

FROM IDEAS TO SALES: COMMERCIALIZING FOOD PROCESSING INNOVATION IN MANITOBA

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Rural Development Institute, Brandon University

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Introduction

In Canada, much of our economy and social prosperity continues to rest on innovation. Not surprisingly, innovation is part of conversations and policy efforts at national, provincial, and local levels, as well as across various businesses, support agencies, and communities. For some, including Jim Balsillie (2017), former co-CEO of BlackBerry and co-founder of the Institute of New Economic Thinking, innovation is an overused word followed by superficial discourse. Yet, for some sectors innovation is equivalent to business growth. In the manufacturing sector, where innovation seems to be their lifeblood, there is significant need to counteract decline in Canada's growth related to innovation (Cohn and Good, 2015). In recent years, innovation in Canada's agri-food industry appears to be failing when compared to other countries, including the USA (Uzea, 2014). Embedded in this sector are strong examples of innovation and the food processing sector has long been defined by diverse forms of innovation. Even a casual observer would conclude that innovation is in the DNA of food processors, as made evident by decades of new products, from TV dinners in the early 1950s to the compostable snack bag of chips in 2010, and more recently hemp oil (Toops, 2010). Within the national context where innovation is needed, a better understanding of what lies behind such innovation has the potential to contribute directly to new knowledge, which moves the discussion from superficial to essential. This new knowledge can bring to the forefront insights about how to accelerate innovation and uncover key aspects of growth.

In the food processing sector, innovation is essential for maintaining competitiveness with lower costs and perceived uniqueness in the rapidly globalizing world (Fortuin & Omta, 2009). After seven years of a processed food trade deficit with USA, between 2009-2015, Canadian companies emerged by 2016 with a \$165M (CAD) surplus compared with a \$1B deficit the previous year (Grier, 2016). The challenge as reported by the Conference Board of Canada (2012) is an "innovation gap" largely related to commercialization. The Conference Board of

Canada emphasizes the transformation of ideas and knowledge into value, with the aim of increasing exports. Adding new knowledge to our understanding of the nature of innovation in the food processing sector adds depth to the discourse and insight into how to support and accelerate the commercialization of innovation. After scanning the many sectors in Canada, it is the food sector Balsillie (2017) distinguishes as promising. When coupled with technology innovation, this sector can inform and fuel the 21st century, across Canada and globally. In this sector innovation is very much the language of fulfilment.

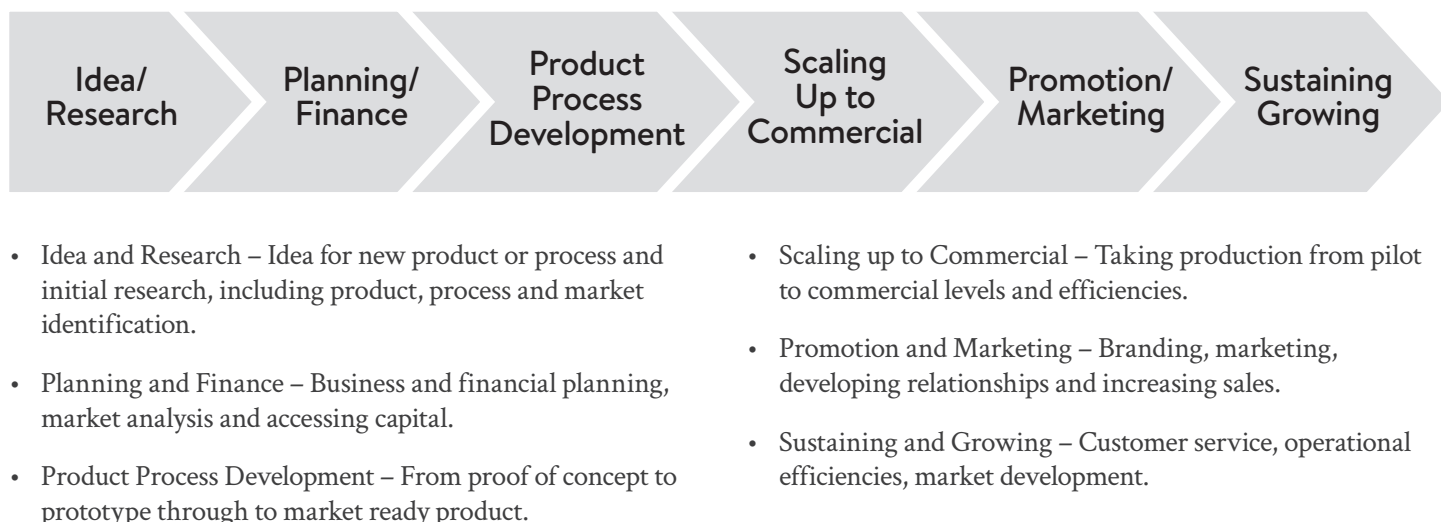
This paper reports on the food processing sector and builds on previous research efforts by the Rural Development Institute in terms of better understanding innovation (Ashton, et al. 2016). While this sector has a well-documented history that includes innovation, we set out to contribute to a very specific knowledge gap. One that reveals the anatomy of innovation based on the actual experiences of successful innovators. In particular, we focus on innovators who have taken unique paths to translate their ideas into sales. After a review of the literature on innovation and innovation in the food processing sector, the research design and methods are discussed. This is followed by findings, discussion, and conclusions.

Literature Review

Many definitions of innovation exist. For this study we approached 'innovation' in a broad sense, based on a significant body of work by the Organization for Economic Cooperation and Development (OECD, 2005). It is the implementation of a significant change in product, process, marketing or organization that is new or improved to at least the company, if not the sector, and hopefully world-wide (export bound). This more holistic approach to defining innovation, particularly successful innovation, means one derives value from the market. One indisputable indicator of commercialization success is sales or related revenues. Ideally, fully successful commercialization occurs when revenues exceed costs. For this project sales signify that customers are buying the change represented in the innovation. As those involved in successful innovation look back over their pursuit, we asked them to distinguish what made it successful to the point of having sales. Understanding the anatomy of commercializing innovation requires examining key elements in terms of their activities over time, involvement of various people, overcoming barriers, and reflecting on the leadership skills to bring about a success.

Innovation can take on many different arrangements in firms. The traditional corporate approach to innovation was to centralize idea generation within a Research and Development unit at one location. In addition, the R&D functions were commonly accompanied by a management system (Kline and Rosenberg, 1986). Frequently this resulted in the commercialization process being directly wed to a linear or sequential approach to innovation. Figure 1 depicts such a commercialization process, moving from one stage to another: idea and research, planning and finance, product process development including prototype development, business of commercial scaling, promotion and marketing, on to sustaining and growing (Materia et al., 2014). Jordan (2014) emphasizes the importance of such stages as milestones which are often associated with specific events when examining a life-science start-up.

Figure 1: Simplified Representation of the Commercialization Process



SOURCES: Agricultural Productivity and Sustainability in Canada, OECD (2015), Growing the Food Industry, Hore, (2015), Saskatchewan Food Development Centre (2013).

Increasingly, innovation is an open and more inclusive process. This has come to mean that more people are invited to contribute ideas and resources. Over thirty years ago, Van de Ven (1984) and more recently Wang et al. (2015) commented on the evolving nature of innovation where the trajectory of a model or concept reaches toward a more collaborative and open process. Such a phenomenon is being reported, for example, in terms of customer-oriented food development (e.g., by Costa & Jongen, 2006). Another concept of the commercialization continuum was evident when examining the importance of stakeholders. Kline and Rosenberg's (1986) chain-linked model considered iterative feedback loops between the various stakeholders and different sets of activities and related processes in the chain. This model indicates a non-linear process while still arriving at the same end – an innovation in the marketplace generating sales.

Today, innovation reaches beyond the R&D units to include ideas from shop floors to suppliers to customers. Defining innovation with more stakeholders introduces more complexity in terms of relations among firms along their supply chains. In fact, Harada (2015) illustrated the difficulties in examining the effects of backward and forward linkages in relation to innovation. However, Fortuin and Omta (2009) reported that a firm's competitive advantage depends on its ability to integrate, build, and reconfigure internal as well as external resources while aligning more closely with the needs of customers. A commercialized innovation by a single company, where one firm moves from an idea to commercialization on its own, is increasingly rare (Aarikka-Stenroos, et al, 2012). Companies need others with experience or expertise in the industry and with technology, coupled with customer/market knowledge to successfully commercialize innovation (Madrid-Guijarro et al., 2009). Fortuin and Omta (2009) reported that for the agri-food industry there is limited evidence of the use of more open innovation, despite the many well-established supply chain and network ties. More recently, in an examination of food processing in Manitoba, emerging evidence showed cooperation and collaboration occurring along the supply chain and with other food industry stakeholders (Ashton et al 2015). Such innovation is and will continue to be critical for this sector to illustrate that it is pulling its weight and adding to the prosperity of the nation. With continued emphasis and increased capacity for innovation, the food processing sector reinforces its positive trajectory buttressed with the fastest growth of patents granted in Canada – another important measure of innovation activity (Balsillie, 2017).

As the food processing sector involves more people in generating ideas and participating in commercialization activities, this situation can become concerning. Too many

people can become a barrier to innovation process by quickly rendering it dysfunctional. As Fortuin and Omta (2009) noted, most insights about the barriers of innovation are based on research in high-tech industries, including biotech, pharmaceutical and digital. In other industries, including supplier-dominated industries such as food processing, innovation remains largely unexplored. In recent empirical work, Batterink et al. (2006) found the main barriers to innovation are related to competencies and economic considerations. Others, including Costa and Jongen (2006) listed major barriers to food innovation as: lack of customer orientation, ineffective teamwork inside the firm and with others, low levels of inter- and intra-organizational cooperation and communications, and inadequate resources of staff, money, and technologies. Yet, Verganti (2009) offered an opposing view. He suggests innovation, especially when rooted in manufacturing, is based on two capabilities of ongoing judgement of a few to help lead and coordinate resources for innovation and all those involved constantly tapping into the social capital of others. Here, social networks are essential for innovation and more established companies pursuing an innovation agenda for growth build reliable and deep dynamic involvement in commercialization efforts. After examining hundreds of innovative companies, Verganti (2009) concluded these social networks are the engines of innovation and because they are unique to each company, they are not easily replicated and lead to strategic differentiation.

In addition, while more ideas and greater resources can be inherent with more engagement, one growing barrier for senior executives is the lengthening time to market when commercializing innovation (Birkinshaw et al., 2011). With the axiom "time is money," knowing how long the commercialization process might require, sheds light on other decisions, including weighing investment risks with expected revenues and related rewards. When some commercialization takes years and not months, it is not surprising that financial resources become a significant barrier; and this is particularly prominent in human trials and approval regimes for new drugs (Madrid-Guijarro, A. et al, 2009; D'Este, P. et al, 2012; Coad, A. et al, 2016). Once an innovation is ready for sale, a novel product may continue to struggle with unfamiliarity in the marketplace (Coad, et al. 2016). Barriers to innovation have been shown to vary depending on the size of the company (D'Este, P. et al.); also different barriers emerge when scaling up to high productivity from small runs (Coad, A., et al.). For Fortuin and Omta (2009) these barriers pointed to the conclusion that the innovation process needs to be closely linked to the internal business strengths and capabilities of the firm, with equal attention being paid to evolving customer needs and technological opportunities.

Linking core competencies of a firm with building customer relations and tracking technologies is the domain of leaders. Yet, there is little consensus about what entrepreneurial skills are the most important and which ones are critical for innovation. After an in-depth examination of 35 small and medium enterprises (SMEs), Lindgren (2012) identified five key leadership traits related to new innovation. Namely, ability to: engage with customers (34%), focus and sell a value proposition of the new innovation (23%), build and maintain trusted relations along their value chain (17%), maintain participation in related networks (14%), and sustain and expand relations within their firm (8%). The remaining 4% of the traits were mixed among finance and project management aspects. With regard to sustaining and growing creative businesses, Lans et al., (2004) identified courage, risk-taking, innovation, and network management as being four predominant leadership skills. Furthermore, Ventureprise (2013) identified skills applicable to all entrepreneurs, namely initiative, ambition, adaptability/flexibility, willingness to take risks and willingness to learn. When comparing entrepreneurs to people in different occupational groups (eg. teachers, trainers, civil servants), Caird (1990) found that entrepreneurs scored significantly higher on qualities related to being results oriented, individualistic, having a creative tendency, being a calculated risk taker, and opportunistic. Admittedly, these

five psychological characteristics are not definitive measures of enterprising potential for business and innovation, but are rather indicative measures (Caird, 2017). Notwithstanding the caution, these characteristics and qualities are repeatedly associated with innovation and entrepreneurial mindsets. In fact, these characteristics are fundamentals in post-secondary programs like those at Aston University for enterprising skills, and are reported in the 20 tips on success as told by successful entrepreneurs (Wagner, 2012). For this research, while recognizing there are many different types of entrepreneurs, be they within corporate structures, government, and civil society and across different sectors and cultures, as Caird (2017) points out, those characteristics and qualities form a significant framework to describe leadership skills when commercializing innovation.

To fill in the knowledge gap about innovation in the food processing sector we examine the anatomy of innovation. We focus on successful innovation which means a new food product has hit the market and is generating sales. The anatomy of innovation is constructed from the perceptions of those directly involved in commercialization with their insights about commercialization, barriers and leadership.



Photo courtesy of www.criknutrition.com

Research Design & Methods

The intention was to garner key insights from those directly involved with the commercialization of food innovations.

As a result, the overall research design was one of qualitative research based on exploratory case studies (Creswell, 2014; Yin, 2014).

The primary research question of this study was: *How does commercialization of a food processing innovation occur in rural Manitoba?* To respond to this question, four specific elements of the anatomy of innovation were examined including how, who, and what of commercialization.

How did commercialization occur?

Objective 1: Analyze major events (milestones) to reveal the progression of the innovation from idea to sales.

Who supported the innovator with what?

Objective 2: Examine the nature, timing, and impact of stakeholder involvement.

What barriers occurred in commercializing the innovations?

Objective 3: Describe barriers to commercialization.

What leadership skills were critical to successfully commercialize a food innovation?

Objective 4: Identify leadership skills used to successfully commercialize a food processing innovation.

The answers to the above four questions provide new information to help add knowledge about the commercialization process for Manitoba food processors. This case-study approach involved selecting firms with a successful innovation, collecting data, and completing related analyses, only after approval by Brandon University Ethics Committee.

Case Study Selection

Criteria were developed to select the cases, and then a province-wide search was completed before selecting the cases. In this project we examined innovation from smaller firms, since SMEs are dominant in rural areas in Manitoba.

Potential firms were selected based on five criteria:

- The business was in the food processing sector.
- The business was located in rural Manitoba or sourced raw materials for their main product outside of Winnipeg.
- The business had less than 99 employees.
- The business had a recent food innovation in the last five years that was a new or improved product and/or process, meaning it was new to the industry or to the world.
- The company had introduced the innovation to the market with revenues.

Besides meeting the above criteria as individual firms, a sixth criterion called for maximizing the diversity among the cases. This meant the selected firms needed to be different from each other, in company sizes and commodities. The goal of this last criterion is to enable the formulation of generalizations about the nature of commercialization in smaller food processing firms. This would not be possible with firms that are similar; generalizations would be stronger with diversity among them, as reflected in the characteristics of the firms themselves.

A search was conducted to identify potential cases aiming for the participation of four to six firms. A broad scan of recent innovators in the Manitoba food industry involved consulting with industry experts and associations, reviewing previous research and related firms (Ashton et al, 2015; Ashton et al, 2016), scanning media announcements, and conducting web searches. As a result, 14 potential firms were placed in random order and senior officials contacted. The first five who agreed to participate became our case studies. All 14 firms were contacted before arriving at five firms, and nine declined citing they did not have time right now.

Data Collection

A semi-structured interview record sheet contained a script for an introduction, along with background information about their company and innovation. Primary and probing questions related to all four objectives were asked of senior officials or owners who were intimately connected to the commercialization of their innovation. This person was called the innovator.

Each innovator was interviewed in person and audio recorded. They identified stakeholders key to their efforts of commercialization. A similar set of semi-structured interviews were conducted with up to five of these stakeholders, to understand the services they offered to the innovator. These interviews were typically conducted over the phone. Due to time and budget, not every identified stakeholder was interviewed and those that were represented different services or support. In each case, stakeholders were provided by the innovator. When asking about leadership skills many drew upon this case study and upon their experience with many clients.

Data Analysis

The interview information was analyzed in relation to the four objectives. Repetition and saturation across the five cases gave insight into the commonalities and uniqueness of the innovation process, barriers, support, and leadership skills.

The timeline for each case was constructed from milestones and then each milestone was aligned with a 'stages in the commercialization continuum' (Figure 1). This enabled estimates of the time for each stage and the entire process. A comparative analysis examined the commonalities and differences in the milestones from the five cases.

Based on interview data from stakeholders in each case, their main purpose in relation to the innovation and their relationship with the firm was described, along with their specialization (eg. in agri-food) and contributions. Using these descriptions, their contributions were aligned with the stages of commercialization. These activities were repeated for each case which allowed for a comparative analysis relative to the commercialization continuum and commonalities and differences between the five cases.

From every interview, barriers to innovation were listed and similar themes were grouped together. Barriers referred to hurdles that had to be overcome with the investment of extra or unexpected efforts and resources (eg. time) in order to advance the commercialization process.

Innovators and stakeholders were asked what leadership skills were needed to commercialize their innovation. Their responses were assembled and thematically organized by keywords. In turn they were categorized in relation to Caird's (1990) five characteristics, and then comparatively analyzed.

To maintain reliability and comparability of results throughout the interview process and data analyses, similar procedures were followed for gathering and analyzing data from each case. To ensure constructed validity for accuracy of the analyses and interpretation and to maintain confidentiality, all participants validated their respective case study and their comments led to refinements in the case studies.

The five case studies then formed the base data-set for this cross-case analysis. The cases are in Appendices A through E and available on the RDI website.¹

One major limitation of this study was having a limited sample of five cases. This limitation was, in part, offset by ensuring a very diverse set of cases were included. In addition, another related limitation was that only five stakeholders key to commercialization were interviewed. This meant that not all stakeholders were included, thus we were not exhaustive in interviewing everyone who contributed to the commercialization. Both time and budget limited the scope of this research. Other limitations were not including all food processors with innovations, including those that were unsuccessful, and not examining all elements of the anatomy of innovation, such as the financial aspects. Another limitation was that neither inventors nor stakeholders released financial data. Finally, the stakeholders interviewed were a sample of those supporting the innovator; none of the stakeholders who significantly hindered or delayed the innovation were interviewed. Stakeholders were uncomfortable in identifying those that hindered commercialization as it may have a negative impact on future interactions. Because we have been able to mitigate the major limitations, we have minimized bias which adds to the confidence to generalize these results.

¹ Innovation case studies see: <https://www.brandonu.ca/rdi/agro-environmental/rural-innovation-in-manitoba-reducing-barriers-to-commercialization-and-growing-capacity-in-the-agri-food-sector/>

Case Studies of Five Food Innovations

The basis for each case study was a new food product that was introduced to the market in the last five years. All are Manitoba companies with a rural aspect; either in their location or source of their raw materials. They formed a diverse group in terms of age and size of company and type of product. Table 1 profiles the five firms, their innovation, and identifies their related stakeholders.

- **The Canadian Birch Company Ltd.** was established to process sap from their own birch trees on the eastern shore of Lake Winnipeg into a variety of 100% natural birch syrups. The amber gold syrup is their innovative product, with a unique colour and flavor due to a unique production process.
- **Solberry Incorporated** makes and sells seabuckthorn products. The proprietary process is their innovation which converts berries into a pure, smooth, naturally bright coloured puree, while retaining the nutrition profile of the berries.
- **Canadian Prairie Garden Puree Products Inc.**² processes high quality, locally grown fruit, vegetables, and pulses into non-GMO purees. Their innovative steam injection cooking process results in pure, shelf stable purees that retain the colour, taste and nutrients of the raw product.
- **Floating Leaf Fine Foods** is a family-owned business involved in harvesting, processing, blending, and packing wild rice. Their innovation is a proprietary process producing quick cook wild rice which is ready to serve in a fraction of the time of traditional wild rice, while retaining taste, texture and nutritional value.
- **Crik Nutrition** is a premium health food company. Their innovation is a unique ingredient in their protein powders which are crickets, as the major ingredient. It is a nutrient dense source of protein.

All five firms were selling their innovative product, and all were actively working to increase production capacity and sales. At the time, Floating Leaf was an established company that saw an opportunity for their quick cook product to open new convenience food markets for wild rice. The other three firms are younger companies or have smaller volumes of product.

All five innovative products represent advances in terms of product and processes within their respective industries. There was diversity in the level of innovation (OECD 2005) as perceived by the innovator. Canadian Prairie Garden's process and purees were very novel, their product and process innovation was described as new to the world. All the other products were described as being new to the industry, sometimes partly because they were using an innovative ingredient; i.e. birch syrup, crickets or seabuckthorn berries. Three of the five firms developed significantly new processes; Canadian Birch modified existing technology and methods (new to company); while Solberry and Floating Leaf developed new processes that were new to their industry. Crik's process modifications were mainly due to their unique primary ingredient.



Photo courtesy of www.solberry.ca

² Canadian Prairie Garden Puree Products Inc. validated their case study and during the writing of this report they were placed in receivership.

Table 1. Profiles of the five innovative companies and their stakeholders

Profile features	Five food processing companies in Manitoba and their innovations*				
	The Canadian Birch Company Ltd.	Solberry Incorporated	Floating Leaf Fine Foods	Canadian Prairie Garden Inc.	Crik Nutrition
Innovation	Amber Gold Birch Syrup	Seabuckthorn Puree	Wild Rice in Minutes	Direct Steam Injection Puree Process	Cricket-based Protein Powder
Year Established	2012	2011	1935	2006	2013
Products	Birch Syrup	Seabuckthorn Puree and products	Wild Rice	Vegetable, Fruit & Pulse Purees	Protein Powder
Market	Canada	Canada	International	International	International
Location	Beaconia	Winnipeg / Portage la Prairie	Winnipeg	Portage la Prairie	Stoney Mountain
Website	http://canadianbirchcompany.com/	http://www.solberry.ca/	http://www.eatwildrice.ca/	http://canadianprairiegarden.com/	https://criknutrition.com/

Stakeholders interviewed	PackEdge Design	Industry Research Assistance Program (IRAP) Advisor	Manitoba Agriculture – Growing Forward 2	CAPE Fund	Source Nutraceutical Inc.
	Food Development Centre	Food Development Centre	Food Development Centre	Saskatchewan Food Development Centre	Entomo Farms
	Forestry Training Services	Seabuckthorn Grower	J.C.D Enterprise – Equipment Consultant	Equipment Supplier	North Forge
	Women's Enterprise Centre of Manitoba	Agriculture and Agri-Food Canada, Indian Head	Floating Leaf Fine Foods Employee	CPG Board Member	Futurpreneur Canada
	Family Member	The Light Cellar		CPG Employee	GFR Pharma

*All companies are small businesses with fewer than 99 employees.

Findings

Findings are results from analyses reported for each of the four objectives, namely, time and commercialization activities, stakeholder involvement, major barriers, and leadership skills.

Timelines and Milestones for Commercialization

A simplified representation of the progress of commercialization with time is analyzed in two ways, first in terms of duration, and secondly in terms of milestones.

Duration, or the total length of time for commercializing an innovation from initial idea to first sale, varied. Across the five cases, duration (Figure 2, far right column) ranged from twelve years to about two years. The first three companies in Figure 2, Canadian Prairie Garden, Canadian Birch Company, and Floating Leaf Fine Foods, experienced a gradual progression through commercialization stages. These all had a time interval between the start of each stage; e.g. between idea/research and planning/finance. In contrast, a different pattern is seen with Solberry Incorporated and Crik Nutrition. They had multiple stages to commercialization that started at the same time. Activities in many of the stages were

occurring simultaneously and iteration meant most stages were continually revisited or active during the innovation. As such, no particular stage was ever completed. Further explanation emerges after examining a small company and a larger one: Crik and Canadian Prairie Garden. Crik Nutrition's initial idea came in late 2014 and was commercially producing in 2015. This rapid progression is partly because Crik contracted out the manufacturing and used an external distribution company. A similar effort was evident with Solberry, who benefited from the Manitoba's Food Development Centre's experience with seabuckthorn and used their facility to make their puree. Both firms involved outside partnerships rather than establishing their own processing facility. This enabled them to make sales much quicker, thus accelerating their commercialization time to initial sales. Canadian Prairie Garden, on the other hand, created new-to-world innovation requiring testing and trials of a whole new process and equipment. They invested 12 years to reach commercial product volumes, including several years devoted to establishing their product in the market.



Photo courtesy of www.eatwildrice.ca

Figure 2. Comparison of timelines for commercializing five food processing innovations

2004														2016	TIME TO FIRST SALES
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Canadian Prairie Garden														12 yr
Idea/Research														
Planning/Finance														
Product Process Development														
Scaling up to Commercial														
Promotion/ Marketing														
Sustaining/ Growing														

Canadian Birch Company														7 yr
Idea/Research														
Planning/Finance														
Product Process Development														
Scaling up to Commercial														
Promotion/ Marketing														
Sustaining/ Growing														

Floating Leaf Fine Foods														5 yr
Idea/Research														
Planning/Finance														
Product Process Development														
Scaling up to Commercial														
Promotion/ Marketing														
Sustaining/ Growing														

2004													2016	TIME TO FIRST SALES
------	--	--	--	--	--	--	--	--	--	--	--	--	------	---------------------

Solberry Incorporated														3 yr
Idea/Research														
Planning/Finance														
Product Process Development														
Scaling up to Commercial														
Promotion/ Marketing														
Sustaining/ Growing														

Crik Nutrition														2 yr
Idea/Research														
Planning/Finance														
Product Process Development														
Scaling up to Commercial														
Promotion/ Marketing														
Sustaining/ Growing														

Key Findings from Commercialization Timelines

- Commercialization time varied greatly between the firms. This depended both on the novelty and number of process innovations the firm went through to complete commercialization. Commercialization took longer when firms chose to use their own processing equipment or facility.
- Faster commercialization when outsourcing production resulted in many commercialization stages occurring concurrently, such as scaling-up production, promotion and marketing.

Milestones on the Road to Commercialization

The major milestones identified by innovators on the road to commercialization are summarized in Table 2, grouped according to the stage of commercialization.

Table 2. Commercialization Milestones of five food processing innovations

Stage of Commercialization	Canadian Prairie Garden	Canadian Birch Company	Floating Leaf	Solberry Incorporated	Crik Nutrition
Idea/Research	Research technology R&D Trial	Research birch trees and syrup processing	In-house testing research equipment Market research	Research seabuckthorn	Research insect protein
Planning/Finance	In corporation, business plan, market analysis. Multiple funders for research	Initial funding and planning Incorporated Funding for equipment Seek funding	Funding for equipment	Incorporated Conference Funding for product development	Funding and advice from numerous sources Spin Masters award
Product/ Process Development	Prototype + Full size equipment. R&D to perfect process and products.	Initial bottling at FDC Establishing own facility, equipment and process	R&D on process Trial-run at FDC Co-manufacturing	Trial-run at FDC Perfect process Value add products	Developed by company and GFR Pharma
Scaling Up to Commercial	Rented facility at FDC Prototype + Full size equipment. Regulatory approval.	Vacating harvest system Equipment & food safety Branding - labels Value-add products	Look for and buy equipment Install equipment in own facility	Production at Food Development Centre	Co-manufacture and co-packing at GFR Pharma Distribution by Source Nutricutical
Promotion/ Marketing	Customer letters of intent Website Product Launch Contracts	Award Selling in stores & tradeshows Food service	Food services Outside promotion Export packaging and launch	Promotion through stores, TV Award	Competitions and awards led to publicity and sales Shopify website
Planned Sustaining/ Growing	Planned expansion to own facility	Value add products Expanding markets	Other blends Production in-house	Expansion New products	More flavours and products

FDC = Food Development Centre

Idea/Research: All innovators started with some research on their product. The three more established companies also examined some aspects of the feasibility of their business idea, including R&D trails by Canadian Prairie Garden, syrup processing by Canadian Birch Company, and investigating equipment by Floating Leaf.

Planning/Finance: Three innovators highlighted getting money to purchase equipment as a milestone: Canadian Birch Company, Canadian Prairie Garden and Floating Leaf. Other funding was needed for product/process development, feasibility studies and marketing. Incorporating as a company, making a business plan and receiving advice throughout the commercialization process were also critical.

Product/Process Development: All five innovators spent time and effort in perfecting their product and its manufacturing process. Each of these innovators began on a smaller scale or trial runs. Canadian Prairie Garden, Floating Leaf and Canadian Birch Company also were upgrading equipment, before establishing the final process and product. Three of the innovators developed their process at the Food Development Centre, while Crik Nutrition contracted a manufacturer and Canadian Prairie Garden developed an in-house process and were located at the Food Development Centre.

Scaling up to Commercial: For the three companies that have their own manufacturing equipment, scaling up milestones centred on getting and commissioning this equipment, which was in turn related to product/process development. Solberry manufactured their puree at the Food Development Centre. Crik did not have the scaling up issues of others once they had established relationships with an outside manufacturer and distributor for their protein powder.

Promotion and marketing: All five companies developed a brand identity, packaging and relationships with customers and promoted their products, though not all of them identified these as milestones. Most of the sales effort was done in-house by the company with critical input from specialized firms. For example, Canadian Birch Company did the majority of their own promotion and marketing, however, they used PackEdge Design to develop their brand and labelling. Competitions and awards were mentioned as milestones by three companies (Canadian Birch, Solberry, and Crik); they gave both recognition and publicity.

Sustaining and growing: All five companies have not fully realized this stage. They expressed interest in increasing their production, either through increasing production capacity, exploring new markets or adding new products. For Canadian Birch and Solberry this meant using their main product as an ingredient in a value-add product.

Key Findings from Milestones

- Despite the very different innovations and companies, innovators identified similar milestones at each stage.
- Most key milestones that defined successful commercialization for the participants centred on either scaling up manufacturing of the product or promotion and sales.
- Three companies' major milestones were concerned with devoting significant efforts and money towards developing, purchasing and commissioning equipment.
- The youngest company accelerated commercialization by outsourcing the processing and distribution of the innovation, which minimized investment while generating revenues the quickest.
- Success in competitions or events that raised awareness of their product or establishment of new sales relationships were important to several firms.



Photo courtesy of www.canadianprairiegarden.com

Stakeholder involvement with commercialization

Stakeholders helped commercialize innovation. We examined who they were and what their roles were in the respective commercialization activities.

Type of Stakeholder:

Innovators received support from a wide variety of stakeholders, some external and some internal to the company. Innovators brought in stakeholders to provide support in cases where they did not have the specific knowledge or when they needed additional resources.

The 24 stakeholders provided either general support or specific support. General support was from organizations and government agencies, equipment experts, and business professionals. Specific support came from inside the company be they family, employees or a contractor, along with those trusted from their supply chain.

When examining the stakeholders together (Table 3), the general supporters provided services available to any company, in terms of giving business advice or support (6) or food processing support (9). For example, North Forge provided business advice and training services to any company, whereas, Source Nutraceutical provides regulatory compliance and distribution services to any food/health related businesses.

The other nine stakeholders provided specific supports to the company: employees, family or contractors (6), or were associated with the supply chain (3). Seeking support from members of the supply chain was consistent with previous case studies that showed strong interaction between supply chain members for various types of agri-food innovation (Ashton et al, 2015).

Table 3: Categories of Stakeholders Identified by Innovators

Categories of Support	Total Stakeholders	Stakeholders	Nature of Support
General Support	15	6	Business/Financial Support
		9	Food Processing Support
Company Specific Support	9	6	Family/Employee/ Contractor/Director
		3	Supply Chain

Role of Stakeholder:

Stakeholders had both primary and secondary roles when it came to commercializing innovation. The primary roles of the stakeholders, while varied, were examined in relation to particular stages of commercialization. In Table 4, stakeholders from outside of the companies were active with Product/Process Development (10), Scaling up to Commercial (11) and Planning/Finance (6) stages. While in the Planning stage they

provided financial expertise or funding. In the next two stages, Product/Process Development and Scaling up, stakeholders with food processing expertise were brought in. At the Initial Idea stage and later with the Promotion stage, the stakeholders were mostly internal. The Sustain and Growth stage is in the planning stage for the five companies which meant there were no stakeholders involved at the time of data collection.

Table 4: Roles of Stakeholders on Commercialization Continuum

Support Role	Stakeholder	Stages of commercialization					
		Idea	Planning & Finance	Product Process Develop	Scaling up	Promotion	Sustain & Grow
General	Business Support (6)	0	6	1	3	0	0
	FP Support (9)	3	0	7	5	2	0
Firm Specific	Family/Staff (6)	3	3	2	0	4	0
	Supply Chain (3)	1	0	2	3	1	0
# Stakeholders		7	9	12	11	7	0

The “business supports” provided access to funding and/or advice (Planning/Finance). The funding was associated with equipment purchase or product/process development. For example, the Women’s Enterprise Centre provided funding for the Canadian Birch Company to purchase equipment.

Each innovator identified at least one “food processing support” stakeholder who helped with product/process development. In three cases, the outside expertise was from the Manitoba Food Development Centre. Five other organizations also helped with this stage, both government and private. Two private companies were identified as providing specialized services with Promotion and Marketing. In addition to their primary role many specialized food stakeholders provided assistance with research or commercial scaling up.

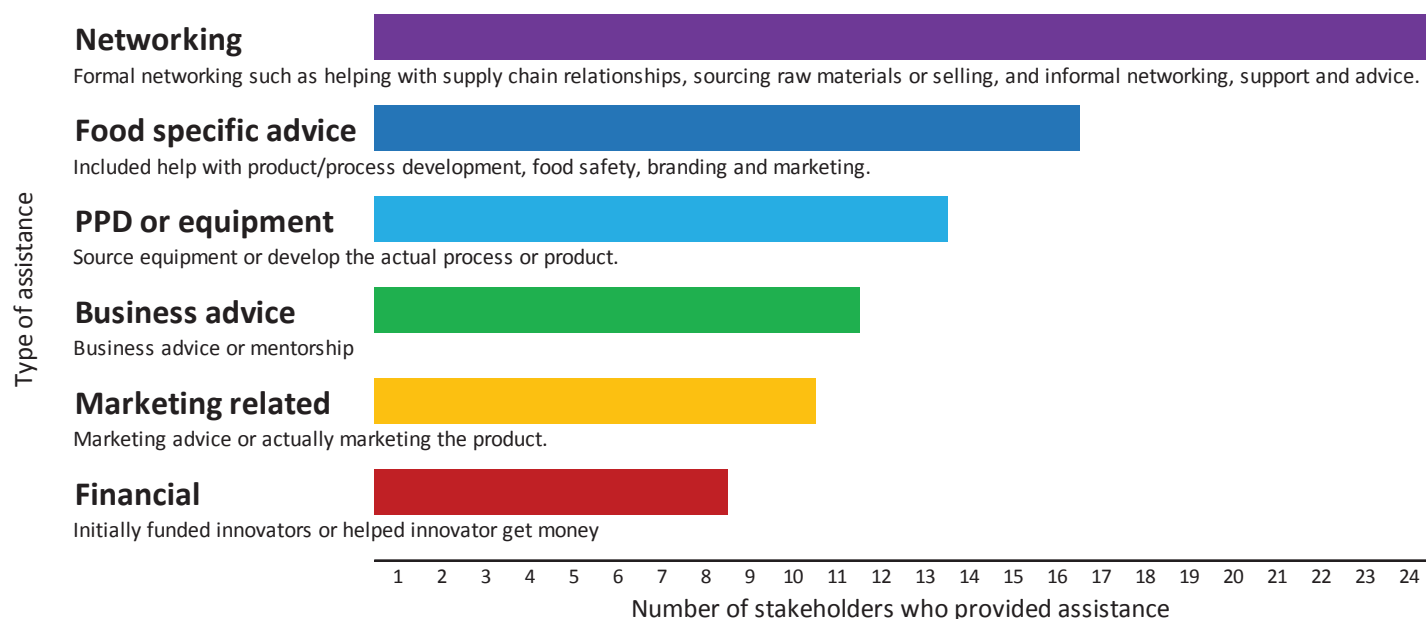
In addition, some of the food processing support stakeholders also had to meet their own organizational requirements before getting involved. The Women’s Enterprise Centre required

the company have at least 50% female ownership, while Futurpreneur works with entrepreneurs who are 18-39 years of age. North Forge’s screening process helped determine the innovator’s commitment to creating a viable business and their ability to be coached. Finally, those stakeholders providing financial assistance to innovators required a business plan and screening for the innovator’s willingness to listen to business advice as a condition for providing funds.

How the Stakeholders Accelerated Innovation:

Secondary roles of stakeholders were described as “sounding boards.” Their suggestions were preliminarily grouped into six ways of assisting with accelerating commercialization of the innovations.

Figure 3. Six ways stakeholders accelerated the commercialization of innovation



Key Findings on Stakeholder Involvement

- Internal or external stakeholders were from business/ financial, food related, internal to the company and supply chain. Only five key stakeholders were examined in this study, many other stakeholders also contributed.
- The majority (19/24) of stakeholders had some degree of specialization in agri-food/food processing.
- Company specific stakeholders such as company staff were involved throughout the commercialization process.
- Business support stakeholders were primarily involved in planning/finance, though their advice and funding affected other commercialization steps.
- Food processing specific supports were primarily involved in product process development and scaling up to commercial though they often gave other support too.
- Government and other support organizations and funders received applications at various times. Yet some support required meeting certain conditions, such as business plans or willingness to listen to advice, attached to providing continued support.
- All stakeholders helped in their primary role and additional informal roles, providing networking and other support.

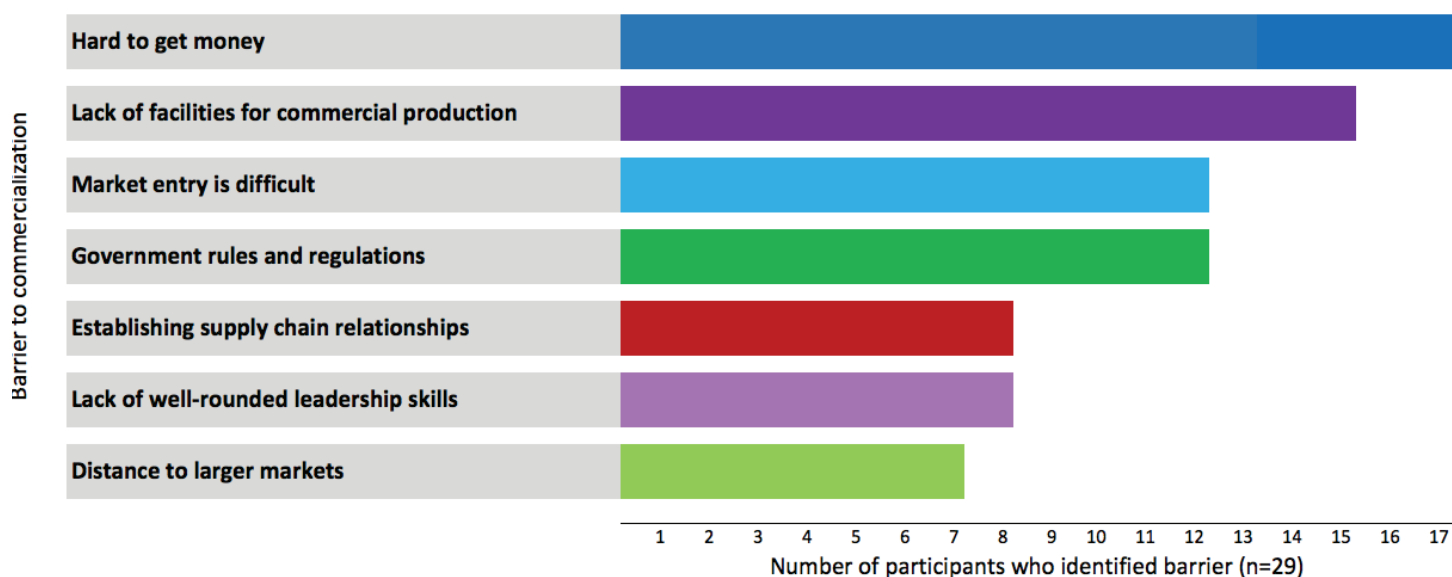


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Barriers to Innovation in Food Processing

Barriers slow down commercialization. The top eight barriers from the stakeholders are noted in Figure 4 and discussed.

Figure 4. Eight barriers to innovation



Barrier: Hard to get money 28/29

Food processors were not always well understood by financial and other support organizations. Participants noted when compared to other industries, food processing was often more capital intensive, took longer to establish a profitable product, and required larger and longer-term loans in order to succeed. Access to capital was identified as a significant barrier for all five food processors. Lack of capital was evident during product/process development, scaling up to pilot or commercial production; or sales and marketing. Though some funding was available for trade shows, there was no government funding available in Manitoba for developing a brand, packaging, marketing or sales. Also, grant programs

were often seen as complicated and bureaucratic, asking for a lot of information for relatively small funding amounts. As well, companies waited for reimbursement instead of getting money up front. One innovator identified a funding program that worked well, Agri-Food Research and Development Initiative (ARDI), where money was provided before the purchase was made. However, this program no longer exists. Another innovator saw this barrier as a trade off: "Do I spend time trying to get more grant money or spend time getting better at selling my product? ... Why should I have to hire someone to help write a grant? Government grants should be more accessible." Another barrier was the difficulty for some to access funding such as "working capital" and "patient capital" once they passed the pilot stage

Barrier: Lack of commercial production facilities 15/29

Fifteen participants identified a lack of infrastructure when trying to scale-up from pilot production to commercial production as being a barrier. As companies establish sales they needed to expand production volumes and efficiencies to commercial levels, for some an intermediate step is needed between prototype and their own facility. This barrier was particularly acute in Manitoba for “wet” processors, such as jams and sauces for example. Their alternative production facilities were licensed community kitchens or the Manitoba Food Development Centre (FDC). These small scale processing options did not have the capacity, flexibility or scale to give commercial efficiencies.

Barrier: Market entry is difficult 12/29

Market entry was difficult for all five inventors. While the goal was typically to establish a customer base, delays were common and impacted getting into the market. Once in the market place, there was significant competition which made it difficult to differentiate the innovations from competitors in the global food market place. Creating awareness and breaking into a market with a novel product was often slow which caused delays in demands, and in turn delayed larger orders and the subsequent production runs to realize better economies of scale. Furthermore, market entry difficulties were connected to other barriers. For example, a company would be at a disadvantage if they had limited production capabilities and could not immediately fulfill larger contracts. Market entry is also restricted because of the regulations placed on selling across borders, both provincially and internationally. The lack of funding assistance for branding, sales, and marketing were identified as barriers to market entry.

Barrier: Government rules and regulations 11/29

Participants acknowledged the need for and advantages given by Canada’s food safety regulations, but there were problems that affected timely commercialization. Regulatory requirements were often onerous and inhibited innovation. Inspections and approvals were not timely, and exceedingly strict regulations did not reflect current conditions. Because of the complex nature of Canadian regulations and multiple regulators, companies were more able to understand the process and ensure they

were compliant. These barriers significantly delayed approving novel processes, slowed product/process development and the related scaling up to commercial production. In addition, export rules within and outside of Canada, particularly with products containing meat (e.g. Canadian Birch’s value-add product, birch-bacon jam), were complicated. A unique barrier was faced by Crik who wanted to claim health benefits, but found the required double blind experiments were too expensive, yet if obtained were valuable for marketing. Five participants identified the lack of government services, including advice on business planning, market research, marketing, and governance. Yet for most, this meant they just had not found the resource or service that they were looking for.

Barrier: Lack of understanding of food processing 10/29

Interviewees were of the opinion that several levels of lack of knowledge about the food processing sector caused barriers and confusion when food innovators commercializing innovations. The wider business advising community does not understand that when compared to other industries, food processing is often more capital intensive; takes longer to establish a profitable product and make money; and requires larger, longer-term loans in order to succeed. It is also difficult to recruit staff for the food processing sector; both for business expertise, and skilled labour. Food processing as an industry also faces a challenge because it does not always fit into a clear sector, is it agriculture or is it a manufacturing industry? This can cause confusion within the available support systems.

Barrier: establishing supply chain relationships 8/29

Challenges and time taken to establish a reliable supply of raw material or to develop relationships with customers was a barrier for eight participants. Both are essential for successful commercialization.

Barrier: Long distance to larger markets 7/29

Primarily due to Manitoba’s low population, and low population density, long travelling distance was a barrier in terms of distribution of product to customers beyond Manitoba. Manitoba’s small market provides a challenge as companies need to expand beyond provincial borders. They also found it difficult to meet other people with similar businesses within the province.

Barrier: Lack of well-rounded leadership skills 7/29

Seven participants saw the lack of leadership skills as a barrier to food innovators. Here they identified their ego getting in the way of decision making, not willing to let others help or not knowing when others should help, and not making a good first impression. Other short comings of some food innovators that hamper commercialization were the lack of business or financial understanding and lack of inter-personal communication skills.

Key Findings about Barriers to commercialization

- Three major barriers were specific to the food processing industry:
 - Lack of effective support to scale-up to commercial production, especially for “wet” products
 - Lack of support for branding and packaging, which is essential in the food industry
 - Barriers related to regulations, either being difficult to understand or not changing with the times
- Other barriers are more acute in the food processing sector
 - Market entry is a challenge in retail, food-service and ingredient sectors
 - Food processing is often capital intensive and time to profitability is longer than other sectors, access to patient capital and working funds
 - The special challenges faced by food processors, including technology and machinery investment, were not always understood by the support organizations.

Leadership in commercializing food innovation

Upwards of 270 key words and ideas from those interviewed described the skills that are needed by innovators to commercialize food processing innovations. About 70 skills mentioned were more related to business skills than leadership, such as communication, sales and marketing skills; knowledge of the food industry and fundamental business principles; and delivering a quality product. The remaining 200 leadership words were grouped into 16 common themes. These were compared to an internationally tested profile from Caird’s (1990) with 5 characteristics and 32 qualities of an entrepreneur (Table 5). While neither list was definitive, the main difference

is that Caird’s list describes an entrepreneur and the list from those interviewed is related specifically to innovators in the food processing sector in Manitoba today.

In reviewing Table 5, five important comparisons are evident.

First, all 16 leadership skills aligned with Caird’s (1990) five characteristics of entrepreneurs.

Second, Persistence and team building were among the participant’s five top leadership skills, be it for high achievement or results oriented. Those interviewed emphasized collaborative team building skills as a way to get results; whereas Caird emphasizes a more inward looking description of individuality and self-reliance. From this research, commercializing an innovation in the food processing sector is much more of a team sport than an individual endeavor, where information from a network of customers and assistance from along the supply chain is critical.

Third, Creative tendency ranks high for Caird and those interviewed. As we were concerned with innovation it is not surprising that being innovative and flexible were listed. With comments about how complicated this sector is in terms of regulations, securing quality raw materials, and adjusting to changing demands of customers, it stands to reason that advice would be needed from many directions. This may well be the reason why Seeking and taking advice was the most repeated leadership skill from the cases. This may well suggest that innovation is best from within the sector by people in the sector.

Fourth, Caird’s internal locus / Belief characteristic focus on internal motivation. Participants expressed this concept largely as a need to have passion for their product or company, and mentioning hard work and confidence.

Fifth, 48% of the participants mentioned characteristics of Autonomous and Calculated risk-taker as important to innovation. Risk tolerance was framed in terms of information skills to reduce risk. The important independent worker qualities for innovation were having a clear vision of the way forward and self-reliance.

Looking at the characteristics listed by participants (Table 5, right column), there is an apparent contradiction between being self-reliant and goal oriented, and being flexible, collaborative, listening to advice. Both sets of qualities were expressed, with a leaning towards being informed and emphasis on innovators needing to seek advice and constantly learn. Yet the independent aspect of an innovator leader was described as building their own team and deciding on their direction and following through themselves.

Table 5. Five leadership characteristics and 32 qualities of entrepreneurs compared with 16 innovation leadership skills

5 Characteristics and 32 qualities of entrepreneurs (Caird 1990)	16 Innovation leadership skills N=29 (Ratios and percentages refer to the number of participants that mentioned the skill)
Need for high achievement (11) <ul style="list-style-type: none"> - Orientation to future - Strong task orientation - Effective time management - Restlessness, driven, energetic - Defend own ideas and views - Determination in meeting objectives and overcoming difficulties - Responsible and persistent - Realistic goals and pursue challenges - Willingly a hard worker to complete tasks - Reliant of own abilities 	Results oriented - Need for high achievement (24/29, 83%) Persistence & determination (19/29, 66%) Perseverance, a positive attitude and the ability to continue past failure or rejection. Collaborative team building (14/29, 48%) Build trust and team atmosphere with employees and supply chain Focus and goal oriented (9/29, 31%) Identify a target and go for it, make it happen Assertive (3/29, 10%) Assertive, extrovert
Creative tendency (7) <ul style="list-style-type: none"> - Imaginative, inventive, comes up with new ideas - Strong intuition, ability to synthesize ideas - Change-oriented, preferring novelty, change is a challenge - Versatile, draw on person resources with problem solving - Curious, interested in new ideas 	Creative tendency (22/29, 76%) Seek and take advice (21/29, 72%). Know when to ask for assistance, and be willing to listen to and accept advice from others. Networking and surrounding oneself with more experienced people. Flexibility (13/29, 45%) The ability to change and adapt Innovative (8/29, 28%) Creative, good at problem solving, thinking outside the box
Internal locus of control (5) <ul style="list-style-type: none"> - Seeks and uses opportunities - Self-confident, believe they have control over their destiny, make own luck - Proactive to navigate problems to achieve success - Express a strong willed control over life - Self-belief, equating results with effort 	Belief – Internal locus of control (19/29, 66%) Passion (13/29, 48%) Enthusiasm, belief in their product and passion for the business. One thought passion was not needed. Dedicated (5/29, 17%) Determined, motivated and devoted Self-confident (4/29, 14%) Confident in self Opportunistic (1/29, 3%) Takes opportunities

<p>Autonomous (4)</p> <ul style="list-style-type: none"> - Independent worker - Self expressive, doing their own thing - Will not always follow group pressure - Preferring to be in charge - Prepared to make up their own mind, willing to stand out - Opinionated - Determined, strong will 	<p>Individualistic - Autonomous (14/29, 48%)</p> <p>Vision (9/29, 31%) Having a clear vision of the way forward.</p> <p>Self-reliance (6/29, 21%) Stubborn, self-reliant, takes initiative</p>
<p>Calculated risk taker (5)</p> <ul style="list-style-type: none"> - Decisive, act on incomplete information - Self-aware, accurately assess own capability - Analytical, good at evaluation likely benefits and likely costs of actions - Effective at managing information and using it to calculate probability of success 	<p>Calculated risk taker (14/29, 48%)</p> <p>Risk tolerant (7/29, 24%) Willingness to invest in the unknown and take calculated risks</p> <p>Using information to set goals (6/29, 21%) Market analysis, SWOT analysis, setting realistic goals</p> <p>Smart (5/29, 17%) Be educated, intelligent, have knowledge</p>

Key Findings on Leadership Needs for Commercialization

- The key leadership skills and characteristics needed to successfully lead innovation in a food processing company were:
 - o Willingness to learn, to seek and take advice was emphasized by many participants as being essential. Developing a network of trusted experts and being flexible enough to change direction if needed.
 - o Having the persistence, passion and vision to move towards the goal of commercializing their product
- Fundamental business skills were also judged as very important by most participants, especially those involved in giving business advice:
 - o Developing and using a business plan, market research, and communication skills
 - o Sales and marketing expertise



Photo courtesy of www.canadianbirchcompany.com

Discussion of Findings

These findings raise four major points for discussion about commercializing innovation among five companies in Manitoba, namely the process of commercialization, the possibility of accelerating commercialization with stakeholders and addressing barriers, the importance of leadership, and organizational culture of innovation.

First, commercialization is evident by activities which required resources, including time. The key activities or milestones reflect what might be expected at each stage (see Table 3). However, this research points to a different interpretation of how the stages occur when commercializing a food processing innovation. Often the commercialization is generalized as sequential stages from idea to sales. Across the cases, the innovation activities activated multiple stages simultaneously. Instead of sequential stages, these cases suggest the stages reflect much more of a horse race where several stages are active at the same time. The Idea and research stage in four cases was done separately in all but the Crik case. In these four cases, activities were frequently occurring in several stages at once and when innovation starts, Idea activities take the lead. In time the others stages are activated. This research also found Marketing research, Planning and Finance, and Networking occurred throughout the duration of commercialization. Second, the cases provided additional details about the Scaling up stage where activities were needed to ensure adequate supplies for processing larger volumes. Additionally, the business side also had to scale up its capacities for sales and marketing and supply, human resource management and business skills. These stages point to what is being innovated as well. Not only are products and processes being innovated, but these cases also included mini innovations in product and processes, along with marketing and organization which seems consistent with OECD's (2005) broader definition.

These cases also provided additional insights about the Scaling up stage. Three other activities build capacity including sales and distribution, human resources and relationship building, and business knowledge. These activities move the innovation from a prototype to larger processing equipment and packaging and distributing larger volumes. The scaling up stage across the cases saw an order and magnitude change, requiring significantly more from suppliers and equipment processors, when compared to earlier prototype arrangements. Each scaling up phase meant enhancing relationships and establishing new ones as financial activities recruited additional funding amounts to pay for larger production for

distribution of larger commercial volumes. At this stage of scaling up, the innovators were challenged with both building capacity for more commercial production and building the capacity of the business to support all aspects of these larger production runs. For example, these included recruiting more and different suppliers, ensuring quality control of production runs, engaging more distributors, adding customers and new markets, and ensuring adequate financing.

In looking back over the innovation process, the linear or sequential depiction of commercialization seemed to explain the Idea stage and somewhat explained the Product and process development stage. The staged model did not accurately explain the complex of activities for product and business development during a Scaling up stage. In addition, these market research, planning and finance, and networking activities are seemingly non-stop. Finally, in terms of when does commercialization end, it seems the answer lies in the last stage of sustain and growth, evident in part when stakeholders were no longer involved.

Second, stakeholders were integral to advancing commercialization. Specifically, business support and food processing support stakeholders were essential to moving the prototype to higher levels of production by assisting in arranging finance, executing product and process development, and scaling up to commercial volumes. Food Development Centres (FDC) figured highly for the Product Process Development (PPD) stage, with four cases benefiting from Manitoba's FDC and one case accessing Saskatchewan's FDC. For these cases, the range of expertise in Manitoba and within these companies and related supply chains, suggest there is sufficient knowledge and access to these critical resources for advancing commercialization. Notwithstanding the assistance for the FDCs and the stakeholders, barriers remained, and all were well-known. The barrier identified by over 70% of the participants was the lack of wet processing capacity. Because it is well known, but still remains a barrier, possibly more information is needed to clarify this opportunity. One approach would be to compare the cost of supplying more processing capacity by accessing the nature of the demand in relation to the value of the opportunity lost by not having this infrastructure available, say over the next 10 or 20 years. Even rough estimates would help to move the discussion towards a resolution, or for now, put in place a reasoning why such an investment is not valuable for industry and/or government.

Third, leadership is a fundamental of entrepreneurship and identified in all five cases as essential to commercializing innovation in food processing. The above discussion highlights three stages when the inventor needed to rally significant resources during the Planning, PPD, and Scaling up stages. From the participants, they provided 17 leadership themes critical for successful innovation. These were related to 32 qualities of entrepreneurs from research by Caird (1990). None of the 27 participants when asked about leadership skills, differentiated specific levels of leadership skill in terms of being at the introductory level, needing to be highly skilled in finance or inter-personal skills for relationship building. Another point is that while the more established companies, like Floating Leaf Fine Foods which have completed innovation initiatives previously, the leadership characteristics may easily be met within their own staff and other trusted stakeholders. As a result leadership skills may be assumed to be available and were not a high priority. Yet for a startup firm, established only two or three years, and most of that time would be focused on activities related to the idea and research stage, the innovator might well find the dual responsibilities daunting. One, pursuing the creative and practical aspects of commercialization activities with the various stakeholders, and another of building a business and all the related processes and business acumen. From all five cases, it seems the learning about commercializing innovation was garnered from the well-established institute of the 'school of hard knocks'. Such an approach, including all the false starts and mistakes along the way would be costly and time-consuming, likely causing delays in commercialization and possibly all out failures as well. One response might be to have the support agencies, where possible, attend to those innovators during the three more intensive commercialization stages for planning, PPD, and scaling up.

A fourth point follows largely from the leadership discussion, but was detected by its absence, rather than by its presence among the participants. What was not mentioned by the innovators or any of the stakeholders, each from their own businesses, was reference to an intentional business culture of innovation. While not asked about directly, it would be responsible to assume that any one of the 27 participants would have made reference their own internal efforts promoting innovation. Alternatively, if the inventor was using a specific system such as an innovation engineering approach, this may have been mentioned. The inference is that the five food development innovations featured in this research may be a one of occurrence, leaving the next innovation more to chance than a deliberate result of efforts to establish a culture internally and among their supply chain and customers.

Despite the absence of a codified model of commercialization or spoken evidence of a corporate culture of innovation, this research provides evidence of the importance of networks, building capacities through experiences and drawing on outside expertise, and being customer-driven by listening and involving customers. These key elements are evidence that the participants knowingly or unknowingly were leveraging what Verganti (2009) called leveraging design thinking to enable innovation and creating differentiation in the market place which social capital and judgement.



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Conclusions

From an in-depth examination of five different food innovations coupled with the above comparative analyses, a response to how innovation in food processing is commercialized today in Manitoba clearly rests on investing resources and multiple leadership skills. When taken together, the above analyses also provided important insights about accelerating the commercialization of food innovation.

The investment of resources in this research meant examining commercialization in terms of time and stakeholders. Crik commercialized their innovation in two years. This short duration was unique among the five cases. It was made possible because the owner outsourced the production and distribution, thus emphasizing his own competencies of business management and e-commerce. With six years as an average duration to commercialize among the five cases, the commercialization of the other innovations followed much more of a sequence from ideas to sales. The Canadian Prairie Garden required twelve years, and like the others they all experienced many concurrent activities ongoing across several stages. All of the cases demonstrated that commercializing an idea takes many tries in most stages. So the inventors were not just inventing a product, most were also inventing their own commercialization pathway, involving mini innovations along the way. Most had to develop and purchase of production equipment, find and engage outside expertise to overcome barriers, and create original marketing materials.

If human resources were a proxy for financial investment, the PPD, Scaling up, and Promotion stages were all costly. Innovators brought together financing and their own experts and others from outside the company to advance the commercialization of the innovation. The Manitoba Food Development Centre figures highly during the PPD and Scaling up stages. During these times, innovators moved from the trusted inner-circle of family, staff, suppliers and customers, to others outside with expertise about production machinery, finance, and the food processing sector.

Enlarging the circle was in part driven by overcoming barriers. Innovators needed the expertise and equipment at the Food Development Centre. As they struggled with challenges of scaling up for larger production runs, they quickly found they needed new suppliers. And much like a set of dominos, innovators found one change led to other challenges. The new products got a boost from the exposure by marketing awards and competitions. With hindsight, what topped the list for

innovators were the need for co-packing facility, financial organizations more attuned to food processing sector funding requirements, and some government regulations suited for small and medium sized producers, instead of just large ones. And in time and with resources, barriers were overcome.

Looking back over their commercialization efforts, innovators and others reported that their advances hinged on leadership qualities. Not just one or two but many leadership qualities were necessary over the years. We suspect the leadership role may have been shared, both with the innovators' companies and possibly among those that joined in the trusted circle. The fulfillment of innovation is about leading and learning to lead on the business and innovation fronts. The qualities of the leaders demonstrated both the art and science of developing a business that could parallel the expected growth from commercializing the innovation. Leading is a challenge of discovering what you do not know, an act of humility of listening, and the self-confidence of risk taking and decision making often with incomplete information. The most recognized leadership quality speaks to a life-long learner captured inside the innovator, one who seeks and takes advice. This is followed closely by persistence and determination. Together these qualities speak to the innovation side, while, financial skills, planning, and marketing speak to the necessary and complimentary development of a business. This duality in purpose (eg., innovation and business) when commercializing innovation demands a much larger range of leadership qualities, but is it more so than if just starting a business?

Commercializing innovation in food processing may seem to be never ending. In many ways commercialization concludes when one reliably delivers a consistently high quality product in the quantity the customer wants, when they want it, and at an acceptable price. This is fulfillment, which requires the supply, production, sales and distribution of quality product, coupled with in-house support and a network of others that execute their roles efficiently and effectively.

Drawing from across the five case studies and the findings in this report, further research is needed to advance commercialization of food innovation. These include:

- Infrastructure or access to infrastructure
 - o Assess the feasibility of increasing co-packing in the food industry in Manitoba, especially wet products (eg. Jams, sauces).

- Financial aspects of innovation
 - o Identify unique financial needs of food processing innovation, eg., seasonal, long term, and explore ways to alter loan payments to fit this industry.
 - o Examine how best to coordinate financial supports available from various agencies and organization and share with a client-centred approach.
 - o Identify examples of business plans that include the commercialization of innovation (eg., business model canvass), to assist innovators to address the financial challenges of commercialization and building a business, form cash flow, marketing, to equipment.
- Networking among innovators and across the sector
 - o Explore ways to increase networking with the food processing industry and the organizations supporting the industry.
 - o Examine the benefits of Food and Beverage Manitoba offering free the first year membership to increase membership and increase networking and the transfer of knowledge, mentoring, and sharing of pitfalls.
- Accelerating commercialization and rural innovation
 - o Map several pathways of commercialization of food processing innovations, to help clarify the language of fulfillment capacity and improve understanding of the innovator's capacity and assist with both business planning and commercialization activities.
 - o Identify food processing regulatory options that better suit SMEs and clarify what is needed to establish them.
 - o Identify the feasibility of innovation 'hubs' across rural Manitoba to accelerate commercialization, especially with PPD, Scaling up and Promotion stages.
 - o Examine how to improve and sustain market access with retailers for new food products.



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