 may lead to the conclusion that as long as the market is within China, the larger the market these food processors serve, the more innovative they seem to be. These focused on how strategic innovation was fostered in these companies and how they managed innovation in a strategic sense.

Innovation - Critical Success Factors

Managers of the 13 successful food processors were asked to rate the importance (scale 1 – 5) of a range of factors fundamental to product (Table 5) and process (Table 7)

innovation and then rate the extent to which these factors had been implemented or addressed by the firm.

The factors these food processors consider critical to the success are not always highly implemented in reality. These factors are divided into four groups according to a somewhat arbitrary division line of 4 marks. Table 6 shows that these four groups are "high importance, high implementation" (A) , "high importance, low implementation"(B), "low importance, high implementation"(C) and "low importance, low implementation"(D). Factors which fall into category B imply that they have not been implemented in practice relative to other factors while those in C suggest that the companies do not need to put too much effort in these areas.

Table 5: Importance and Implementation of Candidate Factors of Product Innovation

Candidate CSFs	**Degree of Importance**		**Extent of Implementation**	
	Average	**Rank**	**Average**	**Rank**
A unique superior product	4.92	1	4.85	1
A strong market orientation	4.77	2	4.85	2
More predevelopment homework	4.54	3	3.92	8
Leveraging core competencies	4.54	4	3.77	13
Top management support	4.54	5	3.92	9
Right organizational structure, design and climate	4.46	6	3.62	15
Sharp and early product and project definition	4.46	7	4.77	3
Products aimed at attractive markets	4.38	8	3.92	10
The resources must be in place	4.15	9	4.38	4
Well-conceived, properly executed launch with solid marketing plan	4.08	10	4.08	5
Completeness, consistency and quality of execution of key tasks from beginning to end of projects	3.92	11	3.77	14
An international orientation	3.85	12	3.85	12
Build tough Go/Kill decision points into new product process	3.85	13	3.92	11
Speed-reduce the development cycle time without compromising the quality of execution	3.77	14	4.08	6
Follow a multistage, disciplined new product process	3.77	15	4.08	7

Table 6: Importance and Implementation of Candidate Factors of Product Innovation

	High implementation	Low Implementation
High Importance	**A** A unique superior product A strong market orientation Sharp and early product and project definition The resources must be in place Well-conceived, properly executed launch with solid marketing plan	**B** Speed-reduce the development cycle time without compromising the quality of execution Follow a multistage, disciplined new product process
Low Importance	**C** More predevelopment homework Leveraging core competencies Top management support Right organizational structure, design and climate Products aimed at attractive markets	**D** Completeness, consistency and quality of execution of key tasks from beginning to end of projects An international orientation Build tough Go/Kill decision points into new product process

Table 7: Importance and Implementation of Candidate Factors of Process Innovation

Candidate CSFs	Degree of Importance		Extent of Implementation	
	Average	Rank	Average	Rank
The company has good and stimulating climate for process innovation work	4.92	1	3.92	7
There are good incentives and driving forces for process innovation	4.92	2	4.85	1
The technical department has good knowledge of conditions in the industry and its external business environment	4.92	3	3.77	12
The technical department includes individuals with suitable qualifications for process innovation work	4.92	4	4.77	2
The technical department is good at generating new ideas and formulating interesting new process innovation projects	4.46	5	3.92	8
Good and well-functioning networks are available for research and technical innovation	4.46	6	4.38	3
The company is good at creating and engaging in innovation collaborations and alliances either within or outside the company	4.38	7	4.38	4
The project group has a good and balanced composition	4.31	8	3.85	10
Ability to identify and define “key surrounding issues” relevant to a project (for example price of energy, market conditions, etc.) and to relate them to the project economy	4.15	9	4.15	5
Clear definition of the areas of technology in which process innovation work is to be performed	4.08	10	4.08	6
Well formulated and measurable project objectives	3.92	11	3.77	13
A well structured project with clearly formulated and measurable “milestones”	3.92	12	3.85	11
Well worked-out preliminary studies with a clear interface to the following project phase	3.92	13	3.92	9
A well-functioning and strong steering committee with the ability to pose difficult and important questions instead of just saying yes or no (a sound skepticism)	3.85	14	3.77	14
Ability to translate and quantify an improved process economy into technical development targets	3.85	15	3.77	15

Table 8: Importance and Implementation of Candidate Factors of Process Innovation

	High implementation	Low Implementation
High Importance	**A** There are good incentives and driving forces for process innovation The technical department includes individuals with suitable qualifications for process innovation work Good and well-functioning networks are available for research and technical innovation The company is good at creating and engaging in innovation collaborations and alliances either within or outside the company Ability to identify and define “key surrounding issues” relevant to a project (for example price of energy, market conditions, etc.) and to relate them to the project economy Clear definition of the areas of technology in which process innovation work is to be performed	**B** The company has good and stimulating climate for process innovation work The technical department has good knowledge of conditions in the industry and its external business environment The technical department is good at generating new ideas and formulating interesting new process innovation projects The project group has a good and balanced composition
Low Importance	**C** No Factor Found	**D** Well formulated and measurable project objectives A well structured project with clearly formulated and measurable “milestones” Well worked-out preliminary studies with a clear interface to the following project phase A well-functioning and strong steering committee with the ability to pose difficult and important questions instead of just saying yes or no (a sound skepticism) Ability to translate and quantify an improved process economy into technical development targets

Similar to the situations in product innovations, there are also areas for improvement in terms of process innovations for these processors. However, there is no category C "low importance, high implementation" found in this research. This is shown in Tables 7 and 8.

Managing Strategic Innovation

While it is a challenge to present a comprehensive analysis of the in-depth interviews held with the five most innovative food processors, we believe there were some key elements that contributed to a culture of innovation within these firms. These are as follows:

(i) The firms seemed to possess characteristics of absorptive capacity, as discussed in the literature. They all maintain close ties with external partners such as universities and customers. More importantly, they seem to recognize the value of information, assimilating it and attempting to apply it to commercial ends.

(ii) They tended to disseminate information within their firms across cross-functional areas albeit in different ways including i.e. intranet, meetings, etc although most of the cross-functional communication is restricted to mid-level managers or major technicians and sales personnel.

(iii) It appeared that the organizational cultural requirements underpinning innovation (Oden 1997; Omta and Folstar 2005) through characteristics of risk taking, innovativeness or questioning attitudes were found more at senior management level. It seemed that these characteristics were not demonstrated widely throughout the firms, certainly not at lower levels.

(iv) While the firms tended to operate within hierarchical structures with decentralized decision-making, most of the interviewees believed flatter and more organic structures were more suited to future growth.

(v) The overall impression of their senior managements created by the interviewees was that each leader had a strong vision, capability to a business venture and organizing the necessary resources to implement it.

(vi) All the interviewees believed that HR practices were important in facilitating innovation. Central to this was selecting and recruiting key personnel as well as investing in training and development. One company used comparatively high remuneration to target technical experts from companies in a neighboring province. Continuous training and development was also regarded as central to a highly qualified and innovative workforce. The funding of post-graduate training to a largely mobile staff was seen as risky yet the overall view was that the investment was worthwhile.

(vii) Reward systems were also a factor in inspiring innovation. One company awarded the main creators or designers of innovations with a certain percentage from the first year's profits arising from their innovations. Effective appraisal and promotion systems and job design were also cited as important elements.

Conclusions

The case study analysis provides some valuable insights into the innovation activities of the food processors in Guangxi which have achieved success in the open market. Process and product innovation work hand-in-hand, and are seen as an important CSFs in the food processing industry. In terms of managing strategic innovation, the five most innovative companies seemed to have the capacity to assimilate the information they obtained and apply the information to commercial ends. Surprisingly, these companies showed little evidence of organic organizational structures and tended to be reasonably traditional in structure. While this tends to be at odds with the literature, the more innovative firms did reinforce the importance of visionary and strong leadership. The role of leadership within these companies may play a more significant role in fostering strategic innovations, especially within, arguably, less mature companies. While centralized decision-making within a hierarchical structure may sound atypical of the classical innovator, they may also contribute to efficient decision making within these companies which may be appropriate in a climate of fast development of both the companies and markets. This does not imply that structural and cultural aspects are not important. Instead, these problems may unfold gradually as the companies continue to grow or reach a steady state and are probably areas for future improvement.

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Appendix 1

Companies	Descriptions
A	Sales: RMB850 million; Products: canned vegetables, fruits and meat; Ownership: private; Recent year's sales growth: >15%; Growth objective: RMB900 million in 2007; Employees: 1980; Geographic market: export oriented
B	Sales: RMB620 million; Products: soy milk; Ownership: private; Recent year's sales growth: >8%; Growth objective: >10% per year; Employees: 1550; Geographic market: national focus.
C	Sales: RMB2100 million; Products: soy milk, sesame products, noodles; Ownership: private; Recent year's sales growth: >10%; Growth objective: >10% per year; Employees: 3200; Geographic market: national focus.
D	Sales: RMB680 million; Products: canned fruits; Ownership: private; Recent year's sales growth: >10%; Growth objective: >15% per year; Employees: 1600; Geographic market: export oriented.
E	Sales: RMB350 million; Products: ginger, aniseed; Ownership: private; Recent year's sales growth: >12%; Growth objective: >10% per year; Employees: 300; Geographic market: export-oriented.
F	Sales: RMB430 million; Products: Traditional snack food; Ownership: state-owned; Recent year's sales growth: >10%; Growth objective: >10% per year; Employees: 520; Geographic market: local focus.
G	Sales: RMB530 million; Products: dairy products; Ownership: private; Recent year's sales growth: >15%; Growth objective: >15% per year; Employees: 1300; Geographic market: local focus.
H	Sales: RMB130 million; Products: canned fruits; Ownership: sole proprietorship; Recent year's sales growth: >10%; Growth objective: >10% per year; Employees: 200; Geographic market: national focus.
I	Sales: RMB610 million; Products: collagen sausage casing; Ownership: private; Recent year's sales growth: >10%; Growth objective: >10% per year; Employees: 510; Geographic market: export oriented.
J	Sales: RMB580 million; Products: tapioca; Ownership: private; Recent year's sales growth: >10%; Growth objective: RMB650-700 million in 2007; Employees: 1050; Geographic market: national focus.
K	Sales: RMB1300 million; Products: goose liver; Ownership: private; Recent year's sales growth: >15%; Growth objective: >15% per year; Employees: 2100; Geographic market: export-oriented.
L	Sales: RMB1630 million; Products: beer and soft drinks; Ownership: public; Recent year's sales growth: >25%; Growth objective: >30% per year; Employees: 5500; Geographic market: local focus.
M	Sales: RMB860 million; Products: pork processing; Ownership: private; Recent year's sales growth: >10%; Growth objective: >10% per year; Employees: 1650; Geographic market: national focus.