An Economic Analysis of Commercialization of Innovation in Small Saskatchewan Agribusinesses

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ABSTRACT

Small firms make up a large proportion of businesses in Saskatchewan and likely have more potential for innovation given their diversity and flexibility. As agribusiness refers to all firms involved in food production, including input suppliers, producers, processors, distributors and retailers, small agribusinesses play a significant role in the economy and assist in diversifying agriculture. Of these, small producers and processors, however, are at a disadvantage in the current, highly consolidated and concentrated retail market environment. Largely restricted to a cottage industry-sized market they suffer from not generating sufficient profits from their commercialization of new products. Due to capital constraints, limited access to financing, and poor understanding of manufacturing, business management, and marketing, they also face many challenges and barriers to entering commercial retail markets where supermarket chains predominate.

Given this perspective, commercialization in small Saskatchewan agribusinesses is analyzed using a case study approach. Relying on supply chain theory and transaction cost economics, a theoretical framework to model successful commercialization by small firms is developed and tested in case studies undertaken among Saskatchewan food processors. In particular, economic models of commercialization and a checklist for commercialization are developed. The models assume that small agribusinesses can access commercial markets through achieving economies of scale and, hence, succeed in commercializing their new products. The checklist for commercialization includes three main challenges of commercialization, namely increasing production scale, accessing commercial markets, and defining optimal production scale and corresponding barriers. A case study analysis has given some validity to the applicability of the economic models of commercialization and the checklist for commercialization.

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CHAPTER 1: INTRODUCTION

1.1 Overview of innovation and commercialization in Saskatchewan

Saskatchewan (SK) is a major grain producer in Canada, inhabited by just over one million people (Saskatchewan Ministry of Agriculture, 2008a). According to Enterprise Saskatchewan (ES, 2009), in 2008 Saskatchewan's real GDP was $41.6 billion (in 2002 *chained dollars*[1]) and grew by 4.4%. This was the highest growth rate among the Canadian provinces. The province's real GDP grew, on average, by 2.0 percent annually between 2004 and 2008, when the national average growth was 1.8 percent (ES, 2009). Agriculture and food processing play a considerable role in Saskatchewan, comprising about 13% of provincial GDP in 2008 (AAFC, 2009). More specifically, Saskatchewan is a leading producer of cereal and pulse crops nationally and supplies approximately five percent of the world's exported wheat (Saskatchewan Ministry of Agriculture, 2008a). In 2006, six million hectares of all classes of wheat with a value of $1.5 billion was produced in Saskatchewan (Saskatchewan Ministry of Agriculture, 2008a). In 2007, Saskatchewan produced nearly four million tonnes of canola, which was 45 percent of Canada's total canola production (Saskatchewan Ministry of Agriculture, 2008a). Moreover, the province is the second largest cattle and beef producer in Canada, producing more than $1 billion annually (Saskatchewan Ministry of Agriculture, 2008a).

Most importantly, over the period 2004 to 2008, when its international exports grew, on average, by 18.3 percent per year, Saskatchewan led the Canadian provinces in growth in international exports (ES, 2009). Specifically, Saskatchewan's international exports rose from $19.7 billion in 2007 to $29.6 billion in 2008 (Saskatchewan Ministry of Agriculture, 2010). This sharp increase resulted from a dramatic rise in prices for agricultural commodities as well as potash, uranium,

[1] This is a measure computed with 2002 as a reference year. According to the Bureau of Economic Analysis of the US Department of Commerce (2009), the chained-dollar value is calculated by multiplying the reference year current-dollar value by the chain type Fisher quantity index and dividing by 100 for GDP and most other series.

oil and other resource-based products (ES, 2009). In 2009, Saskatchewan's agri-food exports were $8.1 billion, representing 37% of total Saskatchewan exports (Saskatchewan Ministry of Agriculture, 2010). Particularly, exports of crops, livestock and processed products accounted for 86%, 2% and 11% of total agri-food exports, respectively (Saskatchewan Ministry of Agriculture, 2010). Wheat and durum were the major export crops and comprised 41% of crop exports and 36% of total agri-food exports in 2009, followed by canola seed, lentils and peas. Cattle and calf exports accounted for 80% of total livestock exports in 2009, while live hog exports represented 11% of total livestock exports (Saskatchewan Ministry of Agriculture, 2010). Saskatchewan supplies considerable quantities of agri-food products to other provinces in addition to international exports.

In 2008, the value of Saskatchewan's manufacturing shipments increased by 17.5 percent to a record 12.3 billion dollars (ES, 2009) which, however, was about 12 and 22 times lower than those of Quebec and Ontario, respectively. This suggests that Saskatchewan does not excel at value added production since manufacturing shipments show how successfully the province is diversifying out of reliance on primary resources; adding value and developing and commercializing new products (ES, 2009). For example, about 300 food processing companies in Saskatchewan produce 2.4 billion dollars of output annually – primarily cereal, meat, dairy products, bakery goods, and food ingredients (ES, 2010). Their output represented nearly 6 percent[2] of real GDP on average during the period of 2004- 2008. Processed products comprised only 11% of total agri-food exports in 2009 (Saskatchewan Ministry of Agriculture, 2010), further evidence that value-adding activity lags somewhat in Saskatchewan.

Saskatchewan, however, has a history of agricultural innovation that underpins its success in agricultural production. Saskatchewan was, for instance, involved in the research that led to the development of canola, which now has become the second largest crop, after wheat, grown in the province. The University of Saskatchewan (U of S) plays an important role in agricultural research in the province and Canada. Major initiatives include the important research facilities

[2] 6 per cent was calculated based on Saskatchewan's real GDP (in 2002 chained dollars) taken from Enterprise Saskatchewan. (2009). Measuring Saskatchewan's progress: Performance indicators for Saskatchewan's economy.

such as the Vaccine and Infectious Disease Organization, the Canadian Light Source synchrotron and the Innovation Place. The latter is one of the largest research parks in North America and is located on the university campus. Since its establishment, the research undertaken at the university has resulted in many innovations. For example, over 100 new crop varieties and the first genetically engineered vaccine for animals have been developed at the University of Saskatchewan (U of S, 2009). The university has also been successful in commercializing many of these innovations so that farmers and consumers, both in Saskatchewan and beyond, have benefitted (Brown, 2008). In addition to public research fostering innovation, individuals and private companies have actively engaged in developing new products, processes, and technologies and some have successfully commercialized their new ideas. In particular, many of the entrepreneurial successes have been in the farm equipment and technology area; e.g. Morris[3] and zero-till technology[4], but there have also been successes in food and consumer products such as Riverbend[5] (Brown, 2008).

Nonetheless, Saskatchewan ranked ninth among the ten provinces of Canada in terms of research and development (R&D) spending as a percentage of GDP at 1.0 percent in 2006, which was well below the national average of 1.9 percent (ES, 2009). This percentage, including R&D spending of the government, private businesses, universities, and non-government organizations within the province, shows that the province did not spend as much as other provinces on R&D. As a result, this may limit innovation and slow economic growth. In particular, in 2006 private businesses contributed 36.2 percent of total R&D spending in the province, up from 26.9 percent in 2002 (ES, 2009); although, the share was far below those of Ontario, Quebec, and Alberta whose businesses accounted for over 50 percent of total R&D.

[3] Morris Industries Ltd. is a worldwide manufacturer and distributor of agricultural equipment, headquartered in Saskatchewan.

[4] Zero-till or no-till is a conservational tillage system in which the seeds are sowed directly into the untilled soil that has retained the crop residues from the previous crop (Derpsch et al., 2011).

[5] Riverbend Plantation Inc., a family owned Saskatoon berry orchard and food processing company located in Saskatchewan, produces fruit based products.

Saskatchewan ranked fourth in the country in the number of patents per capita in 2007, producing 4.2 patents per 100,000 people, which was below the Canadian average of 5.5 and significantly behind the leader Alberta with 10.3 (ES, 2009). Since patents offer inventors monopoly rights to commercialize their inventions for a specified period, the number of patents per capita can indicate the intensity of R&D, innovation, and commercialization activities. Finally, in terms of venture capital[6] investment per capita, Saskatchewan was in fourth place among the provinces in 2007 with $59.17 per capita, which is low compared to the national average of $63.15 per capita (ES, 2009). The amount of venture capital investment indicates investors' willingness to invest in the province and the quality of projects under development, although this indicator needs to be interpreted with caution due to how difficult it is to estimate.

Human capital in the workforce indicates innovative capacity of economies because a highly qualified workforce drives innovation and productivity growth in the economy. The employment of post-secondary graduates as a percentage of total employment increased slightly from 49.1 percent in 2004 to 49.8 percent in 2008, placing Saskatchewan ninth among the ten provinces. Also, the percentage of scientists and engineers employed in Saskatchewan's economy grew from 4.0 percent in 2004 to 5.1 percent in 2008 with a slight improvement from 10th to being 9th among the provinces, while the national average increased from 6.6 percent to 7.1 percent in the same period (ES, 2009). All of these indicators suggest that innovation remains a challenge for Saskatchewan.

In a Statistics Canada's survey on "Financing of Small and Medium Enterprises 2007", small and medium-sized enterprises (SMEs) are defined as commercial firms with fewer than 500 employees and less than $50 million in annual revenues (SME Financing Data Initiative[7], 2009). However, according to the definition of Industry Canada (2009), goods-producing firms that have fewer than 100 employees and service-providing firms employing fewer than 50 employees

[6] Venture capital is private equity investment typically provided to start-up firms by investors with the interest of generating a return (ES, 2009).

[7] SME Financing Data Initiative is a partnership between Industry Canada, Statistics Canada and the Department of Finance (SME Financing Data Initiative, 2009).

are considered “small”. As of December 2008, there were just over one million small businesses that accounted for nearly 98 percent of all businesses in Canada (Industry Canada, 2009). According to Industry Canada (2009), these small firms dominated in all industries, representing over 90% of total businesses in each industry except for public administration (83.1%). Likewise, at the same time small businesses represented 98.4% of total businesses in Saskatchewan, while medium-sized and large businesses represented only 1.4% and 0.2%, respectively (Industry Canada, 2009). During the period of 1998-2008, small firms accounted for 36% of all jobs created, on average, in the private sector, although the relative contribution to job creation by small, medium-sized and large firms varied greatly over the years (Industry Canada, 2009). These statistics indicate that small firms play a considerable role in the economy of Saskatchewan and Canada through the products and services they provide as well as the jobs they create.

In this regard, along with programs funded by the federal government, Agriculture and Agri-Food Canada (AAFC) and other organizations, the Saskatchewan Ministry of Agriculture has implemented some programs, namely the Agricultural Development Fund (ADF), the Saskatchewan Agri-Value Initiative Funding, etc. to provide financial assistance to producers and processors in order to support the development and diversification of Saskatchewan’s agriculture and food sector. Under the research and development component of the ADF, for example, the Ministry provided funding of $7.91 million for 204 projects in the areas of livestock, crops, value-added production, soil, environment, horticulture and alternative crops during the fiscal year of 2007-08 (Saskatchewan Ministry of Agriculture, 2008b).

In addition, in conjunction with universities, research institutes, and industrial associations, the Ministry of Agriculture provides technical support to firms in the agriculture and food industry, establishing new product development and processing facilities like the Saskatchewan Food Industry Development Centre, the Saskatchewan Toll Processing Centre, and the Protein Oil and Starch (POS) Pilot Plant. The Saskatchewan Food Industry Development Centre Inc. (Food Centre), a fee-for-service organization, supports the development of value-added processing in Saskatchewan by providing specialized services, training and a federally inspected pilot plant that aids in the commercialization of food products (Saskatchewan Ministry of Agriculture,

2008b). The Saskatchewan Toll Processing Centre provides a federally-inspected meat processing facility, which can be used by small/ new meat processing companies for a fee until they build their own facilities (Saskatchewan Ministry of Agriculture, 2008b). Along with conducting contract research and development for bio-processing, the POS Pilot Plant also manufactures products for producers serving small, specialty markets, namely food, functional foods, dietary supplements, food ingredients, cosmetics, animal feeds, and agricultural biotechnology (POS Pilot Plant Corp., 2010).

1.2 Problem statement

In the past few years, Saskatchewan's innovation and commercialization performance has been generally below the national average. In particular, the near full employment rate of highly qualified human resources and the investments in R&D and commercialization activities have been insufficient to drive innovation at levels that will allow diversification out of primary products. In particular, Saskatchewan produces a relatively small amount of value added products except for machinery and equipment; instead, it actively engages in commodity markets nationally and globally. In addition, the small number of patents issued annually on a per capita basis and a relatively low availability of venture capital investment in early-stage businesses indicate that the current economic environment does not foster the desired level of innovation and commercialization. Private businesses' involvement in R&D activities, as evidenced by the contribution to the province's expenditures on R&D, has been noticeably lagging as well.

The commercialization process is a lengthy undertaking, from consistently developing ideas to marketing new products. Since marketing the products is essential and can be very costly, commercialization requires entrepreneurs to be persistent. In the past couple of decades, many entrepreneurs have proposed ideas for new food and other agriculturally related products; however, many of these ideas have not made it beyond the R&D stage. A few of the entrepreneurs have reached the stage of producing samples or prototypes of their innovative products and some have attempted to move to the stage of commercial production (Brown, 2008).

Generally, the failure rate in commercializing new products and services is high due, mainly, to capital constraints, lack of knowledge of manufacturing, business management, and marketing, and high unit costs during the early stage of commercialization. Entrepreneurs need access to considerable capital to take their innovative products from the idea stage to putting finished products in consumers' hands. Raising sufficient capital is a major challenge for Saskatchewan entrepreneurs. Since small and new agribusinesses usually do not have sufficient tangible property that can be used as collateral to obtain adequate amounts of credit, they need to raise equity capital to satisfy their capital needs, bringing in investors. Often this means relinquishing some or even total control of their company (Brown, 2008). However, it is also hard to find owners of capital who are willing to invest in risky ventures such as new product development and who are willing to wait several years to earn positive returns from their investments.

Many entrepreneurs do not have the requisite knowledge and experience pertaining to commercial production or processing - where often their activities must comply with federal and/or provincial regulations as well as retailer requirements. Further, as they lack the knowledge and skills related to product design, business management, and marketing, they need to hire specialists, who write successful business plans, do marketing research in targeted markets, and design products. They need to hire skilled workers, who have knowledge about new technologies, new production process, etc., for their production processes and further may need to train workers in cases when it is hard to find the skilled workers.

Marketing products through retailers or supermarket chains is a particular challenge for small scale or start-up agribusinesses and raises their costs because many retailers require their suppliers to supply large quantities at a low price as well as meet their specific food safety and quality standards in addition to public regulations. Indeed, in recent years, the market place has changed significantly due, in part, to globalization and expanding international trade. Globalization and trade have resulted in highly competitive markets where low cost producers, processors, and retailers have gained most of the market share, competing strongly with firms in high cost regions (Brown and Sander, 2007). This has led to a high degree of consolidation and concentration in many facets of the agriculture, food and fibre industry globally (Brown, 2008). The result is fewer and much larger firms. The food retail sector, in particular, has been

experiencing the highest degree of consolidation and concentration in order to better incorporate social and environmental responsibilities into their actions in the face of concerned consumers (Konefal, Mascarenhas, and Hatanaka, 2005; Brown and Sander, 2007).

Larger firms can secure low unit costs for their products or services by spreading fixed costs over large quantities of production or services. In some cases this leads to large market shares and sometimes allows such firms to exercise considerable market power. As a result, these larger firms are sometimes able to exploit their market power when competing and partnering with new and smaller market entrants. Furthermore, larger firms carry out their businesses in many markets – sometimes in different countries - diversifying their sources of revenue and garnering economies of scale.

On the other hand, new market entrants usually target local or regional markets, such as Saskatchewan and western Canada, which are sometimes not a sufficiently large market to achieve economies of scale. Indeed, entering national or international markets require a large capital investment, but new market entrants are often constrained by available commercial scale facilities and financial capital as well as the specialized human resources that are required to carry out large scale manufacturing activities. The government of Saskatchewan has been supporting R&D and commercialization activities and value-added production through providing new product development and processing facilities. However, these facilities are usually used in the early stage of the commercialization process and not designed to manufacture or process products on a sufficiently large commercial scale to reduce producers or processors' unit costs (Brown, 2008).

Commercialization of new products that fosters the development of high value-added industries may be the key to Saskatchewan's economic growth and future prosperity. With this perspective, this thesis will address issues related to innovation and commercialization of agri-food products for small Saskatchewan agribusinesses, investigating factors related to the success of commercialization and barriers to commercialization.

1.3 Objectives

The main objective of this thesis is to analyze commercialization of innovation in small Saskatchewan agribusinesses. In particular, the thesis aims to 1) document the factors affecting commercialization successes or failures, particularly the barriers to commercialization faced by small scale or start-up Saskatchewan agribusinesses, 2) develop a theoretical framework to illustrate how small firms achieve successful commercialization, which can apply to small commercializing firms anywhere in the world, and 3) develop strategies that endeavour to overcome challenges associated with commercialization and that result in successful commercialization. In order to achieve these goals, a case study approach is employed to investigate the factors derived from the literature review and to test the validity of economic models of commercialization designed for small innovative firms.

1.4 Organization of thesis

This thesis is composed of five chapters. Following the introduction, Chapter 2 outlines a review of the literature related to innovation and commercialization of product innovation and theories applicable to commercialization of new products. More specifically, supply chain theory and transaction cost economics are discussed in this chapter as a basis for explaining factors affecting commercialization, particularly integration into supply chain relationships. They are also used to develop effective strategies of commercialization designed for small innovative agribusinesses. Chapter 3 provides the theoretical framework that illustrates successful commercialization by small agribusinesses and their challenges and barriers to commercialization. Economic models of commercialization that show the relationship between commercialization and economies of scale in two representative situations encountered by small commercializing firms and a commercialization checklist are developed and discussed in this chapter. Chapter 4 presents an analysis of commercialization in small Saskatchewan agribusinesses using a case study approach and summarizes the results of the case studies. Chapter 5 concludes the thesis with a summary of research findings. Suggestions for future research and limitations of the study are also included in this final chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter provides a review of the literature related to innovation and commercialization and theories applicable to commercialization. Innovation and commercialization of product innovations are discussed in detail, covering the innovation process and commercialization models. This thesis draws from supply chain theory and transaction cost economics. Supply chain theory helps to explain the challenges of entering supply chains, determining requirements and opportunities for partnership in the chains and, thus, to develop effective strategies of commercialization designed for small innovative agribusinesses. Transaction cost economics, on the other hand, is used to explain how transaction costs influence current economic conditions and markets, vertical coordination between the parties within the product life cycle and further a firm's decision making regarding the choice of partners.

2.2 Innovation and commercialization

According to Seperich, Woolverton, and Beierlein (1994), agribusiness involves all activities performed both on and off farms, which means it includes not only farmers or producers, but also the individuals and firms that provide the inputs, process the output, manufacture the food products, and transport and sell the products to consumers. Therefore, activities carried out by agribusinesses make the food and fibre system work. More specifically, agribusiness consists of agricultural input production, manufacturing or processing, and the distribution/retail sectors.

As competition increases with globalization, firms need to continuously innovate to gain competitive advantage, differentiating products or services from those of competitors and successfully capturing consumers' needs. Indeed, innovation is a critical success factor for firms, particularly in highly competitive markets. Innovation involves changes and improvements to technologies, products, processes, and services (Rainey, 2005) that bring direct benefits to customers and firms as well as externalities or spill-over benefits to society and rivals. The third edition of the Oslo Manual, which proposes guidelines for collecting and interpreting innovation

data in industries, more broadly suggests that “an innovation is 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” (OECD/Eurostat, 2005, p. 46).

More specifically, the Oslo Manual distinguishes four types of innovations: product innovations, process innovations, marketing innovations and organizational innovations. A *product innovation* is defined in the manual as “the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses” (OECD/Eurostat, 2005, p. 48). A *process innovation* is the implementation of a new or significantly improved production or delivery method including significant changes in techniques, equipment and/or software (OECD/Eurostat, 2005). A *marketing innovation* is the implementation of a new marketing method that significantly improves product design or packaging, product placement, product promotion or pricing (OECD/Eurostat, 2005). The manual defines an organisational innovation as “the implementation of a new organisational method in the firm’s business practices, workplace organisation or external relations” (OECD/Eurostat, 2005, p. 51).

Innovations generally have an objective to improve a firm’s performance, but each type of innovation has specific objectives. Both product and process innovations can be a source of market advantage for the innovating firm. Product innovations aim to increase demand and mark-ups, while process innovations intend to decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products (OECD/Eurostat, 2005). Marketing innovations aim to better identify customer needs, opening up new markets, or newly positioning a firm’s product on the market, with the objective of increasing the firm’s sales (OECD/Eurostat, 2005). Organisational innovations intend to increase a firm’s performance by reducing administrative costs or transaction costs, improving workplace satisfaction and thereby labour productivity, gaining access to non-tradable assets such as non-codified external knowledge or reducing costs of supplies (OECD/Eurostat, 2005).

Low and medium-technology industries are generally characterised by incremental innovation and adoption often focused on production efficiency, product differentiation and marketing (OECD/Eurostat, 2005). As most small-scale firms belong to low and medium-technology industries because of physical, financial and human capital constraints, product innovation is most applicable to innovation by small agribusinesses. Results of the study by Herath, Cranfield, and Henson (2008) revealed that firms with multiple product lines were not actively engaged in product development. This, on the other hand, implies that the most innovative firms engaged in product development tend to be start-up enterprises focusing on one or a very limited number of product lines. They also suggest that a narrower product focus is important for successful product development; however, diversification and development of product portfolios are more critical in the case of commercialization.

A Statistics Canada Innovation survey of 800 food-processing companies in Canada revealed that over 70% of them invested in innovation during the period between 2001 and 2003 (Statistics Canada, 2005). More specifically, 37% of the companies in the survey introduced product innovations to the market, whereas nearly a quarter of the establishments introduced process innovations into their lines. Over this period, establishments in fruit and vegetable preserving and specialty food manufacturing were most likely to have introduced product innovations, with 55% of companies having done so, followed by 47% of sugar and confectionery product manufacturing establishments and 16% of the seafood product preparation and packaging establishments. Only 36% of establishments engaged in product innovations developed completely new products, while approximately 55% made significant changes or improvements to existing products. This study indicates that product innovation comprises the major portion of innovations developed by food manufacturers.

Herath et al. (2008) state that “in the agri-food industry, product innovations can range from minor food-product reformulations to crops and products that are physically or genetically novel or different” (p. 207). Small agribusinesses generally focus on the innovative ideas that provide solutions to the problems or needs of a particular segment of consumers as well as reducing production costs to ensure efficient production. Rainey (2005) notes that product innovation internally depends on the firm’s knowledge, experience, capabilities, resources, and current

technologies, but it externally focuses on consumer's needs and preferences. This suggests that innovators should undertake thorough studies to identify consumer needs or market requirements. Therefore, the degree to which an innovator tried to satisfy the needs of users may be a key factor for the successes or failures of a product innovation.

Traill and Meulenberg (2002) believe that in the food industry, three orientations are likely to dominate in different firms: product orientation, where product quality dominates in a company's culture; process orientation in which a company pays more attention to flexibility, efficiency, speed etc.; and market orientation, in which a company focuses on producing what the market wants. Comparing twelve case studies undertaken in six European countries to a survey of European food manufacturers, they reported that to some extent market orientation dominated in these food-manufacturing companies. This suggests that addressing market needs is essential for product innovation by food manufacturers.

Uhrbach (2009) states that the innovation process involves three major groups of activities: general innovation activities; commercialization activities; and post-commercialization activities. General innovation activities may include: engaging in R&D; purchasing R&D from outside the plant and firm, acquisition of equipment, machinery and software; purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other firms or organizations; and training. Activities associated with commercialization of innovative products may include: market research; launching advertising; a market plan; product positioning or profiling; profitability analysis; a project feasibility study; and testing consumer acceptance of the products. Post-commercialization activities, which are important to ensure the success of a newly launched innovation, may include: post-introduction advertising campaigns; entering into distribution agreements; international marketing partnerships; and after sales consumer feedback.

Research and development is the main source of innovation and thus facilitates new product development. According to the Frascati Manual[8], research and development involves

[8] Frascati Manual proposes an internationally recognized methodology for collecting and using R&D statistics.

undertaking basic and applied research to acquire new knowledge and direct research towards specific inventions such as developing new products and processes (OECD, 2002). In other words, research is investigation undertaken on a systematic basis to gain knowledge while development is the application of research findings for the creation of new products and processes. Accordingly, innovation builds on knowledge and thus has aspects of a public good that is non-rival and non-excludable. When innovation is not protected by intellectual property rights it is difficult to exclude others from using or imitating such new ideas or innovations, although the use of the knowledge of innovations by one individual does not reduce the amount available for others to use. In this case, innovating firms cannot capture all the benefits generated by their innovations. Therefore, innovations often need to be protected by intellectual property rights such as patents, licences, copyrights, plant or animal breeder's privilege, etc. to provide incentives for private firms to carry out R&D and innovation activities.

In turn, a firm's expenditures on R&D may indicate its innovative behaviour and innovation potential. Statistics on Scientific Research and Experimental Development Tax Credits show that small businesses spend far less on innovation than large firms in absolute amounts, but their spending as a percentage of revenue far exceeds that of larger firms (Industry Canada, 2009). For instance, based on Statistics Canada's data, Industry Canada (2009) reported that over 19,000 firms spent more than $15 billion on R&D in 2005. Of these firms, 514 large firms accounted for 57 percent of total R&D expenditures with an average of $17.6 million per firm while 16,886 small firms contributed 25% with an average spending of $230,000 per firm. It was also noted that R&D expenditure as a percentage of a firm's revenue generally decreased as the firm size increased.

2.2.1 Commercialization of product innovation

Commercialization is an essential component of the innovation process that captures the value of innovation. In other words, commercialization is a process that turns the innovation or idea into a marketable product or service to realize a positive return from the investment in R&D. Indeed, a valuable invention or idea must have some commercial potential in which such innovative ideas can be brought to market in the form of products or services that satisfy consumers' needs and/or

solve their problems (Toneguzzo, 2008). This suggests that it is important for innovations to address consumers' needs or problems in order to be marketable.

A Canadian panel of experts[9] on commercialization proposed that people and excellence are two main elements of commercialization (Industry Canada, 2006). In fact, without people no activity takes place while excellence refers to who wins in the face of emerging market opportunities through his/her commitment to building a highly skilled workforce, undertaking outstanding research, and making far-sighted investments. They also point out that successful commercialization has two sides: the supply of ideas and talented people and the demand from the marketplace for new products and processes. The panel believes that Canada has focused more on the supply side by increasing funding for the university research that results in knowledge and the talented people needed for commercialization. However, it has not paid much attention to the demand side to encourage businesses to engage in commercialization through reducing barriers and perceived risks. Generally, the panel identified three areas, namely talent, research, and capital on which the government of Canada needs to focus by preparing talented people, enhancing public and private research, and ensuring effective functioning of capital markets.

Getting new ideas to market is one of the most difficult steps in the innovation process because many innovations cannot go beyond the R&D stage for a number of reasons such as lack of production capacity, limited access to funding, the inability to create a demand and so forth. Graaff et al. (2002) point out that globalization has sharpened competition in many markets, requiring more management and engineering effort into product development and larger investment in market launch. Specifically, Hoban (1998) states that only one-third of new food products are successfully commercialized, which illustrates that the success rate for new product commercialization is very low. Therefore, it is worth noting that commercialization is at the intersection of innovation and entrepreneurship and comprises processes and activities that

[9] In May 2005, the minister of Industry appointed six experts to the non-partisan Expert Panel on Commercialization to identify how the Government of Canada could help to ensure continuous improvement in Canada's commercialization performance.

connect economic value creation and economic value realization (Prebble, de Waal, and de Groot, 2008).

The low success rate of commercialization may also show that the money spent on new product development is wasted and economic value is not created. Power et al. (1993), for example, state that approximately 46% of all new product development costs are spent on products which fail. In this regard, firms tend to spend less on R&D for developing new products. In particular, US food companies spend 1% to 4% of their gross sales on new product development (Hollingsworth, 1998). Similarly, the survey results of Statistics Canada (2005) showed that during the period between 2001 and 2003 about one-third of the 800 food processing companies studied allocated 1% to 5% of their annual gross expenditures for food manufacturing on innovation activities while 29% spent less than 1% and another 10% spent more than 6%. Also, results from the Survey of Innovation 2005 showed that 85.4% of Canadian manufacturing plants that developed innovations devoted 1% to 25% of the plant's total expenditures to innovation activities during the period 2002 to 2004 (Uhrbach, 2009). However, investment in new product development is not always wasted because it can contribute to the knowledge creation within the firm; even if it fails.

According to Andrew, Sirkin and Butman (2006), innovation is the process of developing ideas to realize payback and consists of three phases of activity: idea generation, commercialization, and realization. Of these, the commercialization phase is the most challenging for innovators because during this phase the company must evaluate the potential payback it could generate from its innovative idea and make important decisions with respect to the innovation business model, investment, management, company organization, etc. They note that besides generating a cash payback, the innovation process also brings indirect benefits that affect the company's ability to generate cash later. These indirect benefits can be knowledge acquisition, brand enhancement, strengthened partners and associated organizations, and the organization's prestige.

Figure 2.1 depicts a cash curve as described by Andrew, Sirkin, and Butman (2006). The figure also illustrates four factors - start-up costs (pre-launch investment), speed (time to market), scale (time to volume), and support costs (post-launch investment) - that directly affect cash payback. In the figure, the horizontal axis reflects time and the vertical axis represents cumulative cash. A large pre-launch investment may enable a company to develop assets and capabilities required to commercialize and generate a large payback, whereas the post-launch investments ensure success of the commercialization and maximize the payback from the launched innovation. Post-launch investments can be made in marketing and promotional activities, product improvements, and sales, distribution, and channel initiatives. Increasing speed and reducing time to market can increase payback by enabling a company to capture a larger market share at a higher average selling price and by starting the cash flow quickly. However, overly aggressive time to market may disproportionately increase development costs and negatively impact the quality of innovative products or the indirect benefits. Time to volume refers to the period from launch until the new product achieves volume production on the scale planned and that can deliver payback.

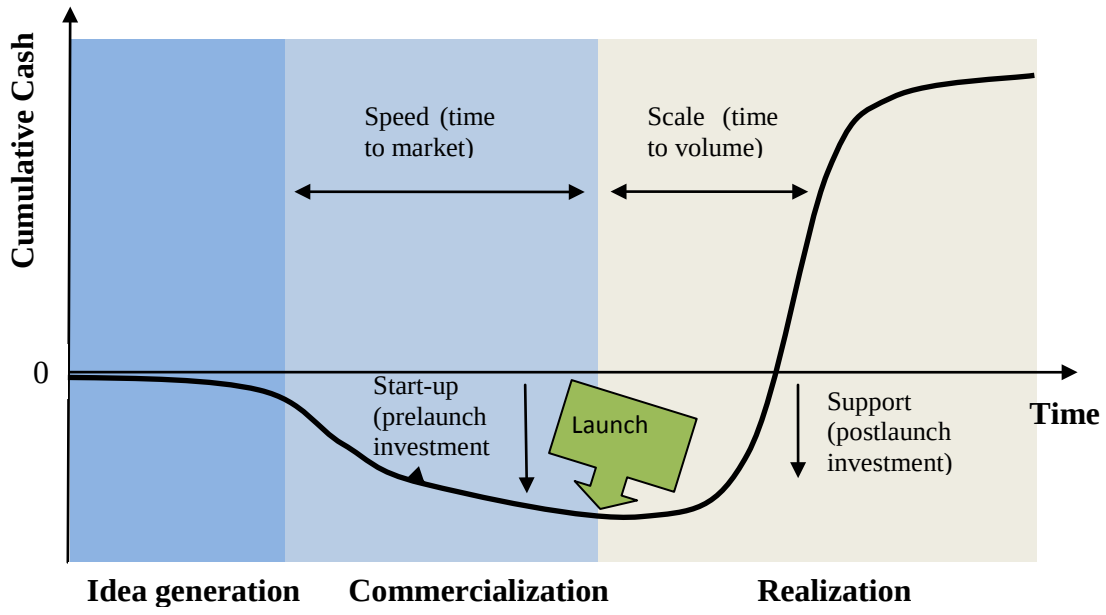

Figure 2.1 A commercialization model – a cash curve
Source: Andrew, Sirkin, and Butman (2006)

Rosa and Rose (2007) adopted this cash curve as a commercialization model in their report on interviews with respondents in the Canadian business sector regarding the commercialization of innovation. They also emphasized that having sufficient financial capital to invest in the project is more important in the first two phases corresponding to *idea generation* and *commercialization* because this accelerates the transition period between these phases and also speeds up time to market, which facilitates successful marketing and future profitability. After the product is brought onto the market, the time to reach a profitability threshold of volume is another important factor that affects commercial success or failure. In fact, the sooner the product or service reaches the optimal production scale that enables a reduction in unit costs, the more quickly the firm will be able to generate profits. In the third phase of *realization*, the firm puts the emphasis on the profitability of investments that is, however, not always achieved in earlier years because of the incremental costs of technical support, advertising and development. Nonetheless, the firm may realize some indirect benefits, which could be one measure of commercial success, from the investment, through the exploitation of intellectual property rights via royalties on patents, copyrights, etc.

Furthermore, Rosa and Rose (2007) also discuss a functional approach to commercialization that focuses on the basis of activities and functions on which the firm as well as the customer can act and provide feedback continuously regardless of the stage or sequences in the commercialization process. They did acknowledge that the commercialization process is an overlapping of complex functions that are not relevant to each firm because firms are quite different depending upon their sizes and fields or industries involved. Therefore, it is suggested that the commercialization model should be formulated in such a way as to fit the reality of each firm with its individual differences and needs instead of being set in one format.

2.3 Supply chain theory

A supply chain refers to the entire vertical chain of activities: from input suppliers, through production, processing, distribution, and retailing to the consumer. More specifically, it includes product life-cycle processes incorporating physical, information, financial, and knowledge flows

between actors in each stage of the product life-cycle that are linked to satisfy consumer needs and requirements (Ayers and Odegaard, 2008).

Another concept, which is sometimes interchangeably used with the supply chain, is a value chain. The value chain is a particular form of the supply chain, which refers to a vertical alliance or strategic network between a number of independent business organizations that share the same vision, common goals, mutual decision-making, risks and benefits within the chain (Hobbs, Cooney, and Fulton, 2000).

Closs and McGarrell (2004) described supply chain management as "inter and intra-organizational coordination of the sourcing, production, inventory management, transportation, and storage functions with the objective of meeting the service requirement of consumers or users at the minimum cost" (p. 8). In particular, the main objective of supply chain management is to optimize the performance of all of these functions within the chain at the least cost possible while adding as much value as possible (Jie, Parton, and Cox, 2007). Adding value is vital for supply chains as greater value may bring the chain members higher profits and return on investment. There can be many ways to add value to products. Novák, Fekete-Farkas, and Fejős (n.d.) suggest two main ways of adding value; innovation and improved coordination. Innovation focuses on improving existing processes, procedures, products and services or creating new ones while the second focuses on coordination among firms located at different levels of the supply chain.

On the other hand, supply chain management tries to create competitive advantage in the chain by improving inter- and intra-organizational relationships (Windischer and Grote, 2003) in order to accomplish the main objective. Supply chains are competing with each other instead of individual firms to achieve competitive advantage for the whole supply chain (Heusler, 2003). This is especially true in the food industry. Novák, Fekete-Farkas, and Fejős (n.d.) argue that with a well-defined and well-functioning value chain, the chain members can realise many economic advantages that serve to sustain the long-term viable economic partnership of the chain. In particular, the value chain members can better influence the market and prices through

their cooperation and increased bargaining power, secure cash-flows of partners, reduce both economic and technological uncertainties, increase the income of the members by lowering and internalizing transaction costs with a better flow of information, efficient measurement methods, etc., decreasing production costs and achieving economies of scale, in some cases increase the technological and market efficiency, competitiveness of collaborating firms, carry out activities with a higher added value and so on. Thus, effective supply chain management provides a major source of competitive advantage for the chain.

Of course, supply chains differ by their practices of implementing supply chain management. Among the many aspects of supply chain practices, Li et al. (2005) distinguish six major dimensions: strategic supplier partnerships; customer relationships; information sharing; information quality; internal lean practices; and postponement. *Strategic supplier partnership* is the long-term relationship between the organization and its suppliers that helps all supply chain members achieve ongoing mutual benefits through the effective use of strategic and operational capabilities of individual members. *Customer relationship* includes a range of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers and improving customer satisfaction. *Information sharing* describes the extent to which information is communicated between supply chain partners. High information sharing enables members of the supply chain to understand the needs of end customers better and, hence, to respond more quickly to changing markets. *Information quality* includes accuracy, timelines, adequacy, and credibility of the information exchanged. While information sharing is vital, the quality of information is also important for supply chain success. *Internal lean practices* refer to eliminating all waste such as cost, time, etc. in manufacturing by using less inputs to produce at a mass production level, reducing set-up times, avoiding unnecessary steps in production, shortening lead times from suppliers, making consumer-pulled products just-in-time, etc. *Postponement* is the practice of moving one or more activities or operations to a later point in the supply chain. In general, there are three types of postponement: form, time, and place postponement. For example, the product form or the forward movement of goods can be delayed until customer orders have been received.

Fisher (1997) suggests that appropriate supply chains and strategies should be chosen depending upon product types such as functional and innovative products. *Functional products* satisfy fundamental and stable customer needs and therefore have relatively long life cycles, low contribution margins, and intense competition. *Innovative products*, on the other hand, have unpredictable demand, high contribution margins, and short life cycles and thus involve high risks. While functional products should be delivered through an efficient supply chain focusing on minimizing physical costs, innovative products should be delivered through responsive supply chains which respond quickly to unpredictable demand by positioning inventory and production capacity in the right places to minimize costs of excessive supplies and obsolescence.

2.3.1 Drivers for supply chain changes

To achieve access to supermarkets and, consequently, successful commercialization, agribusinesses need to have a good understanding of the changes occurring in the agri-food industry and agri-food supply chains. Business and market environments change rapidly along with the pace of development. According to Konefal, Mascarenhas, and Hatanaka (2005), the current, retailer-driven restructuring of the global agri-food system has arisen from three important drivers: 1) the domination of concentrated international food chains; 2) the emergence of buyer-driven commodity chains, which has transferred power to retail chains; and 3) the growth of market differentiation and niche markets.

Similarly, supply chains have been restructured. Ayers and Odegaard (2008) suggest the drivers for supply chain changes are innovation, extended product design, globalization, a flexibility imperative, process-centered management, and collaboration. They note that product innovations increase the value of products to customers, while process innovations decrease costs and improve service. Rising competition necessitates that *extended product design* include new features and services beyond the base or physical product to differentiate products from competitors. Examples of extended products are warranty, after-sale service, and financial services. Indeed, firms in the food retail sector need to continually innovate to stay competitive and maintain their market shares. *Globalization* increases diversified consumer demand and facilitates international trade through which firms are able to source their inputs and sell their

products and services across international borders to meet such diversified consumer demand. *Flexibility imperative* refers to the advantage gained from effective responses to the changes in the business environment such as market conditions, consumer preferences, and new technology. *Process-centered management* requires firms in the supply chain to focus on multi-company business processes for designing or improving organizations and systems that avoid local optimums at the expense of the overall system. *Collaboration* refers to intra- and inter-company cooperative efforts to meet mutual goals within the supply chain.

Furthermore, Amanor-Boadu (2000) grouped changes in market environments into four principal categories: consumer priorities, product life cycles, business design/industry consolidations, and public policy changes. Due to changing consumer preferences and needs, suppliers of products and services need to consider consumer concerns about nutrition, health and food safety in their products, services, and production processes to maintain or build consumer loyalty, making their product/ service life cycles shorter and flexible. Businesses are re-organizing themselves and increasingly consolidating both horizontally and vertically to defend competitive positions or enhance competitiveness because of changes in government policies with respect to, among others, international trade liberalization, reductions of subsidies, alterations in safety nets, food safety regulations, and competition.

Specifically, Hobbs (1998) identified some forces driving changes in supply chain relationships in the Canadian agri-food sector as increased consumers' concerns regarding food safety, quality assurance and environmental sustainability, the reduction of barriers to international trade and investment, technological advances, and heterogeneous consumer preferences. Evaluating the effects of these factors on the coordination of supply chains in the framework of transaction cost economics, she concluded that these factors increased transaction costs and thus facilitated closer vertical coordination, particularly strategic alliances, in the agri-food chains.

2.3.2 Supply chain partnering

Supply chain partnering is the critical issue which affects the success and efficiency of a supply chain since supply chains are competing with each other, but not individual firms. Supply chain

members try to achieve the goals of providing high end-user value through an efficient use of resources and at the same time building competitive chain advantage (Novák, Fekete-Farkas, and Fejős, n.d.). Indeed, good inter-organizational coordination among supply chain partners enables supply chains to add high value at reduced cost. However, current trends in consolidation and growth of large supermarket chains have reduced partnership opportunities for small producers and manufacturers. These large supermarkets require a large volume of supply at a low as possible price. Small producers and manufacturers often suffer from high production costs because of their small plant size and constraints on financial and human capital. Instead, large producers and manufacturers can gain cost advantages due to economies of scale. Specifically, small manufacturers of innovative products have difficulty in supplying supermarkets due to the high risks associated with uncertain demand and quality of their new products in addition to a small volume of supply and high unit costs.

Specifically, Michigan State University conducted a survey among 107 food manufacturers to determine the extent to which firms in the food industry value security in relation to quality, price, delivery reliability, and supplier location (Voss and Whipple, 2008). The survey results indicated that respondents attached high importance to delivery reliability, followed by price, location, product quality, and security when choosing between suppliers. This means that the producers and manufacturers who can supply a sufficient amount with consistency are preferred. In this regard, many small scale and start-up agribusinesses, who do not have previously established reputations and whose products are not well-known with respect to quality and consumer acceptance, are often regarded as unreliable.

On the other hand, small innovative firms may create competitive advantages in supply chains through their involvement. Gellynck, Vermeire and Viaene (2006) emphasized that with their diversity and flexibility, SMEs may enhance the innovation potential of networks. This may be the case in the food retail sector where supply chains need to innovate continuously in order to compete effectively. Since SMEs differ in their ability to deal with the challenges of integration into value chains, different levels of integration may occur in the food sector, resulting in a segmentation of markets with different levels of excellence and regionalization (Fritz and Schiefer, 2008). More specifically, instead of integrating into the global food chains, SMEs with

lower levels of management excellence tend to remain restricted to local or regional markets with different needs and barriers related to horizontal cooperation or value chain integration, but also different needs for support (Fritz and Schiefer, 2008). They further state that the horizontal cooperation of SMEs is usually the base for an efficient integration into the vertical trade relationships of food value chains by strengthening their ability to become successful partners.

Specifically, Metzger et al. (2010) examined three case studies of agribusiness ventures in Costa Rica and Bolivia that have included low income sectors (LIS) into their chains with the purpose of reducing poverty. They found three major factors contributed to successful inclusion of LIS by the three ventures studied: consistent business models, sources of competitive advantage, and the actions taken to overcome barriers to LIS inclusion. First, each commercial enterprise designed a business model that was consistent with LIS incorporation. For example, in the case of the Tierra Fertil program of the CSU supermarket chain of Costa Rica, the chain started to purchase produce from small farmers instead of buying from market middlemen, which enabled it to source fresh produce with variety valued by customers and, therefore, can be sold at higher prices.

Second, each agribusiness chain built one or more sources of competitive advantage. The Terra Fertil, for instance, obtained competitive advantage in superior quality, freshness, hygiene, safety, and a combination of product attributes that was created through the acquisition of produce from geographically dispersed small farmers, introducing safe, hygienic packaging, and improving transportation.

Finally, each company took some actions to overcome barriers associated with LIS inclusion that differed by cases depending on a particular barrier. The three case studies revealed significant barriers to LIS inclusion generally, including logistical barriers, lack of organization among small producers, lack of technical knowledge of growing quality products, and cultural distance. These barriers were overcome by investing in infrastructure, providing technical training to producers through partnerships with NGOs and other actors, building trust through close relationships with small farmers, and paying premium prices to reward product quality and on-

time delivery. They argued that LIS inclusion in agribusiness value chains may contribute to building competitive advantage and creating economic value for the firm and the LIS as well as non-economic value for society.

2.4 Transaction cost economics

Transaction cost economics asserts that vertical coordination between different stages of a supply chain such as production, processing, distribution, and retailing can be analyzed by a transaction cost approach. In fact, the characteristics of the transaction and level of transaction costs affect the choice of vertical coordination along the supply chain. Vertical coordination can be viewed as a continuum from spot market relationship to vertical integration. More specifically, Hobbs (1997) stated that, in between the two extremes of spot market and vertical integration, there are a number of ways of coordinating economic activities, including informal buyer-seller transactions, strategic alliances, formal written contracts, joint ventures, and franchise arrangements.

In spot markets, there are many buyers and sellers exchanging homogenous products at competitively determined market prices. Further, there are no ex-ante and ex-post relationships between sellers and buyers and, thus, transaction costs seem to be low for search goods, but high for credence goods[10]. Under vertical integration, two or more stages of the supply chain are brought together by common ownership and management and transactions between these stages are organized internally within the firm. According to Amanor-Boadu and Martin (1992), a strategic alliance is the network of firms that cooperate to accomplish a common objective by sharing the resulting risks and benefits and mutually controlling decision-making processes. Two or more firms form a joint venture to coordinate economic activities together by contributing equity that represents their shares in revenues, expenses, assets and the control of the company. Formal written contracts and franchise arrangements are other types of agreements made

[10] Search goods are the goods whose characteristics can be observed before a purchase as there is perfect information about quality, such as freshness, colour, smell, ripeness, in the market of search goods, while the quality of credence goods cannot be directly observed by consumers even after consumption (McCluskey, 2000).

between transaction partners. Many kinds of buyer-seller relationships may be established between transaction partners depending on their specifications, transaction costs and the characteristics of transactions.

Transaction cost economics recognizes that economic activities or transactions do not occur without friction; in other words, there are transaction costs to carry out any exchange. Transaction costs are defined by Arrow (1969) as "the costs of running the economic system" (p. 48). Transaction costs consist of three components: information costs, negotiation costs, and monitoring or enforcement costs (Hobbs, 2005). *Information costs* arise prior to the transaction and involve the costs of obtaining data and processing it into information about products, prices and customers that can be made available for decision making. *Negotiation costs* arise from the physical exchange of goods or services such as negotiating, drawing up contracts, etc. *Monitoring or enforcement costs* arise after the transaction is carried out and include costs of arbitration, of litigation, of monitoring quality of goods, and so on.

Transaction cost economics is more micro-analytical and, hence, regards a business firm as a governance structure and a transaction as the basic unit of analysis, relying on its core assumptions about bounded rationality, opportunism, and asset specificity (Williamson, 1986). *Bounded rationality* assumes that human agents tend to be rational when making transaction decisions, but their capacities to evaluate all the situations are limited and thus they spend time and incur costs in obtaining and processing information. Furthermore, human agents are capable of *opportunism*, which assumes that individuals act in their self-interest and could exploit a situation to their own advantage. As a result, there is always a risk of opportunism which needs to be taken into consideration when making decisions on governance structures. Transaction cost economics places a considerable emphasis on the degree of *asset specificity* in an exchange relationship. Asset specificity is a transaction specific investment which arises when a party to an exchange has invested in resources specific to that exchange, with little or no value in an alternative use (Klein, Crawford, and Alchian, 1978; Williamson, 2002). As asset specific investments are vulnerable to the other party opportunistically attempting to appropriate rent from the investment, the investing party may be subject to a holdup problem by the other party.

Hence, if transactions involve more specific assets, a higher degree of vertical coordination is more likely to result due to the risks of opportunism.

Asset specific investments may take the form of specialized physical assets, specialized human assets, site specificity, dedicated assets or brand name capital (Williamson, 2002). *Physical asset specificity* relates to special-purpose equipment, specialized investments required for scale economies, specialized content and packaging of food products for particular buyers. *Site specificity* is created when buyers and sellers locate facilities close to each other to reduce transaction costs. *Human asset specificity* arises from firm-specific training or learning by doing. *Dedicated assets* are large discrete investments made in expectation of continuing business. In the seafood industry, for instance, specific physical assets could be a filet machine for salmon, or specific content and packages for retailers' private label products such as President's Choice. In addition to these forms of asset specificity, Tveterås and Kvaløy (2006) identify *temporal specificity* that relates to the timing of delivery and its effect on product value. For example, when a buyer cancels a purchase on short notice, investments in perishable products like fish become transaction specific due to difficulty in finding alternative processors within the short framework dictated by perishability.

Transaction attributes that have important ramifications for determining governance structures are asset specificity, uncertainty, and frequency. Since even complex contracts are inevitably incomplete due to bounded rationality, there is always uncertainty which suggests adaptive needs (Williamson, 2002). It seems that a low level of uncertainty in a particular transaction results in spot market governance; on the other hand, a high degree of uncertainty, *ceteris paribus*, is more likely to induce vertical integration. Firms with high transaction frequency tend to choose closer vertical coordination to reduce transaction costs. According to Williamson (1986), at whatever frequency, transactions of standardized goods that require no specific investment by either party would be most cost effectively organized using a spot market relationship. In contrast, the recurrent transactions of non-standardized goods in which one of the parties has invested in mixed and highly idiosyncratic assets are best coordinated by hierarchies (vertical integration). For example, transactions between sheep producers and the only lamb processing company in a

particular region could be coordinated by vertical integration when the company invests in equipment or a production facility that is specific to processing lamb.

Changes currently occurring in the agri-food sector affect the nature of a transaction, which in turn influences transaction costs. Drivers for these changes include socio-economic, technological, and regulatory factors (Hobbs and Young, 2000). The socio-economic factors are increasing consumer concerns about food safety and quality and environmental sustainability of production. For instance, in the German fish sector, increasing consumer concerns for quality, safety and environmental sustainability of seafood products were the driving forces for closer vertical coordination, particularly in supply chain networks (Gagalyuk, Hanf, and Steinbauer, 2009). Consequently, governments tighten their regulations on food safety, environment, and other aspects of the regulatory system while retailers seek closer vertical coordination with suppliers to ensure food quality and safety. However, drivers for change in food safety regulations differ from country to country. For example, the initial drivers for the food safety regulation in the UK were primarily related to a need to restore consumer trust in response to the Bovine Spongiform Encephalopathy (BSE) crisis, while incentives for Australia and Canada were related to maintaining or strengthening export competitiveness in response to the growing food safety requirements of trading countries (Hobbs, Fearne, and Spriggs, 2002). In short, tightening regulations raise costs for producers and processors, putting more pressure on the need for financial capital.

In addition to public standards, after the BSE crisis in the EU in the 1990s, retailers began to impose private standards along their supply chains to ensure food safety since they faced direct risks associated with food safety failures. As a consequence, vertical coordination between producers, processors, and retailers has become an important means to assure food safety and quality. Moreover, retailers have been developing their own name brands, and products sold under their brand labels must meet specific food safety requirements and be produced through specific production processes. Giraud-Heraud and Soler (2006) emphasize that retailers' chain brands cause a very profound change in vertical coordination between retailers and the upstream part of the chains, shifting away from a spot market relationship to a closer relationship in which specific agreements are concluded between retailers and producers. For example, Carrefour, a

multinational retail chain, makes supply agreements directly with producers through which it imposes its private standards including complete traceability and other safety and quality requirements (Codron, Giraud-Heraud, and Soler, 2005).

As retailers can impose different private standards, producers and manufacturers may run into a holdup problem with the retailers. Producers and processors may need to invest in introducing food safety systems, such as Hazard Analysis Critical Control Points (HACCP), traceability systems, recall systems, communication systems, and even new technologies, and in training of employees for the technology and environmentally friendly production practices. Once a supplier makes this kind of investment as required by a particular retailer, its investment becomes asset specific to that particular retailer. In this case, the supplier will be subject to opportunism by the retailer and it will be costly to switch to another retailer. Therefore, un-harmonized private standards seem to be another barrier to commercialization by small agribusinesses by requiring a large asset specific investment and, thus, increasing risks of opportunism.

Moreover, food processing is increasingly concentrated because of technology that enhances productivity, characterized by high capital intensity and economies of scale. Technology makes transactions more transaction specific by requiring asset specific investments, specific types of inputs, specifically skilled labour, etc. Accordingly, economic activities have become more complicated and involve risks. Hence, processors also prefer closer vertical coordination with input suppliers and retailers to secure their asset specific investments. Small food processors are not as technology intensive as medium-sized and large food processors, but they still have to possess sufficient capital to realize economies of scale.

Since bounded rationality, opportunism, and asset specificity are present in the current economic environment, transaction cost economics focuses on determining a governance structure for a particular transaction economizing on the sum of production and transaction costs. The changes in the economic environment and in transaction attributes are leading to closer vertical coordination and thus supply chains are becoming more integrated. Wysocki, Peterson, and Harsh (2006) argue that an integrated supply chain has many benefits, such as inventory

reduction throughout the chain, reductions in supplier redundancy, reduced transaction costs, frictions and barriers, increased functional and procedural synergies between chain members, faster response to changing market demands, lower operating and investment costs across the chain, shorter product realization cycles, and lower product development costs.

2.5 Factors related to commercialization success

Acknowledging the vital role of innovation management for both companies and supply chains, Graaff et al. (2002) distinguish five categories of factors influencing success and failure of innovation and innovation introduction: technological competency, organisational competency, marketing competency, tactical introduction decisions, and managing cooperation. The first four categories are at the level of the innovation project and the firm, whereas the last category refers to factors at the supply chain level that influence inter-organizational relations within the supply chain.

Their first three categories - technological, organisational, and marketing competencies - adopted from Cobbenhagen (1999) make up managerial competencies that explain a company's competitive advantage. *Technological competencies* include knowledge and experiences of technologies, possession of installations to develop technologies and the capacity to adopt new technologies. *Marketing competencies* include knowledge of markets and market strategy, a company's reputation, the availability of sufficient resources for market development and the ability to seize market opportunities by identifying consumers' needs and preferences as well as by addressing their problems. *Organizational competencies* include the company's structure and culture that promote innovation by stimulating creativity and being progressive, flexible, and product- and market-oriented. The fourth category, *tactical introduction decisions*, refers to the actual introduction and the logistical aspects of introduction in which decisions regarding the marketing mix of a new product such as price, product, promotion and distribution are made (Graaff et al, 2002). All of these groups of factors seem to be important for small innovative agribusinesses to successfully introduce new products into commercial markets.

Further, Graaff et al. (2002) tested the importance of these factors empirically through a single-case study in the Dutch horticultural sector. They used the so-called innovation score card as a checklist for interviews undertaken with several supply chain participants and experts within government and research institutes. The innovation score card described both the importance of factors and the impact of supply chain participants with respect to innovation and the improvement opportunities per factor and per supply chain participant. Results of their study showed that a supermarket was considered to be the most important participant in the horticultural supply chain because of direct contact with consumers and its market power, followed by a specialty shop and a seed supplier, a growers co-operative and a processor, auction and a wholesaler, and lastly a grower and distribution centre supermarket. Moreover, technology was the most important factor in innovation for the seed supplier, the grower, and the processor whereas all supply chain participants needed to improve co-operation for successful introduction of innovation. This finding indicates that cooperation is the most critical factor to foster innovation and ensure successful commercialization of an innovation.

Both inter- and intra-organizational cooperation and coordination are equally important for the successful commercialization of innovation. Commercialization of product innovation, in particular, requires well-coordinated team work in which all departments of an organization as well as suppliers, distribution channels, and customers effectively work together in order to achieve successful outcomes. For instance, results of a study in the Thai food processing industry by Suwannaporn and Speece (2003) indicated that efficient internal communication among the new product development team, such as R&D, manufacturing, and marketing functions, effective strategy and planning, and more extensive use of marketing research in the new product development process did indeed result in higher success rates in new product introduction. On the other hand, inter-organizational relations such as supply chain cooperation have become a potential success factor in the current agri-food marketplace (Amanor-Boadu, 2000). Indeed, in the agri-food sector, effective supply chain cooperation can provide competitive advantage to maintain and/or gain market share.

In addition to cooperation, factors related to barriers that small innovative agribusinesses face when commercializing new products affect the success of the commercialization. Small scale or

start-up agribusinesses seem to face more challenges when commercializing their new products than existing and/or large scale firms as they lack knowledge and experience. To commercialize new products small scale or start-up agribusinesses need to establish supply chain relationships or integrate into existing supply chains. Hobbs, Cooney, and Kerr (2000) suggest that the challenges faced in developing supply chains in infant industries are insufficient volumes, inadequate supply chain infrastructure, inconsistency of supply, inconsistent quality, uncertainty, absence of price discovery, unavailability of market information, need for new competencies, access to financial capital, and regulatory constraints. Many similar challenges are faced by small agribusinesses when developing or entering supply chains because the current market environment and institutions do not seem to favour them.

The Survey of Innovation 2005 conducted by Statistics Canada determined the degree of importance of obstacles to the development and commercialization of innovation as indicated by innovative manufacturing plants, which comprised 65% of the sample of 8902 manufacturing plants in Canada (Uhrbach, 2009). Obstacles to the development of innovation ranked according to their importance were inability to devote staff to innovation projects on an on-going basis, lack of internal funds for innovation, lack of qualified personnel to work on innovation projects, high innovation costs, lack of outside financing, difficulty in finding cooperation partners for innovation, risk related to the feasibility of the innovation project, and lack of information on technology. Starting from the highest importance, the obstacles to commercialization of innovation were: uncertain demand for innovative goods or services; a market dominated by established firms; an insufficient marketing effort; lack of knowledge of markets; inappropriate targeting; lack of consumer acceptance; lack of industry-wide standards; inappropriate packaging; and lack of government standards and regulations. More generally, it is noted that good management skills, vision, a highly qualified workforce, scientific and technological discovery, and access to capital at each stage of a company's life are vital for successful commercialization (Industry Canada, 2006).

Small innovative agribusinesses face most of these barriers in addition to barriers specific to their size and features of business when developing and commercializing new products. In connection with their small size, small agribusinesses often lack financial capital, available production

facilities and knowledge of marketing, business management, and entrepreneurship. Also, agriculture influences the activities of agribusinesses in some ways as it is the only source of primary inputs for agribusiness. For instance, Metzger et al. (2010) point out that three features associated with agricultural production, such as perishability of raw materials, seasonality of supply (harvests), and variable product quality create challenges for small producers wishing to be accepted as business partners. Generally, the literature suggests that when commercializing new products, small innovative agribusinesses are more likely to encounter barriers: lack of financial capital; lack of human capital; high costs of commercialization; high unit costs of production; high transaction costs; risks of uncertain demand for innovative products; lack of knowledge of the market and industry; changes in regulations and lack of harmonization of private standards; low opportunity of partnering; etc.

Small agribusinesses have to finance initial investments in sample production and test marketing in addition to production facilities and inputs, but they usually lack financial capital. With sufficient financial capital, small agribusinesses are able to accomplish the commercialization by speeding up time to market and time to reach the optimal production scale. However, small-scale and start-up firms usually do not have sufficient internal funding to finance commercialization of new products. Also, they have with little or no credit history and lack tangible assets to secure a loan so that access to credit is limited compared to larger and existing firms. For example, lack of financing from outside the plant for innovation was indicated by two thirds of nearly 5,800 innovative manufacturing plants surveyed in Canada (Uhrbach, 2009). This confirms that finding external funding may be even harder for small agribusinesses. As a result, they tend, for the most part, to use informal sources of financing such as personal savings and loans, credit cards, and loans from friends and relatives. According to SME Financing Data Initiative (2009), for instance, in 2007 start-up SMEs primarily used informal sources of financing as 73 percent of them used personal savings to finance their company, compared with 54 percent of all SMEs[11]. Also, 51 percent of start-up SMEs used personal and commercial loans from financial

[11] This report on Key Small Business Financing Statistics - December 2009 used the results of the Survey on Financing of Small and Medium Enterprises, 2007 by Statistics Canada that covered 1.6 million SMEs in Canada (SME Financing Data Initiative, 2009).

institutions to fund their operations while 64% of all SMEs used personal and commercial loans to finance their current activities. Moreover, start-up SMEs also used other formal financing, such as lease financing (12 percent) and supplier credit (12 percent), less often than established SMEs that used retained earnings (57 percent), lease financing (22 percent) and supplier credit (21 percent).

In addition, small firms developing new products or services are likely to encounter more reluctant lenders because of the perceived risks associated with high development and commercialization costs associated with innovative products and uncertain demand for the products. For example, according to Statistics Canada (2005) 28% of nearly 560 food processing companies that developed innovations tried to raise capital specifically for innovation; however, only about two-thirds succeeded in reaching their target funds while others failed. Riding and Orser (2007) noted that in 2004 the primary lending institutions for funding of SMEs in the prairie provinces of Canada were chartered banks and credit unions that received 49% and 34% of loan applications respectively. Furthermore, small and start-up agribusinesses may not attract venture capital investments. Indeed, venture capital investments are mainly limited to a small number of companies in the technology sector that have high growth potential (SME Financing Data Initiative, 2009).

The food retail sector throughout much of the world is becoming increasingly consolidated, which poses challenges for small agribusinesses wishing to enter supply chains and partner with these large retailers. For example, the top five chains in the U.S. accounted for over 60 percent of food sales (Brown and Sander, 2007). In Canada, 60.3% of retail food sales are made by grocery store chains (AAFC, 2009). The consolidation of retailers has provided market power to control suppliers and to push the costs and risks down the supply chain (Brown and Sander, 2007). In the food retail sector of Canada, a market concentration ratio, which is expressed as the market share of the top four food retailers, increased from 67% in 2004 to 74% in 2006 (AAFC, 2008). Much

of this increase can be attributed to Metro's[12] acquisition of A&P[13] in 2005 while others consolidated because of rising competition sharpened by well-financed entrants such as Wal-Mart and Costco (AAFC, 2008). Hence, small agribusinesses need to supply a large volume to access these large supermarket chains, which increases their costs and risks in addition to the risks related to uncertain demand for innovative products. As a result, small innovative agribusinesses have a very low opportunity to partner with large retailers and have access to large distribution chains.

Moreover, due to the pressure from consumers, supermarkets have begun to implement private standards throughout their agri-food chains to satisfy quickly changing consumer preferences and to ensure food safety and quality. Some have developed their own private standards that go beyond the mandatory regulations required by law while others require third party certification such as GlobalG.A.P[14]. Through private standards or third party certification food retailers require producers to apply certain production practices and to produce products with specific attributes and, therefore, small agribusiness firms incur higher costs to comply with retailers' requirements. These may include initial costs including certification costs and investments in food safety facilities and in control systems, and recurrent costs to maintain the food safety requirements during the supply period. Therefore, stringent regulations and lack of harmonization of private standards, particularly heightened requirements of supermarkets are acting as a further barrier for small agribusinesses to access commercial markets by requiring more investments.

Besides costs of development and production, small producers also face high transaction costs to commercialize their new products. Transaction costs associated with marketing new products via supermarket chains may include costs of complying with a supermarket's specific standards and

[12] Metro Inc. is the third largest food retailer in Canada that operates 558 stores in Ontario and Quebec provinces (AAFC, 2009).

[13] A&P Canada was a supermarket chain.

[14] GlobalG.A.P is a pre-farm-gate standard covering the process of the certified product from farm inputs until the product leaves the farm and serves as a practical manual for Good Agricultural Practice (G.A.P) around the world (GlobalG.A.P, 2010).

requirements, time and resources spent on negotiation and delivery, delays in payment, fees, transportation costs, etc. Specifically, there are many kinds of fees paid to access supermarket chains, including substantial slotting fees which increase the unit cost of a new product. According to the definition of the US Federal Trade Commission (FTC) (2003), slotting allowances or slotting fees are lump-sum, up-front payments from a supplier to a retailer to initially place its product on the retailer's shelves or to access to the retailer's warehouse space. Based on their study undertaken in the cases of seven retailers and eight suppliers in the US, the FTC (2003) reported that the average amount of slotting allowances for five product categories (fresh bread, hot dogs, ice cream and frozen novelties, shelf-stable pasta, and shelf-stable salad dressing) studied ranged between $2,313 and $21,768 per item, per retailer, per metropolitan area. Also, it was noted that a nationwide introduction of a new grocery product in the US would require $1.5 to $2 million in slotting allowances.

In addition, Bloom, Gundlach, and Cannon (2000) describe many other types of fees associated with marketing products via retailers: presentation fees paid for the privilege of making a sales presentation; display fees paid for special merchandising and display of products; pay-to-stay fees paid to continue stocking and displaying a product; and failure fees paid when a product does not meet expected goals. All of these suggest that these fees could be substantial enough to hinder small agribusinesses entering into large supermarket networks.

Also, transportation costs are high when selling the products to distantly located retailers. Transporting small quantities or perishable products increases the costs further and, hence, large quantities are preferred. Besides directly selling to retailers there are many other options to market the products such as via distributors, brokers, and the internet. Transaction costs differ significantly depending on distribution channels chosen. The internet can provide small agribusinesses an opportunity to do marketing among geographically-dispersed customers with relatively low costs and, thus, to increase sales without being restricted to local markets. However, dealing with customs and duties may increase transaction costs for international sales in addition to online security, delivery systems, and quality assurance of products that need to be solved to facilitate online sales (Hobbs, Boyd, and Kerr, 2002).

Many entrepreneurs in the agribusiness sector lack skills and knowledge of marketing, management and entrepreneurship that are essential to the success of commercialization of innovation. For instance, Graaff et al. (2002) found out that, for processors in the Dutch horticulture sector, marketing was the most important activity in the introduction of innovation. Moreover, adequate knowledge of the market and industry where new products are going to be introduced is essential to successful commercialization. More specifically, processors need to target proper markets or consumers through understanding of consumer needs and preferences or market requirements and devote sufficient effort to marketing. Good knowledge of the industry makes it easier to enter and establish good relationships with supply chain members. On the other hand, some small agribusinesses cannot even attract qualified personnel due to relatively low wages, being located in rural areas, or simply lack of qualified human resources in the local labour market, etc.

2.6 Summary

Given limited resources and the needs of an ever-increasing world population, innovation is the most efficient way to boost productivity and economic growth. Indeed, innovation not only brings benefits to the innovating firms and direct consumers but also to society in general. Small scale firms make up a large part of businesses in Saskatchewan and have potential for more innovation with their diversity and flexibility. Thus, the commercialization of new products by small agribusinesses influences the competitiveness of the agri-food industry by enhancing value added activities.

Commercialization is the most significant and challenging phase of the innovation process that enables firms to generate a positive return from the investment in innovation. Commercialization is costly and requires large pre-launch and the post-launch investments that speed up time to market and time to volume respectively. Small innovative agribusinesses lack internal funding to finance commercialization of innovation as well as to having limited access to external financing because of the high risks associated with the high costs of the commercialization of innovation and uncertain demand for a new product. Qualified human resources that can manage commercialization activities, make investment decisions, and conduct thorough studies about the

market, are essential to achieving successful commercialization. However, small agribusinesses also lack qualified personnel and the entrepreneurs themselves often do not have adequate managerial skills and knowledge of marketing and entrepreneurship. Due to lack of knowledge of the market, small agribusinesses may target inappropriate markets or consumers without properly identifying their needs and preferences and also may undertake inappropriate marketing strategies and activities. Therefore, high costs of commercialization, lack of human and financial capital, and poor knowledge of the market may be key barriers to successful commercialization of product innovation by small agribusinesses.

Supply chain theory and transaction costs economics provides important insights into the commercialization of innovation, particularly identifying and investigating the factors related to commercialization success and barriers faced by small scale, innovative agribusinesses in entering supply chain relationships. Further, these approaches can assist in the development of an economic model of commercialization and the design of strategies for small agribusinesses.

Supply chains are competing with each other to gain competitive advantage for the chain, and thereby market shares, in the current competitive market environment. Product differentiation and cost efficiency are important strategies. With this perspective, small agribusinesses can be potential business partners in supply chains with high value-added, innovative products that are consistent with the objectives of supply chains, but they face a number of barriers to accessing supply chains. In particular, small manufacturers of innovative products have a difficulty in supplying supermarkets due to high unit costs and transaction costs, the high risks associated with uncertain demand and unrecognized quality of their new products. Given the small size of available production facilities, or even no production facility being available, small agribusinesses incur high production costs besides the large costs of development and commercialization of new products. Meanwhile, as a result of the changes in supply chain relationships, which are fostering closer vertical coordination and concentration, small agribusinesses have low opportunities for partnering with supermarkets. In brief, the literature on supply chain theory suggests that high unit costs, transaction costs, risks of uncertain demand for innovative products, and low partnering opportunities are the primary barriers to commercialization, particularly for small innovative firms accessing established supply chains.

From the perspective of transaction cost economics, the current changes occurring in the agri-food sector raise transaction costs in many stages of the product life cycle by creating asset specificity and, thus, risks of opportunism. As a result, a higher degree of vertical coordination tends to dominate in agri-food chains because it reduces transaction costs and allows supply chains to respond to rapidly changing market demand. This, however, facilitates industry consolidation and concentration, largely in the retail sector, which in turn has reduced partnership opportunities of small firms in the supply chains. Together with stringent regulations and private standards that are not harmonized, small volumes of supply, unknown product quality, and seasonality of agricultural inputs make transaction costs higher for small innovative agribusinesses as well as their transaction partners. Therefore, based on the literature regarding transaction cost economics, high transaction costs, changes in regulations, and lack of harmonization of private standards are likely to be the main barriers to commercialization for small agribusinesses.

All in all, a firm's ability to deal with all of these barriers has a major impact on the success in commercializing new products. On the other hand, small agribusinesses need to effectively cooperate and communicate with their partners since increasing closer coordination in the agri-food chains has made cooperation within the chains of increasing importance.

CHAPTER 3: THEORETICAL FRAMEWORK

3.1 Introduction

This chapter presents an economic analysis of the commercialization process for a product innovation by small agribusinesses. A firm can suffer from not generating a sufficient return from their investment in a new product. This may take different forms from sustaining losses, meaning the business is simply not viable for the firm, to being profitable, but remaining too small to provide the entrepreneur with an adequate living. Thus, two scenarios such as making a loss and making an insufficient profit are taken as representative situations faced by small agribusinesses in the early stage of commercialization of new products. The economics of commercialization of new food products by small agribusinesses is modelled using graphical analysis for these two situations starting from the early stage of commercialization up to the stage of realizing available economies of scale. In the models, commercialization refers to stages from pre-launch through launch to full commercialization where firms realize payback.

Supply chain theory and transaction cost economics are used to explain the concepts and the reasoning of the models although the models are rooted in standard neoclassical microeconomics. The models specifically deal with new food products that can be marketed to retail chains. A market for innovative food products is assumed to be imperfectly competitive.

3.2 Choosing size of production facilities - Ex ante options and ex post rigidities

Product innovations result in new or significantly improved products that have no perfect substitutes; however, there are likely some imperfect substitutes for them. When goods are of equal value to the consumer, goods are perfect substitutes for each other. In contrast, imperfect substitutes are goods that are sufficiently similar that they can be used for the same purposes, but are different in ways that reflect consumer preferences. The latter refers to product

differentiation, which is viewed as a source of market power and a potential source of competitive advantage. In the food processing industry, in particular, firms often devote considerable resources to devising new food products that differ from those of their competitors.

Depending on the particular industry, most new products, which by being new imply they are differentiated, are sold in imperfectly competitive markets in which firms administer prices of their products and determine sales based on demand[15]. Given an imperfectly competitive market structure, innovating firms in the food processing industry operate in a business environment characterised by monopolistic competition as a large number of small and medium-sized firms exist in the business environment. Whereas firms in perfect competition sell an identical product and are price takers, firms in monopolistic competition sell a differentiated or innovative product and, thus, have some power over setting price. Since other products in the market are close but not perfect substitutes for new products, which are unique in their characteristics or uses, each innovating firm faces a downward sloping demand curve and has some degree of discretionary pricing power over its own product. Consequently, the firm is able to charge a monopoly price, setting its production at the point where marginal revenue equals to marginal cost – the profit maximizing output level.

At the start of the commercialization of new products when the product is introduced into the market, small innovative firms are likely to be restricted to selling at a local or niche market where they can sell only a small volume. This is known as a cottage industry in which small firms carry out small scale production that is often home based. Therefore, the size of innovative firms' production facilities in the early stage of commercialization is likely to be small due to capital constraints, the high risks associated with unknown demand and the restricted venues where the product can be sold (e.g. a farmers' market). In this stage, some firms may not even own production facilities but instead use new product development and processing facilities that are small-scale and available for use at a fee. The result is that the amount produced by small firms in the early stages of commercialization may mean that the firm incurs a high average cost

[15] This is in contrast to producers in perfectly competitive industries where firms are "price takers" – because all products are perfect substitutes and the individual firm's demand curve is perfectly elastic.

– its production is too small to reap any economies of scale. As a result, due to the small size of their production facilities, it is not possible to supply, for example, supermarket chains that require large quantities of supply at a low price and possibly have more stringent food safety and quality standards. Indeed, the average cost of small firms will rise further as they increase their outputs because they face 'U-shaped' marginal and total average cost curves corresponding to the small size of their production facilities. Therefore, a different size plant is normally required to achieve a larger volume of outputs at a lower cost.

The crux of the matter is the relationship between ex ante (before the production facility is built) projections of sales and ex post (after the production facility is built) production costs. The average cost curve associated with any production facility that has already been built is U-shaped. Figure 3.1 depicts an average cost curve and the corresponding capacity of a firm's plant.

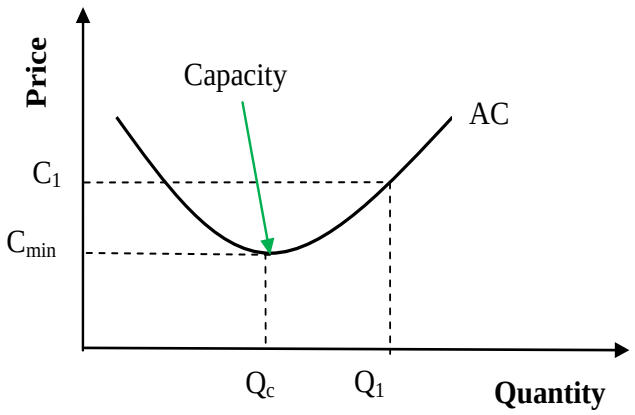

Figure 3.1 An average cost curve and plant's capacity

The minimum point on the U-shaped average cost curve is the output level denoted by economists as the plant's capacity[16] – Q_c. Output level Q_c has an average cost associated with it that is the lowest average cost achievable with a plant of capacity equal to Q_c (e.g. C_{min}). If the

[16] Note the economists' use of the term capacity is different than the common English meaning of capacity. In common English the term capacity is associated with the maximum output a production facility can produce.

output choice of the firm is not at Q_c, say Q_1, given this already built plant, the average cost rises to C_1, where $C_1 > C_{min}$. A similar rise in average cost is associated with the firm choosing an output less than Q_c, remembering that the plant has already been built.

In economic theory it is assumed that there is the possibility of engineering a production facility that is tailored to any capacity – a unique production facility can be built for any capacity. Figure 3.2 illustrates three different capacities that a plant can have, each with the same minimum average cost.

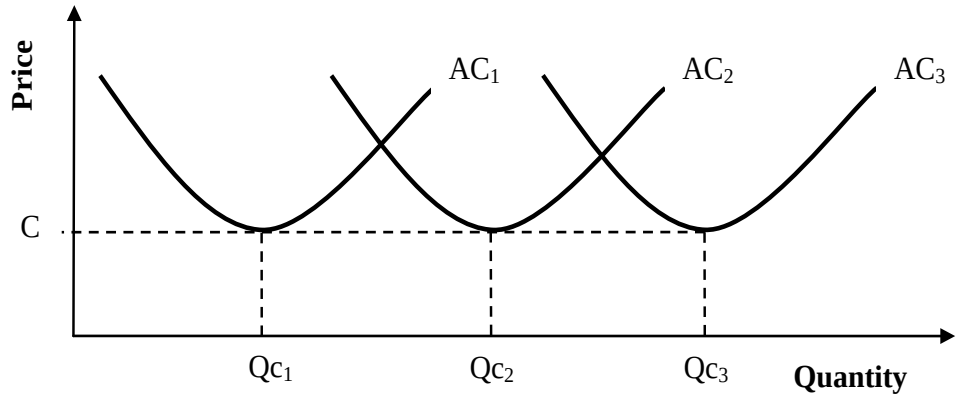

Figure 3.2 Average cost curves of a firm's plant tailored to any capacity

Having infinite potential production facility sizes leads to the question of which size of production facility a firm should choose to build (See Figure 3.3).

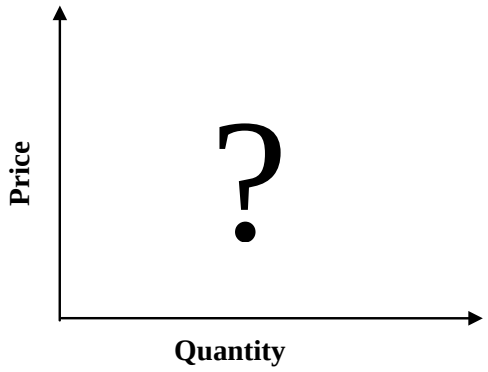

Figure 3.3 A small commercializing firm's situation prior to building a production facility

The answer depends on the firm's expectations regarding its potential market. As shown in Figure 3.3, the firm's cost structure and the market cannot be known because there is no production possible prior to building the production facility unless it uses co-packing plants. The solution, based on forecasts of sales, is to build a production facility with a capacity that matches expected sales. This will minimize costs for the expected sales volume. Indeed, the firm can attain the lowest average costs of production at the output level where all capacity is utilized. A plant's production capacity matching expected sales volume is described in Figure 3.4 where Q_c is the capacity and Q_e is expected sales.

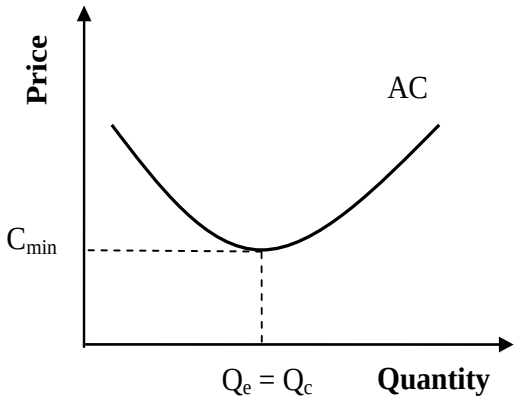

Figure 3.4 Plant's capacity matching expected sales volume

Building a production facility with a capacity different from the expected sales volume will lead to higher costs (See Figure 3.5).

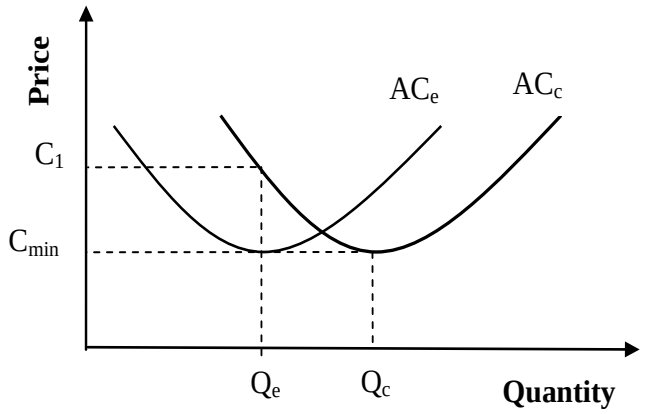

Figure 3.5 A plant's capacity exceeding expected sales volume

If for an expected sales volume Q_e, a firm chooses to build a production facility Q_c to produce Q_e, the average cost would be C_1, and greater than C_{min}. This will be true for all production facilities that do not have a capacity equal to Q_e.

3.3 Economies of scale

The previous discussion takes no account of economies of scale – it has assumed constant returns to scale. Economies of scale refer to "the reduction of long-run average costs resulting from an expansion in the scale of a firm's operations" (Ragan and Lipsey, 2005, p.185). As a firm expands its scale of production from the small-sized plant – often suitable for a cottage industry-sized market - to a medium-sized or large plant, it can produce the larger output with a lower average cost. Indeed, the firm's short-run marginal and total average cost curves shift down as larger production facilities are built. In particular, a larger firm tends to invest in modern techniques of production that lower production costs by increasing capacity of production and thus spreading its fixed costs over a greater volume of output – economies of scale is largely determined by technological factors.

Small firms introducing new food products may encounter two possible situations. First, a small commercializing firm selling its product in a cottage industry-sized market makes a small profit that is just enough to survive due to high costs associated with its small-plant size and the small demand of, for example, a local or niche market. The firm is not sustainable unless it can expand its operation and enter into a market with a larger demand. While profitable, such a small scale operation simply does not provide a "living" for the entrepreneur. Alternatively, a small commercializing firm cannot make a positive profit because its costs are high given its small scale production. In this case, the firm cannot be in business for long and be successful in commercializing its new product. In order to examine the relationship between the cottage industry-based market equilibrium of a small commercializing firm and the situation where the potential for economies of scale exist, a comparative static partial equilibrium approach is applied in this thesis. The comparative static partial equilibrium approach deals with a particular commodity and assumes that effects of other markets are negligible and can be safely ignored in the analysis.

Figure 3.6 illustrates the first case in which a small firm makes a small profit, which is equal to the area ***a***, because a monopoly price P_m is a little higher than the average total cost of producing quantity Q_m. The firm can choose its price as its new product is unique, meaning it has no perfect substitutes. Thus, the firm has a downward sloping demand curve D^0 that is restricted to a cottage industry-sized market (e.g. a local or niche market). Each short-run average total cost[17] (SRATC) curve is drawn for a given plant size; from a plant size appropriate for a cottage industry having a short-run average total cost curve, $SRATC^0$, to a large plant size having a short-run average total cost curve, $SRATC^2$. The SRATCs exhibit economies of scale. Short-run average total cost curves and corresponding marginal cost curves (MC) have a 'U-shape' and show how costs vary if quantity of production varies.

[17] Note the firm's transaction costs are not included in the short-run average total costs (SRATC).

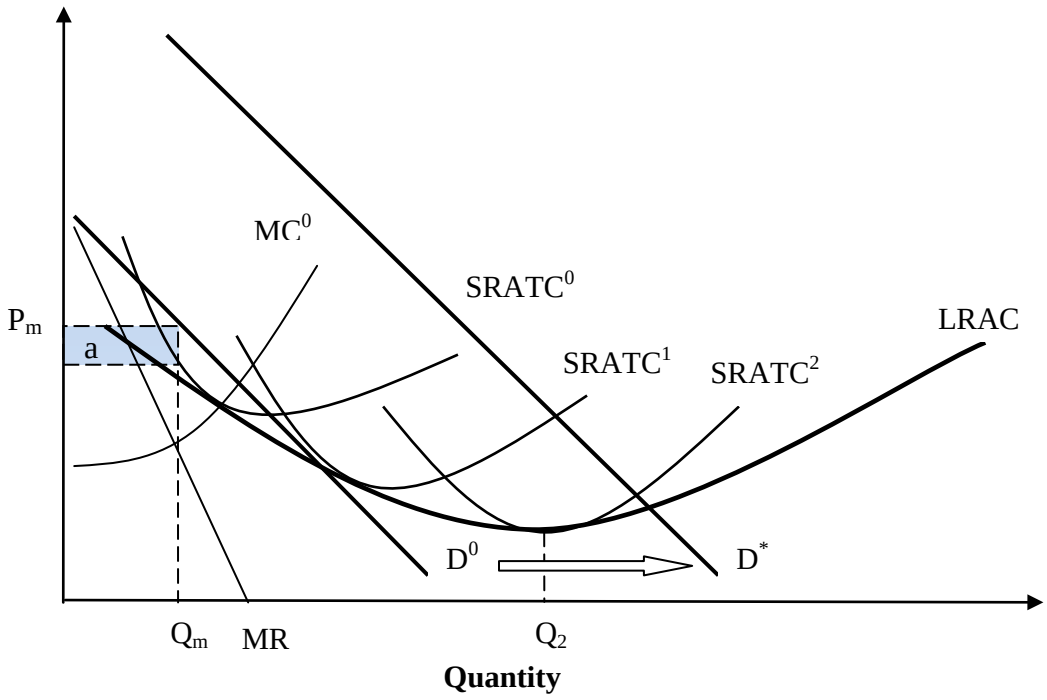

Figure 3.6 Case 1 - A low profit making firm and economies of scale

The long-run average cost curve (LRAC) encloses a series of short-run average total cost curves by being tangent to them (Ragan and Lipsey, 2005). The level of output at the tangency between each short-run average total cost curve and long-run average cost curve shows the level of output for which the plant size is optimal. Since most fixed costs such as managerial and administrative costs do not increase in proportion to the increase in production, the firm's long-run average costs fall until output reaches Q_2. Along the long-run average cost curve from the quantity Q_m to Q_2, the firm experiences economies of scale. The quantity Q_2 is the firm's most efficient scale where the firm attains its lowest possible average cost of production for the available technology and factor prices.

To justify the building of a facility with capacity to produce output Q_2, the firm must face a commercial market demand that includes a regional or national market's demand except for the demand of a cottage industry-sized market. This commercial market demand can often only be achieved by getting integrated into supermarket supply chains. In this regard, the firm needs to achieve the supermarket's derived demand for the new product, which is given by D^*, as the

supermarket's derived demand is the demand for its inputs. The supermarket's derived demand for the new product can be calculated by deducting all its costs and profits from consumer market demand for the product. However, the models assume that transaction costs associated with a new product have not been deducted from the supermarket's derived demand for the new product. Thus, the firm should aim to reach the quantity Q_2 where it realizes all of its available economies of scale and is able to enter a fully commercial market, escaping the limits of a cottage industry-sized market. If the firm increases its production scale greater than Q_2, the firm starts to experience diseconomies of scale due to rising costs. Production scales beyond the scale of producing Q_2 are known as the area of decreasing returns to scale or diminishing returns to scale.

The second case is depicted in Figure 3.7. Area ***b*** reflects the loss incurred by a small firm commercializing a new product because the average total cost of producing quantity Q_m is higher than the monopoly price P_m.

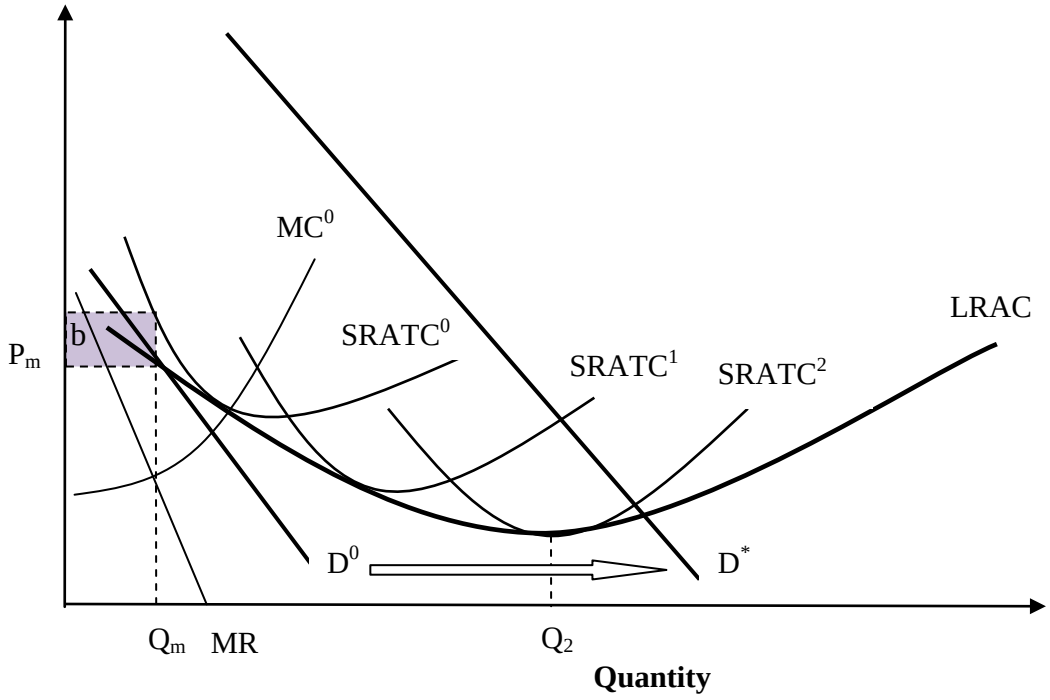

Figure 3.7 Case 2 - A loss-making firm and economies of scale

Similar to the previous case, the small firm cannot produce the quantity Q_2 in the small plant size they have in the early stage of commercialization. In case 2, the firm is not viable in its early stage of commercialization because a profit cannot be made given that the firm's optimal output is Q_m.

3.4 Modelling commercialization for small innovative firms

As mentioned in the previous section, the potential solution to both situations is to capitalize on economies of scale, thereby attaining a lower unit cost. As unit costs decline, the possibility of accessing commercial markets is enhanced. With small plant size, firms will never be able to supply the large supermarkets that purchase a large volume at a price that will be lower than the firm receives in a cottage industry-sized market. Indeed, a cottage industry-sized small firms' average cost of production is likely much higher than the price a supermarket offers.

From the perspective of supermarkets, they prefer to engage in transactions with a few large firms instead of a large number of small firms because of transaction costs. Indeed, supermarkets always seek ways to reduce their costs, thereby lowering prices to remain competitive in a market with aggressive rivals. As a result, large supermarkets also try to capitalize on economies of scale to effectively reduce transaction costs. Generally, supermarkets incur considerably higher transaction costs when handling a number of small suppliers than a few large suppliers since small firms usually supply a small volume. The volume can often only be supplied on an intermittent basis. In particular, supermarkets face high information costs if they must screen the reliability of all small suppliers and the quality of their products. They also face consistently high negotiation costs to write contracts with small firms. The monitoring costs of supermarkets tend to be much higher than the other two transaction costs because they have to pay more attention to food quality, safety and security to maintain consumer trust and royalty. Monitoring costs can be the costs of dealing with delivery delay, incorrect quantities, and quality control as well as enforcing standards, traceability, and labelling requirements.

Most transaction costs are fixed, which means such costs do not depend on the volume of a transaction. For example, supermarkets will spend relatively the same time and resources to

write contracts with suppliers regardless of how much they are going to supply. Accordingly, if the volume of supply increases, unit costs of transactions will decrease. Thus, supermarkets offer prices to their suppliers based on how much they pay for procuring products, including transaction costs and at what price they can sell these products in the market. In other words, supermarket's willingness to pay suppliers depends upon volume of supply. It is possible that a supermarket does not wish to enter into transactions with a supplier if the quantity supplied is not sufficiently large to reduce unit cost of the transaction to the point that generates an acceptable profit margin for the supermarket.

A supermarket's transaction costs and willingness to pay a supplier are shown in Figure 3.8. WTP_s is the supermarket's willingness to pay the supplier - it shows how much the supermarket is willing to pay at different quantities supplied by the firm.

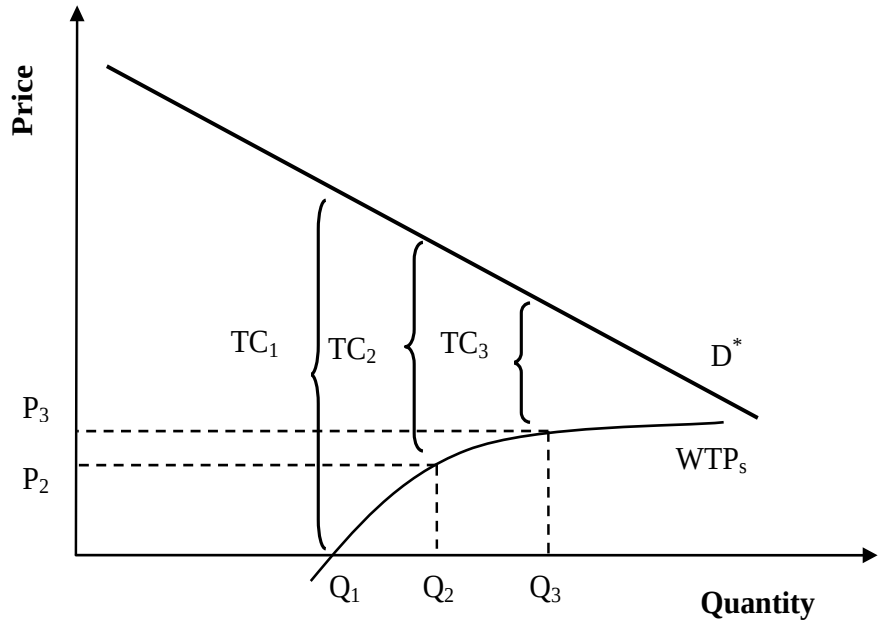

Figure 3.8 A supermarket's willingness to pay a supplier

The supermarket's transaction costs, TC, can be depicted by the gap between the commercial demand curve and supermarkets' willingness to pay the supplier. The supermarket will not offer

any price, even a low price, until the firm supplies the quantity Q_1 where the unit cost of transaction is equal to TC_1. From the point Q_1, the supermarket starts to offer a very low price for the product that rises little by little as the quantity supplied by the firm increases and, therefore, the unit cost of the transaction decreases. The unit cost of the transaction decreases from TC_2 to TC_3 when the quantity of supply increases from Q_2 to Q_3. Consequently, the supermarket's willingness to pay the supplier grows slightly from P_2 to P_3.

Figure 3.9 shows the economic model of commercialization by a small, low-profit making firm. It models how the firm can move from the early stage of commercialization in a cottage industry to the stage of full commercialization where it utilizes its available economies of scale. Average and marginal costs of the firm and transaction costs of the supermarket are also described in the figure.

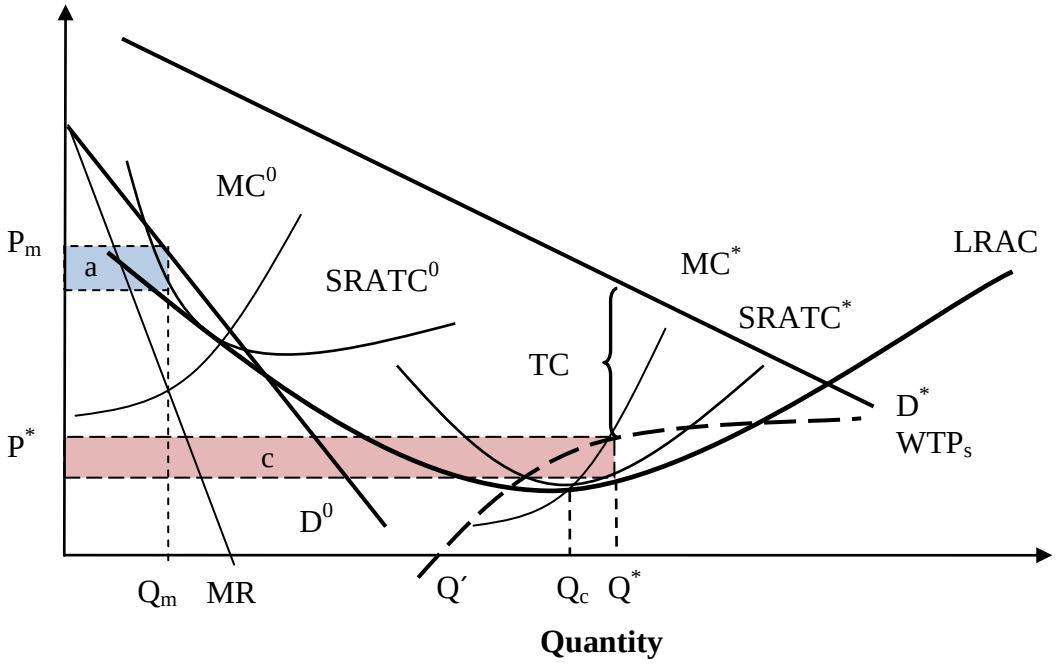

Figure 3.9 Case 1- Commercialization of a low-profit firm

The demand curve of the cottage industry, such as a niche market at which the firm is marketing its new product, is given by D^0. Utilizing all available economies of scale where the firm faces a

marginal cost curve, MC^*, and a short-run average total cost curve, $SRATC^*$, the firm is able to achieve sales levels that are defined by a supermarket's derived demand curve, D^*.

The firm cannot engage in transactions with a supermarket until it supplies the quantity Q´ because the supermarket's costs of handling this small quantity of transactions are very high. The firm also incurs transaction costs, for example, slotting fees, costs of complying with standards and supermarket requirements, when marketing its product through the supermarket chain in addition to the high unit cost of production. However, the firm's transaction costs are not included in the figure as these costs vary from firm to firm depending on their characteristics. If the firm supplies a large volume, its unit costs of transaction will also decrease.

The firm can attain its lowest possible average cost of production at Q_c - the optimal capacity of the firm's production facility where all available economies of scale have been realized. With the production facility of capacity Q_c, the firm can maximize its profit by producing the quantity Q^* where MC^* equals the price P^*, which the supermarket is willing to pay its supplier at the quantity Q^*. Accordingly, the firm can earn a supernormal profit[18], which is equal to the area ***c***. The supernormal profit is sufficient to provide the entrepreneur with a return to his/her entrepreneurial input thus justifying his/her continued interest in production.

If the firm increases its production facility size to a capacity larger than Q_c, its average cost of production will rise due to diseconomies of scale although its average transaction cost may decrease slightly. This, overall, will push the firm's average total costs including transaction costs up and lead to a loss. So the firm should aim to achieve the quantity Q^* to successfully commercialize its new product and realize a sufficient positive return.

The economic model of commercialization by a small, loss-making firm is depicted in Figure 3.10. The model shows how the firm can move from the early stage of commercialization in a

[18] Supernormal profit is a profit above the normal profit that is necessary to keep an entrepreneur in his current business (Black, Hashimzade, and Myles, 2009).

cottage industry to the stage of full commercialization where it utilizes its available economies of scale. It also illustrates average and marginal costs of the firm and transaction costs of the supermarket. The relationship among these terms can be explained in the same way as case 1. However, this firm faces more challenges than the firm described in case 1 to achieve its intended quantity Q^* and, thus, has to devote more efforts to it. Similarly, when the firm has the production facility with capacity of Q_c and produces and supplies the quantity Q^*, it can make a supernormal profit equal to the area ***d***.

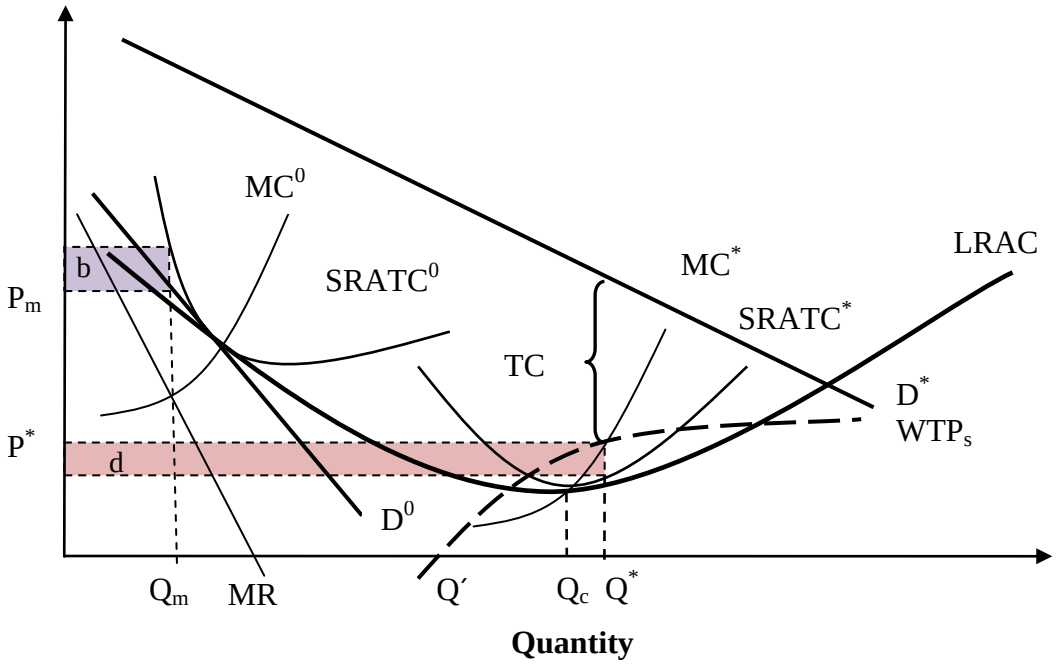

Figure 3.10 Case 2- Commercialization of a loss-making firm

While exercising economies of scale, the firm may also further enhance its profitability through increasing the supermarket's willingness to pay. In other words, the firm may influence the supermarket's price by taking some actions to reduce the supermarket's transaction costs. For example, the firm could introduce a more reliable delivery schedule that reduces the supermarket's risks of delayed inputs and uncertainty or a quality control system that lowers the supermarket's costs of screening the quality of the product. As these kinds of costs, which are mostly fixed, are removed from the supermarket's total transaction costs, the unit costs of transactions will be lower for all volumes of supply. This makes it possible to shift up the

supermarket's willingness-to-pay-a-supplier curve. However, these kinds of efforts to reduce the supermarket's transaction costs are likely to increase the firm`s own transaction costs. Therefore, the firm has to make their decisions weighing the increase of the supermarket's price and the costs of the efforts.

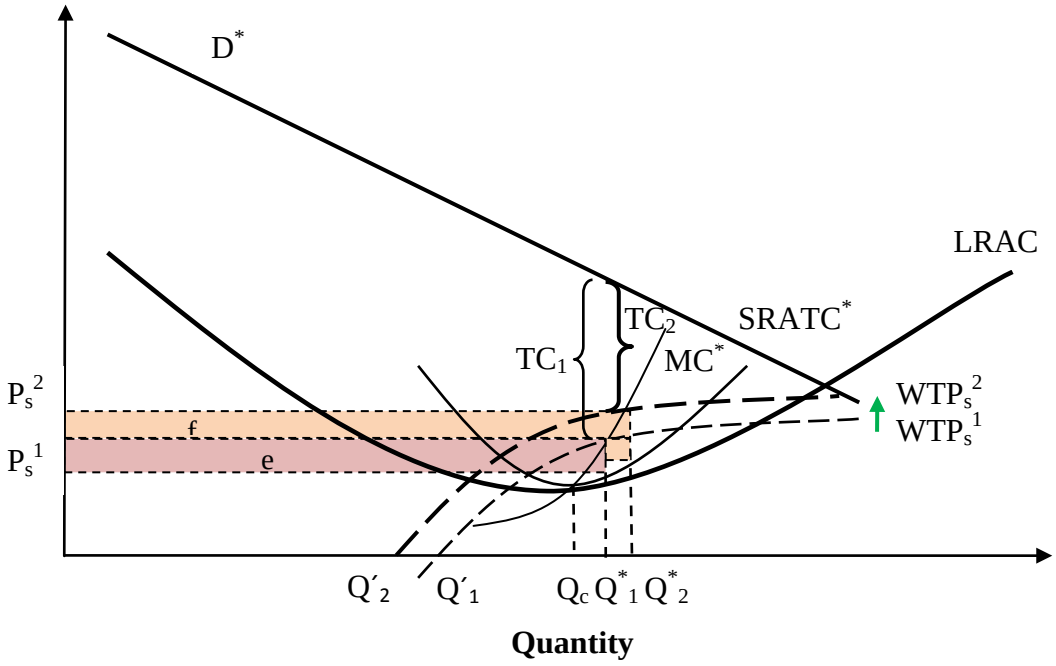

Figure 3.11 A supermarket's willingness to pay a supplier

Figure 3.11 describes a shift in a supermarket's willingness-to-pay-a-supplier curve as a result of changes in the unit cost of a transaction. The firm that has the production facility of capacity Q_c generates the profit equal to area *e* at the profit maximizing quantity Q^*_1 before taking measures to decrease the supermarket's transaction costs. If the supermarket's total transaction costs decrease, the unit costs of the transactions will go down for all volumes of supply and, hence, the curve depicting the supermarket's willingness to pay the supplier moves up from $WTPs^1$ to $WTPs^2$. Specifically, the supermarket's unit cost of the transaction associated with handling Q^*_1 goes down from TC_1 to TC_2, which raises the supermarket's willingness to pay the supplier from Ps^1 to just below Ps^2. Consequently, the firm can increase its profit to area *f* by supplying Q^*_2 at the price Ps^2 where it maximizes its profit.

3.5 Challenges of commercialization

These two cases suggest that small commercializing firms can be successful in marketing their new products in a commercial market by capitalizing on economies of scale. Economies of scale make it possible to attain the lowest average costs of production. However, in practice, how to achieve that scale of production is the "big question" asked by many small agribusinesses. Basically, they have to overcome challenges of commercialization, particularly those associated with achieving economies of scale and accessing supermarket chains. Based on the literature review and the commercialization models of small firms developed in this chapter, three major challenges associated with commercializing via retail chains are identified and listed in Table 3.1. Each challenge includes particular barriers that contribute to the challenge.

The first challenge is that a small firm needs to increase its production scale to meet retail requirements (e.g. from Q_m to Q*). This challenge can be comprised of many barriers, for example, lack of financial and human capital and high costs of commercialization. Both lack of internal funding and limited access to credit are major barriers for small agribusinesses, particularly the firms that are making a loss compared to the firms that could finance some, even a small part, of the commercialization costs with their small profits. Lack of human capital such as unavailability of qualified personnel who perform tasks associated with engineering, managing and planning a large plant as well as the manager's poor managerial skills and knowledge of marketing blocks successful commercialization.

High costs of commercialization such as investments in building a larger production facility are another barrier that raises risks and makes lenders reluctant to provide credit to small agribusinesses. The high failure rate in commercialization of new products also deters private investors from investing in risky ventures like small, commercializing agribusinesses. Therefore, small agribusinesses may not attract venture capital investments. Given these barriers, the time to reach the profitability threshold of volume Q* increases, which reduces the firm's ability to generate profits.

Table 3.1 Challenges and Barriers to Commercialization

CHALLENGES AND BARRIERS	
1. INCREASING PRODUCTION SCALE	
1.1. Lack of financial capital	
1.1.1. Lack of internal funding[(c)]	
1.1.2. Limited access to credit[(a,b)]	
1.1.3. Lack of venture capital	
1.2. Lack of human capital	
1.2.1. Lack of qualified personnel[(c)]	
1.2.2. Lack of knowledge of management, marketing, and entrepreneurship	
1.3. High costs of commercialization	
2. ACCESSING COMMERCIAL MARKETS	
2.1. High unit costs	
2.2. High transaction costs	
2.3. Changes in regulations and un-harmonization of private standards[(c)]	
2.4. Low opportunity of partnering[(c)]	
2.5. Lack of knowledge or experience of the industry[(c)]	
3. DEFINING THE OPTIMAL PRODUCTION SCALE	
3.1. Risks of uncertain demand for innovative products[(c)]	
3.2. Lack of knowledge of the market[(c)]	

Source: [a] Hobbs, Cooney, and Kerr 2000; [b] Industry Canada 2006; [c] Uhrbach 2009

Accessing a commercial market is the second challenge. Generally, the unit cost of production is not low enough compared to the low price the firm receives from the supermarket. In figures 3.9 and 3.10, the small firms can make supernormal profits once they reach the optimal production scale Q_c and supply profit maximizing output Q*; however, these models do not include transaction costs associated with marketing through supermarkets – costs that may raise the unit cost of the products significantly for firms. Changes in regulations and lack of harmonization of private standards pose a further barrier by raising the firms' transaction costs. For instance, if supermarkets impose different standards that require investments specific to a particular

supermarket, firms' transaction costs will rise due to risks of asset specificity. Accordingly, high costs of production and transaction costs hinder small agribusinesses' ability to partner with supermarkets that are very concentrated and have market power to push prices down. This is clearly shown in the figures 3.9 and 3.10 in which the small firms have almost no opportunity to engage in transactions with supermarkets except for supplying at least the quantity Q_c.

Defining the optimal production scale is the third challenge. This challenge incorporates barriers such as risks of uncertain demand for innovative products and lack of knowledge of the market and industry. It is hard to determine the demand for new innovative products because there are no consumer experiences, statistics and studies available upon which a reliable projection of demand can be made. This also raises the firm's information costs. As a result, commercialization of new products involves high risks. For instance, there is a possibility of errors in forecasting expected sales and thus optimal plant size. On the other hand, small agribusinesses lack adequate understanding or knowledge about the market and industry, which creates barriers to successful commercialization. For example, without the adequate knowledge or understanding of consumer needs and preferences small agribusinesses could make an unreliable projection of demand, target inappropriate markets or consumers, and produce products with unacceptable quality.

Importantly, Table 3.1 can be used as a checklist by small agribusinesses prior to commercializing their new products. The commercialization checklist may help small agribusinesses to understand the challenges and barriers to commercialization and, thus, to find ways to overcome the challenges.

3.6 Conclusions

The two economic models of commercialization that determine how small agribusinesses could achieve commercial markets from the early stage of commercialization through realizing available economies of scale are developed. In the early stage of the commercialization of new food products, small innovative firms are often restricted to a cottage industry-sized market,

selling a small volume. The models are based on the assumption that commercial markets can be achieved by taking advantage of economies of scale.

Moreover, the commercialization checklist designed for small, start-up agribusinesses is developed. Based on the commercialization models and the literature, three main challenges of commercialization such as increasing production scale, accessing the commercial market, and defining optimal production scale were identified in the checklist. Increasing production scale is the primary challenge for small innovative agribusinesses because it provides the base for overcoming two other challenges. To effectively utilize available economies of scale and determine their optimal production scale, small innovative firms need at first to forecast their expected sales volume – a speculative process at best. It is a major challenge due to uncertain demand for innovative products and raises their information costs. Also, small commercializing firms likely have to deal with the reluctance of large supermarkets given the low prices they are willing to pay and the high requirements if the firms are to gain access their supply chains.

Supply chain theory and transaction costs economics help explain the challenges of commercialization. Transaction costs play a significant role in supermarkets' decisions with respect to the prices they are willing to pay as well as in small firms' decisions when attempting to access supermarket chains to distribution their products. As supermarkets' transaction costs associated with engaging in transactions with commercializing firms decline, their willingness to pay their suppliers is likely to increase. What can a small commercializing firm do to enter the commercial supply chain? It is probably necessary for the firm to increase its production capacity to the level where it utilizes available economies of scale and receives a price from supermarkets which allows it to make a profit. This level of production may make it possible to generate a sufficient profit to maintain a firm's sustainability in the long run. Finding ways to lower the transaction costs associated with entering supply chains is also likely required. Hence, the transaction cost approach is applied to analyze case studies on commercialization of small agribusinesses. Achieving economies of scale means that building a much larger production facility than was suitable for a cottage industry-sized market. This may entail considerable financial challenges and risks.

In addition to paying more attention to transaction costs, supply chain management needs to be considered when analysing how to reach the output that enables a firm to achieve integration into commercial supply chains. An understanding of the principles of supply chain management assists small agribusinesses in finding ways to enter formal supply chain relationships as potential partners.

CHAPTER 4: ANALYSIS OF COMMERCIALIZATION IN SMALL SASKATCHEWAN AGRIBUSINESSES

4.1 Introduction

In this chapter two case studies of small Saskatchewan agribusinesses are presented. Prior to introducing the cases, the methodology for the case studies is discussed. A case study is an accepted approach for qualitative research to analyze research questions in depth and provide researchers with an opportunity to choose various methods for data collection. Data for the case studies were collected through interviews and reviews of written documents. In accordance with pre-prepared questions, semi-structured interviews were conducted with the president and the manager of two food processing companies to document their commercialization performance and reveal the factors influencing the successes and failures of commercialization.

Two cases are reported in detail including the introduction of the companies, information about the industries they were involved in, and the development and commercialization of new products. Following descriptions of the cases, a case study analysis is discussed in the context of the economic models of commercialization and proposed challenges of commercialization, drawing upon supply chain theory and transaction cost economics.

4.2 Methodology

A case study approach is employed to research the successes and failures of commercialization in small Saskatchewan agribusinesses. Denscombe (2003) notes that “case studies focus on one case (or a few cases) of a particular phenomenon with a purpose of providing an in-depth account of events, relationships, experiences or processes occurring in that particular case” (p. 32). Unlike other approaches such as a survey, the case study approach covers a small number of observations or cases and studies research questions as they naturally occur without introducing artificial changes or controls (Denscombe, 2003).

The strength of the case study approach includes the use of a variety of methods for collecting data depending on the circumstances and the specific needs of the situation (Denscombe, 2003). There are four major methods of gathering data for case studies: interviews, questionnaires, observation and review of documents. A good case study should include multiple sources of evidence (Yin 1994). Interviews are one of the most important sources of case study data. The range of available interview techniques includes structured, semi-structured, unstructured, one-to-one, group interviews, and focus groups (Denscombe, 2003). Structured interviews involve tight control over the format of the questions and answers and the pre-determined form of the answers make it easy to analyze (Denscombe, 2003). Semi-structured interviews also have a clear list of questions or issues to be discussed, but the answers are open ended and thus the interviewee is allowed to elaborate on points of interest (Denscombe, 2003). In this regard, semi-structured interviews are conducted to reveal the factors influencing the success and failures of commercialization. Yin (1994) also suggests that audio recording of the interviews may be more effective for interpreting responses accurately.

Questionnaires consist of a written list of questions designed to collect information about the points with which the research is interested (Denscombe, 2003). Information collected through questionnaires can be used as data for analysis. Alternatively, observation draws on the direct evidence from events rather than relying on what informants tell the researcher (Denscombe, 2003). Two types of observation used in social sciences are systematic and participant observation. While systematic observation is associated with social psychology and produces quantitative data, participant observation is mainly associated with sociology and anthropology and usually produces qualitative data (Denscombe, 2003). Finally, documents are an important source of data and of which written documents, such as books and journals, website pages and the internet, newspapers and magazines, records, letters and memos, diaries, government publications and official statistics, are commonly used in social sciences (Denscombe, 2003).

Of these, methods of interviews and reviewing written documents are used to collect data for this study. With flexibility of questions and open-ended answers, semi-structured interviews provide an opportunity to gather qualitative and case-specific information that cannot be obtained by questionnaires. The observation method is not suitable for this study because the economic

outcomes of a long commercialization process that occurred in the past are analyzed in the case studies. Hence, semi-structured interviews and follow-up interviews were conducted in this thesis with the managers of two food processing companies in Saskatchewan. The interviews followed a set of questions (Appendix B) designed to document the companies' commercial performance in the marketing of new products and further to reveal the factors influencing the successes and failures of commercialization by small agribusinesses. The questions posed to the interviewees were intended to guide the participants and to garner their lessons and thoughts on commercialization strategies and integration into supermarket chains. The interviews were semi-structured; allowing the interviewees to elaborate points of interest and, thus, in some cases, the discussion strayed from the expected scope of the interview questions depending on the nature of the response. Also, available written documents about the companies and industries are reviewed to further provide evidences for the case studies.

In order to achieve the research objective of analyzing factors affecting the successes or failures of commercialization by small agribusinesses, the criteria that the participants' companies should be small-scale and have commercialized, or attempted to commercialize, new food products within the last decade were used. From a membership directory of the Saskatchewan Food Processors Association (SFPA)[19] a few potential companies were identified. However, upon reviewing business plans prepared by students at the University of Saskatchewan, two companies were contacted by phone notifying them of the researcher's intent to contact the organizations' personnel for an interview and were selected based on their acknowledgement and consent of the interview request. A template of the interview consent form is included in the Appendix A. Confidentiality was promised to all research participants[20]. The researcher approached the participants individually in order to limit any feelings of coercion to participate or not participate. The interviewees permitted the interviews to be audio recorded. The audio recording

[19] Saskatchewan Food Processors Association is a non-profit organization formed by food processors with the objective of supporting food processing through providing its members with management and marketing programs and services (SFPA, 2011).

[20] Approval of the study's procedures for data collection, use, and storage as well as protecting confidentiality of research participants was granted by the University of Saskatchewan's Behavioural Research Ethics Board on November 9, 2010.

was used is assisting the researcher in interpreting responses accurately. The interviewees were allowed to decline to answer any particular question(s).

4.3 Case studies

Two case studies of small Saskatchewan agribusinesses, Classic Meats and Canadian Prairie Lamb, were undertaken. The personal interviews were conducted with the president of Classic Meats and the general manager of Canadian Prairie Lamb between November and December, 2010. Responses from the interviews were reported in a case study format.

4.3.1 Classic Meats

Introduction

Classic Meats was established in south western Saskatchewan in 2004 to introduce a value added meat product to the North American market. The company brought to the Canadian market a relatively innovative product - “meat on a stick”. It is a virtual company and thus contracts out its processing to co-packing plants. The president is a majority owner of Classic Meats. The company has two other partners who have shares and provide financial advice and assistance.

Snack and convenience food industries

As its products can be used as snacks or meal replacement, the company competes in both the snack and convenience food industries. Competition in the snack and convenience food industries is intense so that effective marketing strategies based on branding, advertising and promotion, effective distribution, product quality, and price are crucial for successful commercialization (AAFC, 2007). In particular, promotion and shelf placement play important roles because snack and convenience foods have very low brand loyalty (AAFC, 2007). Notwithstanding increased competition, production has been increasing (AAFC, 2007). For example, as measured by manufacturing shipments, the output of the snack food industry in Canada grew by over 60% from $1 billion in 1995 to $1.64 billion in 2003 (AAFC, 2007).

Further, the industry provides high value added products to the economy. In 2003, value-added in the snack food industry was about 60% of the total value of shipments, which was much higher than the 35% average for the food and beverage sector over the same period (AAFC, 2007).

Canada has over 25,000 convenience stores that traditionally sell fuel and tobacco in addition to food products (AAFC, 2010). Typically, fuel sales account for 60% to 70% of their total sales, while cigarettes and groceries sales both account for 15% of total sales (AAFC, 2010). As a result of general decreases in tobacco sales sector-wide, the industry is paying more attention to the grocery segment and specifically focusing on attracting the under 30 year old consumers who usually seek convenience (AAFC, 2010).

Having realized the potential of the convenience stores, distributors and wholesalers are beginning to consider small growers, packers and producers as key suppliers (AAFC, 2010). Indeed, independent convenience stores can compete effectively because of superior locations and by offering specialized products, like fresh and pre-cooked foods. Hence, convenience stores may be an excellent distribution channel to introduce new fresh foods given their customers' loyalty (AAFC, 2010).

Development of the product

The president of Classic Meats had worked on a meat quality project with an Australian group for 15 years. The objective was to add value to meat products. He then came up with an idea for producing a snack product from meat. Starting in 2003, he has worked on developing and bringing this product to the Canadian market.

The president of the company talked about his new product with personnel from the Saskatchewan Food Processors Association and a team was designated to conduct market research on the viability of the product. The president said that the team found that there could be considerable potential for the product in the North American market because at that time there was only one similar product, namely pork on a stick, in the US.

Consequently, he brought his idea to the Food Centre[21] at the University of Saskatchewan. They agreed to assist in developing the new product. The president and his partners named the new product New York Stick (N.Y. Stick) because they considered the product has the same quality as a New York Steak. The Food Centre developed the first N.Y. Stick, Spiced Beef. Since raw products were purchased and supplied by Classic Meats, the Food Centre charged only for equipment and labour.

The N.Y. Stick is fully-cooked meat on a stick, frozen, and vacuum-packed and is microwaveable. The product can be used as a snack or meal for some time-pressed consumers to eat on the run, which makes the product innovative. The product is most suitable for convenience stores as it is pre-cooked and is ready to eat in about 45 seconds when heated in a microwave. It is higher in protein than most other snacks and ready-to-eat products such as sandwiches.

The president indicated that the N.Y. Stick has been well received by consumers. For instance, according to a survey conducted by the Delta Force Marketing Team[22] in 2006, 90% of a total of 97 consumers in Saskatchewan, who sampled the N.Y. Stick, found the product good to excellent while 63% indicated that they would buy it again (Bauche et al., 2007). Also, the president of the company tested consumer acceptance of the products by giving his products to a few convenience stores and truck drivers along the highway in Saskatchewan. The president said that he always got positive feedback.

After attending a trade show in Toronto, Ontario in September 2004, the president realized that it was impossible to find distributors and/or retailers willing to carry only one product due to the large transaction costs associated with single product lines. Therefore, he asked the Food Centre to develop other products with different flavours and made of different kinds of meat.

[21] Saskatchewan Food Industry Development Centre Inc. (Food Centre) is a non-profit organization established as a partnership between Ministry of Agriculture, the Saskatchewan Food Processors Association and the University of Saskatchewan and provides food processors one-stop, full services to assist in the development of new food products (Food Centre, 2011).

[22] Delta Force Marketing Team is a group of students at the University of Saskatchewan who carried out the survey during a course on AgEc 347.3- Agribusiness Marketing Management.

Eventually, three more N.Y. Stick products: BBQ Pork, Southwest Chicken, and Mediterranean Chicken were developed.

As of the end of 2010, Classic Meats had spent around $250,000 on product development and marketing. The president and his partners financed half of the development cost and this funding was dedicated to the development of Spiced Beef. According to the president of Classic Meats, the remaining funding was sourced through provincial government grants for product development through the Agricultural Council of Saskatchewan.

Commercialization

After having overcome the challenges of nutritional value, labelling, and packaging, they believed the product was ready to go to market. However, Classic Meats faced the much greater challenge of getting into the commercial market.

While N.Y. Sticks were being made at the Food Centre, the representative of a national food distributor saw the products and was interested in discussing distribution of the products. Hence, in July 2004 the distributor met with the president of Classic Meats and expressed their interest in distributing N.Y. Sticks into their client convenience stores across Canada. According to the president of Classic Meats, the distributor was willing to pay 10% less than a local grocery store – a client of Classic Meats. As such, the distributor would sell N.Y. Sticks to the convenience stores, at a mark-up of about 55%. Once the product was sold to the distributor, the distributor would be responsible for marketing and, thus, store shelving fees. However, the owners of the company believed that they could market their products themselves and, thus, declined the offer.

A small chain of convenience stores in Newfoundland and Labrador (NL) wanted to carry N.Y. Stick products in 2005. However, Classic Meats would have incurred large transaction costs in addition to high marketing costs of advertising and promotions. Expected transaction costs included transportation costs relative to other marketing channels, shelving fees, potential damage loss during transportation, a risk of delivery delay, and the president's travel costs, etc. For example, Classic Meats had to pay shelving fees of approximately $6,000 to get onto the

listings of the stores. Hence, the president indicated it was impossible to accept the offer due to high marketing and transaction costs.

In May 2005, one of the largest food distributors in western Canada wanted to take the trademark of N.Y. Stick exclusively, paying a small royalty on each stick sold. They were afraid that once the distributor had the trademark, it could make similar products modifying the formulations of N.Y. Sticks and not pass on the royalties. The main problem was how to balance the future returns from the products and control over the products. Classic Meats did not want to lose control of the products and, therefore, refused the offer. At that time, the company lacked experience and legal advice. Later on, they realized that they could have made a good contract that secured sustainable returns from the trademark by specifying a particular volume that needed to be sold each year for a certain period.

The president of Classic Meats talked to a couple of the store managers of an international convenience store chain about stocking N.Y. Sticks. In 2007, N.Y. Sticks were carried in five stores of the chain in Saskatchewan (Bauche et al., 2007). The retail price was twice that paid to Classic Meats (Bauche et al., 2007). Since the sales volume was not large, the president of Classic Meats decided to meet with the president of the Canadian chain in an attempt to expand sales. The president of the national chain expressed an interest in carrying the products. The president of Classic Meats subsequently submitted a proposal to the provincial president of the chain to distribute N.Y. Sticks throughout Saskatchewan. Unfortunately, the provincial president refused his proposal because he overstepped the boundaries of the company's management by selling to those stores in Saskatchewan without first talking to the Saskatchewan president. The president of Classic Meats emphasized that if you want to introduce new food products, be aware of the appropriate way in which to approach a company that respects the potential customer's business model, otherwise your relationship with the company can be destroyed.

In 2007, a business plan was completed for Classic Meats by students of the University of Saskatchewan. The business plan examined the financial viability of expansion if Classic Meats accepted the offer of the national food distributor, who wanted to distribute N.Y. Sticks to

convenience stores throughout Canada. The business plan assumed that Classic Meats contracted with the Saskatchewan Toll Processing facility[23] to produce the products and 70,080 sticks would be sold in each year. The forecasted result indicated that Classic Meats would lose money over the next ten years (Bauche et al., 2007). It was determined that the total revenue the company would earn could only cover the cost of goods sold, but not the administration, marketing and general expenses. In particular, the unit costs of N.Y. Sticks made up over 80% of the sale price to the distributor and would be about 130% over the sale price if it included administration, marketing and general expenses (Bauche et al., 2007). Hence, the price Classic Meats would receive from the distributor was too low to cover costs and even to make positive returns unless a larger volume than was assumed could be sold.

Nevertheless, Classic Meats sold to the national distributor at that price for a short period. N.Y. Sticks were distributed to convenience stores located in Saskatchewan and Ontario, but sales were not as large as expected. The reason for this failure is still unclear. Given the perceptions of the products by consumers, the reasons for the poor sales may relate to an ineffective marketing program in attracting new consumers and/or lack of effort by the distributor in marketing the products. The president of Classic Meats believed that with a large volume they could reduce the unit costs of the products to the level that generated a sufficient profit at the price offered by the national distributor.

Another food distributor in Saskatchewan distributed N.Y. Sticks for a short period, but sales were also not strong, likely because the distributor did not have enough storage and trucks with coolers to accommodate a large volume. Further, it appeared that the stores the distributor sold to did not make any effort to sell the products. Specifically, the president indicated that the advertising signs promoting N.Y. Sticks provided by Classic Meats were not displayed in some of the stores when he stopped by. Indeed, N.Y. Sticks are not as visible as shelf stable products

[23] Saskatchewan Toll Processing Centre (STPC) established by the Saskatchewan Department of Agriculture and Food operates within the facility of Thomson Meats Ltd. (TML) located in Melfort, Saskatchewan to provide start-up meat processors toll processing services.

because they need to be placed in a freezer. Therefore, advertising signs were essential to inform customers that a new product was available.

As the Food Centre could only produce small volumes of N.Y. Sticks, Classic Meats contracted with the Saskatchewan Toll Processing facility in 2008 to produce N.Y. Sticks in a larger volume. A few batches of sticks of each flavour were produced, but there were problems with the production process. For example, the colour of the products was pale and the taste was not the same as the original flavour developed in the Food Centre. Since the packaging was not sealed, these products could not be sold and, thus, were given to the Food Bank. As a result, a lot of money was wasted, which put a further burden on the firm's finances.

Classic Meats has supplied, for most part, a cottage industry sized market since the introduction of N.Y. Sticks. In particular, it sold to a local grocery store, which marked N.Y. Sticks up by 150%. However, the price in the cottage industry sized market only covered unit costs of the products and did not generate a sufficient return for the owners of Classic Meats after marketing, administration and general expenses. Indeed, the sales volume at this cottage industry sized market was not large enough to lower unit costs. For instance, the sales at the grocery store were about 800 to 1200 sticks a month.

Classic Meats is temporarily inactive. The owners of Classic Meats have not lost hope and see there is a large potential for N.Y. Sticks at a commercial scale. The next step for Classic Meats is to write a proposal for an "angels' network"[24] to bring some angel investors - wealthy individuals who invest in new start-up ventures - into this business.

[24] An angel group or network is formed by individual angel investors to assess investment opportunities, share their expertise and decision-making about investments, and pool their capital (Wiltbank and Boeker, 2007).

4.3.2 Canadian Prairie Lamb

Introduction

Canadian Prairie Lamb (CPL) is a company that was established by the Saskatchewan Sheep Development Board (SSDB) and active sheep producers in 2001. The company is governed by its shareholders and the board of directors. Saskatchewan sheep producers comprise approximately 90% of the shareholders with the remaining 10% located throughout western Canada, while the SSDB held a different class of share (Lawrence et al., 2006). The SSDB has a provincial mandate for industry development and supports market development, promotion, extension education and producer seminars, funded by sheep producers (SSDB, 2011b). CPL was created with the objective of increasing Saskatchewan sheep producers' returns through producing value added lamb products. It is a virtual company that contracts out processing of its products to co-packing plants.

Lamb and pre-prepared food industries

Canada produces only 40% of its total lamb consumption while the rest is imported, primarily from New Zealand and Australia (CLC, 2011). Canadian consumption of lamb is significantly lower compared to other meats. For instance, per capita consumption of lamb in Canada amounted to 0.45 kg/person in 2008 whereas beef and pork consumption amounted to 12.41 kg/person and 9.72 kg/person, respectively (CMC, 2008). Canadian lamb production is decreasing gradually while consumption of lamb products is growing by 5% a year and tends to be larger with new immigrants from countries where lamb has a large cultural presence in the diet. Prices of lamb have been high for the past few years and are expected to be maintained in the near future (SSDB, 2009). The growing demand for Canadian lamb, largely from select immigrant communities, coupled with the decline in supply has contributed to higher prices. Consequently, lamb production is likely to decrease further as producers have a tendency to market their replacement ewes for profit because of strong prices (SSDB, 2009).

Saskatchewan is the fourth largest sheep producer in Canada (SSDB, 2009). Statistics Canada's semi-annual survey estimated that on January 1 2011 there were 90,000 head of sheep including

49,800 ewes and 37,800 lambs on Saskatchewan farms (Saskatchewan Ministry of Agriculture, 2011). This was a 2.9 percent increase from the same period of the previous year. With an average of 60 ewes, there are 1,000 flocks registered with the SSDB; however, there are also some unregistered flocks (SSDB, 2011a). As there is no federal slaughter plant in Saskatchewan, most lambs are transported out the province to be slaughtered (SSDB, 2011a). This reduces value added activities in the sheep industry in the province and, therefore, CPL wished to produce value added lamb products.

Development of the product

The SSDB initiated the idea of producing pre-prepared lamb products and started market research in 1999. In 2001, CPL applied for funding to finance product development and commercialization from the Saskatchewan government and received funding matched by sheep producers' contributions.

The Food Centre at the University of Saskatchewan developed recipes for its products and assisted in satisfying all the federal and provincial requirements including packaging and labelling. Raw products such as lamb trim were purchased from a federally inspected lamb slaughtering facility in Alberta and shipped to the Food Centre. CPL produced and sold eight products, namely Kabobs, Parmesan Lamb Meatballs, Greek Style Lamb Meatballs, Tunisian Lamb Cocktail Sausages, Assyrian Lamb Sausage, Mediterranean Lamb Sausage, Roasted Garlic & Peppers Lamb Sausage and Moroccan Lamb in Orange Sauce (Lawrence et al., 2006). The products are derived from the lamb trim except for the Kabobs. The products are relatively new to most Canadian consumers, many of whom have no previous experience with cooking lamb. CPL offers an alternative to the traditional lamb market that consists primarily of unprepared cuts. Therefore, CPL felt that its pre-prepared products were suitable for new consumers and also consistent with the current consumer preferences for convenience foods. The general manager of CPL indicated that their products were well received by the customers in a survey conducted at the restaurants in Saskatoon where CPL distributed the products for the past few years.

Commercialization

Starting in 2001, CPL distributed its products to several small butcher shops and restaurants in Saskatchewan. In 2006, CPL negotiated an agreement to stock its products with one of the largest retail chains in western Canada. Towards the end of 2006, the business plan that aimed to expand distribution through the western Canadian retail chain was conducted for CPL by students of the University of Saskatchewan. The plan was expected to start from year 2007 and based on production being taken over by the Saskatchewan Toll Processing company. CPL's projected gross profit and net profit margins were calculated at 18.5 percent and 5.6 percent respectively, on average, during the first five years of the business plan (Lawrence et al., 2006). Accordingly, CPL tried to transfer its production to the Saskatchewan Toll Processing Company, but it did not succeed. The general manager of CPL said that the products were not produced properly according to the recipes. Therefore, the products were produced at the Food Centre. It does not have a capacity to handle commercial scale production. This made unit costs high although CPL did receive a premium price from the retailer as lamb was a specialty type of meat. Further, the retailer did not ask for any shelving fees.

The manager mentioned that their small production and small sales volume resulted in a narrow gross profit margin insufficient to cover required marketing costs. Since lamb products were relatively new for most consumers, there was a need for marketing activities such as advertisements, promotions, and demonstrations to introduce the products to consumers and maintain interest in the products. Therefore, the company needed to have a high margin to cover marketing costs. This could not be achieved without commercial scale production, which made it look for a commercial scale co-packing plant from other provinces. The company found the co-packing plant in Ontario; however, a supply of its raw product, in other words production of Canadian lamb, was not large enough. Clearly, cooperating with this co-packer would raise its transaction costs, particularly transportation costs.

There were a couple of other major retailers who expressed an interest in carrying the products in their stores, but they wanted to purchase a large volume and were interested in sourcing all of their lamb products from one supplier, such as racks and chops in addition to CPL's pre-prepared

lamb products. This would also have necessitated commercial scale production. One advantage for CPL was that these retailers would not charge any shelving fees to stock its products because of a shortage of Canadian lamb supply in the market compared to the demand. Moreover, CPL needed to source racks and chops from its supplier, the lamb slaughtering facility, in Alberta as well in order to provide a full range of lamb products to the retailers. This would have made the company more dependent on the supplier. However, the supplier could not supply the large volume needed for CPL to meet the retailer's demand.

As a result, the consistent supply of lamb has become a major barrier to commercialization of CPL's new products. CPL engages major retailers, feedlots and processors, but does not have enough producers who can consistently supply sufficient amounts of lamb. Sheep producers are generally small with a flock of 60 ewes on average (SSDB, 2011a). As the manager said, most sheep producers raise a few ewes along with cattle or other farming activities. One possible solution to coordinating supply could be to enter into contracts with producers for the delivery of a certain amount of their lamb production.

Another major problem was a lack of funding. CPL was financed by its shareholders such as sheep producers and the SSDB as well as a Saskatchewan government grant, but funding was not sufficient to cover costs. This suggests that even more funds will be needed to achieve large scale production and sales volumes. According to the manager, it was estimated to take 2 to 2.5 years to achieve the desired sales volume and $2 to $2.5 million will be needed for marketing. CPL cannot raise this much money just from its shareholders given the limited resources of a fairly small producer membership base of the SSDB. Therefore, it is likely that CPL will need to bring outside investors into the business or secure a loan.

Most importantly, CPL initially lacked knowledge of the food industry, particularly how supply chains work. It seems that CPL needed a well-functioning value chain to achieve commercial success as its supply of the raw product was dependent on sheep producers. Consistently, the SSDB has recognized the importance of establishing the value chain that delivered lamb products from producers to consumers (SSDB, 2009). The manager also stated that they may

need an advisory board that consists of experts from each link of the supply chain such as a retailer, a processor, a feedlot operator, a lawyer, an accountant, etc.

After staying in the supermarket chain for about 1.5 years, in 2008 CPL stopped its activity temporarily to assess their situation. The manager indicated that a change in approach would be needed to be successful, and that it was likely to take a long time to get the desired sales volume for the venture to be a commercial success. The manager pointed out that achieving the required sales volume that can generate a sufficient profit was the major challenge rather than accessing retail stores.

The descriptions of the case studies outlined in section 4.3 are used to analyze commercialization of Classic Meats and CPL within the theoretical framework in the next section.

4.4 Case study analysis

This section discusses the analysis of the case studies within the theoretical framework that was developed in Chapter 3. Challenges and barriers to commercialization faced by the two companies are elaborated in accordance with the commercialization checklist developed in Chapter 3. Also, the transaction cost approach presented in Section 2.4 is applied to identify possible transaction costs incurred by the companies.

4.4.1 Application of the commercialization models

The economic models of commercialization generally rely on the assumption that capturing economies of scale is the main way to attain commercial markets and, thus, full commercialization. As well, the commercialization models were based on two possible situations that small firms are likely to encounter in their early stages of commercialization. Case 1 represented small commercializing firms that make a small profit because of the high costs associated with a small-plant size and the limited demand of the cottage industry-sized market. Case 2 represented small commercializing firms that cannot make a profit due to high unit costs given small scale production and high marketing costs relative to production.

The commercialization model can be applied to illustrate successful commercialization by Classic Meats as CPL's commercialization does not fit the assumptions of the models. In fact, CPL could get initial access to a supermarket chain in its early stage of commercialization even though its production scale and sales volume were small. The company did achieve the commercial market, but it did not have sufficient funding to finance the required marketing costs to establish demand for its new products as well as could not increase its production due to a shortage of the raw product. Due to lack of financing, CPL could not undertake sufficient marketing to increase the demand for the products. CPL stopped its activity after distributing to the supermarket chain for about 1.5 years because it could not make a positive return and succeed in attaining a required sales volume.

Classic Meats commercialization of N.Y. Sticks generally follows case 2 where the firm makes a loss from its new product. Due to the products' attributes, the company targeted convenience store chains as its commercial market. As the competition in the market for snacks and convenience foods is fierce, Classic Meats could not successfully access the commercial market due to a range of hurdles that are postulated in this thesis.

Classic Meats initially marketed its new products in the cottage industry sized market, particularly at a local grocery store. It could not go beyond the early stage of commercialization. The company marketed a small volume of the products to a few stores of the international convenience store chain in Saskatchewan for a short period; however, it could not get access to the whole chain in the province. As expected, accessing supermarket or convenience store chains is challenging and it gets even harder if the company does not have personnel who know the food industry well.

A potential economic model of commercialization for Classic Meats is depicted in Figure 4.1. The model shows how Classic Meats can move from its early stage of commercialization in the cottage industry to the stage of full commercialization where it utilizes its available economies of scale and gains access to a convenience store chain.

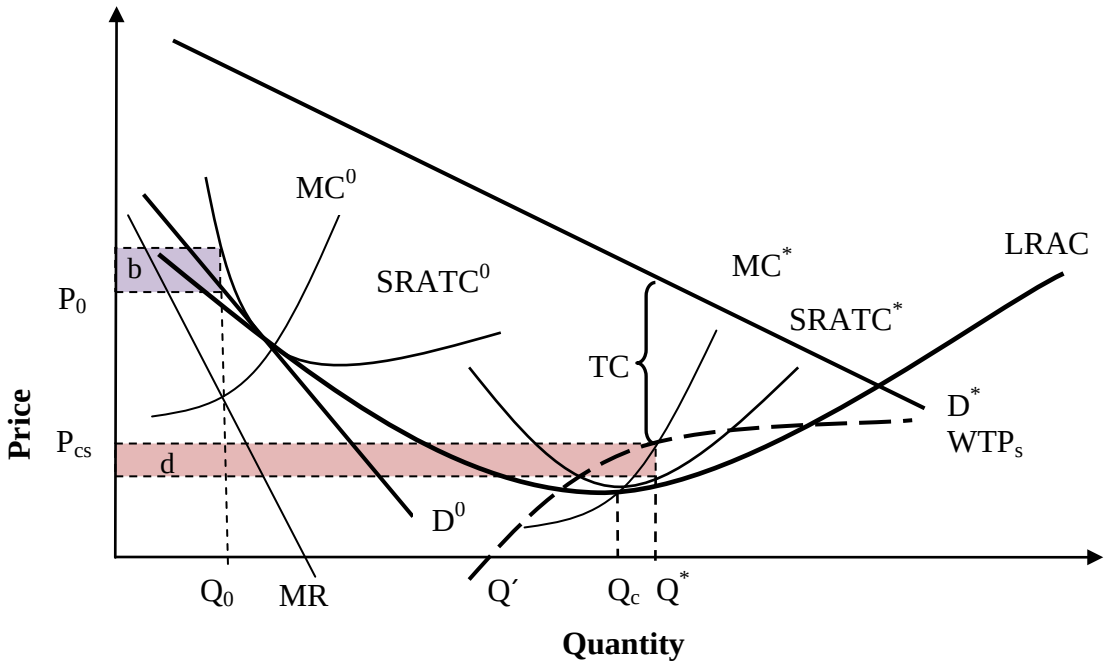

Figure 4.1 Commercialization model of Classic Meats

Facing the demand curve of the local grocery store, D^0, Classic Meats had a marginal cost curve, MC^0, and a short-run average total cost curve, $SRATC^0$, in the current cottage industry sized market. The company made a loss equal to the area ***b*** selling its products at a profit maximizing price, P_0. The unit cost of the product comprised of about 75% of the sale price to the store. Hence, given the small quantity of production, the price was insufficient to cover marketing costs, which was point-of-sales advertising through posters, as well as administration and general expenses that were opportunity costs of the owners' time and using resources belonging to the owners.

Its long-run average cost curve, LRAC, describes how costs vary with the changes in production scale in the long run. Due to transaction costs, the convenience store chain's willingness to pay the supplier, WTPs, does not coincide with its derived demand curve, D^*, and, thus, as in Chapter 3, transaction costs are illustrated in the model by the gap between D^* and WTPs. Utilizing all available economies of scale where Classic Meats faces a marginal cost curve, MC^*, and a short-run average total cost curve, $SRATC^*$, it is able to attain the sales volume Q^* that generates a supernormal profit equal to the area ***d***.

In the case of Classic Meats, they really lacked the experience and knowledge of the food industry so that to the route to access the commercial market was to use distributors. If Classic Meats sells to a distributor, the model can also be applied with a small modification. If Classic Meats sells to the convenience store chain directly, it will receive the convenience store chain's price, P_{cs}, which is equal to the convenience store chain's willingness to pay the supplier. Selling through the distributor is likely to lower the price the company could receive from the convenience store chain because distributors usually pay for marketing. As a result of a decrease in marketing costs, the company's $SRATC^*$ will move down. However, Classic Meats may face higher transaction costs in selling directly to the convenience store than selling to the distributor. Overall, the supernormal profit Classic Meats can earn will not change much as the economic model of commercialization does not consider the firm's transaction costs due to complexity.

On the whole, the model is applicable to show the commercialization challenges faced by Classic Meats and its potential pathway to full commercialization. However, if the company uses different marketing channels instead of directly selling to the supermarket, the model needs some modification.

4.4.2 Challenges and barriers to commercialization

Based on the literature review and the economic models of commercialization, Chapter 3 developed the commercialization checklist that consisted of three main challenges and corresponding barriers. Using the checklist, Table 4.1 summarizes what challenges and barriers to commercialization were faced by the two agribusinesses, Classic Meats and CPL. The table also includes three additional barriers: 1) high marketing costs; 2) lack of control over product quality; and 3) limited supply of the raw product. The last two barriers relate to coordination between up- and down-stream supply chain partners.

Classic Meats and CPL must increase their production scale to achieve successful commercialization. Increasing production scale requires considerable financial resources to be available, but both companies lack financial capital. Both companies did receive matching grants from the Saskatchewan government for their product development and launch although they

spent a significant amount of money from internal sources. Therefore, limited internal financial resources thwarted further expansion and commercialization.

Table 4.1 Commercialization Challenges and Barriers by Agribusinesses

CHALLENGES AND BARRIERS	Classic Meats	CPL
1. INCREASING PRODUCTION SCALE	✓	✓
1.1. Lack of financial capital	✓	✓
1.1.1. Lack of internal funding	✓	✓
1.1.2. Limited access to credit	✓	✓
1.1.3. Lack of venture capital		
1.2. Lack of human capital		
1.2.1. Lack of qualified personnel		
1.2.2. Lack of knowledge of management, marketing, and entrepreneurship	✓	
1.3. High costs of commercialization	✓	✓
2. GETTING INTO COMMERCIAL MARKETS	✓	
2.1. High unit costs	✓	✓
2.2. High transaction costs	✓	✓
2.3. Changes in regulations and un-harmonization of private standards		
2.4. Low opportunity of partnering	✓	
2.5. Lack of knowledge or experience of the industry	✓	✓
2.6. High marketing costs	✓	✓
3. DEFINING THE OPTIMAL PRODUCTION SCALE	✓	✓
3.1. Risks of uncertain demand for innovative products	✓	✓
3.2. Lack of knowledge of the market		
4. CASE SPECIFIC BARRIERS		
4.1 Limited supply of raw products		✓
4.2 Lack of control over product quality	✓	✓

Financing commercialization is very difficult because of the high risks of failure, and thus high costs. Successful commercialization requires large pre-launch and post-launch investments. Like many small companies in the early stage of commercialization, Classic Meats and CPL do not have production facilities; instead, they contract out their processing to co-packing plants. Without tangible assets that could be used as collateral it was difficult for them to obtain debt financing. Therefore, they need equity financing thereby bringing investors into their businesses. However, finding private investors could be also challenging given the high risks of commercialization projects.

Moreover, using co-packing plants helped the companies to lower start-up costs and made it easy to exit from the industry temporarily, but raised an additional barrier – lack of control over product quality. Indeed, both companies had problems with the product quality at the co-packing plant to which they attempted to transfer their production to scale up. This suggests that there was an inability to directly control the production process in this form of transactional relationship. As processing was not done by the companies, there was not much need of human capital. Nevertheless, for Classic Meats, it seems that they somewhat lacked the knowledge of business management and entrepreneurship as they did not realize the potential of some offers of cooperation when making key long-run market access decisions.

Accessing the commercial market was the challenge for Classic Meats, but not for CPL. Nonetheless, both companies suffered from not making positive net profit due to high production and marketing costs. Due to small scale production and sales volumes, the revenue of both companies hardly covered production costs and, therefore, not much money was left for marketing. In both cases, marketing costs put a high financial burden on commercialization since new food products require continuous post-launch advertising, demonstrations and promotions until they reach the required sales volumes. In addition, the companies faced significant transaction costs in their exchange relationships with retailers and distributors. Some possible transaction costs faced by the companies are discussed in the next section.

As suggested by the literature, Canadian food retailers are highly concentrated and, therefore, play major roles in their supply chains, having a lot of power over setting prices and selecting their suppliers. As a result of strong competition among retailers, large retailers want to keep their prices down and, thus, the prices they pay their suppliers. Specifically, the low prices of the large retailers caused the distributors to offer even lower prices to Classic Meats, which made its products nonviable given the high unit costs of production. The president of Classic Meats stated that the national distributor marked the products about 55% over the price paid Classic Meats while the retailers that carried N. Y. Sticks marked them up two to three times more. Hence, Classic Meats' opportunity of partnering with the convenience store chains was considerably limited due to the high costs relative to the low prices as well as the lack of experience and knowledge of the industry.

On the other hand, CPL did receive the premium price from the retailer, which was attributed to the limited supply of Canadian lamb products that gave CPL a little more bargaining power. CPL, however, still had a thin gross profit margin that was not sufficient to cover the required marketing costs. Despite its small size, CPL's opportunities for partnering were not particularly limited because there were not many domestic competitors with most of the competition coming from imports, primarily from New Zealand.

As both companies contracted out their processing to the Food Centre that was federally inspected, they did not worry about the federal and provincial regulations. Indeed, federal and provincial inspection and label and packaging requirements were fulfilled by the Food Centre. As long as mandatory requirements were satisfied, the retailers did not impose any additional private standards. Therefore, regulations and private standards were not an important barrier for the companies.

Both companies did have some knowledge of the market through their business plans as well as attending trade shows and testing consumer acceptance of the products. As a result, their products appeared to suit the current consumer demand and received positive feedback from consumers in marketing studies. Nevertheless, the lack of experience and knowledge of the food

industry was a major barrier to full commercialization by both companies. In particular, Classic Meats lost its chance to get accepted by the convenience store chain because they did not understand decision-making within the hierarchy of the chain. CPL recognized the advantage of developing an advisory board that consisted of experts from every part of the supply chain in order to broaden its knowledge of the industry and the market. This indicates that good cooperation is crucial to successful commercialization, through enhancement of the knowledge of the industry and the market.

Due to uncertain demand for new products, defining the right volume of production was a challenge for the companies in order to minimize costs, mainly transaction costs. Fixed costs per unit may drop if an increase in the volume of production is indicated by a reliable forecast of expected sales. Transaction costs can be associated with forecasting potential demand and a risk of error of forecasting expected sales. For instance, uncertain demand for N.Y. Sticks put Classic Meats at risk when projecting the expected sales and production so as to make decisions about entering into contracts with distributors or selling its trademark. As a result, a great deal of information, time, and effort would be required to draw up more secure contracts. However, even secure contracts still involve high risks due to bounded rationality[25], thereby raising transaction costs. Hence, high transaction costs and the lack of knowledge of the industry affected Classic Meats' decisions to refuse the cooperation offer and, therefore, slowed down the commercialization by increasing the time to reach a profitable volume. Facing the challenge of defining the optimal production scale, CPL will also face another challenge of ensuring a consistent supply of the raw product.

4.4.3 Transaction costs

Transaction cost economics asserts that transaction costs affect a firm's choice of the appropriate marketing channel through which transactions can be carried out the most cost efficiently. However, it is hard to identify and quantify transaction costs because transaction cost data cannot often be obtained via a regular data collection process. Relying on the available data and the

[25] Refer to page 36 for the definition of bounded rationality.

literature on transaction cost economics, some transaction costs related to the transactions which Classic Meats and CPL likely faced, are identified in Table 4.2. The table categorizes the transaction costs of the companies into information costs, negotiation costs, and monitoring costs. The companies faced considerable transaction costs that varied by their partners - distributors and retailers.

Information costs

Both Classic Meats and CPL generally face information costs of identifying the retailer/distributor and of forecasting potential demand, and a risk of error of forecasting sales. The companies incur costs of identifying their retailers or distributors in order to find out their reliability and previous practices of cooperation. Also, they spend time and resources for market research to forecast potential demand for the new products. Due to uncertain demand for the new products and bounded rationality, there is a risk of error when forecasting sales through the retailer or distributor. An additional information cost may arise from having to determine the specific requirements of the retailers when the companies sell directly to the retailers.

Negotiation costs

Since all of these exchange relationships are secured by contracts, the companies incur the negotiation cost of drawing up the contracts that includes the costs of managerial time and effort and of hiring lawyers to get legal advice on the contracts. In the current, retailer-driven agri-food system, small suppliers like Classic Meats are at a bargaining disadvantage relative to large retailers and distributors and, thus, incur the costs by losing possible benefits such as higher prices, better shelf placement, and so forth. On the other hand, CPL spends time and resources to negotiate for prices, shelf placement of the products, etc.

Table 4.2 Transaction Costs

№	Transactions	Information costs	Negotiation costs	Monitoring costs
			Classic Meats	
1	**Selling to the national food distributor**	- identifying the distributor - forecasting potential demand - risk of error of forecasting sales	- bargaining disadvantage - drawing up the contract - travel cost	- controlling product quality in the co-packing arrangement - matching production with actual sales - legally enforcing the broken contract with the co-packing plant - lack of effort by the distributor - monitoring the behaviour of the distributor - ensuring that marketing is undertaken at the retail stage
2	**Selling to the convenience store chain in NL**	- identifying the retailer - forecasting potential demand - risk of error of forecasting sales - finding out the specific requirements of the retailer	- bargaining disadvantage - drawing up the contract - shelving fees - travel cost - relative marketing cost - relative transportation cost	- controlling product quality in the co-packing arrangement - matching production with actual sales - legally enforcing the broken contract with the co-packing plant - monitoring the behaviour of the retailer - lack of retailer effort - risk of damage during transportation - risk of delivery delay
3	**Licensing the trademark to the western Canadian food distributor**	- identifying the distributor - forecasting potential demand - risk of error of forecasting sales	- bargaining disadvantage - drawing up the contract - negotiating royalties	- matching production with actual sales - lack of effort by the distributor - monitoring the behaviour of the distributor - risk of not receiving royalties - risk of losing the product recipes
4	**Selling to the food distributor in SK**	- identifying the distributor - forecasting potential demand - risk of error of forecasting sales	- bargaining disadvantage - drawing up the contract - scheduling frequent delivery	- controlling product quality in the co-packing arrangement - matching production with actual sales - legally enforcing the broken contract with the co-packing plant - lack of effort by the distributor - monitoring the behaviour of the distributor - damage loss during transportation - ensuring that marketing is undertaken at the retail stage
			Canadian Prairie Lamb	
1	**Selling to the western Canadian supermarket chain**	- identifying the retailer - forecasting potential demand - risk of error of forecasting sales - finding out the specific requirements of the retailer	- drawing up the contract - relative marketing cost - relative transportation cost - negotiating for prices and shelf placement of the products	- controlling product quality in the co-packing arrangement - matching production with actual sales - legally enforcing the broken contract with the co-packing plant - lack of retailer effort - monitoring the behaviour of the distributor - risk of damage during transportation - risk of delivery delay

When selling directly to the convenience store chain in Newfoundland and Labrador, Classic Meats would incur shelving fees, travel costs, and additional marketing and transportation costs relative to selling to the distributors. This transportation cost includes the opportunity cost of the company personnel's time and effort to organize transportation to the retailer in addition to the direct transportation cost. Similarly, the travel cost consists of the direct cost of travel and the opportunity cost of the company personnel's time during the travel.

In contrast, the distributors organize the delivery from Classic Meats to their client stores as well as paying for marketing and store shelving fees. Nevertheless, Classic Meats incurs the opportunity cost of the company personnel's time and effort in scheduling frequent delivery when distributing through the Saskatchewan food distributor that does not have a capacity to handle larger volume. Moreover, Classic Meats needs to negotiate royalties when licensing the trademark.

Monitoring costs

In their exchange relationships, both companies face large monitoring costs related to controlling product quality in the co-packing arrangements, matching production with actual sales, legally enforcing the broken contract with the co-packing plant, monitoring the behaviour of the retailer/distributor, and lack of distributor/retailer effort to properly handle the products and undertake sales promotion activities. The costs of matching production with actual sales could include the costs of waste resulted from surplus supplies or the costs of storage due to surplus production. Legally enforcing broken contracts could include the opportunity cost of the company personnel's time to appear in court and any fees associated with lawyers or arbitration. The behaviour of the retailer/distributor needs to be monitored somehow in order to ensure that the terms of the contract are fulfilled. In addition, the companies incur the costs arising from the risks of damage during transportation and of delivery delay when selling directly to the retailers.

Further, Classic Meats incurs monitoring costs of ensuring that marketing is undertaken at the retail stage when marketing through distributors. Furthermore, it incurs significant monitoring

costs associated with selling the trademark, namely the risks of not receiving royalties and of losing the product recipes because of possible opportunism.

In addition to the exchange relationship with the retailer, transactions between CPL and Saskatchewan sheep producers involve asset specificity and thus transaction costs. CPL's supply of the main input is totally dependent on sheep producers and thus its investment in commercialization and establishing the demand for the lamb products could be asset specific. On the other hand, the sheep producers may have site specificity given that there are no other major lamb buyers such as abattoir operators and processors in the province because they could incur relatively higher transaction costs to sell to other provinces. As a result, the asset specificity and possible opportunism necessitate a higher degree of vertical coordination in this exchange relationship. Consistent with the predictions of transaction cost theory, producers have shares in CPL and, hence, the asset specificity and the opportunism are unlikely to increase the transaction costs of both CPL and the sheep producers.

4.5 Conclusions

The case study analysis of the two agribusinesses, Classic Meats and Canadian Prairie Lamb, were reported in this chapter. Like many small companies in their early stages of commercialization, both agribusinesses were virtual companies that did not have production facilities. As hypothesized, the companies could not make positive profits in the initial stages of commercialization because of the high costs associated with small scale production. The economic model of commercialization developed in Chapter 3 was applied to Classic Meats and illustrated its commercialization challenges and the potential pathway to commercial success. On the contrary, CPL's commercialization does not fit the assumption of the models. Indeed, CPL achieved the commercial market in its early stage of commercialization through access to the supermarket chain, but it could not attain the required sales volume due to the insufficient marketing as well as the limited production.

The cases indicate that three main challenges of commercialization, namely increasing production scale, accessing the commercial market, and defining optimal production scale, that

are suggested by the theoretical framework were pertinent to small commercializing agribusinesses. While Classic Meats faced all of them, CPL faced only two because it already had access to the commercial market. Indeed, CPL had the advantage because of the shortage of Canadian lamb in the market. However, both companies experienced many similar barriers to commercialization, namely lack of financial capital, high costs of commercialization, high costs of production, transaction, and marketing, lack of knowledge of the industry, and risk of uncertain demand for innovative products. In addition to these barriers, Classic Meats had few opportunities for partnering whereas CPL had to deal with limited supply of raw products. In short, the case studies showed that most of the identified challenges and barriers contributed to the commercialization failures of the two companies and, therefore, give some validity to the commercialization checklist developed in Chapter 3. With the checklist, small agribusinesses can anticipate commercialization challenges more realistically and, therefore, be prepared to overcome these challenges and barriers to commercialization.

Most of these challenges and barriers were explained based on the literature on supply chain theory and transaction cost economics. In particular, as suggested by supply chain theory, the high degree of consolidation and, thus, large market power in the retail sector, meant that both companies had very little bargaining power and there were limited partnering opportunities for Classic Meats. Of the barriers to commercialization, the lack of knowledge of the industry was a major deterrent to commercialization by the companies, suggesting the need for enhancing cooperation or networking to facilitate information sharing about the industry, investors, retailers and/or distributors. Furthermore, transaction costs associated with the exchange relationships of the companies were identified and discussed through the lens of a transaction cost approach.

CHAPTER 5: SUMMARY AND CONCLUSIONS

This final chapter summarizes the research objectives of the thesis and the major findings of the research. Also, it discusses the limitations of the research and the potential areas for further research.

Analyzing commercialization of innovation in small Saskatchewan agribusinesses was the main objective of this thesis. The thesis specifically wished to 1) document the factors affecting commercialization successes or failures, particularly the barriers to commercialization faced by small scale or start-up Saskatchewan agribusinesses, 2) develop a theoretical framework to illustrate how small firms achieve successful commercialization, which can apply to small commercializing firms anywhere in the world, and 3) develop strategies that endeavour to overcome challenges associated with commercialization and that result in successful commercialization.

The case studies of the two Saskatchewan agribusinesses were undertaken in the thesis to achieve these goals. The data for the case studies were collected through semi-structured interviews and examination of written documents. The president and the manager of the two food processing companies were interviewed and their commercialization performance and the factors influencing the failures of their commercialization were documented in Chapter 4. The economic models of commercialization were developed in Chapter 3 and applied to the case studies. The models suggest that achieving economies of scale is the main strategy to consistently access commercial markets and, therefore, a key component of commercialization success. Also, the case study analysis presented in Chapter 4 indicated that upon understanding the challenges and barriers to commercialization, small agribusinesses can make more realistic decisions and determine ways to overcome the challenges and barriers.

5.1 Summary of research findings

Generally, the case study evidence presented in Chapter 4 has established how these two small agribusinesses struggled to commercialize their new products and what challenges and barriers were faced by them. Further, the case study analysis has lent some validation to the economic models of commercialization developed in this thesis.

It was hypothesized in Chapter 3 that in their early stages of commercialization small firms are likely to encounter the situations whereby they make either only a small profit or a loss due to the high costs associated with their small scale and the limited demand arising from a cottage industry-sized market. The economic models of commercialization relied on this hypothesis and the assumption that commercial markets can be achieved by taking advantage of economies of scale. CPL's commercialization was a little different from the assumptions of the models because it achieved the commercial market in its early stage of commercialization through access to the supermarket chain. However, CPL could not attain the required sales volume due to the large marketing costs required to generate demand for its new products as well as constraints on production. Therefore, the model was applied to the case of Classic Meats. The model was applicable if all the assumptions of the model held and showed its potential path to successful commercialization as well as indicating the associated challenges and barriers.

Furthermore, the challenges and barriers to commercialization for the two companies were identified and compared to those identified in the checklist for commercialization. Three main challenges of commercialization, namely increasing production scale, accessing commercial markets, and defining optimal production scale and their corresponding barriers were developed in Chapter 3. The cases have supported the importance of the challenges and barriers identified and, thus, the checklist can be used by small start-up agribusinesses to gauge their readiness for commercialization. Specifically, except that CPL did not find it challenging to gain initial access to the commercial market, the companies experienced all of these challenges. Also, they experienced barriers such as a lack of financial capital, high costs of commercialization, high unit costs, high transaction and marketing costs, lack of knowledge of the industry, and uncertain demand for innovative products. Each company also faced barriers specific to their cases. In

particular, Classic Meats had very limited opportunities for partnering, whereas CPL had to deal with a limited supply of the raw product.

Ultimately, increasing their production scale was crucial for the companies in achieving successful commercialization whereby they could generate positive returns from the new products. Without having production facilities, the companies found the Food Centre an excellent facility to use for the product development, but it is only suitable for small scale pilot production. Both companies had experienced problems with co-packing arrangements with the Toll Processing Company in Saskatchewan and had difficulties in finding another co-packing plant in relative proximity that could produce at a commercial scale. For CPL, the limited supply of the raw product acted as an additional deterrent to achieving commercial scale production.

For both companies, their small scale production and, therefore, small sales volumes resulted in thin gross profit margins. As a result, the companies suffered from not making positive net profit due to high unit costs of production and, thus, were not able to fully finance necessary marketing activities. Indeed, effective marketing was essential since their products were relatively new to the market.

As expected, the companies started marketing their new products in the cottage industry-sized market, but CPL was able to enter into the supermarket sector relatively quickly. Nonetheless, both companies could not achieve full commercialization, going beyond the early stages of commercialization due to a number of challenges and barriers. For example, Classic Meats found it more challenging to get access to its targeted commercial market, particularly convenience store chains as it competed in both the snack and convenience food industries where the competition is fierce. As a result, it used a distributor, thereby receiving an even lower price from the distributor than that it would have received directly from the retailer. Its gross profit was insufficient to cover marketing, administration and general expenses because of high unit costs resulting from small scale production. On the other hand, CPL could get a premium price from the retailer, but high unit costs associated with its small scale production resulted in the narrow gross profit margin that was also insufficient to cover the required marketing costs.

Based upon the literature and the available data, some transaction costs associated with the exchange relationships of the two companies were identified in Chapter 4. With small scale production Classic Meats had limited opportunities for partnering and, thus, would incur more significant transaction costs than those of CPL to market its products via retailers and distributors. In contrast, regardless of its small scale production, CPL had more opportunities to partner as there were not many domestic competitors that produce similar products. The retailers did not impose any private standards beyond the federal and provincial regulations and, hence, regulations and private standards were not a significant barrier to commercialization. The lack of experience and knowledge of the food industry was a considerable barrier to full commercialization.

The uncertain demand for the new products created a challenge in defining the optimal production scale for the companies. High risks associated with projecting the demand as well as possible projection errors raised their transaction costs, thereby preventing the companies from reaching profitable volumes and full commercialization.

In brief, all of these challenges and barriers had an impact on the commercialization failures of the two companies. A lesson to be learned from the cases is for firms to research the industry where a new product is going to be introduced and the hierarchy of the retail chain in order to determine the most appropriate entry strategy. Increased cooperation or networking may help firms to overcome these challenges and barriers.

Supply chain theory and transaction cost economics shed some light on the challenges and barriers to commercialization and provided a basis for the economic models of commercialization. Applying a transaction cost approach, transaction costs associated with the exchange relationships of the companies were identified and discussed in Section 4.4.3. It seems that the companies did not overtly realize the transaction costs identified in this thesis at the time, but these costs implicitly affected their decisions at each step towards commercialization. Hence, transaction costs need to be considered more systematically when making decisions.

Concentration and, thus, considerable market power in the Canadian retail sector, translated into very limited bargaining power for these small companies and raised their transaction costs.

5.2 Limitations of the research

Limitations of the research undertaken in this thesis should be acknowledged. First, the study specifically focused on commercialization of new food products by small scale agribusinesses. Therefore, the economic models of commercialization and the checklist for commercialization developed in the thesis are unlikely to suit large scale firms as well as the firms in which the assumptions of the models do not hold.

The economic models of commercialization suggest capturing economies of scale is a key strategy to achieve commercial markets and, thus, successful commercialization. However, depending on a product's attributes, there could be other possible strategies that also lead to successful commercialization such as achieving a niche market through e-commerce marketing. Hence, the work undertaken in this thesis did not take into account such possible strategies for successful commercialization.

Moreover, the transaction costs of the two companies identified in Section 4.4.3 are specific to these cases, and thus, cannot be applied to every exchange relationship between a small firm and a distributor/retailer. It is also possible that some transaction costs have not been identified. Furthermore, quantification of these transaction costs is not possible due to data limitations.

Finally, because of the difficulty of finding research participants who are willing to share their experiences of commercialization and the time limitation, the case studies of only two companies were undertaken in this thesis. Also, these companies were not successful in the commercialization of their products. Therefore, the applicability of the economic models of commercialization and of the commercialization checklist would be strengthened if more companies, especially cases of successful commercialization, were studied.

5.3 Suggestions for further research

There are some further research opportunities that may advance the work undertaken in this thesis. First, the two case studies shed light on commercialization and its challenges and validated the applicability of the economic models of commercialization and of the checklist for commercialization. However, more case studies would provide further empirical evidence to corroborate the case study results and the applicability of the theoretical framework. Also, cases of successful commercialization by small scale agribusinesses may reveal additional factors that influence the success of commercialization.

Moreover, the case study analysis underlying the thesis specifically dealt with the commercialization of new food products by small agribusinesses in Saskatchewan. Following the results from this thesis, further research could extend to other products and in other regions in order to fully test the applicability of the economic models of commercialization and of the commercialization checklist.

The thesis suggests that exercising economies of scale is the main strategy to achieve successful commercialization. Therefore, another avenue for further research would be to study potential ways to overcome the challenges and barriers to commercialization documented in the thesis, thereby developing other strategies designed for small innovative agribusinesses. This would help small agribusinesses to succeed and policy makers to develop appropriate policies that support small agribusinesses.

Lastly, applying the concepts of transaction cost economics, some transaction costs of the two agribusinesses associated with commercializing their new products have been identified in the thesis, but how these costs impacted on decisions pertaining to commercialization was not examined. Therefore, one may wish to study the impacts of transaction costs on exchange relationships during commercialization.

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APPENDIX A: INTERVIEW CONSENT FORM

You are invited to participate in a study entitled: "*An economic analysis of innovation and commercialization in small Saskatchewan agribusinesses*". Please read this form carefully, and feel free to ask questions you might have.

Researcher: Undrakh Ganbaatar, MSc Candidate
Department of Bioresource Policy, Business and Economics
University of Saskatchewan
Tel: (306) 966-2041

Purpose and procedure: The purpose of this research is to document factors that affect successes and failures in commercialization by small agribusinesses and barriers to commercialization of product innovation and to develop strategies for successful commercialization. This research is coordinated by the Department of Bioresource Policy, Business and Economics (Prof. William Brown), University of Saskatchewan. The results of this study will form a key part of Ms. Undrakh Ganbaatar's Master of Science thesis in Bioresource Policy, Business and Economics. The research is funded by Saskatchewan Ministry of Agriculture, Alliance for Food and Bio-products Innovation.

You have been selected because you are involved in the commercialization activities of your company and have sound knowledge and rich experience of the company. You will be asked to participate in an interview. Each interview is expected to last between 30-60 minutes. If you give permission, the interview will be audio recorded. You should feel free to decline to answer any particular question(s) and to shut off the voice recorder at any time during the interview.

Potential benefits: Your participation will help to develop strategies that endeavour to overcome the challenges associated with commercialization and result in successful commercialization. Thus, findings from this research may help small agribusinesses to improve their performance and policy makers to develop policies regarding commercialization and support of small agribusinesses, thereby reducing barriers to commercialization and fostering economic growth. It is possible that you and your company may receive no direct benefits from participating in this research.

Potential risks: As all data will be stored in a safe and secure manner and all information will be confidential, the research is expected to pose minimal risk. In unlikely cases where controversial remarks that could have negative consequences for your relationships with others are made, the researcher will try to protect your identity in the ways described below. If for some reason the Researcher wishes to quote your comments in some way that might reveal your identity, she will seek your permission beforehand.

Storage of Data: Data of interview and original audio recording, if applicable, will be securely stored by the Supervisor (Prof. William Brown) at the Department of Bioresource Policy, Business and Economics for a period of at least five years. The data will be destroyed beyond recovery after 5 years when it is no longer required.

Confidentiality: Once interview responses have been analyzed and prior to the publication of research findings, you will be given the opportunity to add, alter, or delete information you provided from a final report as he/she sees fit. Only the Researcher and Supervisor will have access to the interview data and original audio recording.

The research conclusions will be published in a variety of formats, both print and electronic. These materials may be further used for purposes of conference presentations or publication in academic journals, books or popular press. In these publications, the data will be reported in a manner that protects confidentiality and the anonymity of participants. Participants will be identified without names being used, giving minimal information (for instance, what organization you are affiliated with and whether you are a manager) if this information is relevant. Pseudonyms or composite profiles may be used to disguise identity further, if necessary. In principle, actual names will not be used; however, participants whose position involves speaking on behalf of the organization may be asked if certain comments they have made can be attributed to them by name in publications. Any communication of these results that has clear potential to compromise your public anonymity will not proceed without your approval.

Right to Withdraw: Your participation is voluntary, and you can answer only those questions that you are comfortable with. There is no guarantee that you will personally benefit from your involvement. The information that is shared will be held in strict confidence and discussed only with the research team. You may withdraw from the research for any reason, at any time, without penalty of any sort. If you choose to withdraw from the study at any time, any data that you have contributed will be destroyed at your request. You will be informed of any major changes that occur in the circumstances or purpose and design of the research that may have a bearing on your decision to remain as a participant. If, after the interview, you think of something that you would like to change or delete, or you would like to withdraw your responses from the research, you may contact the Researcher at the number provided to request the change or withdrawal.

Questions: If you have any questions concerning the research, please feel free to contact the Researcher at the number provided. This research was approved on ethical grounds by the University of Saskatchewan's Behavioural Research Ethics Board on November 9, 2010. Any questions regarding your rights as a participant may be addressed to that committee through the Ethics Office. This office can be contacted by e-mail at ethics.office@usask.ca or by phone at (306) 966-2084.

Consent to Participate: I have read and understood the description provided; I have had an opportunity to ask questions and my questions have been answered. I consent to participate in the study, understanding that I may withdraw my consent at any time. A copy of this Consent Form has been given to me for my records.

_____	_____
(Name of Participant)	(Date)
_____	_____
(Signature of Participant)	(Signature of Researcher)

APPENDIX B: INTERVIEW QUESTIONS

Firm characteristics:

1. What is the history of your company?
2. What is the ownership structure of your company?
3. What are the main activities of your company?
4. Does your company have a plant to produce your new product?
5. How many full-time employees does your company have?
6. Did your company use any program(s) sponsored by the federal government or provincial governments for the innovation and commercialization?
    a. What percentage of the total development cost was it equal?

Product development:

7. What is the new product that you brought onto the market during the last decade?
8. Did your company conduct any R&D activities for your product innovation?
    a. If No, how did your company originate the idea of your new product?
9. How long did it take for your company to develop your new product?
10. How did you fund the development cost?

Commercialization:

11. When did your company introduce your product to the market?
12. How much was the total cost of product launch?
13. Was your company able to obtain funding from outside sources?
    a. If your company was limited or refused any requests for funds from any source when raising capital for commercialization, what were the reasons?
14. Did you have a business plan for your project of introducing new products?
15. What distribution channels did your company use for marketing your new product?
16. What commercialization activities (market research, launching advertising, a market plan, product positioning or profiling, a project feasibility study, test sales and demonstrations, etc.) did you carry out for your new product?
17. How much is the unit cost of your new product relative to the similar products in the market?
18. How much is or was your total production of your new product?
19. What percentage is it relative to your plant's capacity?
20. Did or does your production generate sufficient returns from your investment?

a. If No, what were the reasons?

21. Has your company tried to sell your product via supermarket or grocery store chains?
22. Was or would be the volume you can supply acceptable to be carried in supermarkets?
23. Did or would you need to pay slotting allowances (shelving fees) to be carried your product in supermarket(s)?
    a. If yes, how much was it?
24. How much was the unit cost of your new product relative to the price supermarket(s) pay?
25. What standards and requirements of food safety and quality did or would the supermarket(s) ask for?
26. Were there any other requirements from the supermarket(s)?
27. What other challenges did or would you face to enter supermarket or grocery store chains?
28. How did or would your company's volume of sales increase when started supplying supermarket chains?
29. Did your company need a larger plant (co-packer) to supply supermarket(s)?
    a. Did your company have an adequate number of qualified personnel required for this commercial scale production?
30. How did or would you forecast the demand for your new product in the commercial market?
31. Did your company's personnel have enough information about the market and consumer needs when making decisions on marketing?
32. What benefits did or would you gain from entering supermarket supply chains?
33. How did regulations and/or standards affect your commercialization performance?
34. What other barriers did you encounter for your commercialization of new food products?
35. What factors do you think affected your success or failure in commercialization?
36. How do you think your company can increase returns from the investment in the new product, if your company was not successful financially?