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# Innovation in Agri-food Processing: Preliminary Study of Commercialization of Bulk Food Ingredients in Manitoba

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## >> Acknowledgements

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# Introduction

» Much has been reported on the challenges and gaps as to why innovation is not happening across Canada, yet this project took a different approach and examined successful innovation. This research could have concentrated on how businesses are overcoming the often-cited critical gaps for commercializing innovation: lack of capital; lack of collaboration between stakeholders in the quadruple helix of business, community, academy, and government; and a risk-adverse culture toward innovation and entrepreneurship (Hall et al., 2014; Innovate Manitoba, 2015.) Instead, we wanted to fill in a knowledge gap related to how innovation occurs, not generally, but specifically, with a preliminary study of 3 food processing companies.

Some innovations are groundbreaking and disruptive, such as computers and the Internet, though many more innovations simply take us to the next step, as we continue to search for newer and better ways of doing things. Small changes in a product's design, or a new use for an existing service, can make the difference between moving forward and standing still. Yet, by standing still a business falls behind competitors that are continually innovating products, processes, and marketing and organizational changes. Many of these innovations occur behind closed doors to protect intellectual property. This project intends to go behind those doors to understand successful innovation.

The *Innovation in the food processing industry* survey helps characterize a national landscape of innovation (Agriculture Canada, 2006). Nearly two-thirds (60%) of this industry manufactures food for the end-user, the remaining 40 % completes primary processing or supplies semi-prepared products for

use in other processes (bulk). The grain and oil seed sector ships 65% of raw crop with little or no processing and 19% bulk, in contrast with 85% of the fruit and vegetable sector products sold finished to the end user and only 6% bulk. Innovations involving bulk ingredients are of specific interest in this investigation.

Studying manufacturing innovations over a decade, Becheikh's et al. (2006) analysis found external factors affected innovation. These included: customer demand; industry concentration; regional infrastructure; specialized workforce; proximity to potential partners such as universities, R&D and financial institutions; networking; knowledge and technology acquisition; and government policies and programs. Introducing innovation often required more innovation up and down the supply chain among suppliers and customers. Without an efficient supply chain, good ideas can go unfunded, undeveloped and unrealized (Cantuarias, 2014). When taken together, these two studies suggest that, when examining the manufacturing industry, using the notion of a "supply chain" will assist in understanding the role of partners in innovation, be it producers, processors, transporters, or wholesale customers.

One strength Manitoba has is the excellent agri-food research institutions in the province. In 2014, RDI research indicated that taking research through to full production involves a number of steps: taking research from the lab, to batch manufacture, to pilot plant and to full-scale production. While larger firms often have sufficient capacity to implement innovation in-house, smaller enterprises in the agri-food industry utilize a strategy of collaboration along their own supply chain. For example, equipment suppliers figure highly in new products and new processes for both grain and oilseeds, and fruit and vegetable sectors (Agriculture Canada, 2006). As a result of this circumstance, this project also includes researchers as part of the supply chain, thus reaching beyond the more typical firm-level analysis.

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Innovation is complex which makes it difficult to measure. While products are easier to define and measure, it becomes more difficult for processes, and even more challenging for innovations that are marketing and organizational. This point of measuring and thus reporting of innovation was discussed in *The nature and extent of innovation in the Canadian food processing industry* (Agriculture Canada, 2006). In examining only product and process innovations in the food processing industry, they found information asymmetry; that is, process innovations were likely understated. In part, this was explained because process innovations are largely initiated in-house with secure conditions. In examining product and process innovations in the food processing industry, this report also noted that the larger the firm the greater the number of innovations were realized since they have larger budgets, easier access to more capital, and quicker returns by drawing on economies of scale and more markets. Among the sectors, fruit and vegetables led the industry in both product and process innovations, with grain and oilseed sector performing above the national average. Given the broad range of innovations that have shaped the successes of Manitoban enterprises, both large and well established as well as smaller and emerging, across various sectors in the food processing industry, all four types of innovation – product, process, marketing, and organizational – will be examined in this study.

But why innovate? *The Manitoba Innovation Strategy (2014)* provides an answer: “Innovation is key to growing a stronger Manitoba economy. It generates new businesses and helps existing companies become more productive and globally competitive”. After completing over 24 major reports for the food processing industry and establishing the importance of innovation in the agriculture and food sector, the Canadian Agri-Food Policy Institute called for more research to gain more knowledge about the linkages between innovation and growth within a company, across the sector, and around the world.

The *Innovation Survey* (Ag Canada 2006) suggested there are many reasons to pursue innovation, including: expanding domestic markets and exports, increasing market share, and more effectively meeting buyer’s needs or requirements. In addition, innovation can improve productivity or reduce production costs, enable production of new products, improve quality, increase production processes, and add flexibility. This project aims to improve our understanding about how innovations contribute to growth.

In summary, this project sets out to understand innovation in the food processing industry regarding four fundamental aspects, namely: types of innovation, involvement along the supply chain in innovation, duration or length of time for innovation to be realized, and specific nature of growth resulting from innovation. As the food processing sector in Manitoba is such a major economic contributor, representing 28% of all manufacturing revenue, employing 12,000 people, with \$4.7 Billion in annual sales (2011), and a strategic focus of government programing, knowing more about innovation in this sector will contribute directly to provincial and local prosperity. Previous research by the Rural Development Institute concluded:

*Continued healthy grow in the sector [food processing] depends on retaining and expanding on Manitoba’s strengths: ... Primary processing of agricultural products in Manitoba, directed to bulk ingredients markets, takes advantage of the province’s ability to create high quality agricultural products and its central geographic location in the continent.*  
(Ashton et al., 2014, p.13).

As a result, this project examined sectors that produce bulk ingredients for sale to other manufacturers.



# Research Design & Analysis

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➤➤ This project specifically examines businesses involved in bulk ingredients as a way to answer the research question: *Where are the opportunities for growth in bulk food processing?* For the purpose of this study “bulk” processors will be defined as companies that sell only to buyers, be they manufacturers, bulk wholesalers, distributors or businesses. They do not sell or package for the final consumer; their product is packaged in bulk, wholesale quantities, e.g. 20 litres or more for an oil product, or 1300 kg totes of vegetable puree. In addition, “opportunities for growth” is understood to be related to both innovations that have recently occurred and to the trajectory of future growth through innovation. Stated differently, this project aims to discover if the business is a “one innovation wonder” or if the growth trajectory is based on more innovations. This project will not examine if the business has an innovation or learning culture, though this issue could be central to a subsequent research effort.

A case study approach is used in this research. This research design ensures that the above research question employs a robust method to bring about an answer and an informed discussion from the cases. RDI sees this project as a preliminary undertaking to expand RDI’s capacity and competencies in the agri-food processing sector and to refine a research design so additional cases can be added to enhance the understanding of innovation in this sector.

We want to be able to generalize across bulk ingredient processors and those in the supply chain in Manitoba. This research design requires a minimum of three cases with great diversity. Examining diverse cases of food processors helps

ensure that when similar findings occur across two or all three cases, this result signals an important and valid conclusion. Conclusions are further strengthened as accurate when the cases have been reviewed and confirmed by those interviewed.


The balance of this section is focused on method, in terms of selecting the diverse cases of food processors, describing the recruiting of participants and data collection method, and identifying the analysis approach.

## SELECTING DIVERSE CASES OF FOOD PROCESSORS

From RDI’s (Ashton et al, 2014) earlier food processing research in Manitoba, eight bulk ingredient processors were identified as possible case-study participants. Three criteria ensured maximum diversity: different commodities, small to large number of employees, and new versus well-established businesses. Some businesses were unavailable, but in time three agreed to participate, some with specific concerns over confidentiality. To address this concern, measures were put in place so that the processor reviewed the draft case study first, before it was circulated to other participants.

Three diverse food processing companies agreed to be part of this project. Richardson Milling’s oat processing facility is the most established of the three, and is one of the largest oat mills in the world, exporting to the USA and Central America. Shape Foods’ flax processing plant started operations in 2008 with a modest staff complement, and has established export customers in the USA and SE Asia. Canadian Prairie Garden Puree Products had its first year of full production in 2014 with about 10 employees, and currently sells to the USA and Canada. Table 1 provides additional details on each to distinguish their diversity. Full case-study reports are given in Appendices A, B and C.

**Table 1. Profile of Three Diverse Food Processing Companies in Manitoba**

Case Study Criteria	Three diverse food processing companies as case studies		
	Richardson Milling	 shape foods	 CANADIAN Prairie Garden PUREES
Website	www.richardson.ca	www.shapefoods.com	canadianprairiegarden.com
Commodity	Oats	Flax	Vegetable, Fruit & Pulse
Product	Flakes & flour	Oil & meal	Purees
Start full production	1991	2008	2014
Location	Portage la Prairie	Brandon	Portage la Prairie
Ownership	Part of James Richardson & Sons Ltd, a family owned multi-enterprise corporation	Privately owned	Privately owned – partners are CAPE Fund and First Peoples Economic Growth Fund Inc.
# Employees	115-130	No data	10+

## RECRUITING SUPPLY CHAIN PARTICIPANTS AND DATA COLLECTION

A snowball sampling technique was modified. Knowing the processors, a Web search aided in creating a general supply chain and likely innovation partners for each case. Senior executives from each of the processors were interviewed and asked to give contact information for supply chain partners and confirm and add innovation partners. While suppliers to processors were identified or confirmed, accessing their customers was more difficult. Each processor was cautious about providing names of their wholesale customers, notwithstanding that we provided our ethics certificate and a written statement of confidentiality. In time, we were able to complete interviews with distributors, a customer and an umbrella organization for manufacturers to cover the customer side of the chain. In total a similar number of interviews were completed for each case along their respective supply chains, with 29 interviews in total. Richardson Milling (RM) had 6 interviews, Shape Foods (SF) had 9 interviews, and Canadian Prairie Garden Puree Products (CPG) had

11 interviews. Three additional interviews with industry experts completed the list.

## ANALYSIS OF DATA

The in-depth interviews, mostly by phone with four completed in person, formed our main data source. The data was used to create each of the case studies in terms of who was interviewed, a brief profile, a sketch of the supply chain, a description of innovations along the supply chain, innovation methods and limits to growth. A draft report was shared with the processors first, then after revisions, shared with and validated by the other case-study participants. See three case studies in Appendices A, B and C.

Cross case analysis featured in this summary report is a result of thematic analysis related to types of innovations, involvement of others in the supply chain, timing of the innovation, and linkages between innovation and growth. A more detailed method for these four themes follows. The answer to the research question is derived from a synthesis of the analysis for all three cases, which is reported as conclusions.

# Analysis of Three Cases

» A thematic analysis across the three cases was used to understand the commercialization of innovation in the bulk food ingredient sector based on four fundamental aspects, namely: types of innovation, involvement along the supply chain in innovation, a sense of duration or length of time for innovation to be commercialized, and the specific nature of growth resulting from innovation. Each aspect is described along with the findings and conclusions.

The innovation initiatives that are the subject of this analysis are listed in Table 2.



See Table 2. Innovation Initiatives Identified in 3 Case Studies located to the right.

## TYPES OF INNOVATION INITIATIVES

Innovations are often grouped according to four types, as they are by OECD (2005), Industry Canada, Innovate Manitoba, and others. This definition suggests that the more traditional notions of innovation of product and process are also joined by marketing and organizational innovations. This research explored not only the simple notion of identifying innovation initiatives and categorizing each into these four types, but also we wanted to understand the linkages between types of innovation. Kline and Rosenberg (1986) described a chain-linked model of innovation that considers linkages between types of innovation. To better understand innovation in the food processing industry, we looked at the types of innovation and any linkages to determine if innovation initiatives cluster around one or more type of innovation. Indeed, the analysis went further and investigated whether a relation exists between the novelty of the innovation (in relation to the company, industry,

world) and its contribution to growth (in relation to low, medium, high). Both of these ordinal scales used the data from the individuals interviewed. Such analyses provided a 'rough' measure of the type of innovation and their contribution to novelty and growth, which are at the centre of the overall research question.

In terms of completing the analyses, specific coding of the interview data was organized thematically based on type of innovation, novelty, contribution to growth and linkages between types.

Each innovation initiative in the case studies was assigned to one or more of these innovation types based on the interview data.

**PROCESS innovation** is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.

**PRODUCT innovation** is the introduction of a good or service that is new or significantly improved with respect to its functional characteristics or intended uses. Both entirely new goods and services and significant improvements to existing products are included.

**MARKETING innovation** is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

**ORGANIZATIONAL innovation** is the implementation of a new organizational method in a company's business practices, workplace organization or external relations.

The novelty of the initiative was informed by the OECD Guidelines in terms of those new to the company, new to the industry (market), or new to the world (rows). In terms of growth, those interviewed indicated if the initiative resulted in small, moderate or large impact on growth (columns).

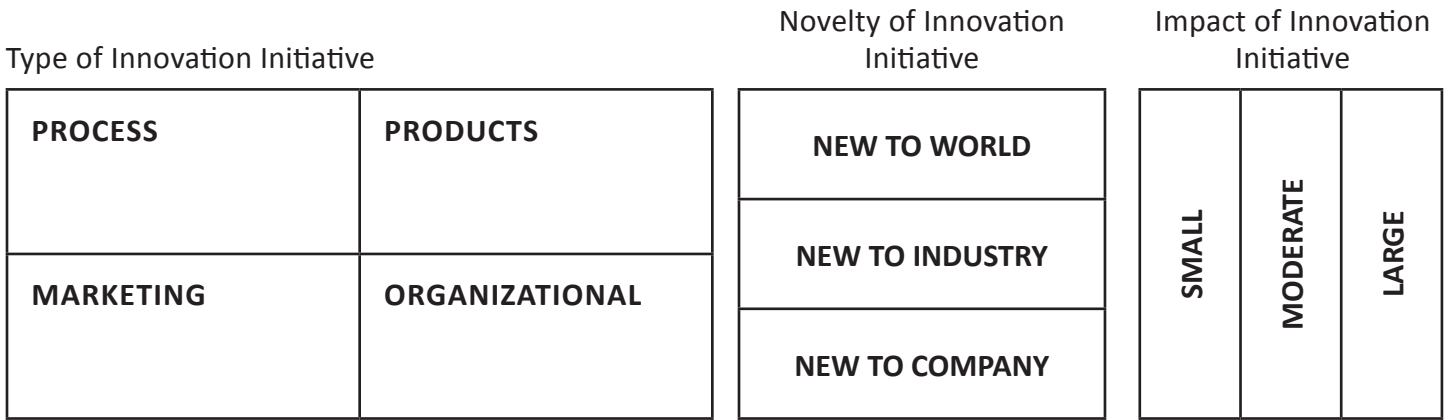


**Table 2: Innovation Initiatives Identified in 3 Case Studies**

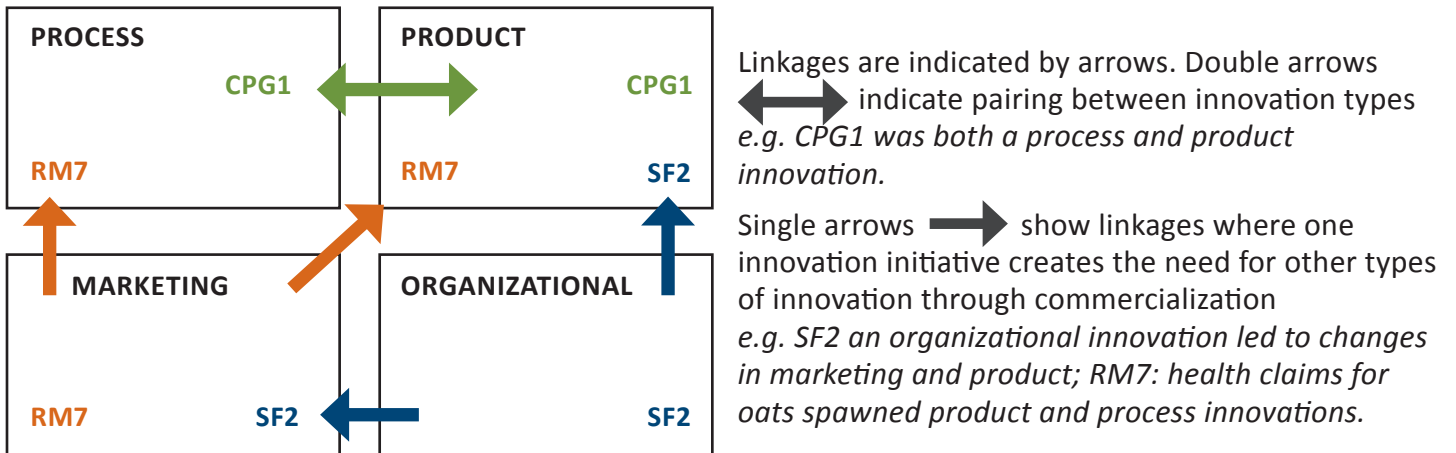
Richardson Milling	Shape Foods	Canadian Prairie Gardens
<b>RM1</b> – kiln and product development with ingredient customers	<b>SF1</b> – unique process gives shelf stable product with excellent taste	<b>CPG1</b> – novel process, direct steam injection retains colour and nutrients
<b>RM2</b> – gaining market share after “oat-bran collapse”, gradual growth of reputation and sales	<b>SF2</b> – ingredient diversification	<b>CPG2</b> – novel aseptic gives shelf stable product
<b>RM3</b> – grower and handler education gives better raw oat supply	<b>SF3</b> – new oil flavours	<b>CPG3</b> – hiring and consulting experienced people
<b>RM4</b> – acquisition by Richardson International leads to investment and logistical efficiencies	<b>SF4</b> – product development with ingredient customers	<b>CPG4</b> – pre-processing
<b>RM5</b> – plant breeding gives specialist products and disease resistance	<b>SF5</b> – new flax products & markets	<b>CPG5</b> – plant breeding and agronomy give higher yields
<b>RM6</b> – past and new health claims lead to higher consumption	<b>SF6</b> – plant breeding and agronomy gives higher yields and specialist products	<b>CPG6</b> – food safety certification & training
<b>RM7</b> – taking advantage of oats natural lack of gluten	<b>SF7</b> – health claims increase human flax consumption	<b>CPG7</b> – demo product development for ingredient customers, product development with food manufacturers
<b>RM8</b> – additional oat products made from fractions of oats		<b>CPG8</b> – increase number of processing lines from 1 to 6, licensing and spin-off companies
		<b>CPG9</b> – health claims and supplementation



**Four layers of information are presented in Figure 1**



Linkages between types of innovations:



**Analysis of Innovation Initiatives Based on Types of Innovation**

Generally, the innovation initiatives were similar in number across all three case studies – Richardson Milling (RM) with 8, Shape Foods (SF) with 7 and Canadian Prairie Garden (CPG) with 9. The innovation initiatives numbered 24, yet many were described as fitting into several types of innovation. The distribution of the initiatives, as organized in

Figure 1, included 18 initiatives as Product innovations, 16 Process, 10 Marketing, and 7 Organizational. The arrows indicate a general pattern of linkages.

Initial analysis of the distribution shows clustering of initiatives in the centre of the plots: new to industry initiatives that are judged to give moderate growth, particularly in product and process, and to a lesser extent, marketing.

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### Process innovation initiatives

- 16 of 24 innovation initiatives involved process innovations. In part, this is expected since the ingredient industry is closely associated with processes of raw material supply, development, and preparation of food ingredients for manufacturer buyers.
- 10 process innovations were identified that were needed as a result of other product, marketing or organizational initiatives.

### Product innovation initiatives

- 18 of 24 initiatives involved product innovations related to seeds, raw ingredients, processed ingredients and food products.
- 12 initiatives were identified as being primarily product innovations.
  - o 10 product innovations were closely paired with other innovations, 6 with process initiatives and 4 with marketing initiatives. For example, with Shape Foods their proprietary process gives a longer shelf-stable product (than their competitors), hence a significant process and product innovation. Similarly, Canadian Prairie Garden's purees are unique products due to their new steam injection and aseptic packaging processes. These innovation types are paired as it is essentially a "chicken and egg" situation where it is difficult to say which innovation came first the process or product. A new ingredient manufacturing process is continuously refined until it gives the desired product, e.g. pure, shelf stable flax oil or cauliflower puree.
  - o 2 product innovations led to other process innovations. These involved product development where the processors work closely with their food manufacturers to develop new retail products. This often led to changes in both ingredient and food manufacturing processes.

### Marketing innovation initiatives

- 9 initiatives were identified as primarily involving marketing innovations.
  - o Developing new products (ingredients and retail) for new markets also occurred in all 3 cases; here the relationship between product development and marketing is so close that it is not possible to say which comes first. For example, the development of novel culinary flax oil flavours was a simultaneous innovation in both product and marketing for the flax oil industry.
  - o 4 of the 9 marketing innovation initiatives led directly to other product or process innovations. Three of them were claims for health benefits and one related to gluten free.
  - o Changes in marketing strategy to gain oat market share (RM2) was in part related to other initiatives including product development (RM1) and health claims (RM6).

### Organizational innovation initiatives

- In total, seven organizational innovation initiatives were reported from the three cases.
  - o Organizational innovations initiatives were made in-house by the processor or by suppliers. For example, hiring experienced staff or education initiatives led to changes in handling of raw oats and improved quality of raw supply to the mill.
  - o Most of these led directly to other innovations in process, product or marketing. For example, the acquisition of Can-Oat (Richardson Milling) by Richardson International led directly to logistical improvements and investment in processing equipment.

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## Novelty and Growth of Innovation Initiatives

The 24 initiatives reflect different levels of novelty and level of growth, as noted in Figure 1.

- Two world-class innovations were identified in this study, the unique processes and products developed by Shape Foods (SF) and Canadian Prairie Garden (CPG) are the base on which both of these companies are built. They stand out from their competitors; both were judged to result in a large amount of growth.
- 12 innovations were new to their industry.
  - o 3 are anticipated to lead to large growth (RM6, SF6, SF7); two reflect the optimism around the potential for increasing oat and flax consumption due to their health benefits, together with the industry-wide push to increase flax production to meet increased demand.
  - o The most populated square in the plot was new to industry innovations that were judged to give a moderate amount of growth with a total of 9 initiatives. These included various new product developments in all three cases and improvements in the supply of raw oats through improvements in breeding, agronomy and handling.
- The remaining 10 innovations were “new to company”.
  - o 3 initiatives are associated with large amounts of growth, all related to expanding markets; SF2 – ingredients, RM2 – gaining market share and CPG8 – increased production as the company grows.
  - o 3 initiatives giving moderate growth were Richardson Milling’s product development and two organizational initiatives: acquisition by

Richardson International and hiring experienced staff and consultants by Canadian Prairie Garden.

- o 4 initiatives were judged to have relatively small effects on growth, though they are necessary for the companies to remain efficient and competitive: for Canadian Prairie Garden’s supply chain, plant breeding, pre-processing and food safety; and gluten free oats (RM).

## Findings Based on Type of Innovation

- Innovations of all four types (process, product, marketing and organizational) were evident in the 3 case studies. Product innovations were most common, followed by process and marketing.
- Organizational and marketing initiatives often result in additional innovations of another type. 10 of the product innovations were paired with a process or marketing innovation during commercialization. Consistently those interviewed spoke of these initiatives together and often intertwined, so it is not possible to tell which came first.
- Some initiatives clustered around product & process innovations; however, all types were evident and important.
- The more significant result of this analysis of types was the degree of linkage, meaning initiatives involving two or more types of innovation either simultaneously or sequentially. Such commercialization is referred to as chain innovation. This is examined further in the analysis of innovation through the supply chain.



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## INNOVATION THROUGH THE SUPPLY CHAIN

Early conceptions of innovation considered innovation to be pushed by R&D and technological change or pulled by consumer demand, giving a simple linear model. Kline and Rosenberg (1986) refined this notion and expressed it as a “chain linked model” which took into account the often iterative interactions among various individuals and organizations up and down the supply chain.

This section analyses interview data collected from those along the supply chain and involved in the innovation initiatives and describes the nature of the relationships. In order to understand innovation along the supply chain it was first necessary to document and understand the supply chains for the 3 case-study companies, (Table 3).



See Table 3: Supply chain participants for 3 case-study companies located to the right.

Despite the differences in commodities and scale, there were significant similarities between the supply chains of the three processing companies. They all process crops that grow well in Manitoba and Saskatchewan. Raw supply is always pre-processed to food grade; but this occurs with different members of the supply chain for each company. They all sell bulk ingredients to food manufacturers, using distributors and directly to manufacturers. Truck and train are used to ship crop and product. The three companies have different additional markets for their products: animal and pet food, food services or private label. Through this study the customer of the bulk ingredient processor is referred to as the “food manufacturer”, as they are the main customer for bulk ingredients. The supply chain does continue to retail stores and final consumers, but that section of the supply chain was not covered in this study.

A single simplified version of the supply chain was used for the following analysis, from grower to processor to “food manufacturer” as the customer. Other outside innovation resources were also added these include: equipment suppliers (processing and agricultural); researchers (plant and seed breeders, medical, processing); commodity and industry organizations; consultants (business, university, chefs) and government (services, incubator facility, regulators).

The first analysis plots the occurrence of innovation initiatives along the simplified supply chain. The second analysis examines in more detail the nature of the relationship in the initiatives to better understand the role of supply chain relations in innovation.

Commercialization involves many different relations along an agri-food supply chain. In examining such relationships, Agriculture Management Institute (2013) characterized them as fragmented, cooperative, coordinated, and collaborative. For this analysis, we describe the relations in terms of initiators and partners. This enables a preliminary analysis of the linkages for commercialization.

### Innovation Initiatives along the Supply Chain

Figure 2 plots the number of innovation initiatives from each of the three case studies in relation to each member of the supply chain.

- Innovation is taking place along the entire supply chain, especially in the case of Richardson Milling. This is likely related to having more relationships between the members of the chain for a longer period.
- Processors are the major innovators in the chain. They are involved in 23 of the 24 innovation initiatives. This is not surprising as the processors were the centre of the case-studies.



See Figure 2: Innovation initiatives along a simplified supply chain for the 3 case studies located to the right.

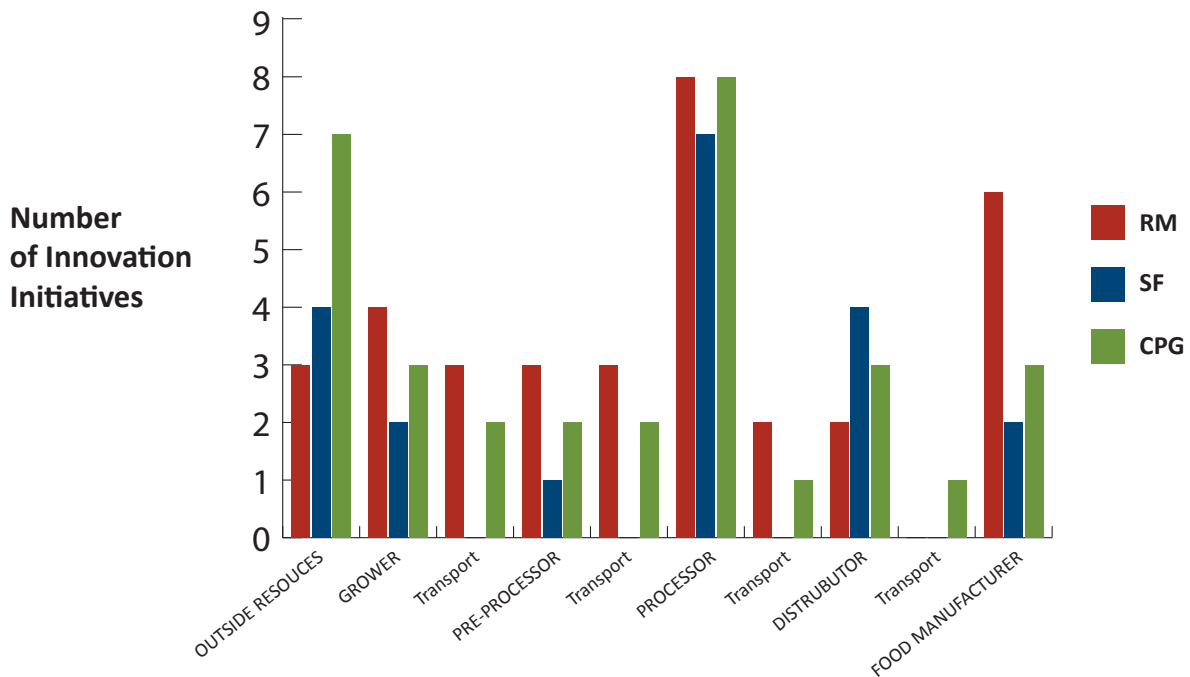
**Table 3: Supply chain participants for 3 case-study companies**

Role in Chain	Richardson Milling	Shape Foods, Inc.	Canadian Prairie Garden Puree Products
Outside resource	Equipment suppliers, researchers, commodity organizations, consultants, government	Equipment suppliers, researchers, commodity organizations, consultants, government	Equipment suppliers, researchers, commodity organizations, consultants, government
Supply	MB & SK	MB & SK	MB
Pre-processing	In-house (MB & SK)	Seed cleaner	Grower
Transport	Train & truck	Truck, train & ship	Truck
Distribution	Direct to manufacturer and via distributors	Direct to manufacturer and via distributors	Direct to manufacturer and via distributors
Processor's customers	Food manufacturers, food service, animal feed & biofuel	Food manufacturers, private label, animal & pet food	Food manufacturers & food service

↓	↓	↓	↓
Retail customer	Retail stores and final consumers	Retail stores and final consumers	Retail stores and final consumers

**Figure 2: Innovation initiatives along a simplified supply chain for the 3 case studies**



- All three chains use outside partners in their innovations (15 of 24). These include plant breeders or health researchers with fundamental research that benefits the whole industry. Consultants and equipment suppliers assist with developing new processes. Canadian Prairie Garden uses many outside innovation partners (7 of 9 initiatives).
- Other concentrations of innovation were with the food manufacturers (11), growers (9) and distributors (9), these involved processing and marketing of the products.

### Innovation Relationships along the Supply Chain

Figure 3a and 3b inventory two types of relationships when commercializing innovation along the supply chain, based on the three cases. One is based on an initiator and a partner, the second involves many.

#### Innovation with two partners

- Many of the 11 initiatives with two partners from the supply chain involve proprietary information about the innovation, and in these cases this information is protected using confidentiality agreements.



See Figure 3a: Initiatives with two innovation partners located to the right.

- In Figure 3a, 8 initiatives involve two partners with one being the initiator and the other taking a more consultative role. For example, Shape Foods and CPG working with their equipment suppliers and consultants to develop their proprietary process; and CPG working with distributors to develop markets for their ingredients. This consultant relationship with experts is important, especially in process development or marketing. Distributors are often important innovation partners; contributing knowledge of potential customers, and their needs and assisting with distribution of ingredients.

- 3 initiatives are an exception as they involve not just one initiator but two initiators. In the case of product development (RM1 and SF4) the ingredient supplier and their food manufacturing customer work together to perfect a retail food product and the associated manufacturing processes. Advances in vegetable agronomy and breeding (CPG5) are made through innovations by both plant breeders and growers.

#### Innovation with multiple partners

- 13 of the 24 initiatives in Figure 3b involve multiple (3 or more) partners to commercialize an innovation initiative



See Figure 3b: Initiatives with multiple innovation partners located to the right.

- The pattern of the innovation relationship within the chain varies for the different initiatives. For example, supply-side innovations were mostly restricted to the that side of the chain (RM3, RM4, RM7, CPG4); food safety affected the whole supply chain (CPG6), driven by government regulations; and the whole industry, together with outside researchers, were involved in validating and publicizing health claims for flax and oats (RM7, SF7), driven mostly by scientific evidence.
- In the oat industry food manufacturers and growers, along with others, work closely to improve oat varieties (RM5). This collaboration is facilitated by a strong, all-encompassing commodity organization, POGA (Prairie Oat Growers Association). For example, in 2014 their 17th annual meeting in the Banff Springs Hotel enabled seed researchers, growers, processors and manufacturers to meet and discuss future challenges and opportunities for their industry.
- Food manufacturers often partner in product development and marketing initiatives, with food processors, distributors and others in the chain.

Commercializing innovation requires different relations among those along the supply chain.

The nature of these resembles chain-linked innovation (Kline & Rosenberg, 1986). A bulk ingredient processor needs to satisfy their food manufacturer customer. At the same time the needs of the manufacturer can generate new innovations. Commercializing an innovation means satisfying at least one of five needs of the ‘bulk’ manufacturer customers, namely: competitive price, reliable supply, safe food, customer service, and something unique, like health benefits. All 24 innovation initiatives in this study were related to one or more of these requirements.

### Findings of Innovation Initiatives along Supply Chain

- Two types of innovation relationships were observed in all three cases: those with 2 partners; and those with multiple partners along the chain.
- More cooperative patterns of commercialization through the whole Richardson Milling chain partially reflects the fact that Richardson International makes up most of the supply side of the chain, and that the company has long-established relationships with distributors, customers and growers. These close relationships along the supply chain and the integration of the innovation into everyday operations are major strengths of Richardson Milling and the oat industry in Manitoba.
- Canadian Prairie Garden and Shape Foods’ innovation initiatives were commercialized using outside resources and single partners. For the younger processors, importing expertise seems preferred when commercializing their innovation initiatives.

**Figure 3: Innovation along the supply chain**

Legend:  Initiator  Partner

Outside resources for innovation include: Equipment suppliers, researchers, commodity organizations, consultants & government.

**Figure 3a: Initiatives with two innovation partners**

	RM 1	RM 2	SF 1	SF 2	SF 3	SF 4	CPG 1	CPG 2	CPG 3	CPG 5	CPG 8
OUTSIDE RESOURCES											
GROWER											
transport											
PRE-PROCESSOR											
transport											
PROCESSOR											
transport											
DISTRIBUTOR											
transport											
FOOD MANUFACTURER											

**Figure 3b: Initiatives with multiple innovation partners**

	RM 3	RM 4	RM 5	RM 6	RM 7	RM 8	SF 5	SF 6	SF 7	CPG 4	CPG 6	CPG 7	CPG 9
OUTSIDE RESOURCES													
GROWER													
transport													
PRE-PROCESSOR													
transport													
PROCESSOR													
transport													
DISTRIBUTOR													
transport													
FOOD MANUFACTURER													

- This analysis also revealed several commonalities between the innovation initiatives that occurred in all three case-studies, they all help processors meet the needs of their food manufacturing customers:
  - o Growers innovating through plant breeding and agronomy
  - o Improvement of the supply and quality of raw materials arriving at the processor
  - o Cooperative product development with food manufacturers
  - o Expanding markets by developing new products, especially those related to health benefits of the ingredients or their components

## CHRONOLOGY OF INNOVATION INITIATIVES

Innovations take time to commercialize and realize value from the original inspirational idea. In this study, examining a sequence of activities for each initiative serves as a proxy for the nature of the commitment by those involved and indicates when significant resources are invested. From the above analysis, the many partners involved means that many are invested in realizing the innovation initiative. This research was not privy to specific investment amounts or detailed timelines in each case. Nonetheless the following information reveals patterns on investment over time.

Based on the interview data, themes emerged related to past and present, along with potential future initiatives. They also indicated different levels of activity over the years, from no activity to some activity, and even intense periods of activity to realize an innovation initiative. Again, we realize these are ordinal scales that will carry different meaning for the different people we interviewed. As a result each initiative was plotted on a simple chronology (past, present, future) with periods of no activity to intense activity. This variation is presented in Figure 4.

## Analysis and Findings on Innovation Initiatives in Relation to the Chronology

Two different chronological patterns of innovative initiatives were evident across the three cases: long and continuous, and short and intense.

- Long and continuous. 9 initiatives are long and continuous, independent of the establishment of the ingredient processing company; for example, food safety (CPG6), plant breeding (CPG 5), and agronomy (SF6, RM 5), and research into health benefits (CPG9 SF7, RM6). Although long, these continuous initiatives also included several periods of intense activity, such as those that have led to health claims for oats and flax, and continuing research on pulses.
- Short and intense. 15 initiatives have an intense period of activity often at the start of the initiative, followed by less intense activity as the initiative is refined. A few initiatives, such as aseptic packaging (CPG2), pre-processing (CPG4) or expansion of production capacity (CPG8) involve brief periods of intense activity.

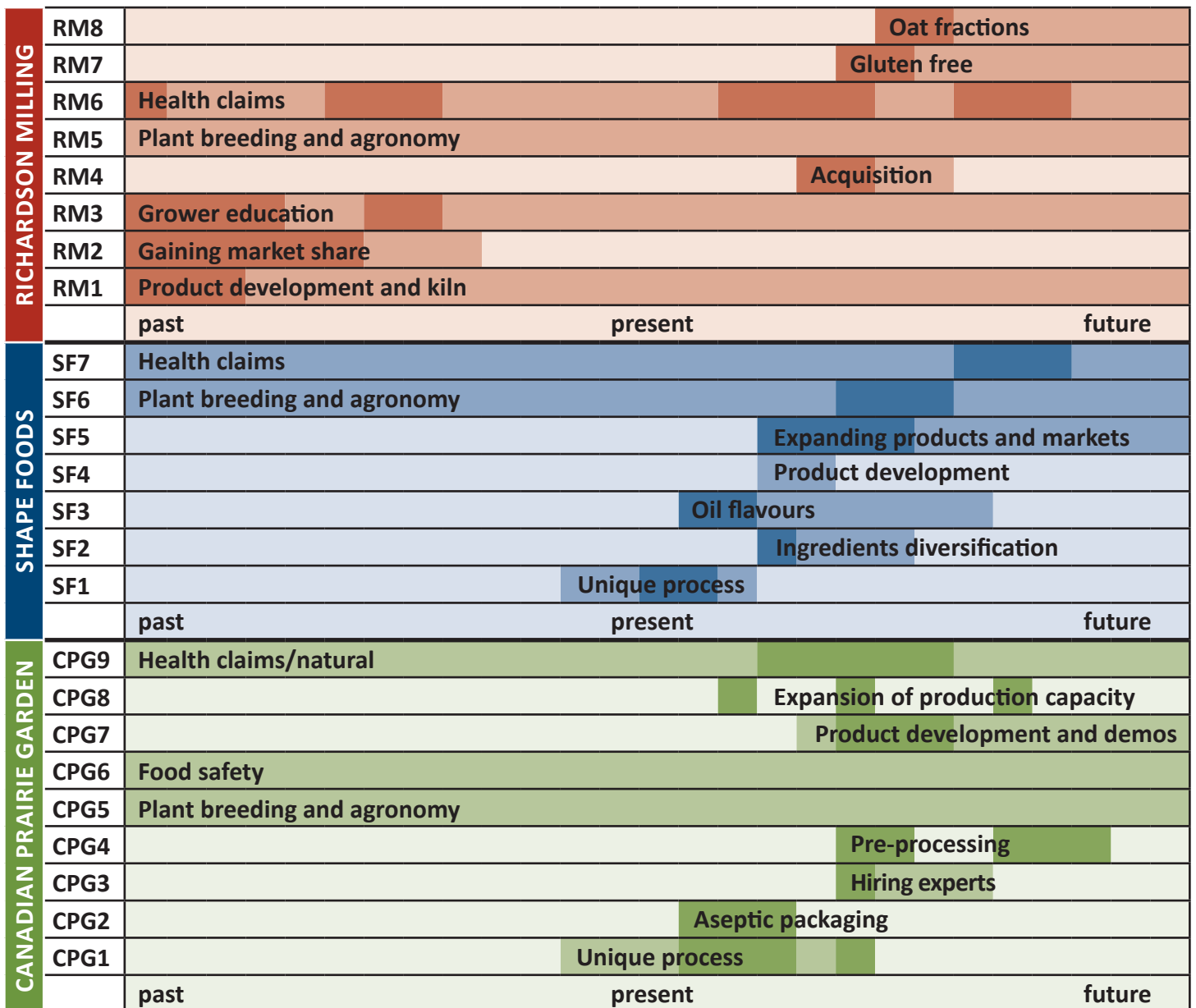


See Figure 4: Duration estimates of commercializing innovation initiatives across the 3 case studies located to the right.

- After 5-10 years, most commercialized initiatives, as reported by those interviewed, become integrated into normal operations and cease to be innovative. For example, gaining market share (RM2), flax oil flavours (SF3), and, hiring experts (CPG3) were eventually internalized operations.
- For all 3 ingredient processors product development with food manufacturers was more intense when their companies were getting established, and continues as an important ongoing innovation activity.
- Research preceded the development of unique processes with equipment suppliers (CPG1, SF1). Once the equipment is fully commissioned, the innovations in process become smaller and associated with product development.



Figure 4: Duration estimates of commercializing innovation initiatives across the 3 case studies



Innovation activity  


 More intense innovation activity

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## GROWTH FROM INNOVATIVE INITIATIVES

As successful commercialization processes bring innovations to market, growth is an important result. Just as the Manitoba Innovation Strategy (2014) argued, as have others (e.g., Hall et al., 2014), growth in businesses is why they foster innovation and commercialization. Growth is most often defined as increases in productivity, entering new markets, diversifying product range, while retaining and creating jobs and being competitive. As commercialization transforms innovative ideas to products, the business organization is also being transformed from their production line to their marketing and sales activities. Innovative businesses become flexible and nimble as they respond to customer needs and wants and as they work with their partners along the supply chain and organizationally too.

The interview data about the results or implications of the innovative initiatives were grouped into common categories. Initially five, then after refinement six categories emerged to describe the major type of growth associated with the initiatives. Four innovation initiatives (plant breeding and CPG expansion) are split in this analysis as different aspects resulted in different types of growth.

### Analysis of Growth Related to Innovation Initiatives

The initiatives formed into six categories of growth, and each is explained (Table 4).



See Table 4: Six categories of growth from innovation located to the right.

- **Expand market for ingredient.** 8 product and marketing innovations have or are expected to lead to expansion of the markets for the oat, flax and puree ingredients, resulting in more consumption of these ingredients. These innovations were related to development of significantly new products, some from new crop varieties with higher protein or oil content.
- **Health claims for oats, flax and pulses** are also expected to grow the market for these ingredients.
- **Increase market share.** 7 initiatives increased or will increase the share of the existing market for the processing companies; most are product and/or marketing innovations, such as new flax oil flavours, gluten free oats or product development with customers. Shape Foods' entry into the ingredient market and Richardson's establishment of market share are included.
- **Increase efficiency.** 6 initiatives led to increased efficiency, which can lead to growth in profitability. In all three cases, growers and plant breeders innovate to increase yields. Two organizational innovations improved efficiency in handling and pre-processing of raw oats and vegetables; as well, process and logistical improvements resulted from the acquisition of Can-Oat by Richardson International.
- **New company.** 3 initiatives led or will lead to the establishment of new companies. That is the unique processes and products developed by Shape Foods and CPG, as well as potential licensing and spin-off companies from CPG.
- **Employment.** 2 initiatives led directly to employment, hiring experienced staff and expansion of processing capacity by CPG. Little data was available on other changes in employment, but it would be expected that significant increases in sales or creation of companies would also increase employment.
- **Remaining competitive.** The notion that companies need to constantly innovate in order to remain competitive was often stated among those interviewed across all three cases. They also mentioned the importance of food safety certification, though it was only identified as an innovation initiative in the CPG case. Richardson Milling's product development with customers does not result directly in growth but is necessary to remain competitive.

**Table 4: Six categories of growth from innovation**

Growth Category	Richardson Milling	Shape Foods	Canadian Prairie Garden
Expand market for ingredient (8)	<p>RM5 – plant breeding gives specialist products</p> <p>RM6 – past and new health claims lead to higher consumption of oats</p> <p>RM8 – additional oat products made from fractions of oats</p>	<p>SF5 – new flax products &amp; markets</p> <p>SF6 – plant breeding and agronomy gives specialist products</p> <p>SF7 – health claims increase human flax consumption</p>	<p>CPG7 – demo product development for ingredient customers</p> <p>CPG9 – health claims for pulses increase puree ingredient use</p>
Increase market share (7)	<p>RM2 – gaining market share after “oat-bran collapse”, gradual growth of reputation and sales</p> <p>RM7 – taking advantage of oats natural lack of gluten</p>	<p>SF2 – entered new section of market through ingredient diversification</p> <p>SF3 – new oil flavours increase sales</p> <p>SF4 – product development with ingredient customers</p>	<p>CPG2 – aseptic packaging increases shelf-life and sales</p> <p>CPG7 – product development with ingredient customers</p>
Increase efficiency (6)	<p>RM3 – grower and handler education gives better raw oat supply</p> <p>RM4 – acquisition by Richardson International leads to investment and logistical efficiencies</p> <p>RM5 – plant breeding gives disease resistance</p>	<p>SF6 – plant breeding and agronomy give higher yields</p>	<p>CPG4 – pre-processing gives operational efficiencies</p> <p>CPG5 – plant breeding and agronomy give higher yields</p>
New Company (3)		<p>SF1 – unique process led to establishment of company</p>	<p>CPG1 – novel process and product led to establishment of company</p> <p>CPG8 – licensing and spin-off companies</p>
Employment (2)	N/A	N/A	<p>CPG3 – hiring and consulting experienced people</p> <p>CPG8 – increase number of processing lines from 1 to 6</p>
Remain competitive (2)	<p>RM1 – continuing product development with ingredient customers</p>		<p>CPG6 – food safety certification &amp; training</p>

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## Findings of Growth in Innovation Initiatives

- Six types of growth were identified as resulting from the innovation initiatives from all three cases (Table 4).
  - Growth as increasing share of the existing market or expanding the size of the market for the ingredient accounted for over half (14 of 24) of the initiatives.
  - 8 initiatives to remain competitive or increase efficiency help with profitability, for both processors and growers.
  - 4 initiatives were about creating new companies and increasing employment.
- Growth is often identified as a driver for innovation. This research points to 6 types of growth resulting from the identified innovation initiatives.

## SUMMARY OF FINDINGS ACROSS ALL THREE CASES

Commercializing innovation is bringing about a dynamic and robust bulk agri-food sector in Manitoba. New products and processes are sparking innovations in marketing and organizations for large and small processors. The innovation initiatives are building companies and contributing to growth in the sector. World-class process and product innovations by Shape Foods and Canadian Prairie Garden Purees are driving the growth of those companies. All three cases are reporting to be on the verge of realizing high-growth with novel products to meet customer needs. These will undoubtedly propel more innovations to be commercialized. The main opportunities for growth of the 3 cases lie with expanding sales geographically by entering new export markets and providing new ingredients or new food products from existing ingredients to meet consumer demand for natural, healthy food products.

Along the supply chain, there are many different patterns of relationships when commercializing innovation. For some innovation initiatives two

partners cooperated, in other situations much of the supply chain was engaged. The largest company, multi-national Richardson Milling, draws upon their extensive horizontally integrated relationships to work cooperatively and collaboratively with their innovation partners along the entire supply chain. Smaller, younger processors are enhancing their innovation capabilities by hiring outside expertise and specialists, as they grow and learn through each innovation initiative.

Moreover, initiatives are found throughout the supply chain that suggests a great deal of independence. Growers are innovating through plant breeding, which in turns results in improvements in the supply and quality of materials arriving at the processors. Food manufacturers, the customers of the processors, are cooperating in innovation initiatives with the processors, as together they create products to respond to the healthy food demands of retail consumers. Many participants emphasized the importance of an ongoing commitment of time and resources so they all realize some of the benefits from commercialization, be it opportunities to grow markets for flax, oats, pulses and vegetables.

A period of research consistently preceded the development of innovative processes with equipment suppliers. For both large and small processors, once an innovation was commercialized successfully it became internalized as regular operational activities – a new normal.

As to why innovate, the answer is for growth and survival. Growth means expanding the market for new ingredients or increasing market share. Constant innovation is also needed to improve efficiency and maintain competitiveness. Innovation in this agri-food sector spawned the growth of two new businesses in the last 15 years, which fosters further investment and generates an environment of entrepreneurs and innovators in Manitoba. This undoubtedly leads to increasing investor confidence, more exports, contributes to economic growth, and creates jobs, all benefiting rural areas.

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# Conclusions

## **Answering the research question: *Where are the opportunities for growth in bulk food processing?***

If growth is about innovation with bulk ingredients, then where it occurs is just about 'everywhere'. Innovation as featured in the three cases is an urban story as the processors are located in the cities of Portage and Brandon, but equally it is a big rural story too as processing in Manitoba creates stable local markets for Prairie producers. Given our brief review of the literature, this rural story is largely untold. Innovation for bulk ingredient agri-food sector extends from the researchers, seed breeders, and agronomists' labs and field tests to growers' fields and to transporters as they strive to maintain quality for processors. Their willingness to remain nimble over long periods and continually innovate with and for their manufacturing buyers will ensure a vibrant industry. The main opportunities for growth of the bulk ingredients industry lie with expanding sales in three ways: geographically, entering new export markets; and developing and marketing new ingredients and new food products from existing ingredients to meet consumer demand for natural, healthy food.

Of equal importance, this preliminary study of 3 cases reveals that these rural innovations are neither solo efforts nor efforts of a select few. Many of the innovation initiatives involve participation and investment by many along the supply chain as well as numerous other commercialization resources. Their investments varied, yet the multiple contributions appear to be a more coordinated choreography for the oat supply chain due to the long-established processor and industry. The younger businesses are building relations as they commercialize their innovations for processing flax for human consumption and making purees. While the motivation to participate in short and intense or long and continuous innovation efforts are partially explained by remaining competitive and for growth, the cases also underscored the importance of ongoing public investment in research and related centres to support these initiatives. Research and the related expertise directly contribute to many of these rural innovations.



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# APPENDIX A

CASE STUDY

## Richardson Milling

Strategies for Growth of Bulk Food  
Processing in Manitoba

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FEBRUARY 2015

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## >> Acknowledgements

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### **Rural Development Institute, Brandon University**

Brandon University established the Rural Development Institute in 1989 as an academic research centre and a leading source of information on issues affecting rural communities in Western Canada and elsewhere.

RDI functions as a not-for-profit research and development organization designed to promote, facilitate, coordinate, initiate and conduct multi-disciplinary academic and applied research on rural issues. The Institute provides an interface between academic research efforts and the community by acting as a conduit of rural research information and by facilitating community involvement in rural development. RDI projects are characterized by cooperative and collaborative efforts of multi-stakeholders.

The Institute has diverse research affiliations, and multiple community and government linkages related to its rural development mandate. RDI disseminates information to a variety of constituents and stakeholders and makes research information and results widely available to the public either in printed form or by means of public lectures, seminars, workshops and conferences.

For more information, please visit [www.brandonu.ca/rdi](http://www.brandonu.ca/rdi).

# Executive Summary

>> This applied research project answers the question: *Where are the opportunities for growth in bulk food processing?*

This case study is one of three conducted to describe successful bulk food processing companies in Manitoba and give insight into opportunities for growth and innovation in these industries.

Richardson Milling is a leading North American manufacturer of processed oats, a subsidiary of Richardson International. Richardson established itself as an industry leader by becoming a reliable supplier of quality bulk ingredients for North American breakfast cereal and granola bar manufacturers. Sells in units: of bags, totes and bulk rail.

Major past innovations:

- Kilning
- Organization change to Richardson
- Education
- Investments

Opportunities for growth in future are:

- Gluten free product
- Turn the focus to oat's health benefits
- Oat breeding & Beta-Glucan

# Introduction

## PURPOSE OF STUDY

Growth in food processing to produce bulk ingredients represents a major opportunity for Manitoba to increase economic activity in the province.

This research is a preliminary study into the growth opportunities from innovation in the bulk food processing industry in Manitoba.

Case studies were conducted for three Manitoba bulk food ingredient processing companies and their associated supply chains.

For the purpose of this study a bulk ingredient processor is defined as a company that sells to manufacturers, bulk wholesalers, distributors or businesses; the unit of sale will be significantly larger than the retail size.

## RESEARCH METHODS

The main research method was interviews with company and association leaders through the supply chain, together with researchers and other innovation partners.

This research uses “Instrumental Case Studies”: three particular cases are examined to provide insight into growth and innovation the bulk food processing industry.

The studies gather data on: history, activities (describe chain processes), setting (product & industry), other contexts and informants (chain). Beyond this description, the focus of the study is growth and innovation in each company and supply chain.

The “Oslo Manual” guidelines for collecting and interpreting innovation data were used to formulate the interview tool for the semi-structured interviews conducted in this study.

An innovation is defined the implementation of a significant change in product, process, marketing or organization that is new (or significantly improved) to the company.

The interviews covered several areas of focus:

- Overview: a description of the company, industry and supply chain are structured and how they work together
- An investigation of innovation in the companies, supply chain and industry:
- Past innovations that lead to this industry
- Innovation opportunities for the future
- Factors that affect ability to innovate
- Linkages to outside innovation resources

## INTERVIEW PARTICIPANTS

Participant	Role
Richard DeKievit <i>Richardson Milling</i>	Processor
Art Enns <i>Prairie Oat Growers Association</i>	Producer, Producer Association
Dave Shambrock <i>Manitoba Food Processors Association</i>	Processor Association
North American Ingredient Distributor	Distributor
American Baked Goods Manufacturer	Customer
Rex Newkirk <i>Canadian International Grains Institute</i>	Researcher
Nancy Ames <i>Agriculture and Agri-Food Canada</i>	Researcher
Bonnie Bain <i>Farm Credit Canada</i>	Financial
Susan Abel <i>Food &amp; Consumer Products of Canada</i>	Manufacturer Association

*Oslo Manual Source: OECD & Eurostat Agri-Food. 2005: Guidelines for collecting and interpreting innovation data.*

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## THE OAT INDUSTRY

Oats have been around since ancient times and are a staple crop both in Europe and North America, used in breakfast cereals, cosmetics, dyes and for livestock feed. In 2013, Canada produced 2,680 thousand metric tons of oats. Today, Manitoba producers harvest over 800,000 acres of oats each year, which is more than 25% of Canada's annual production. The majority of oats produced and processed in the Canadian prairies are exported to the United States and Mexico; smaller markets include the Caribbean, Latin America and Asia.

## RICHARDSON MILLING

### The Company

This case study examines the Richardson Milling oat processing plant located in Portage la Prairie, MB. This plant was established by Can-Oat in 1989 as a result of significant demand increase associated with oat bran consumption. Manitoba was chosen as the location based on raw material supply, strong local workforce, removal of oats from the Canadian Wheat Board, and competitive outbound logistics to key US destinations. Industry and market changes enabled Can-Oat to significantly grow the business and build a second facility in Martensville, SK. Later acquisitions of facilities in Alberta and Nebraska were added to complement and diversify the capabilities. In May of 2013, Richardson International acquired all of these oat milling assets from Viterra Inc. and formed Richardson Milling.

The Portage based oat mill employs between 115-130 people, and is one of the largest oat mills in the world. Richardson Milling's western Canadian oat plants have an annual capacity of over 350,000 tonnes, making them the largest exporter of processed oats.

The oat-bran craze of the 1980s spurred the beginning of the business; in the late 80's supply could not keep up with demand. However, the oat-bran collapse in the early 90's caused the

number of customers to drop drastically. Richardson Milling (then Can-Oat) worked hard to show customers they could meet their needs better than anyone else in the industry and successfully gained market share. Richardson Milling is now the supplier of choice for many flake and flour customers.

Richardson International is Canada's largest agribusiness company and has been serving the Canadian and International agriculture and food sectors for more than 150 years. They are recognized as a global leader in agriculture and food processing as well as a worldwide handler and merchandiser of all major Canadian-grown grains and oilseeds. Richardson has over 2,500 employees across Canada and the United States.

### Processing Oats

Oat processing begins with basic grade cleaning which removes any unwanted materials. The next step is the hulling process where the hull (30% by weight) is removed from the groat. The de-hulled oat (groat) goes through the kiln, which heats the groats to deactivate enzymes that cause rancidity and gives it a toasted flavor. The kiln can be adjusted to give different functional properties for later processing. The kiln is a major part of the proprietary nature of the business, integral to meeting customer specifications. Next, the groat is sized and cut. Finally, the groat is processed into one of the many rolled, flaked or flour products that are offered by Richardson Milling.

### Oat Products

- Whole oat groats
- Large Flake Rolled Oats
- Instant oat flakes
- Whole oat flour
- Oat hulls (animal feed ration)
- Oat hull pellets (bio-mass fuel)
- Steel cut oat groats
- Quick rolled oats
- Baby oat flakes
- Oat bran



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## Markets / Customers

Richardson Milling prides themselves on being a large scale oat ingredient supplier to end-use customers. They sell in wholesale quantities to large industrial manufacturers of cereals, snacks, biscuits, crackers and cookies. The majority of their sales are to the United States; they also sell within Canada and export to Mexico and Latin America.

## Position in Industry

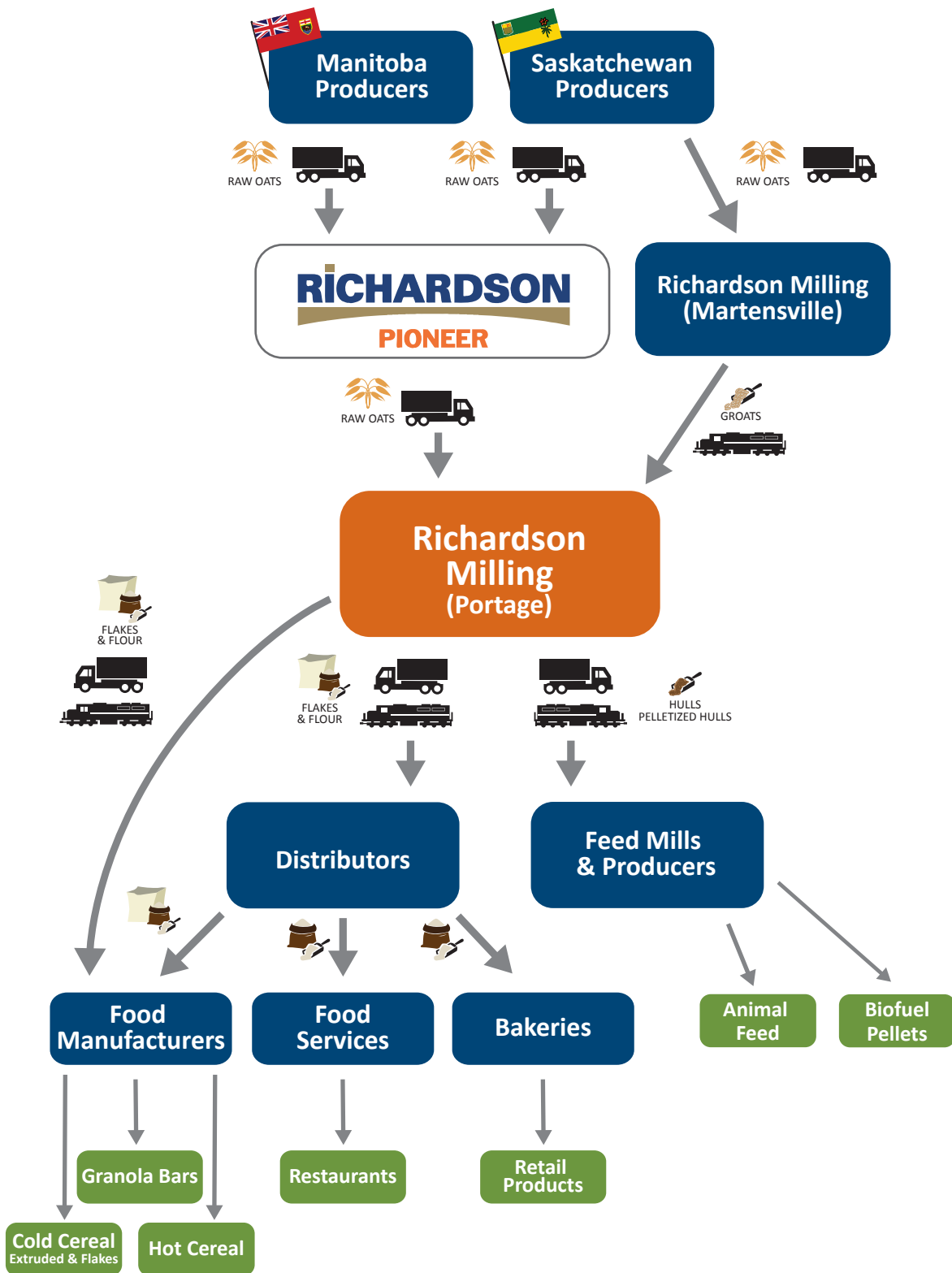
The Richardson Milling plant has been running for 25 years and therefore has a strong position in the oat milling industry. Its customer base is strong, long term and consistent because of the quality of their product, service and R & D capabilities. There are not many opportunities for new suppliers to enter the oat milling market, but Richardson Milling has the opportunity to grow in the market because of its established reputation in the industry and its network throughout the prairies.

Competitors are other oat millers, including some large food manufacturers, (who may also be customers). Internationally, Chile is emerging as a processed oat supplier, especially for the Latin American market.

## SUPPLY CHAIN

For the Portage la Prairie plant, Richardson Milling purchases oats from producers in Manitoba and Saskatchewan. Purchasing is done through Richardson International and the extensive Richardson Pioneer network. The grower relationship goes well beyond oats and is a trusted relationship built over time. Shipping of the oats is either direct to the mill by producers or through Richardson Pioneer elevators, whichever is most efficient. The Portage plant can process more finished product volume than its mill is capable of producing. Milled oat groats are supplied to Portage from the Martensville plant for further processing into finished products. Primary and finished food ingredient products are shipped directly to some large customers; food ingredient distributors are also an important part of the supply chain, especially for US distribution. Richardson leases rolling stock to facilitate transportation of their product. 90-95% of finished food ingredient sales are to the United States.

# RICHARDSON MILLING SUPPLY CHAIN



# Innovations

Richardson Milling has been involved in the oat milling industry for 25 years, leading to its long established relationships within the industry. Although there have been many years for Richardson to innovate, oats are known in the Canadian Prairie as a static and non-changing crop. Therefore, the major innovation in the oat milling industry is the process – the kilning, flaking and grinding. All other innovations that have taken place are market based.

Through interviews, it was noted that as long as there is a return, farmers will continue to grow oats and the industry will grow steadily as well. The most important part is to figure out how to get people to eat more oats which will open more markets. If this happened, the oat acres in Western Canada could double. Financial support for research and promotion is needed, as well as the people to do it.

<p><b>RM1 Innovation: The Kiln</b></p> <p>Type: Process / product</p> <p>New to: Company, industry at times</p> <p>Part of supply chain: Processor</p> <p>When: Past and continuing</p> <p>Time Line: One-step / incremental</p> <p>Developed: In-house with Food manufacturers</p>	<p>The kiln deactivates enzymes that cause rancidity, gives the oats a toasted flavor, and allows for adjustment to give different functional properties in regard to cook-ability and bake-ability. This is a major factor in the proprietary nature of an oat milling business, as every company has different ways they use the kiln and this sets Richardson apart from other processors. Richardson is continually working with food manufacturers to adjust the processing conditions (kiln) to achieve the functional characteristics that each customer needs.</p>
<p><b>RM2 Innovation: Gaining Market Share</b></p> <p>Type: Marketing</p> <p>New to: Company</p> <p>Part of supply chain: Processor</p> <p>When: Early 1990s and continuing</p> <p>Time Line: Incremental</p> <p>Developed: In-house with distributors</p>	<p>After the oat-bran collapse in the early 1990s, many companies were left with no customers. The company (Can-Oat at the time) worked very hard to meet customer needs better than anyone else in the industry. This was achieved by ensuring consistent high quality products through process modifications, listening to and working with customers to fulfill their needs, and providing good service in terms of consistent quality and delivery at a competitive price. These efforts have also included pursuing export markets for their products. These practices though no longer innovative to the company are still followed today.</p>
<p><b>RM3 Innovation: Grower Education</b></p> <p>Type: Product/Market</p> <p>New to: Industry</p> <p>Part of supply chain: Producer</p> <p>When: 1980's / 90's continuing</p> <p>Time Line: Incremental</p> <p>Developed: In-house with growers and customers</p>	<p>For Richardson, it was important to educate oat growers on the importance of keeping the groat intact throughout the harvesting process. If the groat is not kept intact, problems can arise in processing such as breaking up the kernel, which results in waste and decreased quality. Growers were educated about this issue through meetings to ensure a supply of the best milling grain available to Richardson Milling. Food manufacturing customers aided in this education, as maintaining the quality of the finished flake products was important to them. Success with this initiative and the current high quality of their supply is one of the reasons for Richardson's success.</p>

<p><b>RM4 Innovation: Change to Richardson</b></p> <p>Type: Organizational / process</p> <p>New to: Company</p> <p>Part of supply chain: Processor</p> <p>When: May 2013</p> <p>Time Line: One step</p> <p>Developed: In-house, with equipment suppliers</p>	<p>A number of changes that have enhanced company operations occurred following the acquisition of the oat processing plants by Richardson International:</p> <ul style="list-style-type: none"> <li>• Purchasing and supply is done through Richardson International and Richardson Pioneer – providing consistent high quality supply.</li> <li>• Investment in processing equipment and food safety systems.</li> <li>• Integrated IT systems leading to continuous improvement.</li> </ul>
<p><b>RM5 Innovation: Plant breeding</b></p> <p>Type: Product / process</p> <p>New to: Industry</p> <p>Part of supply chain: Grower</p> <p>When: Past and continuing</p> <p>Time Line: Incremental</p> <p>Developed: Researchers &amp; growers</p>	<p>Oat varieties are under constant development, to improve disease resistance and enhance properties desired by the rest of the supply chain, such as protein, or beta glucan content.</p> <p>There is very good cooperation with breeders and the chain to cooperate on setting priorities and funding for oat breeding in line with what the value chain wants. Changes in the variety registration program to protect breeders’ rights to intellectual property are anticipated to have a beneficial effect on plant breeding activity.</p>
<p><b>RM6 Innovation: Promotion of Health Benefits</b></p> <p>Type: Marketing / product</p> <p>New to: Market</p> <p>Part of supply chain: All</p> <p>When: 1989 to future</p> <p>Time Line: Incremental</p> <p>Developed: Entire oat industry, medical and other researchers</p>	<p>Oats have been scientifically recognized for heart health benefits since the 80’s. FDA approval for a beta-glucan / soluble fibre food label health claim in 1997 was an important milestone in the promotion of oat products. There is an opportunity to expand the market for oat products further by promoting the other nutritional components of oats such as protein. High protein is seen as desirable by consumers, and the fact that oat protein is a particularly well-balanced protein should be emphasized when marketing oat products.</p> <p>The health benefits of oats have the potential to cause 5% annual growth of the oat market, significant growth for an established commodity.</p> <p>It was suggested that the health system could have a major impact on promoting healthy ingredients through education of consumers / patients. Getting the health care system (and doctors) to understand the health benefits of oats could give rise to “prescriptions” for improved diet and lifestyle changes for the millions of people at risk of heart disease.</p>

<b>RM7 Innovation: Gluten Free</b>	Richardson Milling is putting resources to investigate a gluten free innovation. Oats are naturally gluten free, however in order to put "Gluten Free" on the label the entire supply chain must be free of wheat and barley. This requires the engagement and cooperation of growers, and all those that handle and transport the oats through the supply chain.
Type: Marketing / process	
New to: Company	
Part of supply chain: Supply side	
When: Future	
Time Line: Incremental	
Developed: In-house with suppliers, transporters	
<b>RM8 Innovation: Fractionating</b>	Oats are not being fractionated like other grain products such as corn. Can oats eventually get to the point where there is enhanced value from various fractions: fibre, protein, oil, starch, syrup? Richardson Milling is examining the possibilities of extracting the most functional nutritive components out of oats by investing in the technology available. Expansion of the "functional food" and supplement markets for oats and their derivatives could give another important market for Richardson Milling and the oat industry in general.
Type: Processing / Marketing / product	
New to	
Part of supply chain: Supply side	
When: Next 10 years?	
Time Line: Incremental	
Developed: In-house with Government, university and industry researchers	

# Innovation Methods

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## Factors that Affect Ability to Innovate

Richardson Milling innovates by proactively pushing new technologies out into the industry through their own research and development staff; they are both customer and product driven. They are in collaborative efforts with the Food Development Centre in Portage la Prairie as well as the Richardson Centre at the University of Manitoba. They also have a dedicated milling technologist who aids in the innovation of operational improvements in order to make the plant more productive through improved efficiency.

Innovative ideas generally come from what the customer (distributor or manufacturer) wants and are screened by the marketing team and the research and development team.

The main incentive for Richardson Milling to innovate is the customer; positive changes will keep the customer coming back. Another reason is the operational efficiencies that come with innovation; product quality is improved. Continual innovation means that the company will stay on top as a leader in oat processing.

Food manufacturers' innovations are driven by the customer and projected sales. Ideas are initiated and screened by R&D and marketing personnel.

## Innovation Linkages

Richardson's conducts external market research to anticipate and track consumer trends. They also use the services of the Food Development Centre.

Richardson Milling has significant innovation linkages with many researchers including agreements and funding of programs at the university level, government level and in-kind donations. They have mutual non-disclosure agreements when innovating with customers.

Richardson's consistency and stability in regards to distributors and customers is described as coordinated and collaborative as they are considered strategic suppliers. When dealing with suppliers, the relationship is at the cooperative level.

Linkages with the supply chain and innovation partners are stable and based on trust in some situations. With regard to stability, there are multi-year agreements which cause a mutually dependent relationship. The Prairie Oat Growers Association provides a useful forum where all members of the value chain, growers, millers, manufacturers, plant and food researchers can meet and establish a better understanding of each other's needs.



# Limits to Growth

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Any food processing depends on a reliable supply of quality raw material. Oats face challenges in getting seeded acres due to competition from wheat, canola and soy in Manitoba. Building relationships with producers and strong prices will ensure supply. For some sectors, such as organic (in Alberta) and high protein oats, contract growing is a possible option.

Recent difficulties in shipping grain by rail has led to missed opportunities for export of oats; however Richardson experienced few delivery problems due to their fleet of leased rail cars.

Although oats is an established, stable food, the market has changed in recent years: it has become convenience driven; cold cereals are no longer considered “convenient” and “bar” consumption has increased. Keeping up with these changes is a challenge for ingredient and food manufacturers. Changes tend to be slow, even if there is a health or other benefit; as there is a risk to changing an established product. There is also risk to moving too slowly and missing an opportunity as new innovative products often have a “life-span” of only 5-8 years.

Fully promoting the health benefits of oats and fractionating, splitting oats into various active components has the potential to increase oat consumption by about 5% annually. To achieve this, research must continue and the whole value chain from grower to manufacturer and retailers must work together to promote the benefits of oat consumption.

# Conclusions

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Major food manufacturing companies need ingredient suppliers that can reliably supply the quantities and quality they need. Richardson Milling is currently fulfilling this need by acting as a “strategic supplier” to several of their customers. Over the years they have built to become a successful company with a mature customer base, through a policy rooted in quality and customer service

Richardson Milling has succeeded in getting a consistent supply of good quality grain for their plant. However attention must be paid to making sure that oat supply is reliable through making it a viable competitive crop for producers to use in their rotation.

There is a possibility for future growth of the oat milling industry. This will stem from successful promotion of the beneficial effects on health of eating oats; to both the medical community and the general public. Promotion of protein content and cholesterol reduction, continued solid scientific research, together with the introduction of new products to make oats more available and attractive to consumers, should result in annual growth of about 5%.



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# APPENDIX B

CASE STUDY

## Shape Foods

### Strategies for Growth of Bulk Food Processing in Manitoba

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FEBRUARY 2015

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## >> Acknowledgements

*Thanks to Shape Foods, Inc. and all the supply chain partners and industry stakeholders who participated in this research.*

*This research was supported and funded by Manitoba Agriculture, Food and Rural Development (MAFRD)*



### **Rural Development Institute, Brandon University**

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# Executive Summary

>> This applied research project answers the question: *Where are the opportunities for growth in bulk food processing?*

This case study is one of three conducted to describe successful bulk food processing companies in Manitoba and give insight into opportunities for growth and innovation in these industries.

Shape Foods is a flax seed processor that manufactures organic and non-organic, non-GMO cold-pressed flax oil and meal. Their flax oil does not require refrigeration and has a shelf life of up to 2 years. They sell bulk ingredients throughout North America and overseas, as well as a private label which is exported overseas.

There is great growth potential for Shape Foods and the flax foods industry in general due to the numerous health benefits of the various components of the oil and meal. Shape Foods will need to work with all other members of the supply chain to build a stable network that meets everybody's needs. All members of the chain will need to invest and innovate to build this business to its potential. This represents both a challenge and an opportunity for all involved.



Courtesy of Shape Foods, Inc. – [www.shapefoods.com](http://www.shapefoods.com)



# Introduction

## PURPOSE OF STUDY

Growth in food processing to produce bulk ingredients represents a major opportunity for Manitoba to increase economic activity in the province.

This research is a preliminary study into the growth opportunities from innovation in the bulk food processing industry in Manitoba.

For the purpose of this study a bulk ingredient processor is defined as a company that sells to manufacturers, bulk wholesalers, distributors or businesses; the unit of sale will be significantly larger than the retail size.

## RESEARCH METHODS

The main research method was interviews with company and association leaders through the supply chain, together with researchers and other innovation partners.

This research uses “Instrumental Case Studies”: three particular cases are examined to provide insight into growth and innovation in the bulk food processing industry.

The studies gather data on: history, activities (describe chain processes), setting (product & industry), other contexts and informants (chain). Beyond this description, the focus of the study is growth and innovation in each company and supply chain.

The “Oslo Manual” guidelines for collecting and interpreting innovation data was used to formulate the interview tool for the semi-structured interviews conducted in this study.

An innovation is defined the implementation of a significant change in product, process, marketing or organization that is new (or significantly improved) to the company.

The interviews covered several areas of focus:

- Overview: a description of the company, industry and supply chain are structured and how they work together

- An investigation of innovation in the companies, supply chain and industry:
  - Past innovations that lead to this industry
  - Innovation opportunities for the future
  - Factors that affect ability to innovate
  - Linkages to outside innovation resources

## INTERVIEW PARTICIPANTS

Participant	Role
Stuart Kidd, Bill Vincent, Dane Lindenberg <i>Shape Foods, Inc.</i>	Processor
Cal Vandaele <i>Vandaele Seeds Ltd.</i>	Supplier/Cleaner/ Transport - truck
Manager, <i>Seed cleaner and supplier</i>	Supplier/ Cleaner
Executive Assistant, <i>Distributor</i>	Distributor
Eric Fridfinnson <i>Manitoba Flax Growers Association</i>	Producer Association
Brian Johnson <i>Flax Council of Canada</i>	Industry Association
Dave Shambrock <i>Manitoba Food Processors Association</i>	Processor Association
Kelly Fitzpatrick <i>Flax Council of Canada</i>	Industry Association
Grant Pierce <i>CARRM – St. Boniface Hospital</i>	Researcher
Rex Newkirk <i>Canadian International Grains Institute</i>	Researcher
Bonnie Bain <i>Farm Credit Canada</i>	Financial
Susan Abel <i>Food &amp; Consumer Products of Canada</i>	Manufacturing Industry Association

*Oslo Manual Source: OECD & Eurostat Agri-Food. 2005: Guidelines for collecting and interpreting innovation data.*

## THE FLAX INDUSTRY

Flax has been a food crop since ancient times, and is well established in Europe, especially Germany. Flax is also used in animal feed and in industrial applications (linseed); the plant fibres are used to make linen. As flax produces higher seed and oil yields in northern latitudes, Canada is one of the best places in the world to grow flax, producing 489,000 tonnes in 2012/13, 45% of worldwide production (80% SK, 11% MB). Flax remains a minority crop in the prairies when compared with wheat, canola soybeans or corn.

## SHAPE FOODS

### The Company

Shape Foods, Inc. crushes prairie grown flax seed into cold-pressed oil and flax meal. These are sold as bulk ingredients and retail packed for private label sales. The processing plant was built in Brandon Manitoba in 2006/7, and operational in January 2008. The original company ceased operations in 2008. Under new leadership, Shape Foods, Inc. was incorporated in 2009 and began crushing at the new plant in January 2010.

Shape Foods was established in Brandon because it had the desired social, economic and transportation links and a good supply of prairie flax seed was available.

Shape Foods' focus is on producing high quality, pure flaxseed based omega-3 oil and flax meal products that can be used to introduce these healthy ingredients to the consumers of North America and the world.

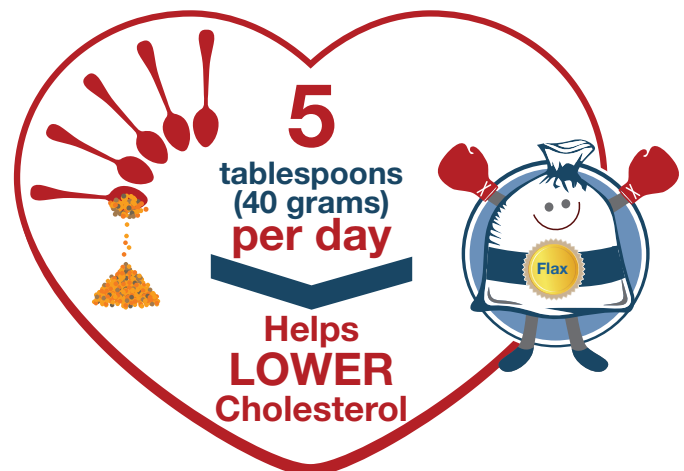
### Flax, Omega-3 and Health Benefits

Recent research on flax indicates that it may reduce the risk of heart disease, cancer, stroke and diabetes.

- In 2014 a health claim for flax was approved by Health Canada as helping reduce cholesterol
- Each tablespoon of ground flaxseed contains about 1.8 grams of plant omega-3s

- Flax oil contains 50-60% alpha-linolenic acid (ALA) an omega-3 polyunsaturated fatty acid. It is believed that the beneficial effects of flax to cardiovascular health and hypertension are due to its high ALA content.
- Flax oil provides better bioavailability of ALA than whole or milled flax seed; this gives a competitive advantage for the use of flax oil as an ingredient to provide dietary ALA.
- Omega-3 oils have anti-inflammatory effects. Flax oil can help consumers balance their ratio of omega-6 to omega-3 consumption. The recommended ratio for good cardiovascular health is 4:1, but the typical North American diet is about 20:1.
- Flaxseed contains 75 to 800 times more lignans than other plant foods, which have both plant estrogen and antioxidant qualities
- Flaxseed contains both soluble and insoluble fibre, which are important for healthy digestion and conditions such as heart disease and diabetes.

## FLAX, THE CHOLESTEROL FIGHTER



Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada



### The Processing Plant

Shape Foods' processing plant is a 70,000 sq. ft. HACCP certified state-of-the-art production facility. Flax arrives by truck (20 or 40 tonnes). The plant has the capability to add additional capacity under the current footprint.

### Processing

Shape Foods' proprietary manufacturing process cold presses flax seed, and removes impurities from the oil without the use of additives, chemicals, or preservatives. Due to this unique extraction method Shape's oil retains flavor and nutrients and has a two year shelf-life; much longer than the industry standard of 6 months.

### Products

Shape Foods' products include flax oil and flax meal marketed as ingredients, sold in several sizes.

Private label oils are available in 250ml or 500ml glass bottles; packaging is critical for flax oil as it is sensitive to light and needs to be protected in black bottles. Pure conventional and organic oils, as well as culinary and dessert oil flavours are available. Private label flax meal from brown or golden, organic or conventional seed is sold in 454g Mylar packs.

All Shape products are Kosher, Halal, gluten-free and vegan.

### Markets / Customers

Most of Shape Foods' ingredient sales are within North America. Their major market for private label is overseas, with significant focus on SE Asia. Flax meal is sold for both human and animal/pet food.

### Position in Industry

Shape Foods, Inc. has been operating for four years and has established a consistent customer base as an ingredient and private label supplier. Competitors are other flax and specialty edible oil producers, fish oils and crushers producing whole crushed flax seed.

### Competitive Advantages

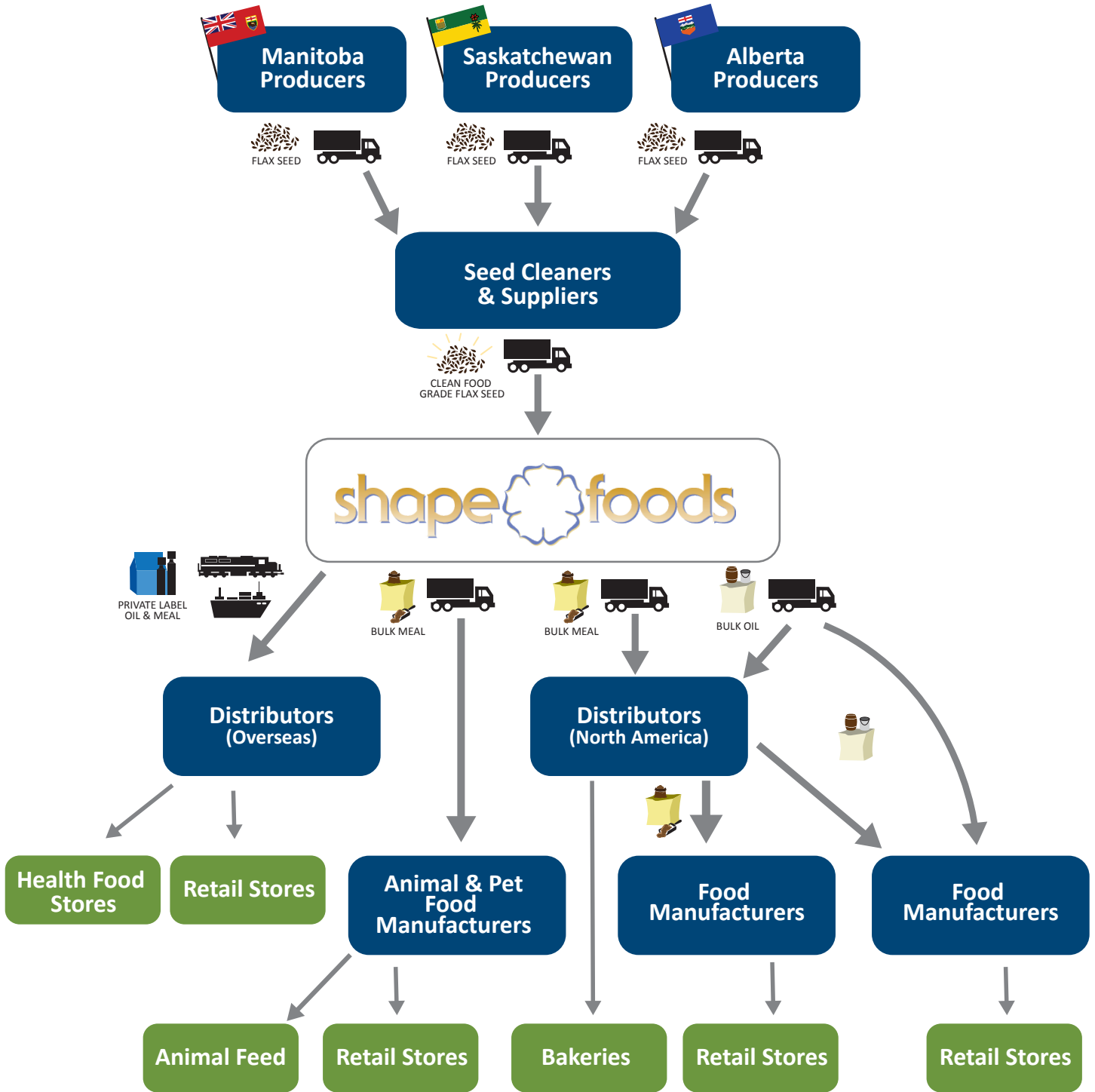
- Shelf stable oil, for up to 2 years
- Oil does not require refrigeration
- The only flax oil that can withstand pasteurization
- Excellent taste
- Culinary & dessert flavoured oils
- Average 11.5% residual fat content in meal, 6.5% omega-3

### SUPPLY CHAIN

Shape Foods purchases flax seed from producers across the Prairies in Alberta, Saskatchewan and Manitoba. The purchasing is done through seed suppliers who also clean and transport the seed by truck. Shape Foods sells its ingredients direct to food manufacturers and uses distributors/brokers to market their products.

After processing, the flax oil is shipped by truck in bulk (20 litre pails, 200 l drums, or 1000 l totes) to food manufacturers throughout North America. Bulk meal is also shipped by truck either in 750kg totes or 50lb bags to animal and pet food manufacturers and human food manufacturers. Private label oil and meal is shipped to port by train; then shipped by sea to overseas distributors.

# SHAPE FOODS SUPPLY CHAIN



# Innovations

Shape Foods' business is based on a unique proprietary process innovation that gives their oil excellent taste, nutritional properties and shelf-life. Their current business plan incorporates a two pronged marketing plan: selling oil and meal as bulk ingredients and reaching the retail market through private label sales, where their innovative flavoured oils give them a distinctive product. Study participants agreed that the health benefits of flax are and will be the main driver for growth and innovations in the flax food industry.

The past confirmed Canadian health claim for ground flax together with promising medical research on the benefits of omega-3 (ALA) and other active compounds in flax will lead to significant growth through marketing, process and product innovations, by Shape Foods or other members of the flax industry. Study participants indicated that the industry is ready to meet the projected increased demand for flax foods; this will include improving growers yield through agronomic and plant breeding innovation.

<p><b>SF1 Innovation: Unique Process</b></p> <p>Type: Process / product</p> <p>New to: World</p> <p>Part of supply chain: Processor</p> <p>When: 2004-6</p> <p>Time Line: Incremental</p> <p>Developed: In-house with equipment company</p>	<p>Shape Foods' has developed their own unique proprietary cold pressed oil extraction process. It is this proprietary process that gives Shape's products their exceptional quality and shelf life.</p>
<p><b>SF2 Innovation: Ingredients - diversification</b></p> <p>Type: Marketing / organizational</p> <p>New to: Company</p> <p>Part of supply chain: Processor</p> <p>When: 2010 and continuing</p> <p>Time Line: Step-wise</p> <p>Developed: In-house with distributors</p>	<p>Shape Foods is developing sales and markets for every part of the raw material flax seed processed. In 2010 the company launched a two pronged marketing strategy: selling their oil and meal as bulk ingredients to food manufacturers, together with reaching the retail market through private label sales. Shape is also diversifying their marketing efforts by actively seeking overseas markets such as SE Asia</p>
<p><b>SF3 Innovation: Flavoured oil</b></p> <p>Type: Product / marketing</p> <p>New to: Industry</p> <p>Part of supply chain: Processor</p> <p>When: 2008 and continuing</p> <p>Time Line: Incremental</p> <p>Developed: In-house with distributors</p>	<p>Shape Foods differentiates its products in the retail market by offering a number of different innovative culinary flavours including Italian and Szchuan, together with dessert flavours. This increases customer choice and available flavours, increasing the appeal of their private label products.</p>

<p><b>SF4 Innovation: Product development</b></p> <p>Type: Product / process / marketing</p> <p>New to: Industry</p> <p>Part of supply chain: Processor</p> <p>When: 2010 and continuing</p> <p>Time Line: Incremental</p> <p>Developed: In-house with customers</p>	<p>Shape Foods makes demonstration oil blends and flavours for customers; as well as various meal grinds. They also work with ingredient customers, giving technical processing advice so these food manufacturers can use flax oil and meal effectively within their products and not cause onset rancidity through improper handling and mixing. This cooperative product and process development is an essential component of establishing a long-term relationship between ingredient supplier and customer.</p>
<p><b>SF5 Innovation: Expanding products &amp; markets</b></p> <p>Type: Marketing / products</p> <p>New to: Company</p> <p>Part of supply chain: Processor + all</p> <p>When: Now and next 5 years</p> <p>Time Line: Incremental</p> <p>Developed: With distributors and others</p>	<p>Flax has very useful functional properties for food processing due to its water absorbing (hydrocolloidal) properties. Flax can be used to replace expensive guar gums in processed foods, adding to functionality for processing and adding nutritional benefit. This represents an opportunity as the oil industry is using large quantities of guar gum in fracking operations. Other markets that have potential for further growth include: the baking industry, flax dressings for salads, protein in third world countries, supplements and cosmetics.</p>
<p><b>SF6 Innovation: Flax breeding / Increased yield</b></p> <p>Type: Process / product</p> <p>New to: Industry</p> <p>Part of supply chain: Growers</p> <p>When: Continuous + next 5 years,</p> <p>Time Line: Incremental</p> <p>Developed: Flax Council of Canada with breeders and growers</p>	<p>There is significant potential to increase yield for Canadian flax growers through research and use of best-agronomic practices. This is essential to ensure a consistent supply of food-grade 99.9% clean product for food processing. A multi-year program with an agronomic package that could increase yield by 25% is currently being prepared by the Flax Council of Canada. This is intended to increase flax acres and production to meet expected increases in demand. It will also enable flax to compete in the battle for seeded acres with the dominant crops: wheat, canola and, increasingly in Manitoba, soy. There is evidence that flax has a genetic potential to give up to 2.4 times the current yield. Plant breeding research is also being conducted to give improved varieties in terms of agronomics, oil yield and food use. An example of a novel flax cultivar breeding project that could enhance Canadian flax for food use worldwide would be to breed a reduced cyclolinopeptide E flax seed cultivar. This would reduce the natural flavour bittering constituent in flax seeds and greatly enhance the character of the flax food taste profile. Developing and promoting Canada's flax growing expertise would allow for more growth as customers would come to Canada first, this could lead to doubling of the industry.</p>



<b>SF7 Innovation: Health claims</b>
Type: Marketing / product
New to: The industry
Part of supply chain: All
When: 2014 - future
Time Line: Incremental
Developed: Health researchers + entire supply chain

Flax has many components that have demonstrated beneficial effects on human health. The health benefits of omega-3 (ALA) are well established; ground flax reduces cholesterol (health claim); soluble fibre, lignans and protein all have positive effects. The study participants recommended continued efforts to educate the food industry, consumers and the medical community on the health benefits, quality and safety of flax. Continued scientific and medical research to explore and validate the health benefits is also essential. Human consumption of flax will increase significantly from the current value of about 20% of the crop, if the value chain works together to develop innovative marketing methods to promote the health benefits of flax and flax products.



Courtesy of Shape Foods, Inc. – [www.shapefoods.com](http://www.shapefoods.com)

# Innovation Methods

## Factors that Affect Ability to Innovate

Shape Foods innovates mainly on their own, with help from NSERC/NRC, the equipment manufacturer, and university and other researchers. The company generates ideas through Bill Vincent, the research and development manager at Shape Foods. Ideas are screened by looking at cost effectiveness, if they meet all the terms and conditions (for flavors), and if there is a maximum impact of omega 3 in a minimum dose. Incentives for Shape Foods to innovate include spreading the word about the health impacts of omega 3 and “offering a contribution to humanity that is ethical and profitable”.

As well, flax is a small player when compared to other grains such as wheat or canola. If the benefits of flax could be marketed to its greatest extent, the industry could double. Study participants suggested that the industry needs to work together through the entire chain (growers, processors, manufacturers, retailers and everyone in between). A sign that this is possible is the Flax Council of Canada’s (FCC) success in leading the elimination of Tryffid from the Canadian flax supply and the lead they have taken in agronomic improvement.

The time and money that it takes to market a novel product (1 year for smaller customer up to 5 years for large established customer) is another factor that affects Shape’s time-line to market for innovations. It takes time to build customer relationships and trust, making a new product is a risk for a food manufacturer. Before making a commitment, food manufacturers must be confident in the product and the ability of the ingredient supplier to consistently provide sufficient high quality supply of the ingredient.

## Innovation Linkages

External information sources for Shape Foods are NSERC, NRC and IRAP who also provide funding. In addition the Richardson Centre for Functional Foods and the Proteomics lab at the University of Manitoba, as well as the Food Development Centre in Portage le Prairie have assisted in product evaluation and development trials.

Their interaction with these linkages is described as cooperative, coordinated and collaborative. However, it was suggested by research participants that “people are in their own worlds” with regard to the cohesiveness of the flax industry in Manitoba, and more communication is needed. However, the chain relationships are still described as cooperative.

There are competing interests as producers want a high price for seed, while processors and manufacturers want the best product at the lowest price. These issues can be addressed by increasing efficiency of growers and yield, (as with the FCC agronomy package) and growing the whole industry. It was suggested that, areas of concern need to be put to the side so that the whole industry can concentrate on educating growers and customers about flax and its benefits in order to allow growth for the whole industry.

Shape Foods’ main area of concern when working with innovation linkages is intellectual property and proprietary information; these concerns are addressed through non-disclosure agreements.

It was agreed across the board that the consistency and stability within Shape Foods’ supply chain is healthy. Relationships are mature and established with reliable customers who are happy with the product. As well, there are new customers that have major potential.

# Limits to Growth

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There is sufficient supply of flax seed and initiatives underway to improve yields. Growth of seeded acres for flax is not unlimited as flax should be grown high pH soils with low cadmium concentrations to keep Cd levels low in the seed. Flax also contains small amounts of cyanogenic glycosides, the amounts are not sufficient to cause harm, but the issue must be addressed in some Asian markets. As well, in order for flax oil processing to grow, there has to be acceptance of new flax ingredients by manufacturers, and acceptance of new flax products by consumers, on an individual and country-wide scale.

With regard to the supply chain, limits to growth include poor secondary roads connecting producers to seed suppliers, consistent supply of food grade flax, yield and knowledge and the tendency for producers to chase last year's markets. Disposing of flax straw is a disincentive for some producers, but that is reduced as there is now a market for the straw in Manitoba. As well, it was suggested that flax breeding programs are not being supported well. This could hurt the industry as breeders would not have as much opportunity to enhance flax as a functional crop.



The industry as a whole has its own set of limitations to growth including a time sensitive need to reinvent themselves with customers, and the possibility that they may not be able to capitalize fast enough the opportunities open to the flax industry before someone else does.

# Conclusions

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Shape Foods has a unique process which gives excellent quality flax oil and meal that has great potential in the marketplace. Challenges begin at the producer level where it has been suggested that growers tend to chase last year's markets. An agronomic package would help growers to increase their yield by 25% which would help provide consistent supply to Shape Foods.

As for Shape Foods, it was consistently commented through our research that they need to continue to build partnerships and customer relationships. Although they have cracked the market in North America and SE Asia, it is important to keep pushing markets in order to grow in the bulk flax oil and meal industry.

There is increasing evidence that points towards flax gaining in popularity as a healthy food. The industry could grow immensely by marketing the health benefits of flax. The promotion of the health benefits of flax oil and meal depends on the cohesiveness of the industry. The flax industry needs to more effectively use the regulatory environment to their advantage (health claims).

The opportunities for growth in bulk flax oil and meal processing are abundant; it is up to the whole value chain to work together in order to meet the needs of potential customers in order to grow.



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# APPENDIX C

CASE STUDY

# Canadian Prairie Garden Puree Products

## Strategies for Growth of Bulk Food Processing in Manitoba

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FEBRUARY 2015

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RURAL  
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INSTITUTE

Dr. William Ashton (*RDI Director*) • Dr. Gillian Richards (*Project Lead, Researcher*)  
Eleni Galatsanou (*Researcher*) • Sarah Woods (*Student Research Assistant*)

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## >> Acknowledgements

*Thanks to Canadian Prairie Garden and all the supply chain partners and industry stakeholders who participated in this research.*

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# Executive Summary

»» This applied research project answers the question: *Where are the opportunities for growth in bulk food processing?*

This case study is one of three conducted to describe successful bulk food processing companies in Manitoba and give insight into opportunities for growth through innovation in these industries.

Canadian Prairie Garden Puree Products is a new company that is founded on a ground-breaking innovation; they have developed and implemented a unique puree manufacturing process. Their direct steam injection process makes many novel products: purees from vegetables, fruit and pulses for use as ingredients in the food manufacturing and food service industry.

Canadian Prairie Garden (CPG) has the potential to become a significant player in the market for puree ingredients. This growth will depend on the company gaining new markets for their products and managing their growth to be able to serve their new markets reliably and effectively. Development of new puree products and demonstration of use of their purees in recipes will be essential components to their sales and marketing efforts.

CPG will need to work with all other members of the supply chain to build a stable network that meets everybody's needs. All members of the chain will need to invest and innovate to build this new business to its potential. This represents both a challenge and an opportunity for all involved.



*Beet Chocolate Cake*

*Courtesy of CPG –  
canadianprairiegarden.com*

# Introduction



Chickpea Puree

Courtesy of CPG – canadianprairiegarden.com

## PURPOSE OF STUDY

Growth in food processing to produce bulk ingredients represents a major opportunity for Manitoba to increase economic activity in the province.

This research is a preliminary study into the opportunities for growth that come from innovation in the bulk food processing industry in Manitoba.

For the purpose of this study a bulk ingredient processor is defined as a company that sells to manufacturers, bulk wholesalers, distributors or businesses; the unit of sale will be significantly larger than the retail size.

## RESEARCH METHODS

The main research method was interviews with company and association leaders through the supply chain, together with researchers and other innovation partners.

This research uses “Instrumental Case Studies”: three Manitoba bulk food ingredient processing companies and their associated supply chains are examined to provide insight into growth and innovation within the bulk food processing industry.

The studies gather data on: history, activities (describe chain processes), setting (product & industry), and other contexts and informants (chain). Beyond this description, the focus of the study is growth and innovation in each company and supply chain.

The “Oslo Manual” guidelines for collecting and interpreting innovation data were used to formulate the interview tool for the semi-structured interviews conducted in this study.

An innovation is defined as the implementation of a significant change in product, process, marketing or organization that is new (or significantly improved) to the company.

The interviews covered several areas of focus:

- Overview: a description of the company, industry and supply chain, and how they work together
- An investigation of innovation in the companies, supply chain and industry:
- Past innovations that lead to this industry
- Innovation opportunities for the future
- Factors that affect ability to innovate
- Linkages to outside innovation resources

*Oslo Manual Source: OECD & Eurostat Agri-Food. 2005: Guidelines for collecting and interpreting innovation data.*

## INTERVIEW PARTICIPANTS

Participant	Role
Kelly Beaulieu <i>Canadian Prairie Garden Purees</i>	Processor
Local vegetable grower	Grower, Pre-processor, Transporter
Dave Shambrock <i>Manitoba Food Processors Association</i>	Processor industry Association
Dustin Omeniuk <i>Trappers Transport</i>	Transport
North American Ingredient Distributor	Distributor
Jonathon Hughes <i>Zast Foods</i>	Marketer
Mavis McRae – Project Manager Brad Gray - Chef <i>Red River Applied Research</i>	Innovation partner
Susan Abel, <i>Food &amp; Consumer Products Canada</i>	Manufacturing Industry Association
Martin Scanlon <i>Department of Food Science, University of Manitoba</i>	Researcher
Roberta Irwin <i>Food Development Centre</i>	Innovation partner
Tanya Der Manager, Food Innovation & Marketing, <i>Pulse Canada</i>	Commodity Industry Association
John Placko Culinary director, <i>Modern Culinary Academy</i>	Innovation partner
Bonnie Bain <i>Farm Credit Canada</i>	Financial

## VEGETABLE & PUREE INDUSTRY

Manitoba has an established vegetable growing sector with annual exports of over \$2m in fresh or chilled vegetables excluding potatoes; farm cash receipts for field vegetables were over \$35m in 2014. The majority of Manitoba vegetables are grown in the Portage area, most fresh produce is marketed through “Peak of the Market”.

Fruit and vegetable processing has been carried out in basic forms since pre-history. Major modern methods of preservation to extend shelf-life are to produce canned, frozen, and dried foods and juices. As the global population becomes more urbanized and wealthier, the demand for these products is increasing at about 1.1% annually (about 2x population growth)\*. The global puree industry is estimated to be about \$56b/year (N America \$32b). The global processed vegetable industry is estimated at \$190b for 2014.\*

\*Ref. *Global Fruit & Vegetables Processing, IBIS, World Industry Report, August 2014* (<http://www.ibisworld.com>)

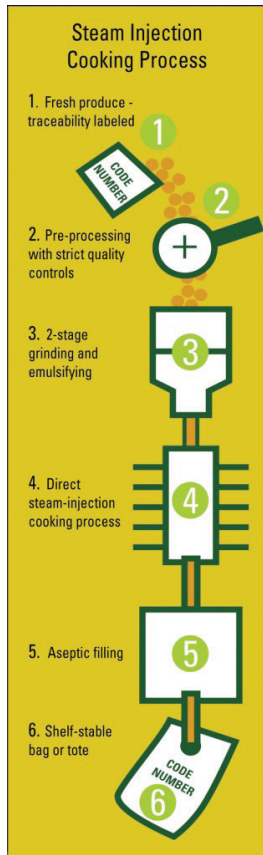
## CANADIAN PRAIRIE GARDEN PUREE PRODUCTS

### The Company

Canadian Prairie Garden processes the superior quality, locally grown raw produce into non-GMO purees. Both the plant and the growers are fully CFIA and HACCP certified.

Canadian Prairie Garden (CPG) began full scale processing in January of 2014 after 10 years of technological innovation. The pilot plant was operational in 2010. There are currently 10 employees working at the processing plant located in the “incubator” facility at the Food Development Centre in Portage la Prairie, Manitoba.

The company was started, and is owned and operated by COO Kelly Beaulieu. Kelly is a professional agrologist who grew up as a member of the Sandy Bay First Nation in Manitoba, Canada. The company's goal is to establish a processing capability that would capture the superior quality of the area's vegetable, legume and fruit crops.



Courtesy of CPG – canadianprairiegarden.com

Package sizes are 10kg, 240kg and 1300kg. Purees can be used as an ingredient in many applications including: soups, baby foods, smoothies, baked goods and desserts, mixed dishes and entrees including pasta enhancements, sauces and dressings.

### Processing

Fresh vegetables, fruit or pulses are processed into purees on an enclosed, continuous processing line using a process that is exclusive to CPG Puree Products. The direct steam injection high temperature cooking process results in full cooking and sterilization with minimal damage to cell structure of the vegetable, legume or berry ingredients.

Their current processing capacity is up to 25 million kg/year.

### Products

Products include 30 different low-acid purees with no additional ingredients or preservatives, including: carrots, onions, cauliflower, broccoli, beans and pulses, squash and saskatoons.

### Markets / Customers

CPG has chosen to market their purees as ingredients to both the food manufacturing industry and food service buyers. Currently they are concentrating on the North American market.

### Position in Industry

CPG Puree Products is a new company with an innovative product that is developing its position in the industry with about \$3m in sales in 2014. Competing products are frozen purees, unprocessed beans and pulses and fresh vegetables, particularly in food services.

### Competitive Advantages

- High quality purees - pure, colour, taste
- Shelf stable - not frozen
- Saves labour – food services
- New innovative ingredients

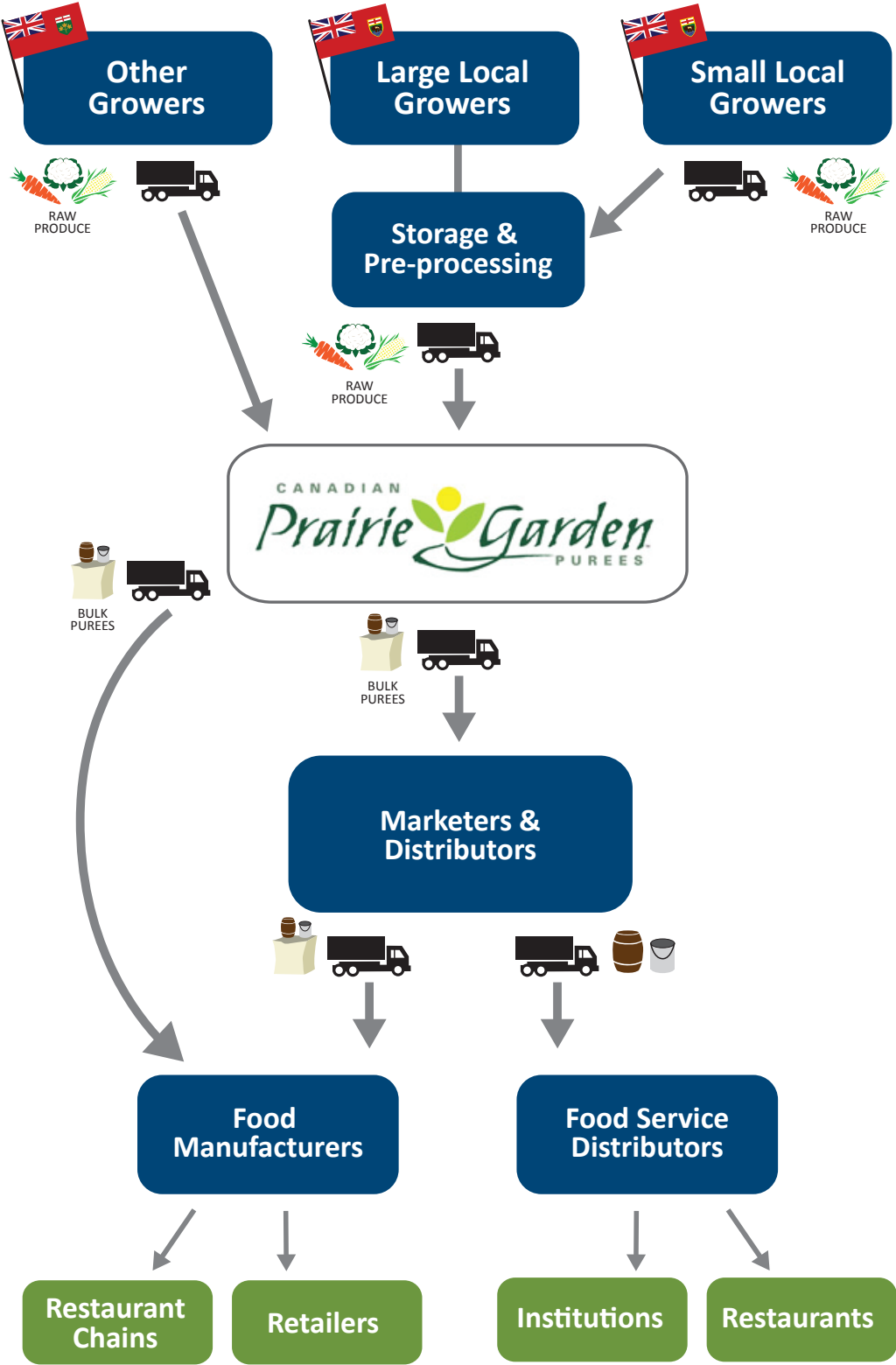
### SUPPLY CHAIN

CPG purchases directly from local growers, who at present are pre-processing the vegetables.

Vegetable growing is well established in the Portage area as the soils and climate are well suited. CPG can use culled vegetables (e.g. broken & crooked carrots) that do not meet retail standards; this reduces costs and waste of valuable food resources. CPG is in the process of developing the customer side of their chain, with the assistance of several industry partners in marketing and distribution.

They are selling their purees as ingredients into two main markets: food manufacturers and food services either directly or through distributors.

# CANADIAN PRAIRIE GARDEN SUPPLY CHAIN





# Innovations

Canadian Prairie Garden Puree Products’ business plan is based on a “new to the world” process innovation that took 6 years to develop, and 4 more years to bring to full production. This process results in new shelf-stable puree products with superior taste, colour and nutrients. These new ingredients require significant process and marketing innovation

to bring them to market, and establish consistent relationships with manufacturing and food service customers. There is considerable potential for growth in traditional puree applications and new opportunities made possible by the unique direct steam injection process.

<p><b>CPG1 Innovation: Direct steam injection</b></p> <p>Type: Process / Product</p> <p>New to: World</p> <p>Part of supply chain: Processor</p> <p>When: Past 10 years – 4 years production</p> <p>Time Line: Incremental</p> <p>Developed: In-house with equipment manufacturer and consultants.</p>	<p>Cooks the vegetable in 4-20 seconds which causes effective destruction of microbes with minimal damage to cell structure of the vegetable, legume or berry ingredients; there is no scorching of the puree which can happen with other methods.</p> <p>The gentle cooking process results in a consistent high quality product with retention of flavors, colors and nutrients.</p> <p>There is a 30% reduction in water usage and waste as well as energy, and up to 60% reduction in cleaning chemicals when compared with other processes.</p>
<p><b>CPG2 Innovation: Aseptic packaging</b></p> <p>Type: Process / Product</p> <p>New to: Industry</p> <p>Part of supply chain: Processor</p> <p>When: Past 10 years</p> <p>Time Line: Incremental</p> <p>Developed: In-house with consultant</p>	<p>Fresh, sterile bag with no microbes, no food pathogens; a safe way to handle the product. No addition of preservatives to the product is important to some customers. Three package sizes are available; after opening, the puree is usable for up to 7 days when refrigerated.</p> <p>The combination of direct steam injection and aseptic packaging gives a shelf-stable product (24 months) which is easy to transport, store and easy to use, (no need to freeze or refrigerate). This reduces labour and handling costs, and improves logistics for manufacturing and food service customers.</p>
<p><b>CPG3 Innovation: Hiring experienced people</b></p> <p>Type: Organizational</p> <p>New to: Company</p> <p>Part of supply chain: Processor</p> <p>When: Last 5 years</p> <p>Time Line: Step-wise</p> <p>Developed: In-house</p>	<p>CPG has made a deliberate effort to hire operational, sales and marketing staff with experience and a proven track record in the food processing industry.</p> <p>CPG also works closely with numerous advisors, consultants, academics, chefs and more recently marketers and distributors to expand the company’s research, development and marketing network.</p>

<p><b>CPG4 Innovation: Pre-processing</b></p> <p>Type: Organizational / Process</p> <p>New to: Company</p> <p>Part of supply chain: Grower</p> <p>When: Within the last year</p> <p>Time-Line: Incremental</p> <p>Developed: In-house with the growers</p>	<p>Pre-processing the raw product, i.e. cooling/washing/cutting/taking seeds out was recently moved from the processor to the growers; this allows CPG to be more efficient. Larger growers already have equipment and staff in place for such tasks for other customers. This is effective with present volumes. However, the price of produce will go up as the farmer's responsibilities increase. The less the farmer has to handle product, the better (unload it, cool it, wash it, handle it again, deliver in plastic totes – doubles the price). If volumes increase substantially, pre-processing may need to be done by the processor.</p>
<p><b>CPG5 Innovation: Agronomy</b></p> <p>Type: Product / Process</p> <p>New to: Company</p> <p>Part of supply chain: Grower</p> <p>When: Continuously, past and future</p> <p>Time Line: Incremental &amp; step-wise</p> <p>Developed: In-house and with suppliers</p>	<p>Growers innovate to increase yield and quality through improved agriculture practices and new varieties of crops that are developed by government &amp; industry researchers.</p> <p>As CPG grows they may work with local growers to grow new crops to provide supplies for new purees.</p>
<p><b>CPG6 Innovation: Food safety</b></p> <p>Type: Organizational</p> <p>New to: Company</p> <p>Part of supply chain: All, including transport</p> <p>When: Continuously, past and future</p> <p>Time Line: Incremental &amp; step-wise</p> <p>Developed: With regulators</p>	<p>The trend over past years has been for progressively better quality control and increased monitoring of processes to ensure food safety. This trend is anticipated to continue in the future.</p> <p>This affects the whole supply chain from growers to ingredient customers, including transportation to and from processing facilities. This requires incremental innovation, mostly through certification and training of employees.</p>
<p><b>CPG7 Innovation: Product development</b></p> <p>Type: Process / Product / Marketing</p> <p>New to: Industry</p> <p>Part of supply chain: Processor / Market</p> <p>When: Continuously, past and future</p> <p>Time Line: Incremental &amp; step-wise</p> <p>Developed: In-house, and with outside researchers; food scientists; chefs; customers</p>	<p>CPG's processing technology allows for continuous innovation in new products. There is continuous process/product innovation; ranging from working with customers to meet their exact specifications for particle size and texture to developing new puree products such as: cauliflower; navy beans and pulses.</p> <p>CPG also works with consultant chefs and customers to research new uses for their puree products; and demonstrate their use in recipes for both manufacturing and food service users. This includes traditional uses in soups and sauces to more innovative ideas such as incorporating bean puree into crême brulee or pulses into pasta. CPG considers this to be an essential step in marketing a new ingredient.</p>



<b>CPG8 Innovation: Expansion</b>	<p>CPG is planning to expand production significantly in the next 5 years. With plans to build to \$30m in 3 years, and \$180m in 5 years with a total of 6 process lines in a new facility. This level of expansion was considered reasonable by case-study participants. The opportunity for expansion is great in the \$56b global fruit and vegetable processing industry. There is no problem with supply of raw product, the land and expertise is available locally; especially with the recent reduction of potato acres.</p> <p>Other alternative possibilities for expansion are licensing of the direct steam injection process to other companies and spin-off companies that use CPG purees to make other ingredients or retail products.</p>
Type: Organizational / marketing	
New to: Company	
Part of supply chain: Process	
When: Next 5 years	
Time Line: Incremental	
Developed: In-house	

<b>CPG9 Innovation: Product expansion</b>	<p>Opportunities for growth from expansion of products, derived from future product and marketing innovations:</p> <ul style="list-style-type: none"> <li>• Protein or fibre supplementation from beans and pulses, this may be enhanced by future possible health claims</li> <li>• CPG purees enable consumers to increase vegetable consumption through non-traditional processed food sources.</li> </ul>
Type: Product / marketing	
New to: Industry	
Part of supply chain: Customer	
When: past & continuing	
Time Line: Incremental	
Developed: In-house	



Left: Carrot Puree    Right: Carrot Cake  
 Courtesy of CPG – [canadianprairiegarden.com](http://canadianprairiegarden.com)

# Innovation Methods

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## Factors that Affect Ability to Innovate

The incentives to innovate within this supply chain are to develop and grow the company, to maintain employment and grow sales through finding and meeting the needs of customers. Research funding has also facilitated R&D, e.g. MRAC, ARDI, AAFC.

Innovation ideas are generated in-house and through networks, they are evaluated through a business plan before research investment is made.

Obstacles to innovation are predictable: money, time and staff. Research and development takes away from production and is expensive. Generating in-house expertise to deal with new technology is a challenge.

It is also a challenge to introduce an innovative ingredient into the marketplace; change is difficult for any company, whether they are a manufacturer with an established product line or a chef with an established menu and ingredient sources. A new ingredient can require investment and innovation by the manufacturer in product development, product testing, processing changes, equipment and marketing. A new ingredient must justify these investments and be available as a consistent, high quality supply for a competitive price.

## Innovation Linkages

CPG innovates in-house, with the assistance of a network of experts: an engineering company to develop the process equipment, the Food Development Centre; food scientists; Red River Applied Researchers (chefs) and other industry consultants and partners.

Relationships with innovation linkages are both informal and formal; services are either paid for or “in-kind”. Some open information sources are used.

Ownership of intellectual property is a concern that is addressed through non-disclosure agreements; some innovations are kept “in-house”.

Opinions on the nature of the linkage relationships within the supply chain were variable; from collaborative to cooperative. There is good communication between neighbours in the chain – cooperative/coordinated; however a collaborative relationship through the entire value chain has not yet developed.

There is a good distribution network across North America; distributors and brokers believe in the product. It is too early to tell how stable relationships are with customers; however linkages with researchers are stable.

# Limits to Growth

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General opinion is that CPG has a superior product with a number of competitive advantages, especially in terms of taste, colour, nutritional retention, and shelf-life. These will appeal to manufacturers and food service suppliers, especially those who are capitalizing on current trends towards “natural” “pure” and “healthy”. The trend towards “functional foods” could also be advantageous to CPG as their products can enable the incorporation of fruits, veggies and pulses (with their fibre and protein) into processed foods. There is enthusiasm through the supply chain and innovation partners about the unique quality of CPG puree products and the potential for global growth.

The challenge is to raise awareness of the company and its products and gain enough customers to grow at a sustainable rate. Money is another limiting factor: significant investment in marketing and processing facilities will be needed to achieve the desired growth. Processing capacity must keep pace with sales; consistency of supply is paramount in the ingredients business.

Price is also important; a balance needs to be achieved between the customers’ desire for a low price and a premium price for a quality product needed for sustainability of investment, processing and supply (growers) for CPG.

There is enough local capacity for growers to produce sufficient supply of quality vegetables, expansion in the number of vegetable growers would also be relatively easy as the seeded potato acres have decreased recently. If CPG could run at full capacity in the future, the number of producers around the Portage la Prairie area could triple. As processing volumes increase there will need to be negotiations with growers – on price and supply (as there may not be sufficient volume of lower priced culled product). This will ensure that all parties are happy when the business starts to grow and volumes increase.

# Conclusions

Canadian Prairie Garden Puree Products is aiming to grow quite quickly. The challenge will be to work with growers and customers to balance the growth of supply, processing capacity and customer base.

The study participants thought CPG's goal of 6 fold growth of processing capacity in 5 years was reasonable and achievable. Developing and fostering good relationships throughout the supply chain will be essential to CPGs smooth growth and success. This potential growth is founded on a world-leading innovation in process and product, combined with innovative and sustained marketing to food service and food manufacturing customers.

There is great potential for growth in the bulk processing industry for fruit and vegetable purees. Consumers know the health benefits of these foods; purees provide an easy to use ingredient that will increase vegetable and pulse consumption. CPG is highlighting the purity, quality and ease of use of its Canadian prairie products; this approach would likely be beneficial to other Manitoba bulk ingredient processors.

The health benefits and ease of use are the most important aspects to highlight. Marketing the natural freshness and purity of this prairie Canadian product would also help the growth of CPG and the bulk food industry in Manitoba.

Some suggested areas of possible further expansion of puree products and their marketing included increased use in processed foods for specific health benefits; such as protein or fibre supplementation from beans or pulses.



*Top: Parsnip Puree  
Bottom: Parsnip Gnocchi*

*Courtesy of CPG –  
canadianprairiegarden.com*



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