



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

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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; Conference Board of Canada, 2015). Instead, we wanted to fill in a knowledge gap related to how innovation occurs, not generally, but specifically, with a study of 8 food processing companies.

Some innovations are ground-breaking 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). These two studies suggest when examining the manufacturing industry, using the notion of a "supply chain" it 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 (Ashton et al, 2014). 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). This project also includes researchers as part of the supply chain, thus reaching beyond the more typical firm-level

analysis. Innovation is complex, which can make it difficult to detect, let alone to measure. While products are easier to define and measure, it becomes more difficult for processes, and even more challenging for marketing and organizational innovations.

In examining only product and process innovations in the food processing industry, Agriculture Canada (2006) found information asymmetry; that is, process innovations were likely understated. In part because process innovations are largely initiated in-house with secure conditions. This research does examine product and process innovations in the food processing industry. All four types of innovation – product, process, marketing, and organizational – will be examined in this study. Given the broad range of innovations from large and well established as well as smaller and emerging, in the food processing industry, the cases examined form a diverse sample of businesses. This research uses the term ‘innovation initiative’, an innovation or collection of similar innovations identified by those interviewed. Of importance is identifying what is causing growth. This leaves open for them to discuss what is new and innovative, and avoids imposing a definition of innovation. In one way, this study is in part about what is defined as innovation by those in the food processing industry in Manitoba.

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 (CAPI, 2014) 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 (Agriculture 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.

There are other reasons to innovate. Possibly top among them is to respond to broader societal demands. One example is creating new functional foods targeting non-communicable diseases. This can include diabetes and heart disease. In Canada, the market for functional foods and nutraceuticals was estimated to range from \$1 to \$2 billion. In Manitoba, health area savings of \$360 to \$400 million per year are possible through changing eating habits to include more functional foods, as reflected in the Canadian Climate Advantage Diet (Patiño Valiente, 2014). While this research does not address these related reasons for innovation specifically, health benefits are becoming a reason for innovation, particularly as it relates to market demands.

In summary, this project sets out to understand innovation in the food processing industry regarding types of innovation, novelty, 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 programming, knowing more about innovation in this sector will contribute directly to provincial and local prosperity. Previous research by the Rural Development Institute concluded:

Continued health growth 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 examines sectors where one or more of their products are bulk ingredients for sale to other manufacturers.

Research Design & Analysis

>> 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 to buyers, be they manufacturers, bulk wholesalers, distributors or businesses. They do not sell to the final consumer; some or all of 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 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, including in other provinces as well.

We want to be able to generalize across bulk ingredient processors and those in the supply chain in Manitoba. This research design benefits from eight cases with great diversity. Examining diverse cases of food processors helps ensure that when similar findings occur across several or all, the 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 describes the process of selecting the diverse cases of food processors, 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, 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, and did not participate. In total, 12 processors declined involvement; with some not having time and others suggesting they were at critical times for their innovations, and asked us to come back later. We ensured confidentiality and accuracy by inviting processors to review the draft case study first, before it was circulated to other participants.

The diversity of the eight participating food processing companies varies by:

- Commodity – oats; flax; vegetables, fruit and pulses; hemp; wild rice; honey; cattle, bison and elk; wheat corn, millet and pulses
- Product – oat flakes and flours; flax oil and meal; purees; hemp oil, powders and seeds; rice and blends; honey; block ready meat and flours
- Age – established in 1954 to 2014
- Employees – over 10 to 115+

The companies at the centre of the eight cases are:

- Richardson Milling (RM) started in 1991 and now operates one of the largest oat mills in the world, exporting to the USA and Central America.
- Shape Foods (SF) flax processing plant started operations in 2008, and has established export customers in the USA and SE Asia.

- Canadian Prairie Garden Puree Products (CPG) had its first year of full production in 2014 employees, and currently sells to the US and Canada.
- Hemp Oil Canada Inc (HOCI) started in 1998, and is the world's largest producer of hemp oil; export destinations include Europe and the US.
- Floating Leaf Fine Foods (FL) began processing wild rice in 1955, now sells bulk rice and retail blends to customers around the world.
- Bee Maid Honey (BM), the largest producer owned honey processor in Canada was established in 1954, and sells retail and bulk honey; mostly to domestic and US customers.
- True North Foods (TNF), incorporated in 2012, plans to process cattle, bison and elk in a federally licensed facility, full capacity will be about 1000 head/week.
- Brar Natural Flour Mills (BNFM), started in the 1980's, mill specialty grain and pulse flours to supply authentic, traditional, South Asian ingredients to the North American market.

Table 1 profiles each company; the full case studies are in appendices A to H.



See Table 1. Profile of Eight Diverse Food Processing Companies in Manitoba located on Page 6 & 7.

RECRUITING SUPPLY CHAIN PARTICIPANTS AND DATA COLLECTION

Earlier research by the Rural Development Institute identified an initial list of contacts of leaders in this industry. Through discussions with the contacts, a snowball sampling technique narrowed the selection to locate processors. Once identified, a Web search of the processor gave a preliminary profile of their businesses. Senior executives from each of the processors were interviewed and asked to give contact information for supply chain partners and to confirm and add innovation partners. While suppliers to distributors were identified and contacted,

accessing the processors customers was more difficult given the busy schedules of senior company officials. With persistence we made contact.

Interviews were completed with processors, distributors, customers and industry-related organizations, researchers and experts. At least 5 interviews were completed for each case along their respective supply chains. Four industry experts were also consulted; they gave insights applicable to multiple cases. In total 61 interviews form the data base for this project.

ANALYSIS OF DATA

The interview data created the company case studies: 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 of the case study report was shared with the processors first, then after revisions, shared with and validated by the other case-study participants.





The categorization and definition of the innovation initiatives was derived from descriptions given by the interviewees; most initiatives were described by more than one participant. The initiatives varied from relatively short term activities such as processor development of a new ingredient process to multi-year, multi-component initiatives with whole industry participation such as researching and achieving health benefit labelling for an ingredient.

Cross case comparisons are a result of thematic analysis of the innovation initiatives where 5 themes emerged from the interviews:

- Types of innovations,
- Novelty,
- Impact in terms of types of growth,
- Involvement of others in the supply chain, and
- Chronology of the innovation.

Each of these themes is examined in more detail before completing a synthesis across all eight cases to derive a preliminary answer to the research question: *Where are the opportunities for growth in bulk food processing?*

Table 1. Profile of Eight Diverse Food Processing Companies in Manitoba

Case Study Criteria	Eight diverse food processing companies as case studies			
	 RICHARDSON MILLING RM	 SHAPE FOODS SF	 CANADIAN PRAIRIE GARDEN CPG	 HEMP OIL CANADA INC. HOCI
Website	richardson.ca	shapefoods.com	canadianprairiegarden.com	hempoilcan.com
Commodity	Oats	Flax	Vegetable, Fruit & Pulse	Hemp
Product	Flakes & flour	Oil & meal	Purees	Seeds, oil & powders
Start full production	1991	2008	2014	1998
Location	Portage la Prairie	Brandon	Portage la Prairie	Ste Agathe
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.	Privately owned
# Employees	115-130	No data	10+	30

Eight diverse food processing companies as case studies





 FLOATING LEAF FINE FOODS FL	 BEE MAID HONEY LTD. BM	 TRUE NORTH FOODS TNF	 BRAR NATURAL FLOUR MILLS BNFM
eatwildrice.ca	beemaid.com	truenorthfoods.ca	sherbrarmills.com
Wild Rice	Honey	Beef, Bison & Elk	Grains & Pulses
Wild rice, blends & products	Packaged honey	Block Ready Meats	Flours
1955	1954	2012	1980's
Winnipeg	Winnipeg	Carman	Winnipeg
Family owned	Owned by producers co-operative	Privately Owned	Family Owned
20	40	25	25

Table 2: List of Innovation Initiatives from Cases

 Richardson Milling	 Shape Foods	 Canadian Prairie Gardens	 Hemp Oil Canada Inc.
RM1 – kiln and product development with ingredient customers	SF1 – unique process gives shelf stable product with excellent taste	CPG1 – novel process, direct steam injection retains colour and nutrients	HOCI1 – novel hemp seed crushing, cold pressing and filtering processes
RM2 – gaining market share after “oat-bran collapse”, gradual growth of reputation and sales	SF2 – ingredient diversification	CPG2 – novel aseptic packaging gives shelf stable product	HOCI2 – novel processes to de-hull and roast hemp seeds
RM3 – grower and handler education gives better raw oat supply	SF3 – new oil flavours	CPG3 – hiring and consulting experienced people	HOCI3 – product development through the hemp food chain
RM4 – acquisition by Richardson International leads to investment and logistical efficiencies	SF4 – product development with ingredient customers	CPG4 – pre-processing of raw crop	HOCI4 – marketing of and research on health benefits of hemp food products
RM5 – plant breeding gives specialist products and disease resistance	SF5 – new flax products & markets	CPG5 – plant breeding and agronomy give higher yields	HOCI5 – plant breeding and agronomy research and guide for new producers
RM6 – past and new health claims lead to higher consumption	SF6 – plant breeding and agronomy gives higher yields and specialist products	CPG6 – food safety certification & training	HOCI6 – expansion of processing capacity, investment in equipment and processes through the supply chain
RM7 – taking advantage of oats natural lack of gluten	SF7 – health claims increase human flax consumption	CPG7 – demo product development for ingredient customers, product development with food manufacturers	HOCI7 – planned new company for healthy hemp seed extracts, research into health benefits
RM8 – additional oat products made from fractions of oats		CPG8 – increase number of processing lines from 1 to 6, licensing and spin-off companies	HOCI8 – opportunity to use the whole plant and expand the industry
		CPG9 – health claims and supplementation	HOCI9 – opportunity expand into new market sectors and geographies

 Floating Leaf Fine Foods	 Bee Maid Honey Ltd.	 True North Foods	 Brar Natural Flour Mills
FL1 – proprietary wild rice roasting and quick cook rice processes	BM1 – producer-owned cooperative, makes company "honey experts"	TNF1 – federally licenced ruminant processing plant	BNFM1 – traditional Indian ingredients, made in Canada
FL2 – wild rice blends with pulses and other grains	BM2 – product development, new flavours, textures and products	TNF2 – small, flexible federal plant, gathering animals from 100-200 mile radius	BNFM2 – product development of atta, corn, millett and chana daal flours
FL3 – product development, pastas and pancake mix, potential new health products	BM3 – Packaging design and manufacture, retains and opens markets	TNF3 – individual “pod” processing gives increased flexibility and traceability	BNFM3 – development of healthier products: high fibre atta, gluten free flours and low glycemic index atta
FL4 – updating retail packaging to retain or increase market share	BM4 – New markets: food service, Chinese exports, potential health benefits	TNF4 – custom processing service to multiple species and specialty markets	BNFM4 – marketing health and nutritional benefits of ingredients and foods
FL5 – world class BRC food safety certification opens new markets	BM5 – Bee health: working with multiple partners to stay ahead of pests, diseases and weather	TNF5 – environmentally sustainable and low cost solution to disposal of waste water	BNFM5 – International Year of Pulses: increasing awareness of uses, nutritional benefits and sustainability of pulses
FL6 – upgrading equipment and processes, through the supply chain from harvesters to distributors	BM6 – Increase in crop pollination services and monoculture	TNF6 – livestock breeding for customer preferences, feed efficiency and profitability	BNFM6 – modernizing and upgrading technology and facilities through the supply chain
FL7 – expansion opportunities in export and ingredient markets: vegetarian, organic and starch alternatives	BM7 – Updating technology, machinery and practices through the supply chain	TNF7 – new livestock management techniques and adoption of new technology	BNFM7 – innovative marketing and packaging
FL8 – future expansion and upgrading of FL processing facilities	BM8 – diversification to reduce risk and serve customers	TNF8 – marketing meat’s nutritional properties, serving niche markets	BNFM8 – opportunities for new markets: food service, exports or convenience foods
		TNF9 – opportunity for added value processing for Canadian and export markets	

Analysis of Cases

➤ A thematic analysis across eight cases was used to understand the commercialization of innovation in the bulk food ingredient sector. Each case reported on five fundamental aspects, namely: types of innovation, novelty and impact on growth, types of growth, coupled with an analysis of innovation along the supply chain and duration for commercialization. Each aspect is described along with the findings and conclusions.

Across the 8 cases, 66 innovation initiatives are analysed (Table 2). The cases with more details of the companies, their supply chains and innovations are in Appendices A - H.

Generally, the innovation initiatives were similar in number across all 8 case studies: – from 7 and 9 innovation initiatives identified for each processor and their supply chain.



See Table 2. List of Innovation Initiatives from Cases located on page 8 & 9.

CATEGORIZING 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 the more traditional notions of innovation of product and process are also joined by marketing and organizational innovations. In addition, Kline and Rosenberg (1986) described a chain-linked model of innovation that considers linkages between types of innovation and individuals and organizations along the supply chain.

This research initially categorizes the types of innovation initiatives; then examines relationships to understand the linkages between innovations, as seen by those interviewed.

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.



See Figure 1. 66 Types of Innovation Initiatives from Cases located on the right..

Analysis of Types of Innovation Initiatives from Cases

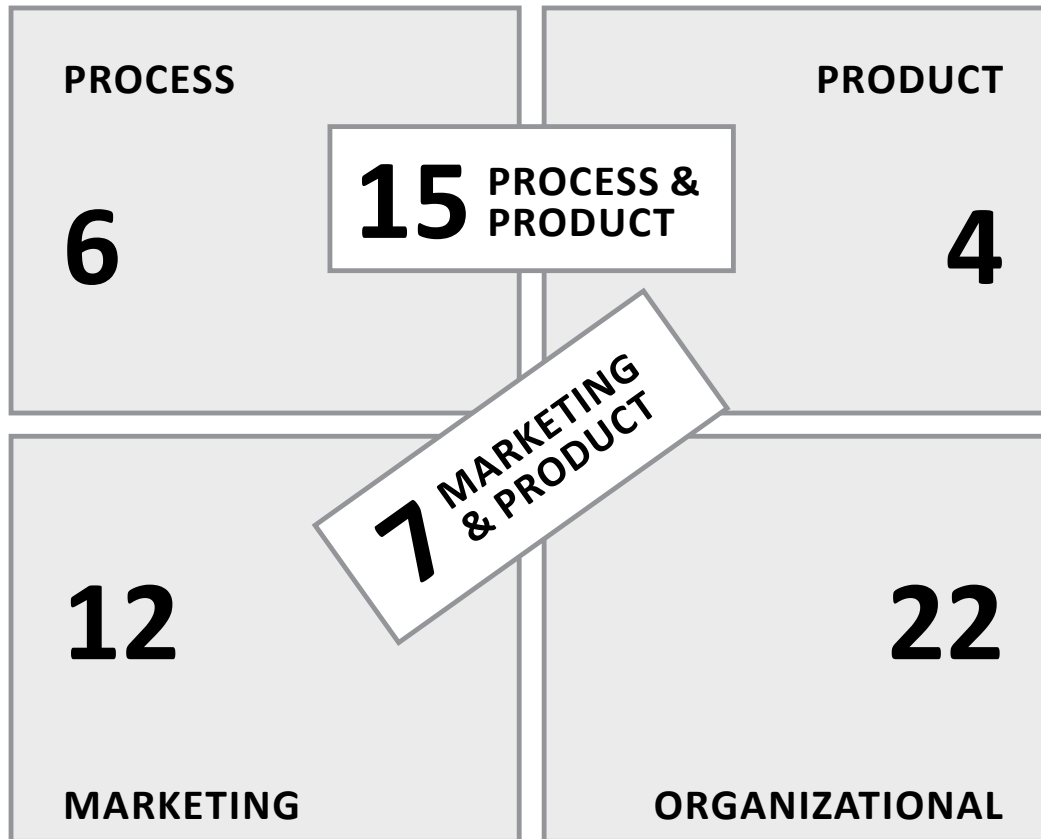
All four types of innovation are evident across the cases, together with paired innovations. (Figure 1).

Process innovations are part of 21 initiatives, though only 6 are classified “process” only, for example companies through the supply chains updating equipment and processes to keep up to date with advances in technology (FL6 and BM7).

Product innovations (26 total) are usually paired with product or marketing; one of the 4 “product” initiatives is Shape Foods working with manufacturing customers to develop new retail products from their innovative of new flax ingredients (SF4).

Marketing innovations: 19 initiatives are identified involving marketing, 12 are not directly paired with a product. These usually concern development of new export or domestic markets, or are related to health

Figure 1: 66 Types of Innovation Initiatives from Cases



benefits and labelling. For example: Opportunities for wild rice to expand into new markets for export and ingredients, namely organic, vegetarian and starch alternatives (FL7).

Organizational innovations: a total of 22 diverse initiatives are identified as organizational. From hiring experienced staff (CPG3), establishing a company through an innovative idea (BM1, BNFM1, TNF1) or the planned creation of a new spin-off company to make hemp products to serve the health food and nutraceutical markets (HOC17).

Paired Types of Innovation Initiatives

Often a novel product involves a novel process. This is a familiar pairing in food science, where both product and process are occurring concurrently, referred to as PPD (Product/ Process development). Of the 15 paired **Product / Process** initiatives, 9

involve the processors developing a new process to give a novel food ingredient. An example is FL1, the development of an innovative process to make a wild rice product that cooks in less than half the time of conventional wild rice. Three initiatives with a pairing of product and process involve agronomy; e.g. in the oat industry (RM5), advances in the processes of seed breeding and agronomy result in desired specialist products such as oats with higher beta glucan content. The remaining 3 initiatives of this type concern ingredient and retail product development.

Seven initiatives pair **Marketing / Product**. Here a marketing initiative and development of new product(s) are intertwined. For example, the development of culinary flavoured flax oils (SF3) requiring significant product development and consumer research to enable creation of a new culinary market for flax oil.

There were examples of initiatives that, in continuing though to commercialization, triggered other linked initiatives within companies and along the chain. For example, as the hemp food industry started the first priority was to grow hemp seeds (product) and create ingredients (product / process), such as hulled hemp seeds (HOCI2). This new product needed to be marketed to food manufacturers, to make a retail product such as a new bar (HOCI3); this in turn required product/process development and new marketing. Another example is the organizational innovation (RM3) of the processors, food manufacturers and commodity organizations working together to establish an oat grower education program. This led to changes in agronomy and handling by producers and handling processes by transporters; which in turn led to increased quality of raw oat product coming into the mill, giving less waste and increased quality of processed ingredient (product).

Findings Based on Type of Innovation

- All four types of innovation are represented among the 66 initiatives from across the cases, showing that these companies are innovating in many diverse ways.
- This analysis indicates a complex relation exists among the types of innovation, especially exemplified by paired initiatives. One third (22) of the initiatives are best described as a paired innovation because the two types of innovation are occurring at the same time, either Product / Process or Marketing/ Product.
- In addition there are linkages among initiatives, involving two or more types of innovation. Such commercialization is referred to as chain-linked innovation and can involve multiple members of the supply chain.

NOVELTY AND IMPACT

The novelty of an innovation initiative is informed by the OECD Guidelines (2005). This Guide suggests three levels of novelty in terms of i) new to the

company, ii) new to the industry (market/province), or iii) new to the world. In terms of growth, those interviewed indicated three levels of growth associated with an innovation initiative: i) small, ii) moderate or iii) large impact on growth.

Figure 2 plots the initiatives' novelty, and the level of growth that occurred or is anticipated to occur from realizing an initiative. The scales on the plot (Novelty and Impact) are based on interviewees' responses (thus an ordinal scale). Drawing from across all eight cases, the large number in the cell indicates the number of initiatives in the quadrant. The small numbers associated with the processors' logo indicate the initiatives for each case.



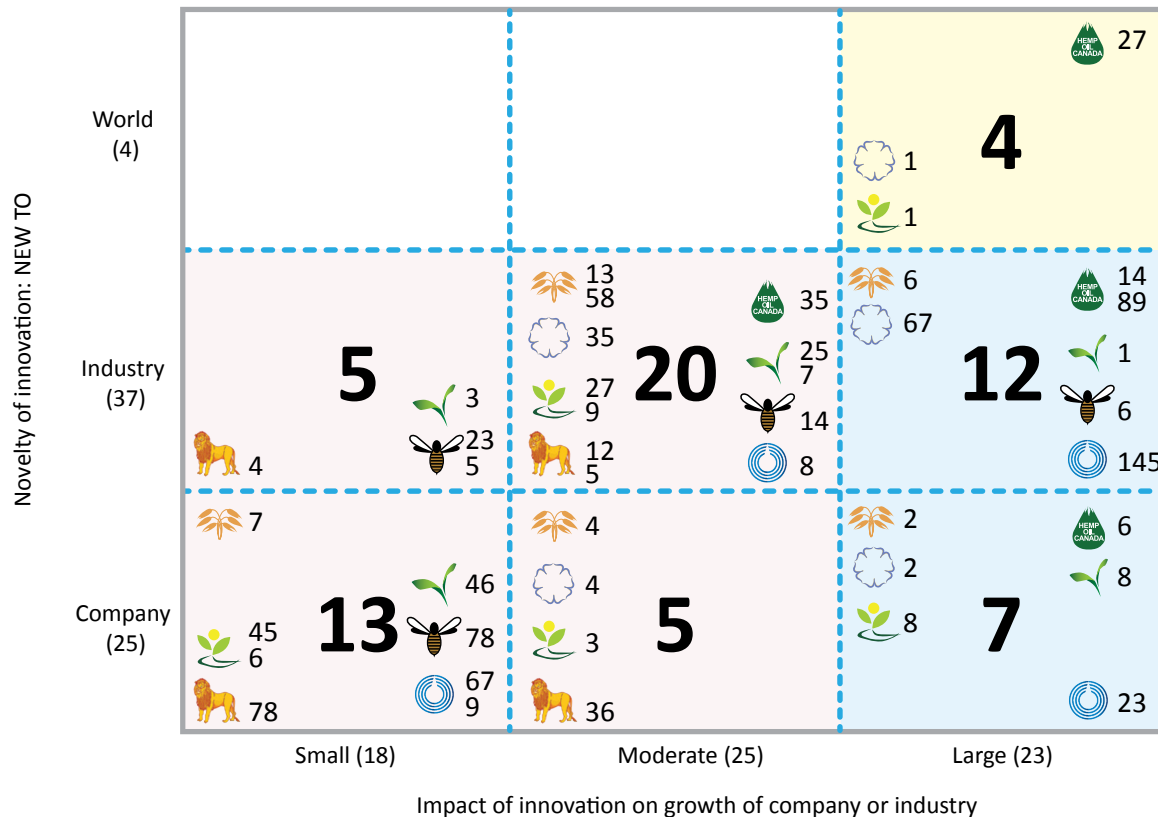
See Figure 2: Novelty and Impact for Innovation Initiatives located to the right.

Analysis of Novelty and Growth of Initiatives

The 66 initiatives reflect different levels of novelty and levels of growth, Figure 2. Four initiatives are new to the world, 37 (5+20+12) initiatives (56%) are new to the industry or market, and the remaining 25 (13+5+7) new to the company. Drawing from the interviews, there are three patterns of novelty and growth evident in Figure 2.

- Four world-class initiatives originating from three processors resulted in new companies; they are leading to a large amount of growth (top right corner). The unique processes and products developed by Shape Foods (SF1) and Canadian Prairie Garden (CPG1) are the base on which both of these companies are built, making them stand out from their competitors. Hemp Oil Canada was the first company to successfully commercially de-hull hemp seeds (HOCI2); this too is a founding pillar of this company. A planned spin-off company (HOCI7) to create new extractions of hemp to serve the health food and nutraceutical markets is the fourth new to the world innovation.

Figure 2: Novelty and Impact for Innovation Initiatives



- Large growth is possible from different levels of novelty (right hand column). 23 initiatives (35%) have large impacts. 7 of the 8 cases have at least one initiative giving large growth. Hemp is notable in having 6 such initiatives, reflecting the rapid growth of the company and industry. 5 True North initiatives are instrumental in the establishment of their ruminant processing facility, which could increase Manitoba capacity by a factor of 5. Large growth is also projected from increasing consumption due to health benefits of oats, flax and hemp, new facilities and spin-off companies (e.g. CPG8, FL8) and new processes, products and markets.
- Innovation seems fundamental to the food processing sector (2x2 cells left hand corner). 43 initiatives are new to the company or industry with low to moderate growth. 25 initiatives give moderate growth, where each case study had at

least 2 initiatives. These innovations vary greatly and include new flax oil flavours (SF3), product development of traditional Indian flours (BNFM2 &3)) and advances in agronomy to improve oat quality and yield (RM3). Meanwhile, relatively small impacts are associated with 18 initiatives. Five new to industry initiatives include innovations in product development (BM2, FL3), bee health and packaging in the honey industry. Thirteen new to company initiatives give small amounts of growth; these included upgrading technology (FL6, BM7), innovation by producers (CPG5, TNF6 & 7, packaging (FL4, BNFM7) and new products (RM7, BNFM8).

Two blank cells (top left corner) for new to the world and small to moderate impact is not surprising as a successful world leading innovation would be expected to lead to large amounts of growth.

Findings from Novelty and Growth of Initiatives

- Innovation initiatives of all levels of novelty and growth exist in these cases.
- Four world class initiatives result in the formation of a new company; each is developing new products and processes with significant advantages over their competitors. The four initiatives are reported to result in large amounts of growth. These initiatives when coupled with another 19 large growth initiatives, suggest the future trajectory of this industry is on a continuous growth track.
- In addition, with initiatives numerous across companies and industry, the sectors exhibits a propensity for innovation be it processing companies or firms in their supply chains building new facilities, developing products, seeking new markets; designing packaging or upgrading technology. Innovation is enabling companies to remain relevant and competitive.

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, business organization is also being transformed, from production line to marketing and sales activities. This suggests businesses with innovation initiatives are flexible and nimble to respond to customer needs and wants, and as they work with their partners along the supply chain and together as an industry.

The interview data about the results or implications of the innovative initiatives are grouped into common categories of growth. Initially five, then

after refinement six categories emerged to describe the major types of growth associated with each of the initiatives.

Analysis of growth related to Innovation Initiatives

The initiatives formed into six categories of growth:

- Expanding market for product
- Increasing efficiency
- Gaining market share
- Creating new companies
- Remaining competitive
- Increasing employment

Each is explained in Table 3.

- **Expanding markets:** 24 initiatives from all eight cases involve expansion into new markets generally resulting in large or moderate growth. Many companies are exploring new export markets. Some of the new markets are created through process or product innovations, such as Floating Leaf's quick cook rice, which enables wild rice to be more competitive in food service and enter the convenience food market. All eight companies/chains see significant opportunities for growth in human consumption of their ingredients through investigating, validating, enhancing and marketing the health benefits of their commodities/products and their fractions. Of note is large growth from beta glucan health labelling for oats (RM) and growing evidence for Omega 3 benefits (SF and HOCl). Increased demand for protein and fibre positively impacts 7 of the 8 case study companies; all except BeeMaid, and honey has a number of potential health benefits which could increase consumption.
- **Increasing efficiency** is present in 12 initiatives in all eight cases. Most often producers and other members of the supply chain are updating their equipment. Others change breeding and agricultural practices to give generally moderate or small increases in yields, quality and efficiency. In two cases innovations improve efficiency in handling and pre-processing of raw oats and vegetables; as well,

process and logistical improvements result from the acquisition of Can-Oat by Richardson International.

- **Increasing market share** was important to 12 initiatives and found in 7 of 8 cases. It is centred on developing new ingredients and final food products. These initiatives often meant working closely with customers: e.g. new flax oil or honey flavours, healthy flours, hemp or wild rice bars. These initiatives usually gave moderate or small amounts of growth. There are two exceptions: Richardson Milling had gradual growth to become a major oat supplier and Shape Food's entry into the ingredient market resulted in large growth.
- **New Company:** seven of the eight cases have a novel founding innovation that leads to the establishment of a new company and a significant amount of growth. Usually a new process is the basis for a new company. For example, CPG's novel puree manufacturing process and product. Planned future "spin-off" companies were identified by both CPG and HOCl.
- **Remaining competitive:** the notion that companies need to constantly innovate to remain competitive was often stated in interviews through all eight supply chains. As was the idea that customer service was "all important", i.e. providing a quality product on time, listening and acting on customer requests. These seemingly smaller innovative activities (product development, food safety, packaging, and diversification) are judged to be essential to both surviving and growing as a company.
- **Increasing employment:** 4 cases (CPG, HOCl, FL and TNF) have innovations that lead directly to growth in employment; generally through value added processing or expansion of processing facilities, e.g. HOCl's new \$14m plant. Little data is available on other changes in employment, but it would be expected that significant increases in sales or creation of companies would also increase employment through the supply chain.

All 37 companies in all cases also mentioned the importance of food safety certification, though it is only

identified as an innovation initiative three cases (CPG6, FL5 and BNF6).

Findings of growth in Innovation Initiatives

- Innovation initiatives result in many different types of growth. Six types of growth are identified as resulting from the innovation initiatives from all eight cases, as noted in Table 3.
- Innovation results in growth in profits, most certainly from expanded market for product and increase in market share. Usually this growth occurs through product development or creating or expanding to new markets through new products or exports; or increasing consumption related to health benefits.
- Forming new companies directly related to a new process and or product demonstrates that innovation creates companies and new profit centres. Five of the 8 cases report construction of new or expanded facilities, thus adding further jobs and purchases to the local economy, and taxes for governments.
- Initiatives (21) also help with profitability through increases in efficiency or enabling companies to remain competitive.

Growth is often identified as a driver for innovation. This research points to 6 types of growth from the 66 initiatives. The relative importance of these types of growth is not easy to determine. New companies and new facilities are important for the province and the local area due to the associated increase in economic activity and employment. Increases in sales will also increase both these factors, locally, especially on the supply side of the chain. Increasing competitiveness and profitability are important results of most innovations. The concept of "innovate or die" was mentioned in several cases, as a way to maintain market share and keep up with their competition by meeting their customers' needs and updating technology. Innovation initiatives can be relatively small, such as assisting manufacturers with product development or updating packaging to increase convenience or shelf life; but are essential for company survival in a competitive marketplace.

Table 3: Six Categories of Growth from Innovation

Growth Category	Richardson Milling	Shape Foods	Canadian PG Purees	Hemp Oil Canada Inc.
Expand market for product 24	RM5* – plant breeding gives specialist products RM6 – past and new health claims lead to higher consumption of oats RM8 – additional oat products made from fractions of oats	SF5 – new flax products & markets SF6* – plant breeding and agronomy gives specialist products SF7 – health claims increase human flax consumption	CPG7* – demo product development for ingredient customers CPG9 – health claims for pulses increase puree ingredient use	HOCI2 – novel de-hulling and roasting processes gave new food ingredients HOCI4 – potential for health benefits to increase hemp consumption HOCI8 – expansion of industry through using entire hemp plant HOCI9 – expand into new sectors and export markets
Increased efficiency 12	RM3 – grower and handler education gives better raw oat supply RM4 – acquisition by Richardson International leads to investment and logistical efficiencies RM5* – plant breeding gives disease resistance	SF6* – plant breeding and agronomy give higher yields	CPG4 – pre-processing gives operational efficiencies CPG5 – plant breeding and agronomy give higher yields	HOCI5 – advances in agronomy increases efficiency, guide attracts new producers
Gaining market share 11	RM2 – gaining market share after “oat-bran collapse”, gradual growth of reputation and sales RM7 – taking advantage of oats natural lack of gluten	SF2 – entered new section of market through ingredient diversification SF3 – new oil flavours increase sales SF4 – product development with ingredient customers	CPG2 – aseptic packaging increases shelf-life and sales CPG7* – product development with ingredient customers	HOCI3 – product development with and by customers increases sales
Creating new companies 11		SF1 – unique process led to establishment of company	CPG1 – novel process and product led to establishment of company CPG8* – planned licensing and spin-off companies	HOCI1 – new cold hemp-crushing process at start of company HOCI7 – planned new nutraceutical company
Remaining competitive 9	RM1 – continuing product development with ingredient customers		CPG6 – food safety certification & training	
Increasing employment 5			CPG3 – hiring and consulting experienced people CPG8* – increase number of processing lines from 1 to 6	HOCI6 – growth of capacity through chain with expansion of industry

* Six innovation initiatives (RM5, SF6, CPG7 & 8, FL1 and TNF8) are split in this analysis as different aspects resulted in different types of growth.

Floating Leaf Fine Foods	Bee Maid Honey Ltd.	True North Foods	Brar Natural Flour Mills
<p>FL1* – new roasting and “quick-cook” processes expand product range and markets</p> <p>FL2 – blends add products and markets</p> <p>FL5 – BRC and other certifications allow entry into specialty and export markets</p> <p>FL7 – opportunities for wild rice in vegetarian, organic and starch alternatives</p>	<p>BM4 – food service and exports, opportunities from possible health benefits</p> <p>BM6 – bee-keepers expand pollination services</p>	<p>TNF3 – individual “pod” processing increases traceability</p> <p>TNF4 – custom processing service – multiple species</p> <p>TNF8* – marketing healthy bison and elk increased consumption</p>	<p>BNFM4 – promotion and product based on proven health benefits</p> <p>BNFM5 – International Year of Pulses increases awareness</p> <p>BNFM8 – export, food service and opportunities for convenience foods</p>
<p>FL6– upgrading equipment and technology</p>	<p>BM7 – upgrading equipment and technology</p>	<p>TNF6 – livestock breeding for feed efficiency and velvet production</p> <p>TNF7 – new livestock management, adopting technology</p>	<p>BNFM6 - modernizing and upgrading equipment and facilities, improve food safety</p>
<p>FL3 – product development and “natural health product”</p>	<p>BM2 – product development: honey, and using honey as an ingredient</p>		<p>BNFM3 – product process development for healthy flours</p>
<p>FL1* – proprietary roasting process established FL as a processing company</p>	<p>BM1 – cooperatives start company and processing facility</p>	<p>TNF1 – new federally certified ruminant processing facility</p> <p>TNF2 – size of facility, capacity of 1000 head/week</p>	<p>BNFM1 – company created to make authentic Indian flours in North America</p> <p>BNFM2 – process/product development for range of flours</p>
<p>FL4 – design new packaging to maintain market share</p>	<p>BM3 – design new packaging to maintain market share</p> <p>BM5 – maintaining bee health, through research and collaboration</p> <p>BM8 – diversification to reduce risk and serve customers</p>	<p>TNF5 – environmentally friendly and low cost waste disposal</p> <p>TNF8* – marketing the quality and advantages of beef</p>	<p>BNFM7 – marketing initiatives and new packaging</p>
<p>FL8 – planned expansion and upgrading of processing facilities</p>		<p>TNF9 – opportunity for value-added processing for provincial or export markets</p>	

INNOVATION THROUGH THE SUPPLY CHAIN

The importance of relationships along the chain to various agri-food processing sectors has been benchmarked for Ontario (Agricultural Management Institute, 2013) and without an efficient supply chain, good ideas can go unfunded, undeveloped and unrealized (Cantuarias, 2014). Here the members and structure of the supply chains for the 8 cases are examined, followed by analysis of the involvement in innovation, and innovation relationships along the supply chains.



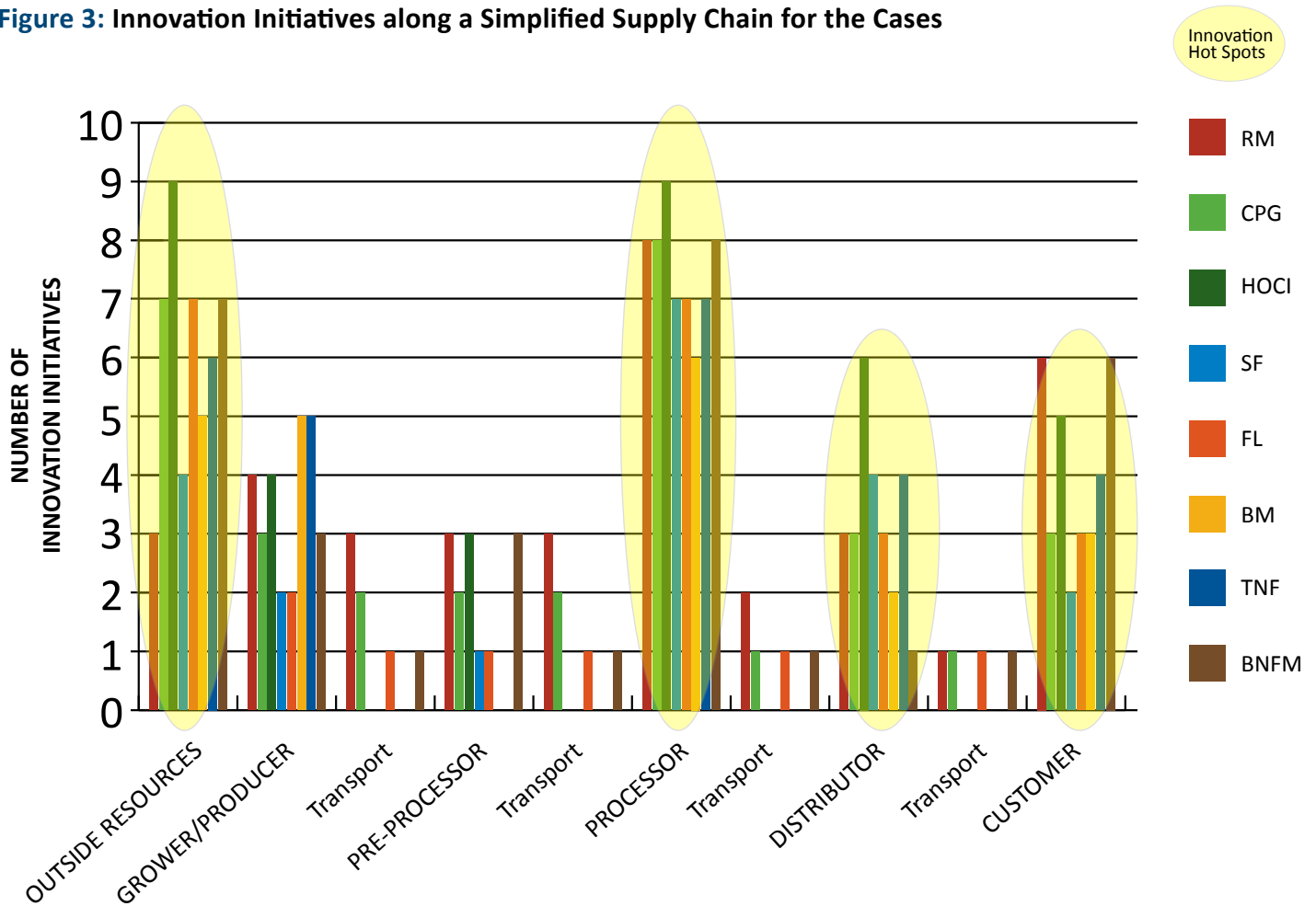
See Figure 3: *Innovation Initiatives along a Simplified Chain for the Cases* located to the right.

The Supply Chains

Despite the differences in commodities and scale, there are significant similarities between the supply chains of the eight processing companies.

- A single simplified supply chain includes grower to processors to “food manufacturer” or customer. Other resources were provided by 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).
 - 7 of the 8 processors use crops and raw product growing in Manitoba and Saskatchewan; and source most of their materials in these provinces. The exception is Brar Natural Flour Mills, who source their specialized grains and pulses from many sources, some overseas.
 - With the exception of True North, raw supply is pre-processed to food grade before processing into an ingredient; but this occurs at different
- points of the supply chain. The oil seed processors (SF & HOCl) purchase food grade seed from specialist seed cleaners, as does BNFM. The grain processors (RM, FL & BNFM) clean to food grade in-house, at their own facilities. CPG’s vegetables are pre-processed by their growers. Honey is extracted by bee keepers and processed by Bee Maid.
- All 8 processors use distributors, for bulk, food service or retail products and 7 of the 8 sell bulk ingredients directly to food manufacturers. True North’s product and business model is different as the majority of their business will be to provide a slaughtering service to deliver block ready product. There is relatively little food manufacturing for red-meat, the majority of their product will be for food service or retail markets.
 - The processors also sell to others, which make up varying proportions of their businesses. 7 of 8 processors sell bulk product to the food service industry (restaurants or institutional) and RM and SF have animal and pet food customers. Four processors (SF, HOCl, FL and BM) package private label product for retail chain customers; three also have their own retail brands: BM honey, BNFM flours and FL rice, blends and manufactured products. True North does sell some block ready meat, but the business model is to provide a slaughtering and processing service for most of their customers
 - Truck is the main mode of transport for crop and ingredients. Train and ship are used to transport crop and product depending on the destinations and volumes involved; for example Richardson Milling’s large volumes are moved by train within Canada and to the US and Shapes exports to Asia use train and ship.
- The supply chains do continue to retail stores and final consumers, but that section of the supply chain was not covered in detail in this study.

Figure 3: Innovation Initiatives along a Simplified Supply Chain for the Cases



This research originally targeted processors with bulk products for ingredient use by food manufacturers. Through the research process it was discovered that these companies also serve markets that could be considered bulk as they are sold in large quantities or bulk packaging, but are closer to retail products; namely food service and private

label. Three companies (FL, BM and BNFM) also have their own brands of retail products that make up a significant portion of their business. This diversity of products and customers were considered strengths by processors, since they help to spread risk for the processor while serving customers' needs.

Innovation Initiatives along the Supply Chain

- From interviews the level of participation by each member of the supply chain in each innovation initiative was determined. Figure 3 presents the level of participation in innovation initiatives from the cases, in relation to the simplified supply chain. Innovation takes place along the entire supply chain. Those interviewed suggest this is due to two fundamental realities: each member of the chain is innovating to keep their business competitive and many innovations involve multiple members of the chain.
- As many as four ‘hot’ spots where innovation initiatives are the greatest in number occurred with processors, outside resources, B2B customers, and distributors.
- Processors are major innovators in the chain; they are involved in 60 of the 66 innovation initiatives. This is not surprising as the processors were the centre of the cases.
- Resources outside the supply chain make significant contributions to the majority of the innovation initiatives (48 of 66). For example: plant breeders or health researchers conduct research that can benefit many along the supply chain and others in the industry; consultants and equipment suppliers assist with developing new ingredient processes and chefs help with product development (CPG7). The CPG, HOCl, BNFM and FL chains were notable for using outside innovation partners in the majority of their initiatives.
- Other concentrations of innovation activity are with distributors and B2B customers/food manufacturers; both are often directly involved with product development and market expansion. Distributors also have a role in contributing knowledge of potential customers and their needs.
- Pre-processors update equipment (e.g. HOCl6) and growers improve their yields and quality (e.g. SF6, TNF6 & 7) and in some cases are involved with market expansion.

- The transportation companies are innovating and affected by innovations occurring along the chain, especially those concerning food safety (CPG6) and specialized transport such as gluten free (RM7).

Innovation Relationships along the Supply Chain

Across the 66 innovation initiatives, not one initiative is undertaken alone. Processors are teaming up with others, forming trusted relationships along the supply chain. Two types of relations are evident across the eight cases and each is described:

- 27 initiatives (40%) involve a company working with just one partner in the supply chain or outside resources. Initiatives with 2 partners often involved innovations where confidentiality was important, such as the development of a proprietary flax oil extraction method (SF1), where Shape Foods worked closely with an equipment supplier. 8 initiatives involved processors working closely with members of the supply chain, e.g. assistance from distributors to establish a foothold in the ingredients market (RM2, SF2). For 19 of these initiatives producers or processors were working with outside resources, such as vegetable producers working with plant breeders to increase yields (CPG5).
- 39 of the innovation initiatives (60%); involve multiple partners, where three or more companies or outside resources work together, the pattern of the relationship along the supply chain varies for the different initiatives. Some initiatives are on the supply-side of the chain (acquisition RM4, pre-processing CPG4); other initiatives involved other parts of the industry, e.g. grower education to increase quality and quantity of supply (RM3, HOCl5). B2B customers such as food manufacturers often partner in product development and marketing initiatives, with food processors, distributors and others in the chain, e.g. Shape Foods exploring markets such as flax products to replace the functionality of guar gum additives (SF5). A compelling trend in demand regarding health claims is resulting in concerted

efforts to respond by those along the supply chains, commodity organizations and researchers. This has led to health claims for both flax (SF7) and oats (RM6), and similar efforts are underway for hemp (HOCl4). 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) organizes annual meetings where seed researchers, growers, processors and manufacturers can meet and discuss future challenges and opportunities for their industry.

Findings of Innovation Initiatives long Supply Chain

- All members of the supply chains are innovating for differing reasons; some to remain competitive and others to develop world leading processes and companies.
- Through all the cases and their supply chains a recurring theme is the importance of relationships, trust and open communication between suppliers and customers. This seems to be a pre-requisite for working together to solve problems, innovate and grow their businesses together.
- Two types of innovation relationships were observed in all eight cases: those with two partners and those with multiple partners along the chain. Innovations involving proprietary processes or information tended to have a fewer participants.
- 49 innovation initiatives involved outside resources. Companies access expertise to complement in-house capabilities. These included diverse sources from equipment suppliers, government regulators, processing and business consultants to health, processing and agricultural researchers. These resources are important to the successful commercialization of the innovations.
- Co-operative patterns of innovation were evident in all chains, particularly the RM chain. This may be for at least two reasons: first, due to the high

degree of vertical integration within the Richardson family of companies; and second, because the oat industry is well established with long-term business relationships along the chain. Companies in the HOCl supply chain also innovate together; many have worked closely together to establish and grow the industry over the past 25 years.

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. To more easily 'map' the chronology, those interviewed made reference to their own timelines, often noting specific dates for certain events. As a result, the interviews were combined for each case to help construct a timeline, knowing each participant carried different meaning of past, present, future, along with time periods of intense and less intense activity.

Analysis and Findings on Innovation Initiatives in Relation to the Chronology

Three different chronological patterns of innovative initiatives were evident across the eight cases: long and continuous, short and intense, and long-term intermittent.

Long and continuous pattern of innovation. More than half (34 of 66) of the initiatives were long and continuous, often independent of the establishment of the ingredient processing company and anticipated to continue into the future. Most cases stretched over many years, even decades. Some reported continuing innovation in agronomy, updating technology and research into health benefits. 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, grower education in flax, oats and hemp industries. These initiatives are often a collection of multiple research and innovation initiatives on the general theme by multiple parties, operating independently and in partnership. Product development, expansion of markets and adoption of new technology are also ongoing through the supply chains of all the studies.

Short and intense pattern of innovation. About one third (21 of 66) of the initiatives were short and intense (generally less than 3 years), sometimes preceded by research or followed by periods of less intense activity as the activity is refined. These are usually single innovations with significant impact on the company and growth: they include major advances in processing (e.g. CPG1 & 2, SF1, HOCI1 & 2, FL1), organizational changes (RM4, SF2, CPG8, TNF 1, 2 & 4) and new plants (CPG8, FL8). Interviewees reported that such innovations, once they are fully commercialized are internalized into the company's normal operations, and cease to be innovative.

Intermittent pattern of innovation. The remaining 11 of 66 initiatives were classified as intermittent, with short periods of innovation activity, that were repeated (often regularly) over the long-term. These included for example, expansion and pre-processing for CPG (4, 8); packaging (FL4 & BNFM7), and step-wise development of their cooperative, diversification and product development for the Bee Maid (1, 2 & 8) chain.

Findings of innovation initiatives over time

- In all eight cases innovation occurred over different time-scales depending on the nature of the problem(s) to be solved. Short-term innovations that addressed and solved a problem, giving a new process or market that is incorporated into the companies normal operations.
- Long-term continuous initiatives are generally addressing issues that require continuous improvement, such as agronomy, health benefits, product development, and expansion into new markets. Some long-term initiatives are intermittent with little activity needed between intense periods, such as expansion of processing facilities or safety certification.

SUMMARY OF FINDINGS ACROSS ALL CASES

Commercializing innovation is bringing about a dynamic and robust 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, Canadian Prairie Garden Purees, and Hemp Oil Canada are driving the growth of those companies that are 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 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 business relations yet two distinct patterns when commercializing innovation emerged. For some innovation initiatives, two partners cooperated. A second pattern engages those along much of their respective supply chains. The largest company, multi-national Richardson Milling, draws upon their extensive 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. Similar patterns of innovation were evident in all cases, with a range of sizes and ownerships – family owned, producer cooperative and privately owned - as well as established and new commodities.

Moreover, innovation initiatives are found throughout the supply chain that suggests a great deal of interdependence. Growers are innovating through plant breeding, which in turn 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, and together they create products. One frequently mentioned driver was to respond to the healthy food demands of retail consumers. Many participants emphasized the importance of an ongoing commitment of time and resources to realize some of the benefits from commercialization, including opportunities to grow markets.

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 creating or 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 new businesses in the last 15 years, which fosters further investment and generates an environment of entrepreneurship and innovators in Manitoba. This undoubtedly leads to increasing investor confidence, more exports, while contributing to economic growth and creating jobs, all benefiting rural areas.

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 cases is an urban and rural story. Some processors are located urban areas, such as Winnipeg; others are in rural centres, Portage and Brandon, as well as Carman and Ste. Agathe. Innovation is also a big rural story as processing in Manitoba creates stable local markets for many prairie producers. Given our brief review of the literature, this rural story seems largely untold. Innovation for bulk ingredients in the agri-food sector extends from the researchers, seed breeders, and agronomists' labs and field tests to growers' fields and to transporters and suppliers as they strive to maintain quality for processors. The hemp industry is an example where Manitoba is a world leader and has a commodity where value is added before exporting. The willingness of companies along the supply chain to remain nimble over long periods and to continually innovate with and for their manufacturing buyers all contributes to a vibrant industry. The main opportunities for growth among these processors and related supply chains 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. Innovative ingredients are increasingly being challenged to meet consumer demand for natural, healthy food.

Of equal importance, this preliminary study 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 resources supporting commercialization. Their investments varied, yet the multiple contributions appear to be a more coordinated choreography for the oat supply chain, seemingly due to the long-established processor and a vertically integrated industry. The younger and smaller businesses build relations as they commercialize their innovations for

processing, be it for flax for human consumption or making purees or flours. While the motivation to participate in short and intense or long and continuous innovation efforts are partially explained as companies strive to remain competitive and seek growth. The cases also underscore the importance of ongoing public investment in research and related centres to support these initiatives. Research and the related expertise directly contribute to a range of these rural innovations.

Further research is needed to...

- Increase education and awareness of the complex nature, and variety of innovation and commercialization processes and relationships within industry, government and NGOs.
- To further study commonalities and differences across the sector, examine innovation in a wider cross-section of the food processing industry. This could include expansion into other provinces, e.g. Saskatchewan and Alberta; or inclusion of processors manufacturing retail products for sale to retail stores or direct to consumers.
- Through consultation with industry, government and NGOs: identify specific processes of, and barriers to, innovation and commercialization with a view to improving speed and success rates of commercialization, leading to growth. In cooperation with a partner, put into place measures designed to accelerate innovation and commercialization in the food processing industry, and measure their return on investment.
- In-depth study of the relationships, linkages and resources for day-to-day operation, innovation and commercialization for a specific sector of the food-processing industry. This would give a greater understanding of the complexities, barriers and drivers for innovation and commercialization for this sector and develop and test a method to examine other sectors.

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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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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.

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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.

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 & Consumer Products of Canada</i>	Manufacturer Association

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

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

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

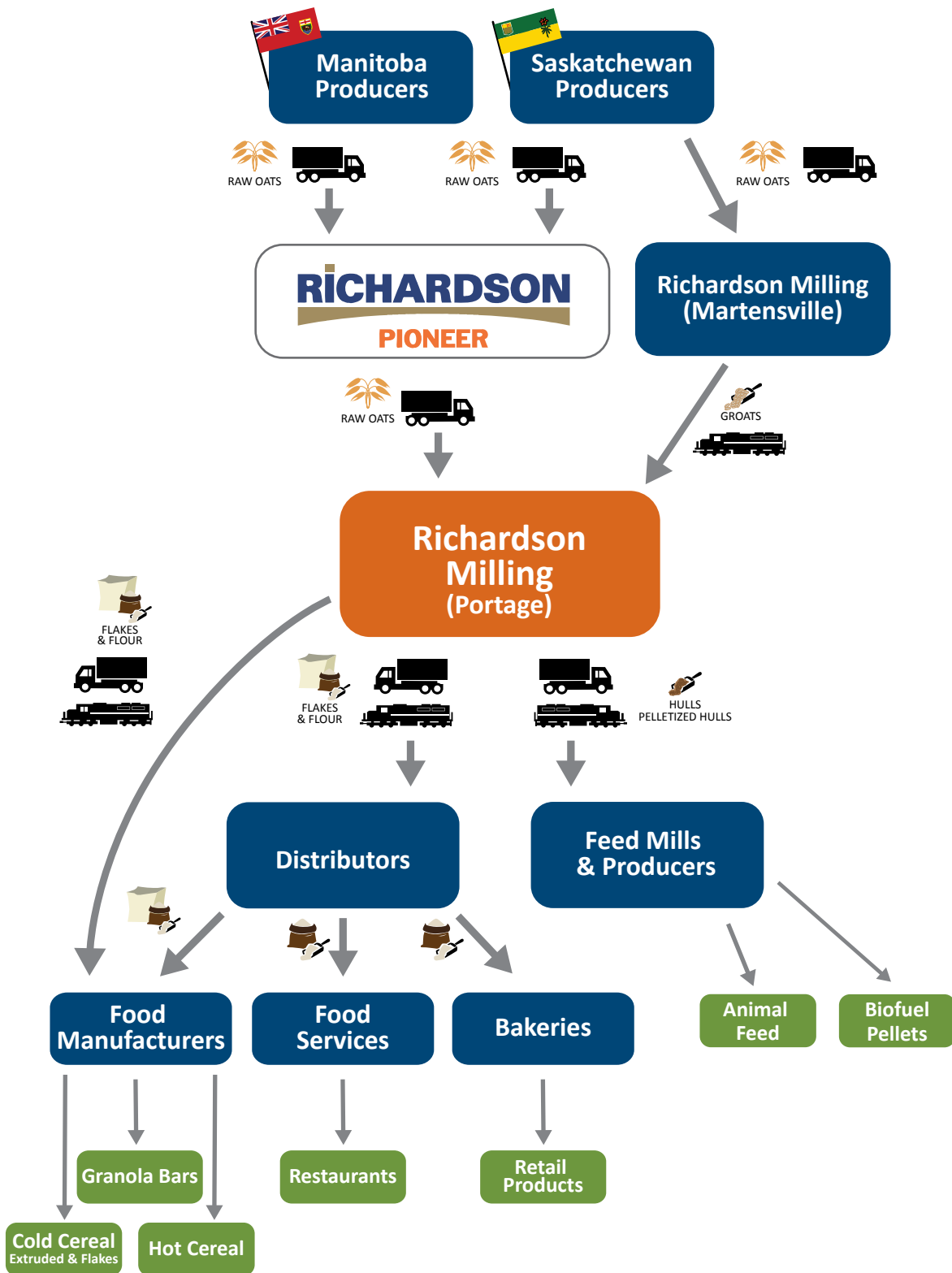
The Richardson Milling plant has been running for 25 years and therefore has a strong position in the oat milling industry. Its customer base is strong, long term and consistent because of the quality of their product, service and R & D capabilities. There are not many opportunities for new suppliers 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.

RM1 Innovation: The Kiln

Type: Process → Product

New to: Industry

Part of supply chain: Processor

When: Past and continuing

Time Line: One-step / incremental

Developed: In-house with food manufacturers

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.

RM2 Innovation: Gaining Market Share

Type: Marketing

New to: Company

Part of supply chain: Processor

When: Early 1990s and continuing

Time Line: Incremental

Developed: In-house with distributors

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.

RM3 Innovation: Grower Education

Type: Organizational → Product & Market

New to: Industry

Part of supply chain: Producer

When: 1980's / 90's continuing

Time Line: Incremental

Developed: In-house with growers and customers

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>RM4 Innovation: Change to Richardson</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"> • Purchasing and supply is done through Richardson International and Richardson Pioneer – providing consistent high quality supply. • Investment in processing equipment and food safety systems. • Integrated IT systems leading to continuous improvement.
<p>RM5 Innovation: Plant breeding</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 & 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>RM6 Innovation: Promotion of Health Benefits</p> <p>Type: Marketing → Product</p> <p>New to: Industry / 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>

RM7 Innovation: Gluten Free	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 → Product & Process	
New to: Company	
Part of supply chain: Supply side	
When: Future	
Time Line: Incremental	
Developed: In-house with suppliers, transporters	
RM8 Innovation: Fractionating	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: Process / Marketing → Product	
New to: Industry	
Part of supply chain: Supply side	
When: Next 10 years?	
Time Line: Incremental	
Developed: In-house with Government, university and industry researchers	

Innovation Methods

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

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

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

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.

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

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 & 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.

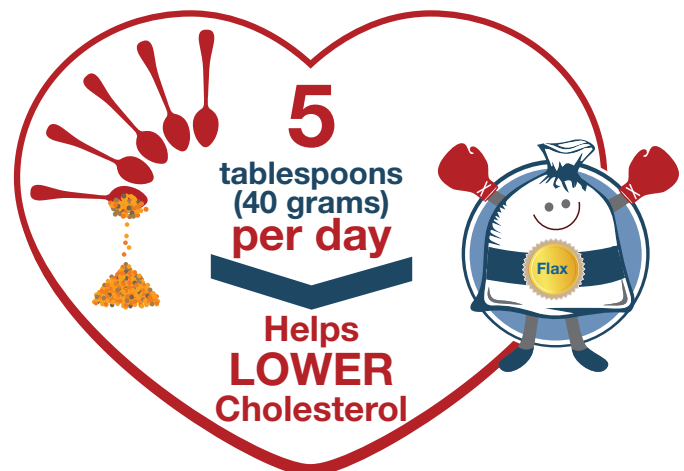
Flax, Omega-3 and Health Benefits

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

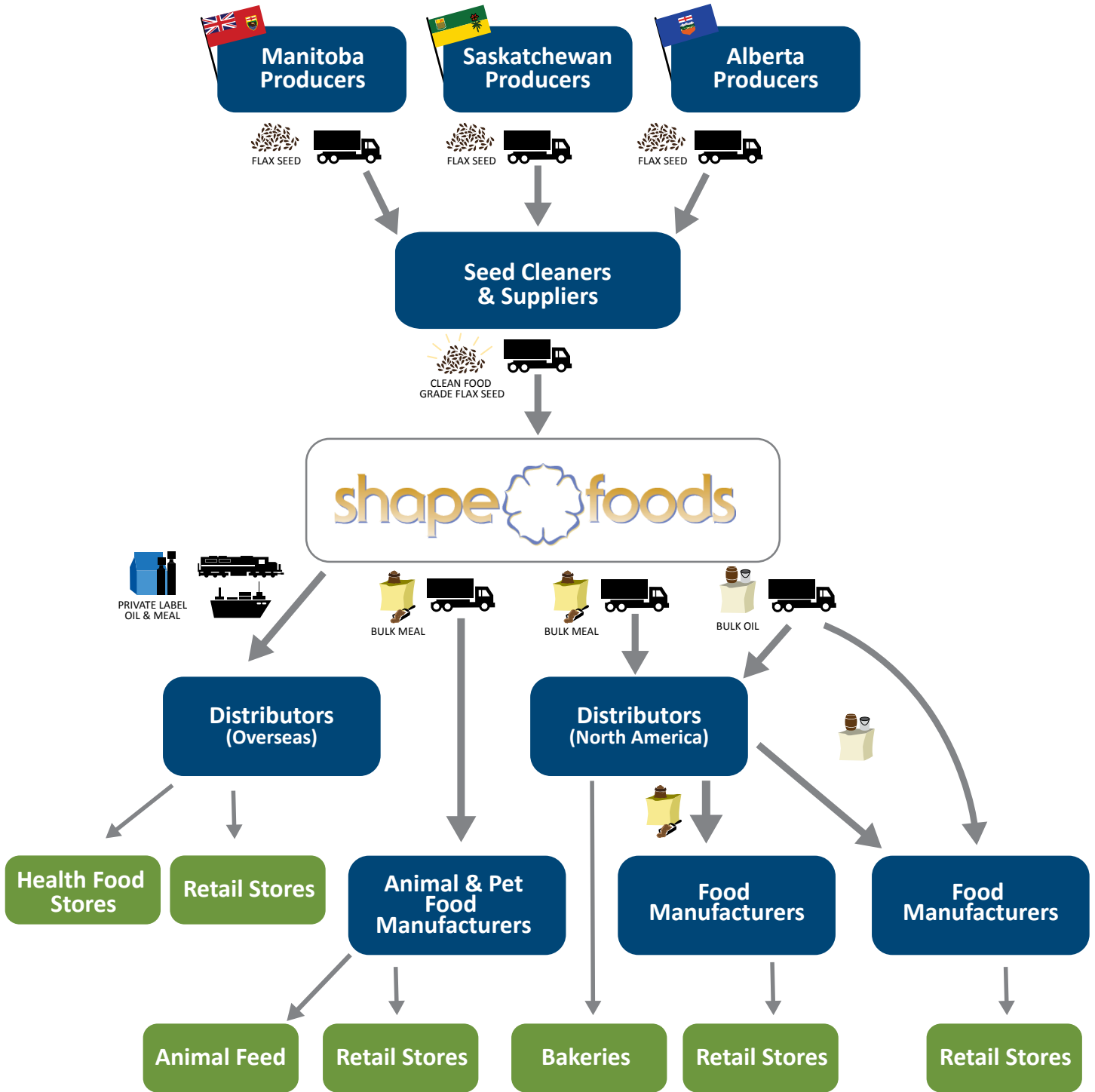
- Shelf stable oil, for up to 2 years
- Oil does not require refrigeration
- The only flax oil that can withstand pasteurization
- Excellent taste
- Culinary & dessert flavoured oils
- Average 11.5% residual fat content in meal, 6.5% omega-3

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>SF1 Innovation: Unique Process</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>SF2 Innovation: Ingredients - diversification</p> <p>Type: Organizational → Marketing & Product</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>SF3 Innovation: Flavoured oil</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>SF4 Innovation: Product development</p> <p>Type: Product → Process</p> <p>New to: Company</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>SF5 Innovation: Expanding products & markets</p> <p>Type: Marketing / Products</p> <p>New to: Industry</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>SF6 Innovation: Flax breeding / Increased yield</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>

SF7 Innovation: Health claims

Type: Marketing → Product

New to: 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

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

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

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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>> Acknowledgements

Thanks to Canadian Prairie Garden 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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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.

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 & 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>)

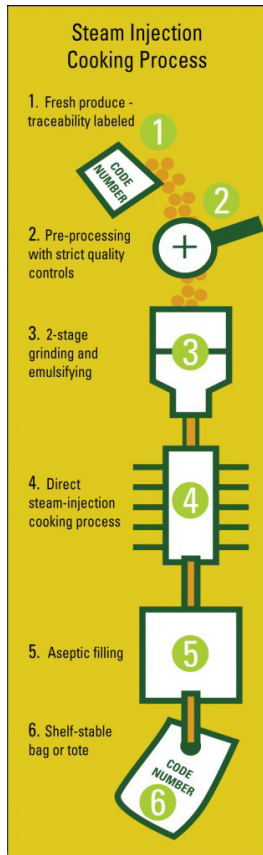
CANADIAN PRAIRIE GARDEN PUREE PRODUCTS

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

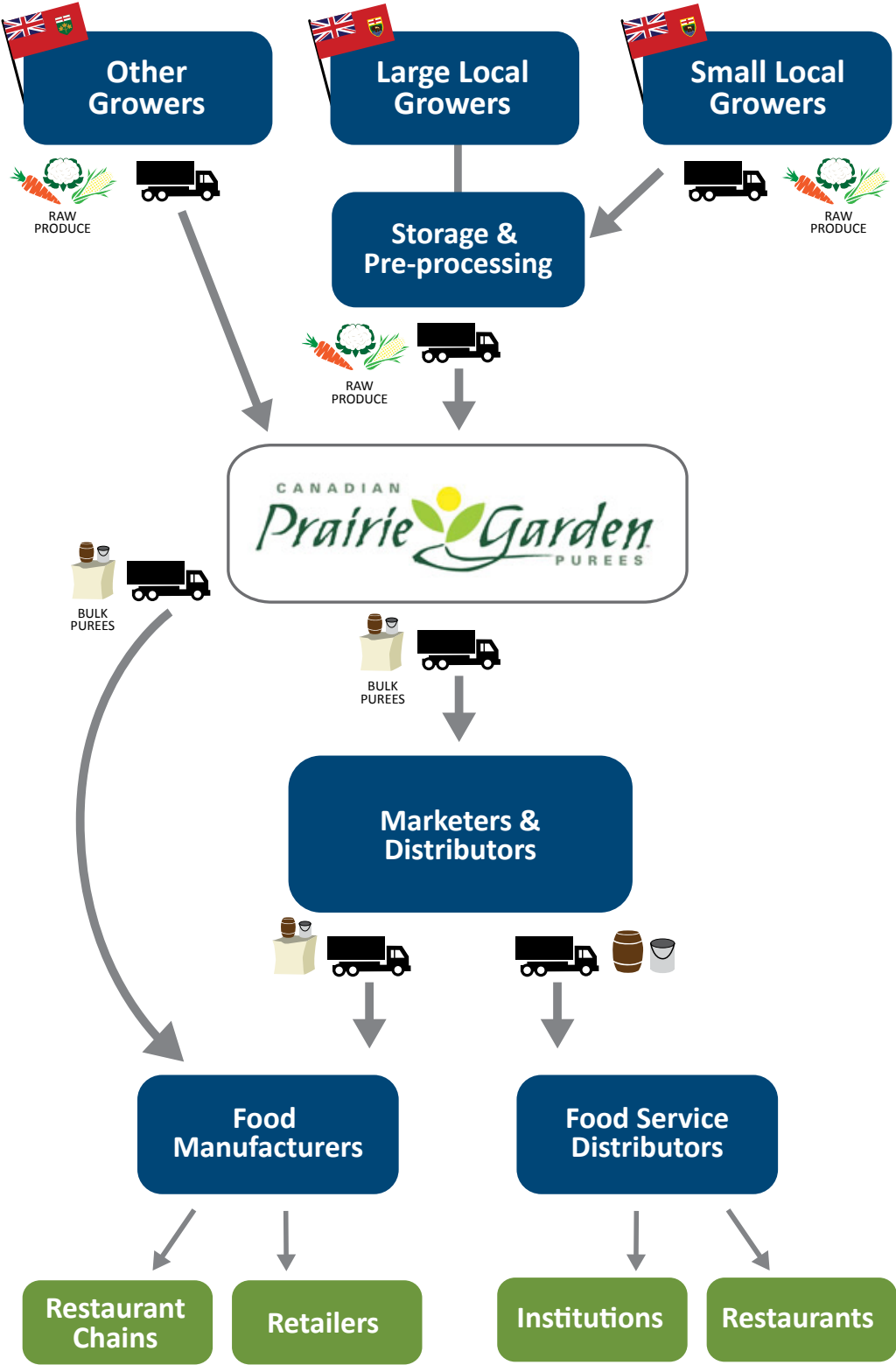
SUPPLY CHAIN

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>CPG1 Innovation: Direct steam injection</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>CPG2 Innovation: Aseptic packaging</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>CPG3 Innovation: Hiring experienced people</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>CPG4 Innovation: Pre-processing</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>CPG5 Innovation: Agronomy</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 & 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 & 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>CPG6 Innovation: Food safety</p> <p>Type: Organizational → Process</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 & 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>CPG7 Innovation: Product development</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 & 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 crème brulee or pulses into pasta. CPG considers this to be an essential step in marketing a new ingredient.</p>

CPG8 Innovation: Expansion	<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	
New to: Company	
Part of supply chain: Process	
When: Next 5 years	
Time Line: Incremental	
Developed: In-house	

CPG9 Innovation: Product expansion	<p>Opportunities for growth from expansion of products, derived from future product and marketing innovations:</p> <ul style="list-style-type: none"> • Protein or fibre supplementation from beans and pulses, this may be enhanced by future possible health claims • CPG purees enable consumers to increase vegetable consumption through non-traditional processed food sources.
Type: Marketing → Product	
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

Innovation Methods

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

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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270-18th Street, Brandon, MB R7A 6A9



APPENDIX D

CASE STUDY

Hemp Oil Canada

Strategies for Growth of Bulk Food
Processing in Manitoba

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AUGUST 2015

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>> Acknowledgements

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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.

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 eight conducted to describe successful bulk food processing companies in Manitoba and give insight into opportunities for growth and innovation in these industries.

Hemp Oil Canada Inc. (HOCI) is a privately owned hemp food processor based in Ste Agathe, Manitoba. Established in 1998, they are the ground floor of the Manitoba and Canadian hemp industry, (one of) the world's largest hemp oil producers. They produce organic and conventional hulled and toasted hemp seeds; hemp oil and hemp powders, mostly for the bulk food ingredient market.

Through the years HOCI have innovated in many ways to develop processing technology, new products and with their customers, have gradually built the market for hemp food products in North America and the world. Annual growth rates of about 25% for the company and industry are expected to continue as the health benefits of hemp oil and seeds are investigated, and the products gain main-stream acceptance. An inconsistent and changing regulatory environment is one of the greatest challenges to growth in the hemp food industry; both in Canada and internationally. Consistent fair regulation will enable the industry to grow; this is especially important in attracting new producers to grow the crop and utilizing the potential of the whole plant: seeds, stalk and leaves.



Courtesy of Hemp Oil Canada – www.hempoilcan.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 follows from a preliminary study into the opportunities for growth that come from innovation in the bulk food processing industry in Manitoba. For the purpose of these studies a bulk ingredient processor is defined as a company that sells to manufacturers, bulk wholesalers, distributors, businesses and food service. Private label sales are also included as a type of bulk sale in this research; in addition some processors also sell their own branded products. The unit of sale will be in most cases significantly larger than the retail size.

For the second year of the study, the notion of health benefits associated with ingredients was an additional factor examined with the majority of companies selected.

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”: eight 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” guidelines¹ for collecting and interpreting innovation data were used to formulate the interview tool for the semi-structured interviews

¹ Oslo Manual Source: OECD & Eurostat Agri-Food. 2005: Guidelines for collecting and interpreting innovation data.

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

INTERVIEW PARTICIPANTS

Participant	Role
Shaun Crew - CEO Hemp Oil Canada	Processor
Larry Marshall Marshall Farms Inc. - Organic Producer	Producer
Kris Anderson - Logistics Manager Interlake Agri	Seed Cleaner
Michal Tózsér - CEO Hemp Seed Oil Europe	Distributor / Customer
Materials Manager North American Food Manufacturer	Customer
Kim Shukla Canadian Hemp Trade Association	Commodity Organization
Alphonsus Utioh – Manager Food Development Centre	Innovation partner
Peter Jones - Director Richardson Centre (RCFFN)	Research Centre
Dave Shambrock Manitoba Food Processors Association	Processor Industry Association

HEMP FOOD INDUSTRY²

Hemp has been an important fibre and food crop for over 10,000 years. Hemp fibre has been used to make clothing, ropes, and paper; the grain has been stewed, roasted, and milled for food; and the oil derived from the grain has been used for food, cosmetics, lighting, paints, varnishes, and medicinal preparations.

After a 60-year ban, commercial cultivation of Industrial Hemp became legal in Canada in 1998. This was largely due to an initiative of a small number of Canadian companies, as well as Canadian universities and provincial governments that researched industrial hemp production and processing. The Industrial Hemp Regulation³ program that came into effect in 1998 applies to all persons in Canada engaged in the cultivation, distribution, importation, exportation, and processing of industrial hemp.

Current world leaders in hemp production are Canada, Germany, England, France and China. The leading hemp acreage provinces in Canada are Alberta, Manitoba and Saskatchewan. According to the Manitoba Government 14,732 acres in 2013 were planted in Manitoba out of the 66,671 licensed acres in Canada.

In 2012, the total retail value of hemp products exceeded \$500 million. This includes food and body products, clothing, auto parts, building materials and other products.

Health Benefits of Hemp

Hemp foods are new, however nutritional analysis of hemp seed indicates potential for health benefits. Hemp oil is high in “healthy” polyunsaturated fatty acids with a 3:1 ratio of Omega 6 to Omega 3. The oil is also used in body-care applications as it is high in vitamin E. Hemp seeds (and powders) have high protein and fibre content, with a good range of amino acids. Hemp protein is easily digested due to a lack of trypsin-inhibitors and the high fibre content gives an increase in satiety. Current research is looking at

potential benefits effects of hemp consumption, including: effects on eye health, cholesterol levels, blood pressure, insulin levels and appetite.

HEMP OIL CANADA

The Company

Hemp Oil Canada was incorporated in March 1998; the same month that Health Canada re-legalized the cultivation of industrial hemp in Canada. In 1999, following 14 months of intensive market, product, and processing research and development, HOCl opened the first exclusive hemp seed processing facility in Canada. The company moved to its current facility in 2006, recovered quickly following a fire in September 2013, and a new larger facility will be ready to operate in the summer of 2015. HOCl currently employs about 30 people. The company and the industry have grown at about 25% per year since 1999.

Today HOCl is one of the world’s largest bulk wholesale producer, private label packager, and custom processor of hemp food products and ingredients. They have exclusive Canadian rights to Finola®, a popular hemp variety with excellent nutritional, taste and agronomic characteristics. Hemp Oil Canada exports globally to more than 15 international destinations.

Processing

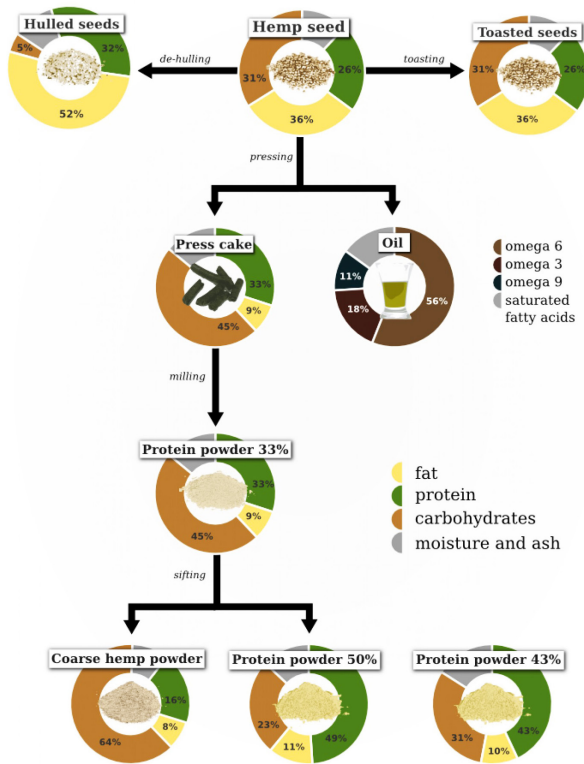
Hemp seed oil is extracted mechanically without use of chemicals, preservatives or additives and cold pressed at temperatures below 48°C yielding solid “press cake” and oil. Hemp protein, hemp flour and powder are produced by mechanical milling and sifting of the resulting solid press-cake. The oil is filtered using HOCl’s cold filtering technology, removing any natural suspended solids. No heat or chemicals are applied during the process.

Hemp seeds are hulled through a no-heat, mechanical process without sacrificing any nutritional benefits. Hemp seeds can also be roasted using custom-built hemp seed roasters for providing different flavors. Roasted hemp seed (25%) combined with coffee beans (75%) produce hemp coffee.

2 Sources: Agriculture and Agri-Food Canada, Health Canada, Canadian Hemp Trade Alliance, Manitoba government http://www.gov.mb.ca/agriculture/crops/production/print_hemp.html

3 <http://laws-lois.justice.gc.ca/eng/regulations/SOR-98-156/index.html>

Hemp Seed Processing & Typical Product Composition



Courtesy of <http://www.hempseedoil.eu/>

Products

Hemp Oil Canada offers a variety of products from hemp seed oil, which is offered as bulk, private label or in capsules (Veggie Green Caps), to hemp seeds (both toasted and hulled) and hemp protein, flour and powder. Specialty (e.g. hemp coffee) and organic products are also offered.

Hemp Oil Canada is GFSI accredited under the FSSC 22000 food safety and quality program standard. In addition, HOCI holds certifications for Organic (Pro-Cert Organic Systems, USDA, JAS, EU Organic) and special dietary (Kosher, Halal, gluten-free) products and the facility is allergen-free and HACCP-designated.

Markets / Customers

Hemp Oil Canada supplies its products only to manufacturers, bulk wholesalers, distributors and businesses; they do not sell to the final consumer. Their products are sold both nationally and internationally.

Position in Industry

Hemp Oil Canada is the largest wholesale hemp producer in Canada and among the largest in the world. Hemp Oil Canada together with Manitoba Harvest (the largest retail hemp product company in Canada) established the hemp industry in Manitoba and in Canada and they are still leading the way for tons processed, innovation and growth.

Competitive Advantages

- Largest producer and processor of bulk hemp food products / ingredients
- Quality and customer-care driven
- Expertise and knowledge of the industry - products, processes and market were created from scratch
- Well connected and established company - have dealt with almost everyone in the hemp industry over the years

Supply Chain

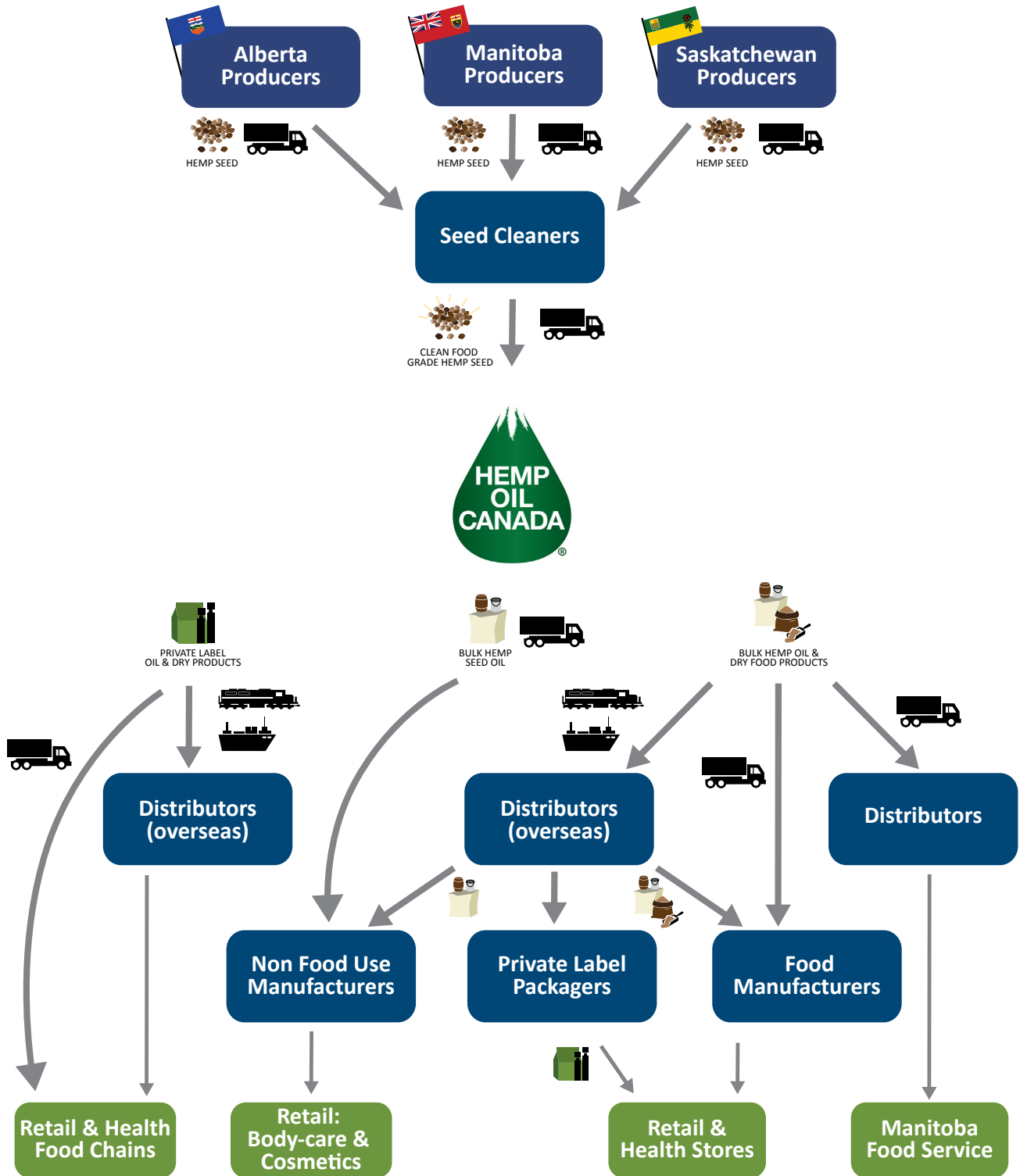
Hemp Oil Canada purchases seed from contracted hemp producers in three provinces, Alberta, Saskatchewan and Manitoba. The seed is shipped by truck to seed cleaners across the prairies, where it is cleaned to HOCI's specifications. The clean seed is then trucked to Hemp Oil Canada's plant in St. Agathe, Manitoba for processing.

Sale of ingredients to food manufacturers (e.g. nutrition bar, cereal and cookie manufacturers) comprises the majority of HOCI's business followed by direct sales of private label products to retail chains. A significant portion of the oil is used in the cosmetics industry.

Food service sales (e.g. restaurants, hospitals and schools) are a smaller but increasing part of HOCI's business.

Hemp Oil Canada exports its products throughout North America and internationally to about 30 destinations. In some cases (European Union, Australia, Korea, Japan and Mexico) distributors are used; HOCI ships directly to other destinations.

Hemp Oil Canada Supply Chain



Innovation

Hemp Oil Canada is a founding company for the North American hemp food industry which is “new” to the continent following a 60 year “legislated break”. Hemp Oil Canada and the rest of the industry have innovated rapidly, creating the processes, products and markets for hemp food products. Investments are being made into research, as many of hemp’s functionalities have

not yet been fully explored. There is significant potential for the industry to continue to innovate and grow with growing acceptance of hemp as a food crop and ingredient, and possibilities for uses for the entire hemp plant for fibre, livestock feed and nutraceutical or pharmacological products.

HOCI 1 Innovation: New Oil Processes

Type: Process / Product → Marketing

New to: Hemp oil industry

Part of supply chain: Processor

When: 1998 & 2003

Time Line: one-step x 2

Developed: In-house with equipment suppliers

Hemp Oil Canada adapted established cold press technology to extract the oil from hemp seeds. This decision was in part a marketing decision as this process naturally gives a higher quality, premium oil. Omega 3 and 6 fatty acids are not damaged by the process.

A new cold filtration process was developed using a method modified from water filtration technology. This process is more efficient than conventional food oil filtering, giving less waste and a clear, consistent product with excellent taste and shelf life.

HOCI 2 Innovation: New Seed Ingredients

Type: Process / Product

New to: World hemp industry

Part of supply chain: Processor

When: 1999 & 2000

Time Line: one-step x 2

Developed: In-house with equipment suppliers and customers

Perfecting the process to de-hull hemp seeds to give a “nut” or hemp heart was the innovation that established the company and the Manitoban industry. Equipment from the seed-cleaning and sunflower industry was adapted, to give a process that had the advantage of being scaleable.

HOCI was the first company to roast hemp seeds. Initially suggested by a customer who wanted to incorporate hemp into coffee, the toasting process (using a modified coffee roaster) gives a nuttier taste than raw hemp seeds. This product is now an ingredient in many products, including coffee.

HOCI 3 Innovation: Product Development

Type: Product → Process

New to: Industry

Part of supply chain: Processor / Distributor / Manufacturer

When: Continuous to future

Time Line: Multiple step-wise

Developed: In-house with and by distributors, manufacturers & Alberta Innovated Technology Futures (AITF)

Hemp Oil Canada, their European distributor and their manufacturer customers are constantly developing new products and expanding the hemp market.

HOCI sends a lot of samples to potential customers so they can experiment with using seeds, oil or flours as ingredients, ingredients are also customizable to manufacturers’ specifications.

New products have included superfood bars; with multiple high energy, functional ingredients including hemp ingredients and cereals with added hemp. Germinated hemp seed is a novel ingredient that is easier to digest; has a 30% increase in tocopherol content (Vitamin E compounds) and strong antioxidant properties.

<p>HOI 4 Innovation: Health Benefits</p> <p>Type: Marketing → Organizational & Product</p> <p>New to: Industry</p> <p>Part of supply chain: All</p> <p>When: Continuous to future</p> <p>Time Line: Multiple step-wise</p> <p>Developed: All with health researchers</p>	<p>Realizing the importance of the health benefits and possible health claims; hemp processors, the rest of the industry and government are funding research on the effects of hemp in the diet on blood pressure, cholesterol levels and eye health.</p> <p>Hemp oil has significant Omega 6 and 3, in a ratio of about 3:1. Hemp also has significant fibre and vitamin E content.</p> <p>Hemp flour can be used in recipes and baking to increase protein content, the amino acid profile is virtually complete. Hemp Oil Canada has successfully separated the crushing solids into high fibre and high protein powders, giving popular new ingredients and products, including flavoured protein powders for body builders (developed in Europe).</p>
<p>HOI 5 Innovation: Agronomy</p> <p>Type: Process → Organizational</p> <p>New to: Hemp industry</p> <p>Part of supply chain: Producers</p> <p>When: Continuous to future</p> <p>Time-Line: Incremental + one step</p> <p>Developed: CHTA, processors, agronomists, government, AITF & PCDF (Parkland Crop Diversification Foundation)</p>	<p>Hemp is well suited to the prairies, growing well in the North; it is relatively easy to grow organically as it grows faster than the weeds. However, as industrial hemp was not grown in North America for 60 years most producers are not familiar with the crop, or the multiple regulations surrounding it. Producers are constantly experimenting to improve quality and yield. HOI employs an agronomist to serve producers and has exclusive rights to a top food grade hemp variety, Finola®.</p> <p>To encourage more producers to grow both conventional and organic hemp and meet growing demand, the Canadian Hemp Trade Alliance has spearheaded the creation of a guide for producers. This guide covers regulations and licenses; agronomy, growing and harvesting to give high quality seeds for food use.</p>
<p>HOI 6 Innovation: Expansion</p> <p>Type: Organizational → Process</p> <p>New to: Company</p> <p>Part of supply chain: All</p> <p>When: since 1998; before 2025</p> <p>Time Line: Continuous, step-wise</p> <p>Developed: In-house, with equipment suppliers, engineers & architects</p>	<p>Hemp Oil Canada will complete a new plant in the summer of 2015; this facility will have significantly greater efficiency, automation and processing capacity.</p> <p>The evolution of the Canadian hemp food industry has led to a global increase in the distribution and use of hemp oil and seeds. The growth of Hemp Oil Canada has led to the establishment of new companies both locally and around the world. In the prairies, seed cleaners have invested in specialist equipment and developed management systems to achieve efficient processing to the highest food safety and quality standards. This includes colour sorters and treatment with Neo-Pure, an innovative new organic, biodegradable sanitizer to remove fungi and bacteria on raw seeds.</p>

<p>HOI 7 Innovation: Healthy Hemp Seed Extracts</p> <p>Type: Organizational → Process, Product & Marketing</p> <p>New to: World</p> <p>Part of supply chain: Processor</p> <p>When: Future about 2017</p> <p>Time Line: One step then incremental</p> <p>Developed: In house with researchers & equipment manufacturers</p>	<p>Hemp Oil Canada is planning to expand in the next 2 years, forming a spin-off company that will create new fractions and extractions of hemp to serve the health food and nutraceutical markets.</p> <p>Protein extracts with 85 to 90% protein would open up new markets and fibre made from hemp hulls has potential as a novel fibre ingredient.</p> <p>There are also potential bio-actives in hemp seeds: more research is needed on plant sterols, polyphenols and antioxidants.</p> <p>This direction of expansion is an extension of current trends towards healthy eating and natural supplements with proven health benefits. More research is needed, but it could result in prescriptions for functional foods or supplements for those with genetic disposition to conditions that could be helped by dietary intervention.</p>
<p>HOI 8 Innovation: Use Whole Plant</p> <p>Type: Organizational → Product</p> <p>New to: Industry</p> <p>Part of supply chain: All</p> <p>When: Future</p> <p>Time Line: Step-wise</p> <p>Developed: Industry, with government, AITF and others</p>	<p>In contrast to Canada, most hemp acres in Europe are grown for fibre rather than seed. Expansion of the hemp fibre industry in Canada would give additional income to prairie hemp farmers (from plant stalks) and support the growth of the whole industry.</p> <p>A pharmaceutical extract from the leaves, CBD or cannabidiol, has neuro-protective and anti-inflammatory effects, with potential for use in treating a variety of conditions including epilepsy.</p> <p>If they received regulatory approval; hemp seed screenings could be used in livestock feed, with several benefits including reduced antibiotic use.</p>
<p>HOI 9 Innovation: Expand Markets</p> <p>Type: Marketing</p> <p>New to: Industry / Company</p> <p>Part of supply chain: Processor</p> <p>When: 2013 to future</p> <p>Time Line: Incremental & step-wise</p> <p>Developed: In house and with distributors & AITF</p>	<p>There are multiple opportunities for hemp products to expand into several new markets.</p> <p>HOI has recently expanded into the food service sector; this diversifies their customer base and is also likely to increase the use and acceptance of hemp as an ingredient.</p> <p>There is a time-limited opportunity for Canadians to expand into the US market; where it is legal to sell hemp food products (since 2004) and grow hemp for research purposes (since 2014); a domestic US industry will develop as soon as regulations permit.</p>

Innovation Methods

Factors that Affect Ability to Innovate

The members of this supply chain were unanimous in their responses regarding **incentives to innovate**. Growing their business and commitment to grow the hemp industry were the two main reasons cited explicitly or implicitly by the participants. Overall, the supply chain members seem to have innovation highly ranked in their companies' mandates and they are driven by the excitement that they are part of a fast growing industry. For HOCl innovations were also driven by serving customer needs and producing high quality products.

Innovation **ideas are initially generated** in-house, but a more collaborative effort of product development with customers then follows. Companies seek and take into consideration their customers' feedback and are flexible to change and test their products before launching them. There are cases where the innovation ideas come from the customers themselves and collaborative work results in the final product. The grower representative interviewed for this study mentioned that their ideas are exclusively generated in-house, however they partner with graduate students from the local university to implement them.

Obstacles to innovation come down to a lack of specialized hemp equipment, government regulations and lack of research funding. The hemp food industry is only 17 years old in Canada; at the beginning products, processes and markets/demand were all created from the ground up. Every process from farm to processor needed new equipment which was either adapted from another crop or created from scratch. This slowed down process and product innovation compared with other more established crops.

The majority of participants mentioned opportunities for new innovative products that utilize the leaves for pharmaceuticals. Even though there is current market demand, participants cannot

explore the opportunities offered, due to current Health Canada regulations that require producers to immediately "dispose of the branches, leaves and flowering heads by retting or by otherwise rendering them into a condition such that they cannot be used for any purpose not permitted under the Act."

Insufficient government funding for supporting research around the hemp crop was also mentioned as an obstacle; for example seed breeding, where hemp is a poor cousin compared with more established crops.

Innovation Linkages

As with idea generation, Hemp Oil Canada and the majority of the supply chain members innovate in-house with the assistance of their staff but with close collaboration with their equipment suppliers and customers.

External information sources for Hemp Oil Canada and most of the supply chain members are trade shows, national and international hemp conferences / conventions and equipment manufacturers who provide engineering expertise. Two organizations have provided significant support and research data to the hemp industry: AITF - Alberta Innovates Technology Futures and Manitoba's PCDF - Parkland Crop Diversification Foundation. At the producer's level the Prairie Agriculture Machinery Institute (PAMI) and Agriculture and Agri-Food Canada's research centers were also mentioned as useful sources of external knowledge.

Relationships with innovation linkages are both informal and formal depending on the company. Hemp Oil Canada has contracts with hemp producers and there are formal contracts when the chain members work with researchers and institutes. Except with universities and researchers, there is not much concern about intellectual property or proprietary information and companies communicate openly with each other based on mutual trust.

Opinions on linkage relationships within the supply chain varied from cooperative to collaborative. However, when the members described how they work together it appears that relationships tend to be closer to collaborative. Information and experience sharing and feedback exchange occur along the supply chain, e.g. at industry-wide international conferences. Additionally, companies are working together to move the industry forward. A great example for the hemp industry is that two processors: Hemp Oil Canada and Manitoba Harvest are jointly funding research into possible health benefits of the crop.

Relationships are considered consistent and stable as many companies have been working together for years, with occasional ups and downs; due to price and supply. Overall there is commitment to support other members of the supply chain to ensure profitability for everyone.

Limits to Growth

Hemp industry is a relatively young, fast growing industry; Hemp Oil Canada is growing at approximately 25% per year and projected to continue. The crop itself is very innovative and there are many opportunities for future growth and expansion. So what are the limits to growth?

Confusion on the part of regulators and the public between Indian hemp / marihuana and industrial / food grade hemp is still holding the market back. As all begin to understand that food hemp has less than 10ppm of THC (and zero psycho-active effect) further acceptance as a main-stream food ingredient and growth of the market will occur.

Seed supply is one of the top barriers to growth as seen by the study participants, especially organic seed where demand exceeds supply. It is difficult for the processing companies to source organic seed and they have to compete with each other when it comes to contracting new or retaining organic hemp growers. Licensing and harvesting challenges are additional reasons that might discourage farmers from growing hemp. However, the industry as a whole is working to attract new producers through agronomists, mentoring and creation of a hemp production guide by the CHTA.

Updating of regulations to reduce red-tape and allow for full use of all the plant (with additional income for producers) will also encourage growth of the production side of the industry to keep up with demand. In particular, there is an emerging market for hemp leaf extracts that could potentially result in significant growth for the hemp industry.



The majority of participants mentioned that there is a need for a quick Canadian regulatory response to this demand, otherwise other countries (the US within 5 years) will take over the market and it would be very difficult for the Canadian industry to catch up.

Limited research regarding hemp (as a crop and as a food) and limited support from governmental sources as compared to other crops (e.g. canola) has not allowed the hemp industry to explore its full potential. The industry itself is investing in research but additional support from government would be appreciated; and will be especially valuable at this early stage. It was noted that hemp industry is a true example of a value-added industry and that “nothing leaves Canada’s shores until it is further processed” which is in stark contrast to many other prairie crops.

Conclusion

Hemp Oil Canada has the benefit of being one of the founders of hemp industry in Manitoba and in Canada. The expertise and innovations that HOCI has developed over the past 16 years have positioned it among the best well known and established companies in the hemp industry both nationally and internationally.

Hemp itself is a very innovative crop, with opportunities for more of its functionalities to be explored. The Canadian hemp industry has grown at an impressive rate, developing and adapting processes to give new products and develop a market for hemp ingredients and consumer food products. This should continue as consumer acceptance of the product grows; especially if current research leads to health claims for hemp food products.

There is an emerging market for additional innovative products that can be created from different parts of the plant. Utilization of the whole plant will benefit all the members of the supply chain. Additional research and changes to the existing hemp regulations is needed in order for the industry to take advantage of these opportunities.

The hemp industry is characterized by a collaborative relationship throughout the supply chain, with strong communication and information sharing; this should enable the companies and industry to take advantage of the opportunities to continue to grow.



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APPENDIX E

CASE STUDY

Floating Leaf Fine Foods

Strategies for Growth of Bulk Food
Processing in Manitoba

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AUGUST 2015

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>> Acknowledgements

Thanks to Floating Leaf Fine Foods 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

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.

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 eight conducted to describe successful bulk food processing companies in Manitoba and give insight into opportunities for growth and innovation in these industries.

Floating Leaf Fine Foods is a vertically integrated, family owned business that has been processing wild rice for 4 generations. They process and package naturally grown wild rice, for food service, retail, private label and food manufacturing markets.

Wild rice is grown naturally in the lakes and rivers of northern prairie Canada, and its supply is inconsistent due to weather and water levels. This is a challenge to the industry as a whole, however Floating Leaf has managed this risk by offering diversified products (e.g. blends) and services (e.g. co-packing).

Floating Leaf is a company that has focused on innovation; they keep up to date with current trends in the industry such as: packaging design, sprouted seeds, and convenience foods that are also tasty and healthy.

There are many opportunities for growth under the above trends, and also in export markets. Floating Leaf's planned updated and expanded facilities will give them the capacity to take advantage of these opportunities.



Courtesy of Floating Leaf Fine Foods – www.eatwildrice.ca

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 follows from a preliminary study into the opportunities for growth that come from innovation in the bulk food processing industry in Manitoba. For the purpose of these studies a bulk ingredient processor is defined as a company that sells to manufacturers, bulk wholesalers, distributors, businesses and food service. Private label sales are also included as a type of bulk sale in this research; in addition some processors also sell their own branded products. The unit of sale will be in most cases significantly larger than the retail size.

The notion of health benefits associated with ingredients was an additional factor examined with the majority of companies selected.

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”: eight 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” guidelines¹ for collecting and interpreting innovation data were used to formulate the interview tool for the semi-structured interviews conducted in this study.

¹ Oslo Manual Source: OECD & Eurostat Agri-Food. 2005: Guidelines for collecting and interpreting innovation data.

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

INTERVIEW PARTICIPANTS

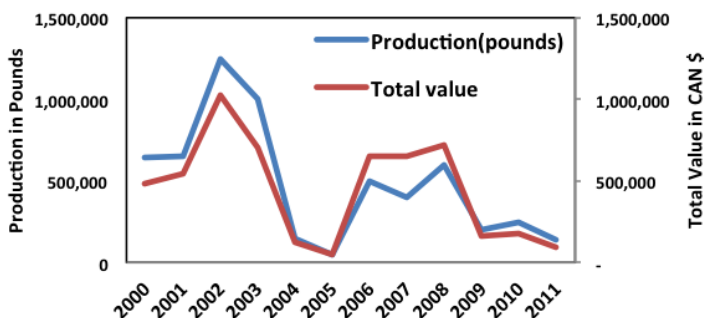
Participant	Role
Murray Ratuski - President Floating Leaf Fine Foods	Processor / Manufacturer
Eric Sylvestre Saskatchewan Rice Harvester	Grower/Harvester
North American Food Distributor	Distributor
Matthew Ratuski – Sales & Customer Relations Director Floating Leaf Fine Foods (previously in Food Service)	Processor / Manufacturer (Distribution)
Alphonsus Utioh – Manager Food Development Centre	Innovation partner
Peter Jones - Director Richardson Centre	Research Centre
Dave Shambrock Manitoba Food Processors Association	Processor Industry Association

WILD RICE INDUSTRY

Wild rice is a grass which grows in water (*Zizania aquatica* or *Zizania palustris*); a very distant cousin of Asian rice. The grain has been traditionally gathered as a food in North America for hundreds of years. In Canada wild rice is usually harvested as a naturally organic crop, grown in the clear fresh water lakes and streams of Ontario, Manitoba, and Saskatchewan. Rice is harvesting over one month in the fall, with 4 or 5 passes over the lake by specially adapted air-boats. Wild rice also is commercially cultivated, in paddy fields, in California, Minnesota (also grown in wild), Hungary and Australia.

The majority of Canada's wild rice is grown in Northern Saskatchewan. Manitoba's annual production has focused exclusively on wild rice that has been harvested from natural bodies of water (lakes and rivers) mainly in areas east of Lake Winnipeg, in the Whiteshell and in the northwest near The Pas and Flin Flon. Over the last decade, Manitoba's share of Canada's annual wild rice production has averaged around 25 percent². Manitoba's annual wild rice production (and associated \$ value) have fluctuated significantly in recent years.

Historical Production and Value of Wild Rice in Manitoba



2 http://www.gov.mb.ca/trade/globaltrade/agrifood/commodity/wild_rice.html & https://umanitoba.ca/faculties/afs/dept/agribusiness/media/pdf/Crops_in_Manitoba_2012.pdf

Health Benefits of Wild Rice³⁴

Wild rice is classified as a whole grain, is a good source of dietary fiber and has nearly double the amount of protein of white rice. The fat content is low; however, most of the lipids are essential omega-6 and omega-3 fatty acids. In addition to macro-nutrient content, wild rice contains phytosterol levels several times higher than white rice. Furthermore, the antioxidant activity of wild rice is 10–15 times higher than white rice.

Current interest in ancient grains and gluten-free diets, as well as possible antioxidant and lipid lowering properties, make wild rice an attractive grain addition to the diet.

FLOATING LEAF FINE FOODS

The Company

Floating Leaf Fine Foods (FL) is a family business owned by the Ratuski family. The family business started in 1935 with buying green wild rice, and began processing in the mid 1950's. FL currently has a Manitoba roasting plant, and a processing and packing plant in Winnipeg.

Over these years, Floating Leaf has been supplied with wild rice by the same families of harvesters mainly located in Northern Saskatchewan, Manitoba and fewer in north-west Ontario.

Floating Leaf is the only Canadian company involved in every facet of the wild rice industry; from harvesting, to processing, to blending and packing. In addition to the products they make, Floating Leaf is an accredited co-packer of other companies' products.

Floating Leaf is a true long-term family business as the fourth generation of the family is actively involved in the management team. FL currently operates with 20 employees, half are part-time.

3 <http://cerealchemistry.aaccnet.org/doi/abs/10.1094/CCHEM-08-13-0161-RW>
4 Surendiran et al, Nutr Rev. 2014 Apr;72(4):227-36

Processing

Raw wild rice is cured for 2 or 3 days at the Floating Leaf facility. Processing occurs with a unique technique developed by the Ratuskis, the process is based on the principles of roasting instead of par-boil steaming. This results in wild rice with excellent color, taste, texture and stronger aroma.

At Floating Leaf's Winnipeg facility the rice is cleaned before further processing; this involves removing dust, metal detection, etc. The rice is then graded by size and further processed for the desired cooking time and consistency; it is then ready for packaging or blending with other grains.

Floating Leaf's Winnipeg facility is BRC certified; meeting the requirements of Global Standard for Food Safety. It also holds the following certifications: HACCP, Organic (OPAM), Kosher and Non GMO.

Products

The Floating Leaf brand includes pure wild rice; wild rice blends (gourmet and prairie) and pasta; pancake, muffin and waffle mixes; stuffing; and other products. All the company's wild rice and blended ingredients are available in retail packaging and bulk quantities.

Floating Leaf also packages private label products, makes custom blends and co-packs products for other companies.

Markets / Customers

Food service is a very big part of Floating Leaf's business. Retailers (large but also independent chains), food manufacturers, wholesalers, brokers, distributors and co-packing clients comprise the customer base of Floating Leaf. Exporting to international destinations is an additional part of Floating Leaf's business; currently FL exports to Europe, Australia, Japan, Dubai and South Africa.

Position in Industry

Floating Leaf is one of the largest processors and manufacturers of wild rice and blends in Canada and the only Canadian company with national branded pure wild rice.

Competitive Advantages

- Involved in all facets of the process – harvest to packaging
- Focused on on-going innovation
- Family business with long history and knowledge of the industry

Supply Chain

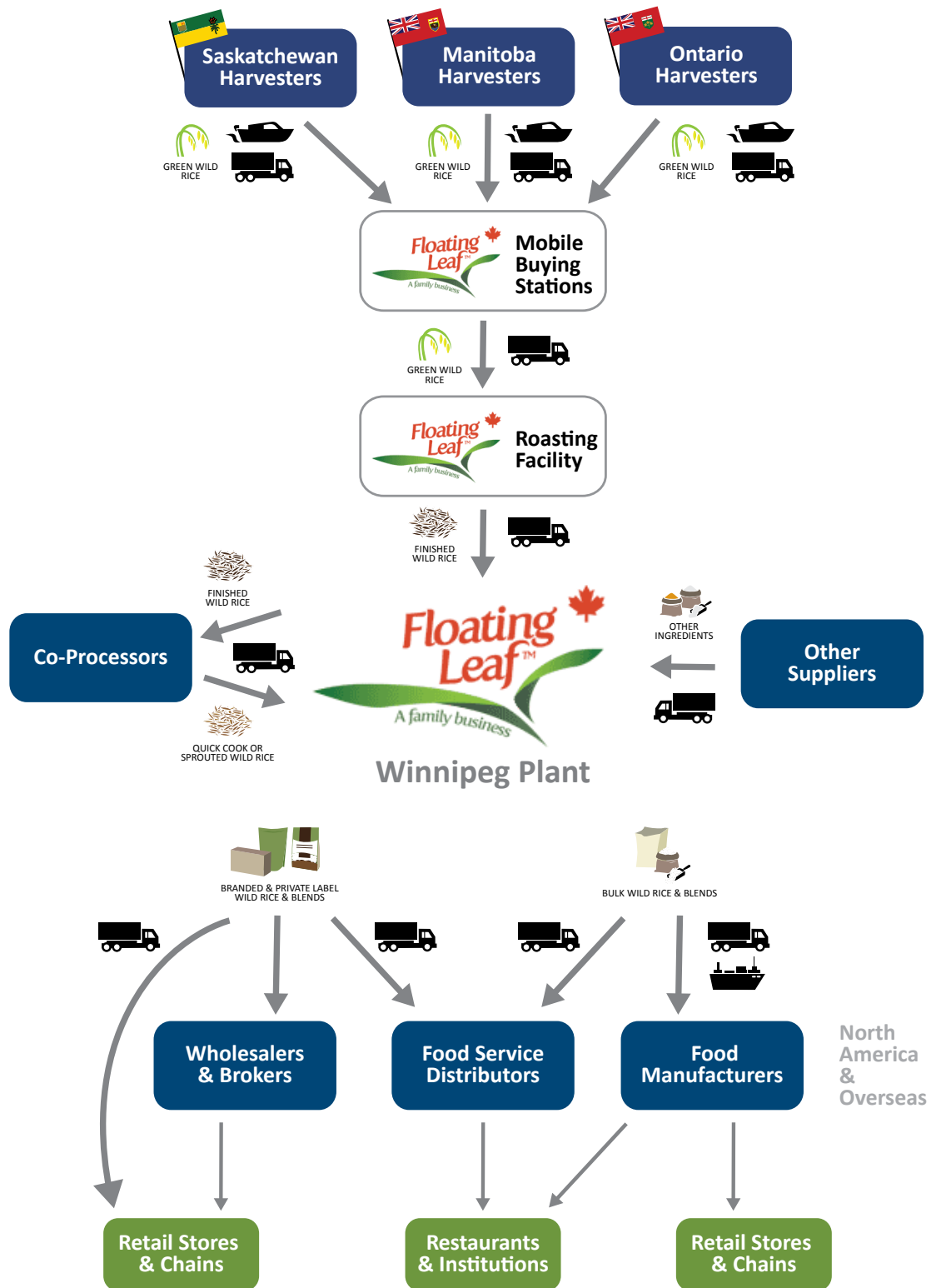
Floating Leaf gets its wild rice supplies mostly from Saskatchewan harvesters, but also from Manitoba and North West Ontario. In the cases of insufficient Canadian supply, wild rice is also imported from the US.

Wild rice is harvested using air-boats then transported to Floating Leaf's mobile stations by truck or boat. These stations move periodically depending on where the wild rice areas are. Wild rice is trucked to the Floating Leaf's roasting facility for initial processing, then to the Winnipeg plant for grading and packing. Some product is shipped to co-processors for sprouting or conversion to quick-cook rice.

At FL's BRC facility in Winnipeg the wild rice is cleaned, graded, blended and packaged into the final product for retail, private label or bulk sale.

Floating Leaf sells directly to food service distributors, food manufacturers, brokers, warehouses and large retail chains. When it comes to overseas customers, they mainly sell their products through distributors.

Floating Leaf Wild Rice Supply Chain



Innovation

Floating Leaf is a vertically integrated company that has close contact with its wild rice harvesters and processes rice for bulk ingredient sales, retail branded and private label products. The majority of their innovations have centered around developing innovative processes and products to expand the market for wild rice in retail and bulk ingredients and innovating to serve their

customers better. Harvesters and distributors are constantly innovating to increase efficiencies and keep up to date with technology. There are opportunities for Floating Leaf and the wild rice industry to expand the wild rice industry through exports and increased use as a "healthy" food and ingredient.

FL 1 Innovation: Unique Processes

Type: Process / Product

New to: Wild rice industry

Part of supply chain: Processor

When: 1965 & 2014

Time Line: one-step x 2

Developed: In-house and with Food Development Centre

The Ratuski family developed a unique, proprietary roasting process for their wild rice in the 1960s. Careful monitoring of temperature and moisture gives a consistent premium product that is darker, stronger aroma, nuttier taste, and firmer texture than other processes.

"Wild Rice in Minutes" was launched in 2014. A proprietary process produces quick cook rice that cooks in 10-12 minutes, is easy to digest, and has very similar nutrients to conventional wild rice. This innovative product will open markets in convenience foods and blends using wild rice.

FL 2 Innovation: Blends

Type: Product / Marketing → Organizational

New to: Wild rice industry

Part of supply chain: Processor

When: Continuous to future

Time Line: Multiple step-wise

Developed: In-house with Food Development Centre and customers

Floating Leaf has been making simple blends of wild rice with brown and white rice for decades.

They are now taking advantage of the opportunity offered by their quick cook proprietary process by developing multigrain blends for their own brands, private label and custom ingredient customers. Floating Leaf has worked with chefs and customers to blend tasty combinations that add to the health value and "functionality" of wild rice with pulses, seeds and other grains.

Blends also diversify Floating Leaf's products, spreading risk, especially when wild rice is in short supply.

FL 3 Innovation: New Products

Type: Product / Process → Marketing

New to: Industry

Part of supply chain: Processor / Manufacturer

When: Continuous to future

Time Line: Multiple step-wise

Developed: In-house with co-packers & customers

Floating Leaf has developed two new products using wild rice flour as an ingredient: wild rice pastas and pancake mix. The flour is made by milling "splits", broken rice that is not suitable for sale as whole grains.

Wild rice is an organic product with many useful nutrients; it falls well within the "natural health products" umbrella. Floating Leaf is researching other opportunities to use whole grains, wild rice flour and other extracts as ingredients in products that follow current consumer trends of healthy, convenient foods. Wild rice "bars" with added "functional" ingredients and wild rice water (similar to barley water) are examples of possible future products in this category.

<p>FL 4 Innovation: Packaging</p> <p>Type: Marketing</p> <p>New to: Company</p> <p>Part of supply chain: Processor</p> <p>When: Continuous to future</p> <p>Time Line: Multiple step-wise</p> <p>Developed: In-house with designers and packaging suppliers</p>	<p>A significant portion of Floating Leaf’s business is retail – whether their own brands or private label.</p> <p>Floating Leaf is continuously developing and introducing new packaging materials and designs. Together with developing and offering products that meet customers’ needs, an essential marketing tool is keeping packaging up-to-date and ensuring products are attractive and noticeable on the shelf.</p>
<p>FL 5 Innovation: Safety Certification</p> <p>Type: Organizational → Process</p> <p>New to: Industry</p> <p>Part of supply chain: Processor</p> <p>When: Continuous to future</p> <p>Time-Line: Incremental</p> <p>Developed: In-house with certifiers and rest of chain</p>	<p>Floating Leaf has multiple certifications such as Organic, Kosher, non-GMO and HACCP. They have completed certification through the internationally recognized BRC program, meeting the Global Standard for Food Safety, the only wild rice producer in Canada to have this level of certification.</p> <p>BRC certification has opened doors for new domestic and export markets for wild rice ingredients and retail products; as well as providing similar opportunities for other Manitoba products through a co-packing service.</p>
<p>FL 6 Innovation: Agronomy and Technology</p> <p>Type: Process</p> <p>New to: Company</p> <p>Part of supply chain: Producers & Distributors</p> <p>When: Continuously, past and future</p> <p>Time Line: Incremental & step-wise</p> <p>Developed: In house with other producers & equipment suppliers</p>	<p>Wild rice harvesters are periodically investing in new harvesting equipment, and improving harvesting and grain handling methods to give the best wild rice grain quality. There are opportunities to improve re-seeding and straw-management to more effectively manage this wild crop. Wild rice is an annual plant and the establishment of a seed-bank to ensure seed supplies year over year was suggested as a tool to stabilize supply.</p> <p>Distributors are continuously upgrading to keep up with technological changes in inventory and data management; this enables them to serve customers better, be more efficient and avoid waste.</p>
<p>FL 7 Innovation: Expand Markets</p> <p>Type: Marketing</p> <p>New to: Industry</p> <p>Part of supply chain: Processor</p> <p>When: 2013 to future</p> <p>Time Line: Incremental & step-wise</p> <p>Developed: In house and with distributors</p>	<p>Several participants pointed out that there are many opportunities for wild rice to expand into two large niche markets, both for export and ingredients. Organic and vegetarian were highlighted, where blends with pulses, seeds and other grains make the product healthier and more convenient.</p> <p>The starch market is currently very open to new alternatives; this is an opportunity for the wild rice industry to expand their reach into more mainstream markets.</p>

FL 8 Innovation: New Plant	<p>Floating Leaf is planning to build a new processing facility in Manitoba within the next 5 years. This will replace and update the existing processing and packing functions of their current facilities. It will also include the capacity to “sprout” wild rice and other grains and pulses, currently being done at co-processors.</p> <p>The new facility would increase Floating Leaf’s processing capacity; whilst also offering a needed service of sprouting, processing and co-packing to the Manitoba food processing community.</p>
Type: Organizational → Process	
New to: Company	
Part of supply chain: Processor	
When: before 2025	
Time Line: Step-wise	
Developed: In-house, with partners	

Innovation Methods

Factors that Affect Ability to Innovate

The **incentives to innovate** for Floating Leaf is to stay ahead of the competition, that means to bring something different/better or a new concept to the market. It was clear from all supply chain members that in order to “stay in business” and grow, innovation must be an ongoing thing. From the grower’s point of view, ensuring a good quality crop was the major incentive which eventually results in better crop value.

Floating Leaf innovates initially in house but then seeks feedback from their customers, suppliers and other partners. Ideas **are generated** by the management team; members of the team are constantly attending trade shows, observing market trends, talking with chefs and other customers. Almost all members of the supply chain mentioned “talking with others” is what triggers innovation ideas.

Participants unanimously cited “money” is the main **obstacle to innovation**. More funds are needed for exploring new opportunities, upgrading machinery etc, however funds are not always available. Time was an additional barrier identified as people get busy with everyday work and they don’t often dedicate the time needed to generate new innovative ideas.

Innovation Linkages

Floating Leaf uses a great variety of **external knowledge** sources such as: trade shows; the Food Development Centre; internet, TV and social media to observe the trends; customers and partners; and annual publications of large retail chains (e.g. Sobeys, Loblaws). Chefs are an important source of information, for the majority of the supply chain members, to identify trends and seek feedback for ingredients and product.

Relationships with innovation linkages are both formal and informal, but overall there is open communication among the supply chain members. Ownership of intellectual property does not seem to be of a great concern among the innovation linkages of this supply chain.

Linkage relationships were considered by most participants to be close to collaborative, even though the large retail chains are more difficult to work with. Floating Leaf seems to maintain a close relationship with members of both sides of the supply chain.

Consistence/Stability: Relationships within this supply chain are considered overall consistent and stable; with most participants feeling that stability plays a key role in a chain. An exception to this is the relationship with some of the growers. From the processor’s experience, price is a priority for growers and FL is integrating “relationship and trust” at the same priority as price. From the grower’s point of view, keeping the business relationship with Floating Leaf is crucial, even though there might be better offers for their crop.

Limits to Growth

Participants almost unanimously identified crop supply being the major barrier to growth. Consumer interest in wild rice has risen dramatically and is often outpacing supply. However, Canadian wild rice is grown naturally and its supply is not consistent.

There are a couple of reasons associated with the inconsistency in wild rice supply. First, wild rice is a sensitive crop and weather (e.g. high water, cool spring, short summer, early fall) significantly affects its production. In some cases there has been crop failure for two or more years in a row; causing problems for processors and the growers, who still need to cover their operating costs. Processors often try to offset the shortfall in Canada by importing rice from the US despite the noticeable differences between the two varieties. Secondly, when crop prices are good growers are tempted to sell the entire crop and there is not much seed left for re-seeding (which results in less production for the following year). Lastly, there are some wild rice production areas that have been abandoned because communities surrounding them have lost interest in the wild rice business. Younger generations in those communities seem to be less interested in wild rice business succession; access to some of the lakes is also a problem.

The instability in both pricing and in crop supply is hurting the industry. Floating Leaf has managed to diversify this risk by diversifying its products. The blends that are now produced use wild rice mixed with other crops, so less wild rice is needed. Expanding their business to co-packing for other processors is an additional way for FL to diversify its risk during low supply years.

Finally, in order to grow the companies need to innovate and in order to innovate they need to invest money. The margins, as in most of the food processing industry, are so compressed that they do not always allow companies to build up funds to invest in future innovation. Lack of funds is also seen as a limit by the other members of the supply chain. Revenue instability for example, which is associated with crop instability as mentioned above, does not allow the harvesters to save money to invest in new equipment or exploring new methods for harvesting.

Conclusion

Floating Leaf Wild Rice is a well-established family business with great knowledge of the wild rice industry built over the years. It is the only Canadian company involved in the whole wild rice process from harvesting to packing and marketing national brands.

Over the years Floating Leaf has introduced new processes and products to the market and has a mandate to keeping its products up to date and exploring new trends and new markets. Demand for wild rice is increasing both nationally and internationally and the marketing umbrellas of “natural”, “healthy”, “sprouted”, “convenient cooking” and “starch alternatives” are opportunities for growth of the company and industry. Export markets are also very promising, especially for a Canadian BRC certified company like Floating Leaf.

Wild rice is grown naturally in Canada and its production is not consistent from one year to another. This fluctuation in wild rice supply is hurting the industry since in some years processors either have to go without or import wild rice from the US (not always possible and with noticeable differences among the varieties). Floating Leaf is dealing with this issue by diversifying its services (co-packing services to other processors) and products (blends with other grains).

Floating Leaf has the capacity, experience and the focus on innovation needed to take advantage of the opportunities offered and succeed in future growth.



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APPENDIX F

CASE STUDY

Bee Maid Honey

Strategies for Growth of Bulk Food
Processing in Manitoba

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AUGUST 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.

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 eight conducted to describe successful bulk food processing companies in Manitoba and give insight into opportunities for growth and innovation in these industries.

Bee Maid Honey is a producer owned honey processor and packager with facilities in Manitoba and Alberta. The majority of their production is packaged for retail, either their own brand or private label. They also sell bulk processed honey for ingredient use by food manufacturers or the food service industry and bulk raw honey to other honey processors.

Bee Maid has built a reputation for consistent, high quality product and service over 60 years, particularly in the area of innovative packaging. The company has grown steadily and plans to continue to do so through expanding into more export markets. The honey industry is addressing challenges to bee health by working with other players in the agricultural industry. In the future, the continued expansion of the use of pollination services in agriculture will change bee-keeping, but with good coordination, the whole industry can benefit.



Courtesy of Bee Maid Honey – www.beemaid.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 follows from a preliminary study into the opportunities for growth that come from innovation in the bulk food processing industry in Manitoba. For the purpose of these studies a bulk ingredient processor is defined as a company that sells to manufacturers, bulk wholesalers, distributors, businesses and food service. Private label sales are also included as a type of bulk sale in this research; in addition some processors also sell their own branded products. The unit of sale will be in most cases significantly larger than the retail size.

The notion of health benefits associated with ingredients was an additional factor examined with the majority of companies selected.

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”: eight 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” guidelines¹ for collecting and interpreting innovation data were used to formulate the interview tool for the semi-structured interviews conducted in this study.

¹ Oslo Manual Source: OECD & Eurostat Agri-Food. 2005: Guidelines for collecting and interpreting innovation data

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

INTERVIEW PARTICIPANTS

Participant	Role
Guy Chartier <i>Bee Maid Honey</i>	Processor
Bill Bygarski <i>MB Honey Producers (MCHP)</i>	Producer
North American wholesale distributor	Distributor
North American retail chain	Customer
Rod Scarlett <i>Canadian Honey Council</i>	Commodity Organization
Ronald Fessenden, MD, MPH	Resource: honey health research
Dave Shambrock <i>Manitoba Food Processors Association</i>	Processor Industry Association

HONEY INDUSTRY

Honey is a natural, unrefined food that does not spoil and has been a human food for more than 8000 years. The Canadian apiculture (honey bee) industry produces more than 75 million pounds of honey each year, Canada usually accounts for 2-4% of world

honey trade². In 2013 Canadian honey exports³ were over \$59million with United States (\$45.5m) and Japan (\$11.9m) being the major export destinations. Manitoba accounts for 26% of Canadian honey exports. In 2014 there were 546 beekeepers in Manitoba (8,777 in Canada) and 78,000 colonies (694,217 in Canada)⁴. Honey bees are also important as pollinators; the estimated value of honey bees to crop pollination in Canada is over \$2 billion⁵.

In 2014 Canadian honey production value was about \$201m. Manitoba was third in honey production with 17%, just behind Saskatchewan (20%) and Alberta (42%)³.

The global honey bee industry is facing bee-health challenges, varroa mites are a major factor in overwintering losses of up to 44% in some provinces. This affects the bottom-line of bee-keepers and the price of honey.

Health Benefits of Honey

Honey's anti-microbial properties have been the focus of most valid clinical research. In many studies honey has been shown to be effective as a topical skin treatment for more than 60 bacteria, fungal infections and treatment of burns. Several recent studies have demonstrated that honey is more effective than an over-the-counter cough suppressant; suitable for children above the age of 12 months.

Honey has long been accepted as a healthy, pure, natural source sweetener; a tasty, convenient source of carbohydrates and energy. Honey's potential therapeutic effects⁶ suggest several promising areas of research:

- Anti-microbial effects and mechanisms
- Evaluation of the effect of processing on the composition and health benefits of honey.

- Effect of honey consumption on fasting blood sugar and HbA1c levels in type 1 & 2 diabetics and normal individuals
- Effect of honey consumption before bedtime on sleep patterns and REM sleep
- Long term effect(s) of honey consumption on risk factors for the metabolic syndrome (diabetes, obesity, hypertension, cardiovascular disease)

There has been relatively little study of these potential benefits of honey. The reason is two-fold; there are over 300 varieties of honey each of which may have different properties, this complicates research methodology. Also, realizing patents and profits from honey's health benefits may be difficult. However, if current research confirms how and why honey is beneficial to health, there is the potential for wide acceptance and an increase in honey use and consumption.

BEE MAID HONEY

The Company

Bee Maid is the only Canadian honey company that sources all its honey from its owners; the more than 300 beekeepers who are members of the Manitoba (includes Saskatchewan) and Alberta honey co-operatives. Each co-operative has its own packing facility, Winnipeg and Spruce Grove, Alberta. Bee Maid markets and distributes honey from both plants. Bee Maid also owns a plastic bottle manufacturing plant, based in the Spruce Grove facility.

Bee Maid Honey Limited commenced operation in 1954 when the Manitoba and Saskatchewan Honey Co-Operatives agreed to market all their honey jointly. In 1961-2, the Alberta Honey Co-op joined with the Manitoba and Saskatchewan Co-ops to form Bee Maid Honey and began full participation in both the domestic and export markets.

Manitoba Bee Maid accounts for about one third of Manitoba honey production, and about 10% of Canadian honey processing. There are 40 employees

2 <http://faostat3.fao.org/home/E:> Food & Agriculture Organization of the United Nations, Statistics Division

3 <http://www.agr.gc.ca/>: Statistical Overview of the Canadian Honey Industry – 2013

4 Statistics Canada. Cansim table 001-0007 - Production and value of honey, annual

5 http://www.honeycouncil.ca/honey_industry_overview.php

6 Report to Committee for the Promotion of Honey and Health, R. E. Fessenden, 2008



Locations of Bee Maid Honey's beekeepers across the Prairies
 Courtesy of Bee Maid Honey - <http://www.beemaid.com/>

at the Winnipeg facility, including administration, processing, packing, and bee-supplies.

Processing

Honey requires little processing. The raw honey is warmed-up, filtered to remove any solid matter such as wax or pollen in order to ensure adequate shelf life. Honey is pasteurized to kill any yeast that may be present by rapidly heating to about 160°F, then rapid cooling, prior to packing into bulk containers or retail bottles.

All Bee Maid honey processing and packing operations are SQF certified and undergo regular HACCP inspections, monitored by Canadian Food Inspection Agency (CFIA), to insure that the utmost levels of food safety. Bee Maid Honey is Kosher and true source certified, with traceability back to the producer.

Products

Liquid honey forms the majority of Bee Maid product. The colour and taste of honey differs according to the nectar source, the flowers visited by the honey bees. Three main types of liquid honey are available: traditional Canada No 1 White, Golden and Amber.

Retail and private label honey is packaged in retail sizes. Bulk, liquid honey is available in 15kg, 30Kg and 284kg barrels and totes. Classic creamed honey and squeezable creamed honey are also available.

Markets / Customers

Majority of sales are retail packaged, either Bee Maid or private label. Bee Maid Honey also sells to wholesalers, distributors in retail, foodservice, baking and the food ingredient industry and exports raw honey to other packers in the US and Japan mainly (approximately 20% of the business).

Position in Industry

Bee Maid is the largest single source honey packer in Canada and in the top 10 in North America.

Competitive Advantages

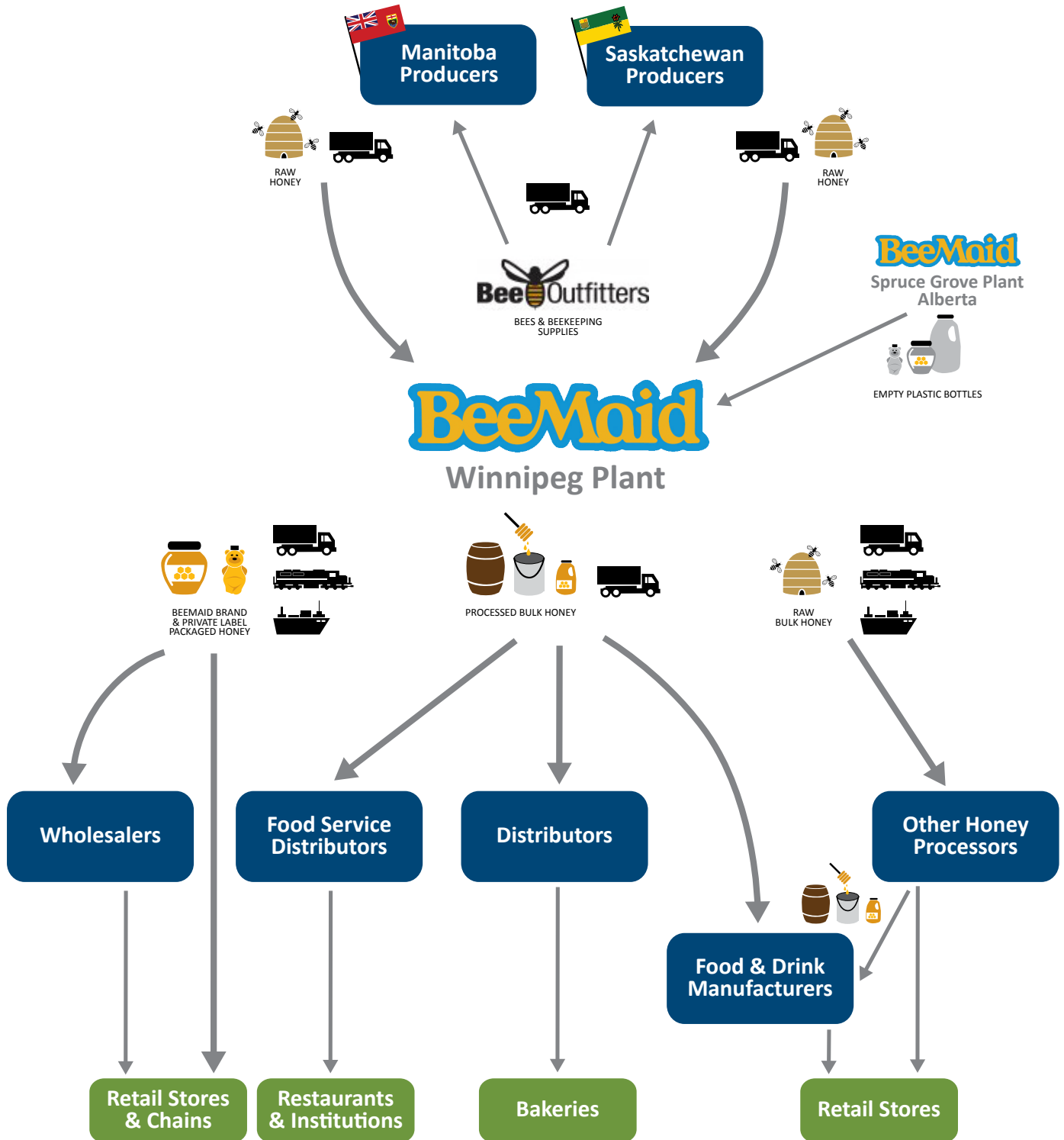
- Producer owned - consistent high quality honey
- Honey experts - knowledge of entire honey industry from bee to bottle
- Packaging - design and make their own plastic bottles

Supply Chain

Bee Maid Honey's beekeepers harvest the honey and ship it to Bee Maid Honey plants for packing and distribution. Bee Maid cleans and re-uses their own heavy duty honey barrels for raw honey, this practice reduces both costs and waste. Bee Outfitters, a Bee Maid company, supplies bees and supplies to members and other prairie apiarists: this keeps the company in-tune with the entire honey industry.

The majority of Bee Maid's sales are retail packaged as private label and Bee Maid brands. They sell direct to large retail chains (central warehouses) and through wholesalers to smaller retail stores. The company is also an exclusive private label supplier to two major food service distributors. Bulk honey is also sold as an ingredient to food and drink manufacturers. To ensure consistent supply to their customers Bee Maid's intake is greater than their processed sales. They sell any excess raw honey to other honey processors, usually on the export market. Bee Maid sells most of its honey in North America. They have not exported to Europe since 2012 due to strict GMO guidelines.

BeeMaid Honey Supply Chain



Innovation

Bee Maid Honey and the Canadian honey industry are well established, with significant export business, based on consistent quality product and service. Bee Maid's innovation is concentrated around retaining their market share through providing existing and new customers with excellence in product and packaging. All parts of this supply chain continuously innovate to

keep up with technology, serve their customers better and remain competitive. Honey was generally seen by the supply chain members as a traditional product, where there is not much innovation around the product itself. No surprise that most of the innovations identified focused on marketing, organizational and process type of innovations.

BM 1 Innovation: Producer-owned cooperative

Type: Organizational → Marketing

New to: Canadian Beekeeping Industry

Part of supply chain: Producer / Processor

When: 1930's to future

Time Line: one-step then incremental, keeps evolving

Developed: In-house within the Prairie honey industry

Prairie provincial honey cooperatives formed in the 1930's to jointly market honey. This organizational innovation continued with MB and SK Cooperatives establishing Bee Maid Honey in 1954; Alberta joined in 1962. Individual bee-keepers benefited from this innovation since they could sell their honey, share risks and gradually increase the value of the honey they sold. The 1970's saw expansion in processing and reach of marketing beyond provincial borders, to the current position of world-wide distribution.

Bee Maid is currently the largest single source honey packer in Canada and among the top 10 in North America. Since the early 2000's Bee Maid has re-positioned itself as a co-op in the honey industry by marketing its strengths such as the extensive knowledge of the honey industry from "hive to home", being producer owned and supporting Canadian bee-keepers; taking advantage the emerging trend of "knowing where your food comes from".

BM 2 Innovation: Product development

Type: Product / Process

New to: Industry

Part of supply chain: Processor

When: Continuous to future

Time Line: Multiple step-wise

Developed: In-house with customers

Bee Maid developed a new "creamed honey" product in the mid-1990s: a shelf-stable opaque honey that can be dispensed from a bottle. This unique product can also be flavoured – lemon or cinnamon for example. This adds diversity to Bee Maid's product-line.

Within the wider industry other products are being developed – such as solid honey to give "candy" and honey flavored whiskey and water. "Natural, unfiltered" honey is also marketed in the US; this is not heated above 120°F, has bee-parts and wax removed with cloth filters, but retains small pollen particles, that are removed by conventional processing (micro-filtering).

Honey is a common ingredient in many products; as such, new products with honey as an ingredient are constantly being introduced by food manufacturers. These new products often follow consumer trends towards foods that are natural, healthy and convenient; though price and shelf-life are still very important factors for both retailers and consumers.

<p>BM 3 Innovation: Packaging</p> <p>Type: Product / Marketing</p> <p>New to: Company / Industry</p> <p>Part of supply chain: Processor / Retail</p> <p>When: Continuous to future</p> <p>Time Line: Multiple step-wise</p> <p>Developed: In-house with co-packers & retailers</p>	<p>Bee Maid has the capability to design and manufacture custom plastic bottles at their Alberta plant. The company is always working with customers to improve the functionality and shelf appeal of their packaging. This ranges from squeezable bottles; hive and bear shapes; and club-size. Packaging is a key factor in making products stand-out from their competition in all markets: branded, private label and food-service.</p> <p>“Lil-honey” single serve packaging for coffee-shops is an important recent innovation. This not only provides a clean, convenient product for their customers and consumers; but also increases brand awareness for Bee Maid Honey.</p>
<p>BM 4 Innovation: New Markets</p> <p>Type: Marketing</p> <p>New to: Industry / Company</p> <p>Part of supply chain: Processor / All</p> <p>When: Continuous to future</p> <p>Time-Line: Incremental</p> <p>Developed: In-house with chefs, consultants and researchers</p>	<p>Bee maid proactively started discussions and worked together with well-known chefs in Winnipeg, discovering that chefs preferred to use darker coloured honey as an ingredient. By marketing amber honey as “chef’s choice” Bee Maid has become a major player in supplying the food services industry.</p> <p>The Canadian honey industry makes more honey than Canadians consume, so expansion to export markets is always pursued. At present Bee Maid is exploring expansion into the Chinese market; taking advantage of their consistent high quality product, packaging expertise but also the reputation of Canadian products.</p> <p>There is potential for honey to be marketed for specific health benefits. Honey has many possible health applications and this has the potential to increase demand for honey, but additional scientific research is needed.</p>
<p>BM 5 Innovation: Bee Health</p> <p>Type: Process → Organizational</p> <p>New to: Industry</p> <p>Part of supply chain: Producers</p> <p>When: Continuously, past and future</p> <p>Time Line: Incremental & step-wise</p> <p>Developed: with government, researchers and agricultural industry</p>	<p>Honey bees are the “producers” in the honey industry and beekeepers are constantly striving to keep their bee populations healthy; staying ahead of pests, diseases and weather.</p> <p>The major health threat is the varroa mite. This caused a major change in Canadian overwintering practices in the late 1980’s when bee importing was restricted to only queens; that led producers to find ways to keep their hives over winter.</p> <p>There is a strong tradition of working together in the bee industry. The “bees and neonicotinoid pesticides” issue has recently resulted in a unique collaboration between apiarists, crop producers, pesticide companies and government to come together to find a solution for all.</p>

<p>BM 6 Innovation: Pollination Services</p> <p>Type: Organizational → Process</p> <p>New to: Agricultural industry</p> <p>Part of supply chain: Producer</p> <p>When: Last 20 years and future</p> <p>Time Line: Incremental & step-wise</p> <p>Developed: With crop producers</p>	<p>Pollination by honey bees is becoming more important for a number of crops; especially fruit trees, blueberries, cranberries and canola (2 colonies /acre increases yield by 15%). The Canadian pollination industry has been valued at \$4.4b, over 10X the value of the honey industry. This is more prevalent in Alberta; presently in Manitoba all bee-keepers are honey producers, though many also offer pollination services.</p> <p>A related challenge is that some bee-keepers need to innovate due to the increasingly “monoculture” nature of agriculture, the lack of biodiversity. For example, canola flowers for 35 days, and bees need a food source for the rest of the summer.</p>
<p>BM 7 Innovation: Updating technology</p> <p>Type: Process</p> <p>New to: Company</p> <p>Part of supply chain: All</p> <p>When: Continuously, past and future</p> <p>Time Line: Incremental & step-wise</p> <p>Developed: In-house with equipment suppliers</p>	<p>Through the distribution and retail side of the supply chain, innovations are made continuously to keep pace with changes in technology. These changes give more energy efficiency; save labour; streamline systems and achieve better tracking of products to enable to companies to serve their customers better and remain competitive.</p> <p>On the producer side: apart from overwintering (BM5) bee-keeping practices have not changed a lot over the years. However some mechanization has occurred: from radial to parallel honey extractors; wax presses and self-levelling booms to lift hive boxes.</p>
<p>BM 8 Innovation: Diversification</p> <p>Type: Organizational</p> <p>New to: Company</p> <p>Part of supply chain: All</p> <p>When: Continuous</p> <p>Time Line: Step-wise</p> <p>Developed: In-house</p>	<p>Several companies in various parts of the chain had diversified their operations from their original business. Bee Maid sells beekeeping supplies in addition to buying and selling honey. Beekeepers are adding pollination services and selling bees in addition to honey production.</p> <p>Diversification is partly in response to a need for a service, it is also a way of spreading and reducing risk. For example: many wholesale distributors had to diversify to food service when the wholesale industry changed fundamentally about 5 years ago as a result of cigarette manufacturers taking over their own distribution.</p>

Innovation Methods

Factors that Affect Ability to Innovate

The **incentives to innovate** within this supply chain are to stay in business, ensure a sustainable cost model of operation and keep the customers satisfied and engaged. Money and ensuring bee health were also mentioned as incentives to innovate.

Bee Maid has an innovation team and ideas **are generated** in-house and through their members, customers and suppliers. At the bee-keepers' end of the supply chain ideas are mainly generated by individuals, but also by discussing ideas in meetings and adapting innovations from others.

This individuality in generating ideas is one of the **obstacles to innovation**. However, this is improving over time with more associations taking a proactive approach in connecting bee-keepers and encouraging knowledge sharing and discussions. Other obstacles mentioned come down to resources (cost, time, staff and expertise) and the fact that not much scientific research has been done in relation to bee-keeping and honey production.

Innovation Linkages

Bee Maid's innovation team sources **external knowledge** from Food Development Centres, consulting firms, designers and various packaging suppliers, and from customers. Provincial associations and governments are great partners for sourcing and disseminating knowledge for producers, through workshops and national conventions. Since honey is a common international product, the internet is an additional source of external innovation ideas.

Relationships with innovation linkages are mostly informal and ownership of intellectual property was not mentioned as a concern by the members of the supply chain.

Opinions on the nature of the **linkage relationships** within the supply chain were variable; from coordinated to collaborative. Overall Bee Maid's supply chain is considered by participants one of the most integrated supply chains compared to other processors in the honey industry. Bee Maid is seen as succeeding in linking the honey producers with its customers and honey consumers.

Consistence/Stability: Relationships within this supply chain are considered long term and stable, with most of the chain members having grown their businesses together. However, this stability may be vulnerable to change if the traditional profitability of honey is challenged by a drop in the international price of honey.

Limits to Growth

One of the main barriers to growth as seen by the industry stakeholders interviewed for this case study is that honey itself is not a very innovative product. Although the industry and Bee Maid specifically, have been creative with attractive and innovative packaging and there are marketing opportunities under the “natural foods” umbrella, there is not much diversity when it comes to the product itself. An exception to this is a company from PEI that has developed a line of pure dried honey products.

As with every agricultural commodity, honey supply is affected by bee diseases, weather and agronomy, including pesticide use. All these factors can affect bee health and populations, and in the long run affect honey production and processing. Bee-keepers and others in the honey industry are working together and building relationships with the larger agricultural community, including chemical companies, to address these challenges.

It is worth noting that recently there have been significant obstacles in exporting Canadian honey to Europe, in part because it may be produced through pollination of a genetically modified crop and the definitions surrounding the GM pollen are unclear. This gives an additional barrier to growth for Bee Maid and other processors in the industry.

Honey production used to be the soul of bee-keepers’ business in Canada. Recently, the fast



expansion of the pollination services sector has changed the nature of the Canadian beekeeping industry. Honey bees are extremely important for the pollination of crops in Canada and pollination services offer promising growth expansion capabilities for the bee-keepers. This change in the structure of the honey industry may effect bee and honey supply; however, with good coordination the entire industry can benefit.

Finally, Bee Maid is a single source packer that only packs Canadian honey; this gives some competitors a price advantage since they can source cheaper honey from other countries.

Conclusions

Bee Maid has been an established successful company with stable growth over the years. Operating as a co-op has proven successful not only for the co-op members that benefit from a stable partnership to market their honey but also for the company as it is the only single source processor that uses exclusively Canadian honey. With the emerging consumer trends of “knowing where your food comes from” and “buy local”, Bee Maid has competitive advantages for future growth in both North American and international markets.

Honey is a traditional product that has been part of consumer’s diet for many generations and there have been few innovations in texture and flavour of product itself. Honey does continue to be a popular ingredient with a natural and healthy reputation; as such new products containing honey are continuously being introduced. The possibility exists for expansion into health and medical applications if scientific research proves some of honey’s potential health benefits.

Significant innovations have occurred around the functionality and the design of Bee Maid packaging. More user-friendly and attractive honey products are currently offered in the market and this is a continuous and evolving process.

Diversification was a common theme through the entire supply chain, from producer and processor to distributor and store, all had diversified their products, markets or customers to reduce risk and build their business.

Bee Maid’s supply chain is very well integrated and Bee Maid manages to link the source (bee-keepers) with its customers and final consumers. The pollination services industry is likely to continue to expand. There will be a challenge to manage supply and demand of bees and honey; however pollination does offer bee-keepers an opportunity for diversification and with good coordination the whole industry could potentially benefit.



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APPENDIX G

CASE STUDY

True North Foods

Strategies for Growth of Bulk Food
Processing in Manitoba

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SEPTEMBER 2015

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>> Acknowledgements

Thanks to True North Foods and all the supply chain partners and industry stakeholders who participated in this research.

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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 eight conducted to describe successful bulk food processing companies in Manitoba and give insight into opportunities for growth and innovation in these industries.

True North Foods is a privately owned ruminant processing facility located north of Carman, Manitoba, currently the largest provincial beef processor. Following recent upgrades to the facility the company is pursuing federal certification for slaughter and processing of cattle, bison and elk to “block ready” cuts.

Their small, flexible federal plant is designed to serve the needs of producers and marketers who wish to export without trucking their animals long distances to slaughter. When the facility is operating at full capacity in 2019 it is projected to process 1000 head a week, 5 times the number of cattle processed in the entire province 2013.

In the wider industry, producers are continually innovating to increase efficiency, through improving genetics and livestock management practices. New uses of technology are being developed to improve animal welfare and profitability.

The establishment of True North’s federal processing facility in the province is seen as a positive development for the industry, giving opportunities for producers, marketers and processors to expand their markets outside Manitoba without having to ship their animals long distances.

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 follows from a preliminary study into the opportunities for growth that come from innovation in the bulk food processing industry in Manitoba. For the purpose of these studies a bulk ingredient processor is defined as a company that sells to manufacturers, bulk wholesalers, distributors, businesses and food service. Private label sales are also included as a type of bulk sale in this research; in addition some processors also sell their own branded products. The unit of sale will be in most cases significantly larger than the retail size.

For the second year of the study, the notion of health benefits associated with ingredients was an additional factor examined with the majority of companies selected.

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”: eight 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” guidelines¹ for collecting and interpreting innovation data were used to formulate the interview tool for the semi-structured interviews

¹ Oslo Manual Source: OECD & Eurostat Agri-Food. 2005: Guidelines for collecting and interpreting innovation data

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

INTERVIEW PARTICIPANTS

Participant	Role
Calvin Vaags - CEO True North Foods	Processor
Art Petkau Beef Producer	Producer
Ian Thorleifson Elk & cattle producer, elk procurer President, Manitoba Elk Growers Assn	Producer & Customer / Distributor
Roger Provencher Bison marketer, Canadian Prairie Bison	Customer / Distributor
General Manger Foodservice Distributor	Distributor
Janet Honey University of Manitoba (retired)	Researcher
Melinda German Manitoba Beef Producers	Producer Organization
Dave Shambrock Manitoba Food Processors Association	Processor Industry Association

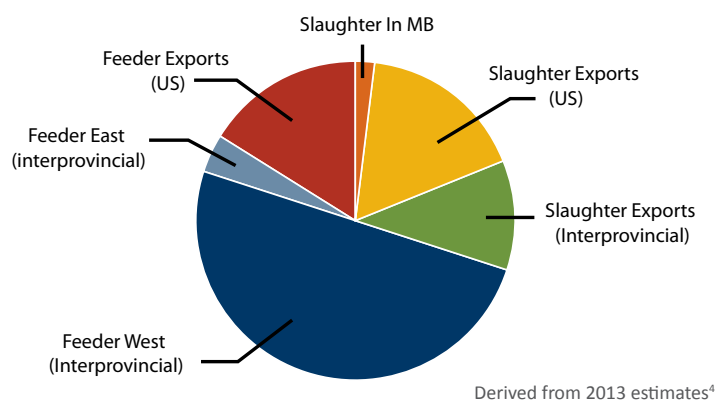
MEAT PROCESSING INDUSTRY

Beef is the third most widely consumed meat in the world (about 25%), behind pork and poultry, at 38% and 30% respectively. The three largest consumers of beef are the United States, Brazil, and China. The world's largest exporters of beef are Brazil, India, Australia and the United States.²

FAO (Food and Agriculture Organization of the United Nations) predicts food consumption will increase by 60% by 2050, due to increased population but more importantly income growth, more middle class in developing countries. "Beef is one of the few commodities where the growth rate is expected to grow over the next decade".³

Historically Manitoba has a strong cattle industry peaking at 581,000 head slaughtered in the province in 1976. Currently the Manitoba beef slaughter capacity is about 10,000 head, in provincially registered plants. In 2013 Manitoba's cattle industry sold about 400,000 head of slaughter or feeder cattle out of the province; mostly to Alberta (about 2/3) or south to the US. In 2013, over 2 million head were slaughtered in Alberta. The Manitoba cattle industry was hit hard by export restrictions during "BSE years" and in the late 2000's by a stronger Canadian dollar and US mCOOL regulations.⁴

All Cattle Exiting in Manitoba - 2013



² <http://www.indexmundi.com/agriculture/?commodity=beef-and-veal-meat&graph=domestic-consumption>

³ <https://www.fcc-fac.ca/en/ag-knowledge/money-and-finance/what-growing-global-demand-means-for-canadian-ag-markets.html>

⁴ Manitoba Cattle and Beef Industry, 2013 – 2014, Janet Honey, University of Manitoba

Manitoba bison and elk production in Manitoba operates on a much smaller scale, with 75 bison producers (about 15,000 head). About 2000 bison are slaughtered in-province each year, but most are shipped to the US for slaughter. The elk industry started with ranches in the 1970's, expanded with the market for antler velvet, now have meat and trophy hunting as additional sources of income. Manitoba has about 20 elk producers (about 2000 head).

Health Benefits of Beef, Bison and Elk

All red meat (beef, bison and elk) is a very good source of complete protein, iron and B vitamins. Bison and elk both give leaner meats than beef or pork. Bison, elk and some specialty cattle are marketed as "natural" foods, as they are raised with no antibiotics, growth stimulants, hormones or steroids.

TRUE NORTH FOODS

The Company

Beef producer and feed lot owner Calvin Vaags established Carvers Knife, a retail meat store, in 2004 as a solution to lack of market for his cattle due to the US border closure (BSE) in May of 2003. Carvers Knife later expanded to include wholesale. Plains Processors, located north of Carman, a provincially registered plant was purchased in 2008, and True North Foods was incorporated in 2012 and currently employs about 25 people.

The application process for federal licenses is underway. Licenses are country specific and species specific; the first will be beef to the US, then moving to other species (bison and elk) and markets, e.g. the European Union and China.

Processing

The plant has been modernized and enlarged in preparation for federal certification; it is now capable of handling very large animals, e.g. bull cattle, bison and elk.

True North is currently processing cattle under a provincial license. Animals enter the facility, where they are slaughtered humanely. The carcasses are cooled overnight then processed using a “pod-based” system, individual processing which enables each cut to be traced to the animal’s CCIA tag.

True North’s facility has HACCP certification; and is planning to certify for Kosher and Halal.

Products

True North’s end product is boxes of “block ready” meat, cut to the customers’ specifications. To be ready for sale to the consumer this meat needs further processing by a butcher, retail store or food service distributor.

Markets / Customers

The business model for True North will be largely “custom processing” where they will contract to provide a service: process live animals and deliver “block ready” packages of meat.

Many customers will serve niche markets, for example: Halal or Kosher, organic or grass fed beef, bison or elk, these markets demand a high degree of traceability for identify preservation. Their products will be sold both nationally and internationally, access to these markets depends on a federally inspected plant.

Position in Industry

True North Foods will be the only federally licensed beef and ruminant processing facility in Manitoba and Saskatchewan. They will be very small relative to the large facilities in Alberta where most Canadian beef is processed.

Competitive Advantages

- Federal license enables international marketing for processing customers
- Geographic advantage – shorter shipping distances for live animals

- Flexibility – small enough to meet customers’ needs and can serve large markets
- Diversification – serving multiple markets – beef, bison and elk
- Strong traceability

Supply Chain

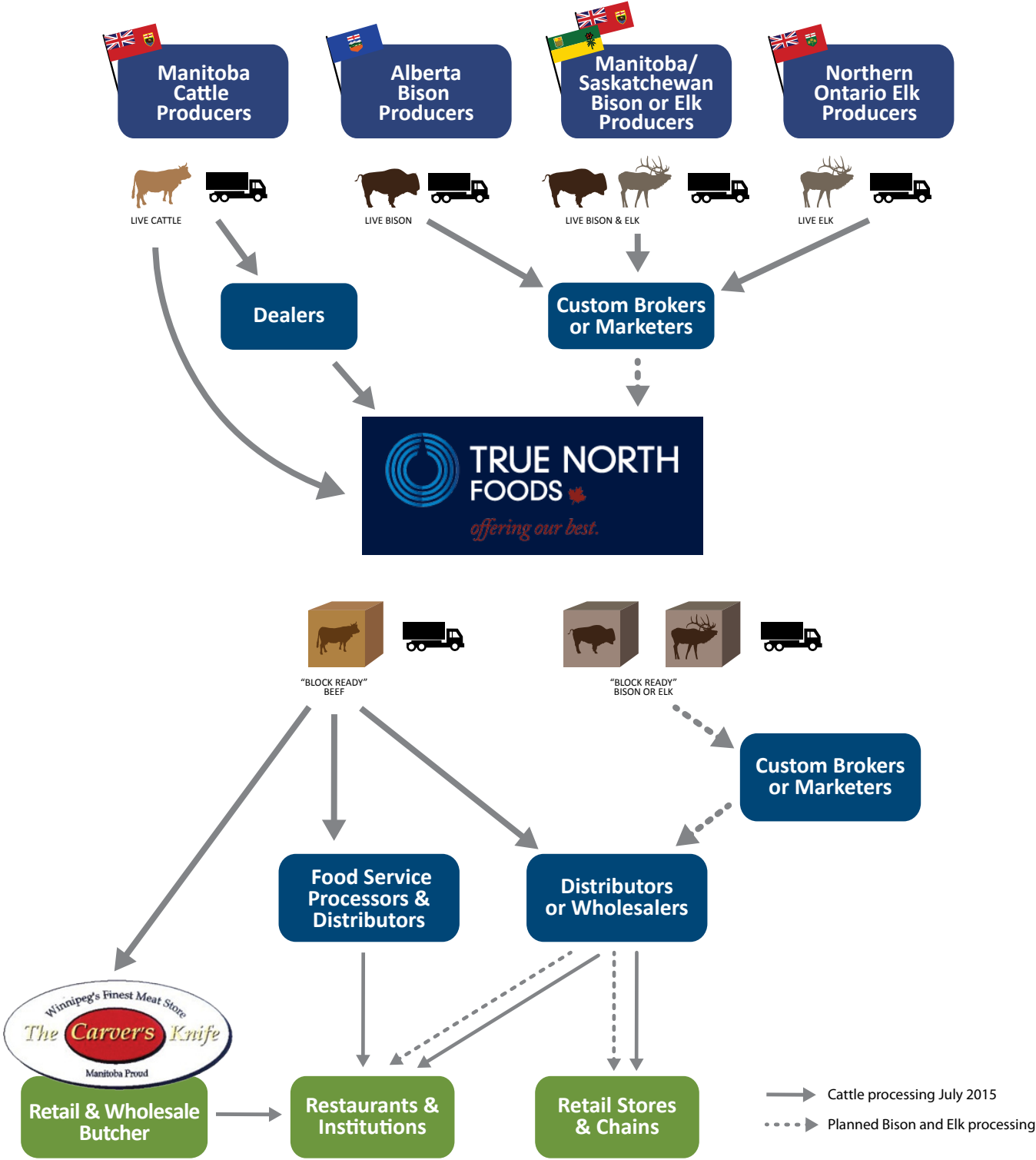
The supply chain given is a projection of the supply chain following federal certification.

True North Foods will sell a “service” to producers, brokers, marketers and dealers. Taking in live animals and delivering boxes of “block ready” meat ready for distributors, retail stores and chains. So, in many cases the “supplier” will also be the “customer”.

A significant proportion of the business will be custom processing of beef, bison and elk, Most of the “block ready” product will be exported to the US or other provinces through retail and food service distributors, procurers and marketers.

Currently a portion of their business is vertically integrated from the Vaags feedlot to True North processing to Carvers Knife retail and wholesale, with additional processing options for local producers.

True North Foods Supply Chain



Innovation

True North Foods' business model is an innovative one for the Canadian industry and the first federal plant in Manitoba for over 30 years. They will provide a slaughtering and processing service to Manitoba beef, bison and elk producers, targeting in particular those who have niche and export markets. Innovations have centred on setting up the business and facility with the capacity, flexibility, food safety certification and traceability that these customers need. Two process innovations are directly related to the new larger facility; processing using a pod-based system and the development of a novel water treatment process. These producers and marketers are leading the way in

move towards meat industry paying attention to what customers want in terms of knowing where their food comes from, food safety and animal welfare.

Industry wide producers, with support from the research community, are continually innovating to improve the genetics of their herds and refine livestock management systems to increase efficiencies and animal welfare. Looking to the future it is possible that the establishment of a viable federal ruminant processing facility in Manitoba will encourage producers to increase herd sizes; and lead to more value added meat processing for export markets.

TNF 1 Innovation: Federal facility

Type: Organizational → Product & Marketing

New to: Province

Part of supply chain: Processor

When: 2012 -2015/16

Time Line: multiple small steps

Developed: with consultants, equipment suppliers & regulators

True North will be the first large federally licensed ruminant processing facility in Manitoba since the 1980s. In cooperation with partners and regulators the facility was expanded and modernized to meet federal standards. Federal certification will enable TN to process larger, more cost-effective volumes; it will also provide a valuable service to Manitoba producers. New markets will open up as they will have the option of processing their stock in Manitoba, and marketing and exporting to other provinces (and chain stores), the US and overseas.

TNF 2 Innovation: Size of facility

Type: Organizational → Product

New to: Company

Part of supply chain: Processor

When: 2012 into future

Time Line: one-step

Developed: In-house with producers, distributors and customers

The facility will have a maximum capacity of about 200 head/day, or about 50,000/year. This is large compared to provincial processors (Plains Processing was 15/day), and at capacity will result in a 5 times increase in ruminant processing in Manitoba. It is however, much smaller (and less efficient) than larger Alberta plants (about 6000 head/day, from 1000 mile radius). TN's efficiency advantage is being closer to their supply (100-200 miles); this reduces travel cost, weight loss and stress on the animals. A smaller plant will also be more flexible, able to accept smaller loads, even single animals, which will be an advantage for smaller producers. This innovative approach is going against the "bigger is better" philosophy, towards "local food" and quality control.

<p>TNF 3 Innovation: Individual “pod” processing, traceability</p> <p>Type: Process / Product</p> <p>New to: Company / Industry</p> <p>Part of supply chain: All</p> <p>When: 2012 - 2015</p> <p>Time Line: One-step</p> <p>Developed: In-house with partners and equipment manufacturers</p>	<p>True North Foods is using a novel pod-based processing system taking full advantage of modern metal detection and monitoring technology. The whole carcass is processed into boxes of block ready meat at several stations in one “room”; each box will have primal cuts from just one animal. A major advantage of this is traceability, the meat is tracked to the CCIA tag of the animal, and hence to its life history. Pod processing also increases flexibility, with the capacity to process multiple species, large breeds and bulls, and enable customers to specify how the animal is processed.</p> <p>Enhanced traceability builds on industry-wide efforts to track produce from field to plate; giving better disease control and food safety, and giving producers the ability to evaluate the quality of meat from individual animals. Traceability will also satisfy consumer preference taking advantage of the trends of “knowing where your food comes from” and “know your producer”.</p>
<p>TFN 4 Innovation: Custom processing – multi species</p> <p>Type: Organizational</p> <p>New to: Province</p> <p>Part of supply chain: All</p> <p>When: 2015 to future</p> <p>Time Line: Multiple step-wise</p> <p>Developed: In-house with producers, distributors, brokers and customers</p>	<p>TNF will be selling a service rather than a product and targeting niche markets. Producers, brokers or marketers will bring live animals and take away boxes of block ready meat. The target customers are producers, marketers or brokers, such as grass-fed beef, or organic beef; other species (bison and elk) and Kosher and Halal customers. Country specific cuts and hormone free traceability will be important for export markets. Marketing and selling meat will be a minor part of TNF business, because each niche has its own established market, methods and marketers.</p> <p>There is established demand for this service in Manitoba (and adjoining provinces), especially for bison and elk that have large potential export markets and are currently shipping animals long distances to the US for slaughter.</p>
<p>TNF 5 Innovation: Waste water</p> <p>Type: Process</p> <p>New to: Industry</p> <p>Part of supply chain: Processor</p> <p>When: 2012-2015</p> <p>Time-Line: one step</p> <p>Developed: In-house with consultants and regulators</p>	<p>The expanded facility needed to meet modern standards for the disposal of specified risk materials (SRMs) and waste water.</p> <p>The company developed an innovative method that met environmental approval by adapting common agricultural practices and technology. This environmentally friendly and low cost solution removed a potential stumbling block to the establishment of the company, as conventional solutions would have been prohibitively expensive.</p>

<p>TNF 6 Innovation: Livestock breeding</p> <p>Type: Product</p> <p>New to: Company / Industry</p> <p>Part of supply chain: Producer</p> <p>When: Continuous to future</p> <p>Time Line: Incremental</p> <p>Developed: In-house, and with researchers</p>	<p>All three livestock industries are continuously selectively breeding for desirable qualities such as consistent tenderness. 70% of cattle production costs are feed, so selection is made on the basis of efficient conversion of feed to muscle; sophisticated genetic monitoring is replacing traditional “feed them and weigh them” studies. The recent formation of the Beef Cattle Research Council is resulting in improved collaboration between producers and all researchers.</p> <p>Plains and wood bison are cross-bred to give faster growing animals. Selective elk breeding has increased antler velvet production by 50%. As elk meat production increases in importance, producers are also breeding for feed efficiency to reduce feed costs.</p>
<p>TNF 7 Innovation: Livestock management and technology</p> <p>Type: Process</p> <p>New to: Company / Industry</p> <p>Part of supply chain: Producers & distributors</p> <p>When: Continuous to future</p> <p>Time Line: Incremental</p> <p>Developed: In-house, and with researchers</p>	<p>Bison and elk are naturally able to cope with the Manitoba climate all year; innovations have concentrated disease prevention and livestock management and handling, e.g. tight-lock fencing brought in from New Zealand.</p> <p>Cattle producers are constantly experimenting with different feeds and management practices, e.g. intensive and rotational grazing, and winter bale and swath grazing. Technology is being adopted to improve animal welfare and food safety, e.g. needle free injections and heat cameras to speed diagnosis of sick cattle. In the future cattle monitoring on range may be aided by drones and remote monitoring of Radio Frequency ID tags.</p> <p>Distributors are upgrading equipment and facilities to keep up with advances in technology and increase efficiency.</p>
<p>TNF 8 Innovation: Marketing healthy meat</p> <p>Type: Marketing</p> <p>New to: Industry</p> <p>Part of supply chain: All</p> <p>When: 2000 into future</p> <p>Time Line: Step-wise</p> <p>Developed: Whole industry, with government and others</p>	<p>The bison and elk industries made concerted and successful efforts to market their “low fat, natural, no antibiotics or hormones” meat in the 2000’s. At present here is no need for active promotion as, if anything, demand exceeds supply.</p> <p>In the cattle industry there is a developing recognition that the whole industry, including producers need to move marketing more towards consumer demand, (e.g. Certified Angus Beef). This means paying attention to and communicating effectively around animal welfare, management practices and the quality and advantages of their products. True North Foods’ facility and business plan is set up with this in mind; with the flexibility and traceability to enable producers and brokers to sell to multiple niche markets.</p>

TNF 9 Innovation: Value - Added	<p>Once True North is up and running with federal certification there will be the possibility of value added processing in Manitoba.</p> <p>At present Manitoba slaughtered ruminants cannot be sold outside the province or to many retail chains. Federal certification will give opportunities for value added processing. The block ready product coming out of True North plant could be further processed and cut for domestic markets such as retail chains in Manitoba and other provinces. Burger or steak packages could also be processed for export markets. “Made in Manitoba” or “Saskatchewan Grown Beef” are possible marketing approaches that feed the consumer desire to know where their food comes from.</p>
Type: Organizational → Marketing	
New to: Company	
Part of supply chain: Processors	
When: Future	
Time Line: Step-wise	
Developed: In house and with distributors and retailers	

Innovation Methods

Factors that Affect Ability to Innovate

The **incentive to innovate** for members of this supply chain was often to increase efficiencies and remain competitive. Growing their sector and profits were also factors, together with increasing animal welfare. For TNF innovations were to solve problems related to establishing a new larger company, and meet the needs of their markets.

For producers, innovation is generally very “grass-roots”, they **generate ideas** in-house and follow-up with discussions with other producers and “knowledgeable people. A proportion is actively engaged with researchers and government through workshops, direct contact and the internet. Producers and processors innovate by following-up on ideas by consulting equipment suppliers and specialists. For distributors and marketers, food shows are an important venue to generate ideas and form relationships to promote their product.

Obstacles to innovation were the usual “money, time and expertise”. Another significant obstacle was resistance to change, unwillingness to try something new. This was sometimes on the part of producers, and also relating to regulation. The general view was that regulation is a good and necessary thing, but that it should be consistent, reasoned and scientifically justified – regulations that don’t meet those criteria or are slow to change with new advances will slow the pace of innovation and growth. An example is uncertainty about international regulation around disease in elk; this discourages producers who may be considering entering the industry.

Innovation Linkages

Innovation linkages were seen as **business linkages** in this industry, these tended to be open and informal; trust was developed over time. There was little concern over proprietary information or intellectual property; though this may change as technology progresses.

The bison industry is vertically integrated (collaborative) with a marketing arm of the producers association selling a significant portion of prairie bison to established customers. Cattle and elk are generally less integrated with strong, stable relationships to the next person in the chain, fragmented to cooperative **relationships**. There is room for improvement in the meat industry becoming more of a “value-chain” rather than a “supply-chain”, with members from producers to researchers to distributors working together to promote the industry and their products. There is a trend towards more coordinated or even collaborative relationships as producers and marketers look to serve the retail customers’ needs.

External information sources were industry media, both printed and web-sites. For producers peer-to-peer interactions and industry events were also important. Several mentioned listening and reading widely, taking ideas from other species or industries; and surrounding themselves with a broad spectrum of professionals

Limits to Growth

True North Foods as a company is in the process of getting established as a federal processor. They are projecting about 3 years to reach full production, giving a 5-fold increase Manitoba ruminant processing to about 50,000 per year. The industry participants thought that the facility will meet pent-up demands of Manitoba producers and marketers, especially those who are seeking niche and export markets (within and outside Canada). Bison and elk producers will be able to export their animals without trucking them long distances, with significant benefits in terms of bottom-line and animal welfare. Beef producers seeking niche markets and exports out of the province will also have the opportunity to have significantly shorter trucking distances to slaughter.

When everything is taken into account True North will have to be price competitive with the Alberta and US processors who are currently processing Manitoba ruminants. In terms of the total Manitoba beef industry; even at full capacity True North will process less than 12.5% of Manitoba beef production, so it should not negatively affect other Canadian businesses significantly.

Looking to the future, the establishment of a federal ruminant processing facility in Manitoba is seen to be very positive for the beef, bison and elk industries, as the diversity of marketing opportunities will increase. Stability and capacity of



the industry is also a factor; Manitoba was particularly hard-hit by the BSE export restrictions because the provincial processing industry was so small. These two factors may encourage Manitoba producers to take advantage of current tight supplies and increase production for all three species. With a larger processing facility close by, an increase in “finishing” feeder cattle in the province is possible. There are however, challenges to expanding herds, most notable being the large investment required in equipment and stock, prohibitively large for many potential young producers; the older demographics of current producers and difficulties in financing large investments at current high prices.

Conclusions

True North Foods is the largest provincial ruminant processor in Manitoba; it plans to expand capacity to 1000 head a week in the next 3 years once federal registration is complete. This is in comparison with about 10,000 for the whole province in all 2013.

They offer a processing service, taking in live animals and delivering boxes of block ready meat. Their innovations have centred on tailoring the facility to the needs of customers who serve niche markets; with flexibility in terms of number of head, species and size of animal, and attention to traceability, food safety and individual customer requests.

With the current tight supply of beef, bison and elk there is an opportunity to expand production in Manitoba. The addition of an option for federal processing and the associated easier access to inter-provincial, US and overseas markets, is considered to be positive for the Manitoba industry as a whole. It will provide another option for producers and marketers who are moving in a more “consumer oriented” direction, and those who want shorter trucking distances for their animals. There may also be opportunities for value added processing of TNF’s block ready cuts for retail and food service markets.



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APPENDIX G

CASE STUDY

Brar Natural Flour Milling

Strategies for Growth of Bulk Food
Processing in Manitoba

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SEPTEMBER 2015

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>> Acknowledgements

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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 eight conducted to describe successful bulk food processing companies in Manitoba and give insight into opportunities for growth and innovation in these industries.

Brar Natural Flour Milling Inc. is a family owned, Winnipeg based company that manufactures specialty flours for the South Asian market in North America. They produce and sell 9 flours from 4 different grains and pulses that replicate ingredients for traditional Indian recipes. Their customers are mostly retail stores and restaurants with some food manufacturing for private label flatbreads.

Brar's innovations have centred on milling processes and products, as well as marketing and meeting their customer's needs. They and the companies in their supply chain are also constantly innovating to meet their customers' needs, stay competitive and keep up with changes in technology and food safety.

Brar is one of many processors and manufacturers that are responding to a societal push towards healthier eating and functional foods, as demonstrated by their efforts to develop multigrain atta and a "healthier" atta flour with a lower glycemic index. They and other manufacturers of pulse product may gain from increased awareness of the health and sustainability benefits of pulses from IYOP 2016



Courtesy of Brar Natural Flour Milling – www.sherbrarmills.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 follows from a preliminary study into the opportunities for growth that come from innovation in the bulk food processing industry in Manitoba. For the purpose of these studies a bulk ingredient processor is defined as a company that sells to manufacturers, bulk wholesalers, distributors, businesses and food service. Private label sales are also included as a type of bulk sale in this research; in addition some processors also sell their own branded products. The unit of sale will be in most cases significantly larger than the retail size.

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This research uses “Instrumental Case Studies”: eight 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” guidelines¹ for collecting and interpreting innovation data were used to formulate the interview tool for the semi-structured interviews

¹ Oslo Manual Source: OECD & Eurostat Agri-Food. 2005: Guidelines for collecting and interpreting innovation data

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

INTERVIEW PARTICIPANTS

Participant	Role
Kirat Chahal, Assistant Manager, Brar Natural Flour Milling	Processor
Dale Byrkit, Regional Manager – Food Ingredients, The Andersons Inc.	Supplier
Kent Wall, President Portco Packaging	Supplier
Mitesh Trivedi, Owner Charisma of India Restaurant	Customer
Jagjit Gill, Owner Gill’s Supermarket	Customer / Distributor
Ashok Sarkar, Senior Advisor, Technology, Canadian International Grains Institute (CIGI)	Technical Expert
Tanya Der, Manager, Food Innovation & Marketing, Pulse Canada	Commodity Organization
Dave Shambrock, Exec Dir, Manitoba Food Processors Association	Processor Industry Association

BRAR NATURAL FLOUR MILLING

The Company

Brar Natural Flour Milling started in 1980's as an idea (and a passion) of Mr. Lahora Singh Brar, to produce high quality flour products that replicate the tastes of India. As such Brar is serving a niche market – but fairly large one; there is a large South Asian population in North America giving continued demand for ingredients for home and restaurant use.

The Winnipeg company grew gradually in size and number of products over the years, incorporating in the early 1990's. In 2003 an additional distribution and processing facility was built in Abbotsford, B.C.. In 2012 Brar expanded further, moving into a new facility in NW Winnipeg, incorporating some new milling equipment and more storage; they currently employ about 25 people in Winnipeg.

Processing

Brar always buys food grade grains and pulses; but to ensure food safety and quality they put all grains through their cleaner. Different raw materials are processed into flours of various grades using several milling machines. Base optimal milling settings are known from years of experimentation, these are refined to account for variation in each year's crop. The Winnipeg facility(s) is HACCP certified.

Products

Brar mills 9 flour products from 4 different pulses and grains. Brar's highest volume product is atta. This is durum wheat flour that is milled to a coarser grind than baking flour and used for traditional Indian breads, such as naan, roti or chapattis.

Most *Sher* and *Brar* brand atta and flour products are sold in 20lb bags, some are also available in 4lb, 8lb and 40lb sizes.

Durum wheat → Atta flour 4 grades: Desi style, White Whole Wheat, Brown Whole Wheat and Parshad/Halwa atta

Chickpea → Super Fine Besan, Coarse Besan, Kala Chana Flour

Maize/ corn → Sweet Corn Flour

Millet → Bajra Flour

Lentils → cleaned and packaged daal, not milled

Food service distribution service: Sher brand tea, plus Sher basmati rice, daals, beans and spices.

Markets / Customers

Most Brar products are sold to south Asian restaurants or specialty food stores in Canada or the US. Some atta is used in food manufacturing; being the main ingredient for "private label" naan. All Indian ethnic / regional groups could use Brar's flour products in their traditional cooking, as well as Pakistani and West Indian. Business is seasonal with a peak in the "wedding season" and cultural holidays, and a low from November to January as some south Asians escape Canada's cold for a few months.

Position in Industry

Brar is the most successful North American specialist company making milled products to serve the South Asian population in Canada and the US, their reputation is for consistent high quality product. Other sources of atta and other Indian style flours are from large North American flour millers and imports from India.

Competitive Advantages

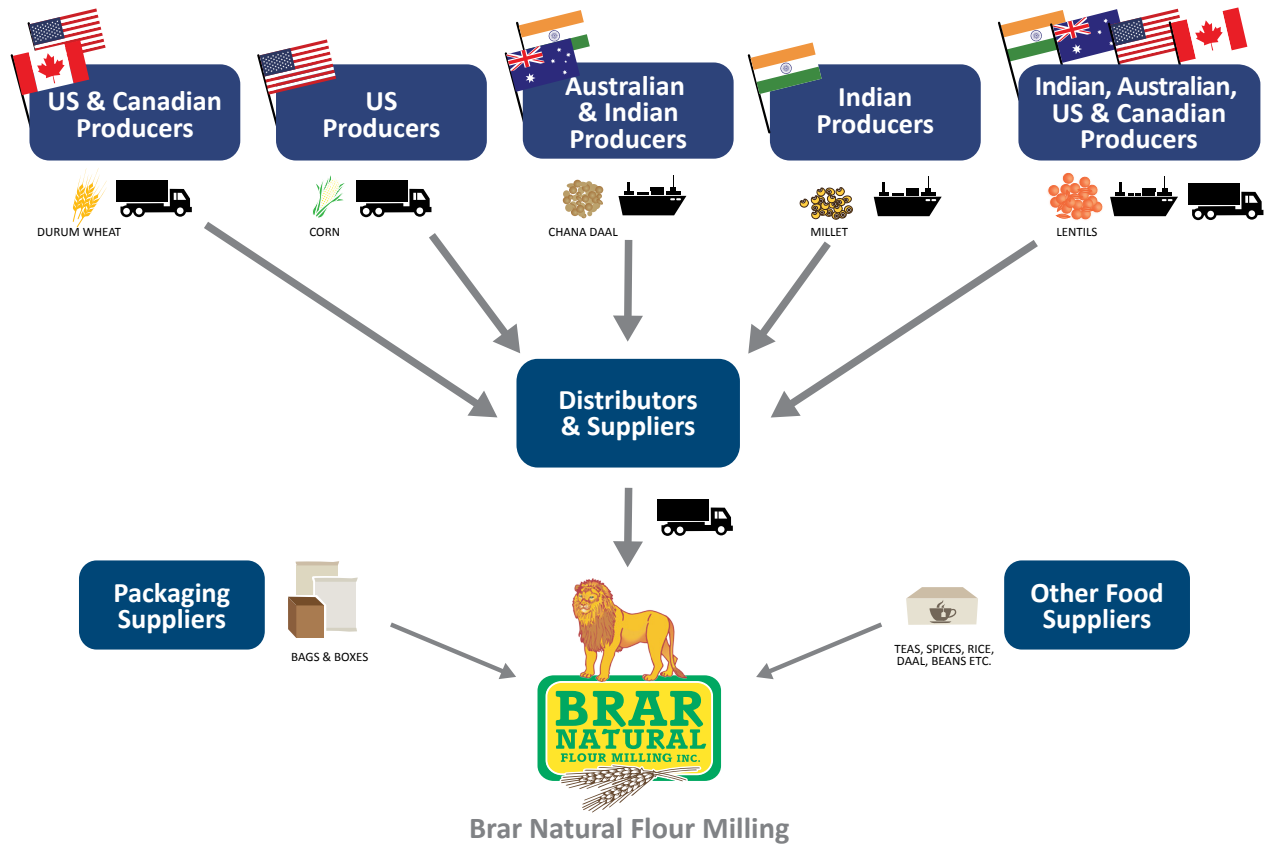
- A range of ingredient products that work well for traditional Indian recipes
- Made in Canada, customers comfortable with food safety
- Reputation for high quality products at a competitive price

Supply Chain

Brar buys its raw grains and pulses from various sources, wherever they have found a reliable, quality source. Their supplies are purchased through distributors or seed companies who clean to food grade. Raw material needs to have similar properties to that grown in an Indian climate, so some crops need to be grown under warmer conditions than Canada, so they import chana daal from Australia and India, and corn from the southern US. They usually sell directly to retail stores or restaurants in Canada and the US, though some of their sales do go through distributors. As their volumes are generally low, most of the overland shipping in Brar's chain is by truck.



Brar Natural Flour Milling Supply Chain



Innovation

Brar Natural Flour Milling’s main innovation activity has been to develop and perfect the processes to produce a range of high quality traditional Indian ingredients for the North American market. Their products include pulse and millet flours, higher fibre atta and they are developing a low glycemic index atta. All these products are able to take advantage of consumer trends of wanting nutritional products with proven health benefits. This is part of an industry wide push to develop products, increase

awareness and sales of functional foods, such as the International Year of Pulses. Through the supply chain companies are innovating to stay competitive, market their products and services and keep up with changes in technology and food safety. Possibilities for growth in the sector include expanding markets through exports and expanding outside the ethnic market in North America, and development of new functional ingredients or prepared, easy cook foods.

BNFM 1 Innovation: Indian Ingredients made in Canada	<p>The founding innovation for Brar Natural Flour Milling was the idea of creating a company that would provide the Indian population of North America with ingredients that reminded them of the tastes of India but were manufactured in Canada. An essential part of the company philosophy was, and is, to produce high quality, pure, natural ingredients for traditional south Asian cooking.</p> <p>The company grew gradually over the years. Finding reliable source for raw grains and pulses and developing and perfecting a range of authentic products took significant effort and time. Both products and marketing have continued to focus on south Asian communities in North America.</p>
Type: Organizational → Product & Marketing	
New to: North America	
Part of supply chain: Processor	
When: 1980’s	
Time Line: One step then multiple small steps	
Developed: with consultants, equipment suppliers & customers	
BNFM 2 Innovation: Ingredient Development	<p>Atta flour, Brar’s main product, is very difficult to make, but they have succeeded through a combination of the right starting material, milling equipment and settings. Brar’s other flours took a similar level of product development effort, resulting in high quality consistent products with good colour and shelf life.</p> <p>It took many years to give flours that had the taste, texture and cooking properties to work in traditional Indian recipes. Their sweet corn flour was judged to be particularly good, allowing cooks to make very thin chapattis. Though the basic processes are now established, Brar adjusts the milling process each year to account for variations in each year’s crop and to maintain and improve product quality.</p>
Type: Process / Product	
New to: North America	
Part of supply chain: Processor	
When: 1980’s to future	
Time Line: Multiple small steps	
Developed: In-house with consultants, equipment suppliers and customers	

<p>BNFM 3 Innovation: New Healthier Flours</p> <p>Type: Process / Product</p> <p>New to: Company / Industry</p> <p>Part of supply chain: Processor</p> <p>When: 1990 - 2016</p> <p>Time Line: Multiple steps</p> <p>Developed: In-house with consultants, equipment suppliers and researchers</p>	<p>Brar has developed and introduced several new healthier product options for their customers. Millet & chana daal were introduced in the early 1990s and whole wheat atta (fibre wala) in 1998.</p> <p>Currently, Brar is researching and developing multigrain atta flour and an atta that will give a lower glycemic response (through addition of other grains and pulses) and still work for traditional recipes. The latter will be of particular benefit to diabetics. In addition to changing the formulation they are also scientifically validating whether the new product does indeed have a lower glycemic index than pure wheat atta flours.</p>
<p>BNFM 4 Innovation: Health benefits</p> <p>Type: Marketing</p> <p>New to: Industry</p> <p>Part of supply chain: All</p> <p>When: 1990 to future</p> <p>Time Line: Multiple step-wise</p> <p>Developed: Whole industry with health researchers</p>	<p>In recent years and into the future a major focus of food and ingredient marketing will be on nutritional and health benefits.</p> <p>Consumers, especially the younger generation are looking for healthy foods; more people are reading nutrition labels and looking for fibre and protein in their diet. Society is becoming aware that functional foods can positively affect health, e.g. Health Canada's approval of "high in protein" labelling for a range of pulse products adds marketing options for these products.</p> <p>There is evidence that a diet rich in pulses can reduce the risk of heart disease and cancer, and research is being conducted into satiety and obesity, and blood sugar control. Throughout the food industry, scientifically based health claims are and will be, an increasingly important driver for increasing retail, and ingredient product development and sales.</p>
<p>BNFM 5 Innovation: International Year of Pulses</p> <p>Type: Organizational → Marketing</p> <p>New to: Pulse industry</p> <p>Part of supply chain: All</p> <p>When: 2010 to future</p> <p>Time-Line: Multiple steps</p> <p>Developed: Whole industry cooperation led by commodity groups (e.g. Pulse Canada) together with research organizations, e.g. CIGI.</p>	<p>In the wider pulse industry, a major organizational innovation is the International Year of Pulses (IYOP 2016). This initiative has brought together pulse, growers, processors, manufacturers and commodity organizations from all over the world to increase awareness about the benefits of pulses... the "Food of the Future" and promote consumption. IYOP will emphasize the nutritional (protein and fibre) and environmental (lower fertilizer and water usage) benefits of pulses as well as the many possible uses as an ingredient: in traditional recipes and as ingredients to boost nutritional properties of processed foods.</p> <p>This initiative follows on from a continuing Canadian "pulse innovation project" that seeks to research the potential for manipulating milling of pulses to extend the possible uses for pulse ingredients.</p>

<p>BNFM 6 Innovation: Modernize & upgrade</p> <p>Type: Organizational → Process</p> <p>New to: Company</p> <p>Part of supply chain: All</p> <p>When: Continuous to future</p> <p>Time Line: Incremental</p> <p>Developed: In-house, and with customers and experts</p>	<p>Through-out the supply chain all companies gave examples of upgrading, modernizing or expanding their operations. In the case of Brar, they have expanded their production several times over the years; the most recent being their 2012 move to a new Winnipeg facility, with updated equipment and increased storage.</p> <p>Other companies expanded and upgraded to serve new markets (new store), provide new services and products and increase efficiency (new kitchen). Many innovations along the chain, including packaging manufacturers and truckers, related to food safety as regulations continue to evolve over the years.</p>
<p>BNFM 7 Innovation: Marketing and Packaging</p> <p>Type: Marketing</p> <p>New to: Company</p> <p>Part of supply chain: Producers & distributors</p> <p>When: Continuous to future</p> <p>Time Line: Incremental</p> <p>Developed: In-house, and with researchers</p>	<p>Since the inception of the company Brar has targeted their marketing towards ethnic communities within India. As such their packaging is multi-lingual (English, French, Hindi, Punjabi & Gujarati). They are well known in the community through advertising on specialty TV channels, supporting cultural events and reaching youth through “Sher” the Lion (sher means lion in many Asian languages).</p> <p>To meet the needs of their customers, Brar have worked with their packaging supplier to design superior quality, leak-resistant, “shelf visible” bags for their products. Packaging is important in terms of food safety and shelf life, to retain the integrity and freshness of the product, before and after purchase.</p>
<p>BNFM 8 Innovation: Expansion of markets</p> <p>Type: Marketing / Product</p> <p>New to: Company</p> <p>Part of supply chain: Processor and Manufacturer</p> <p>When: 2012 into future</p> <p>Time Line: Step-wise</p> <p>Developed: Industry, with government and others</p>	<p>A number of opportunities were identified that could expand the markets for Brar’s products, including exporting to other ex-patriot Indian communities, such as those in the UK.</p> <p>Brar has expanded their business to also serve as a food service distributor for their restaurant customers, adding tea, daal, beans, rice and spices to their product line.</p> <p>There is an opportunity to sell to customers outside the ethnic community. The wider community is experiencing Indian food through restaurants and ethnic sections in grocery stores. Sales of ingredients may increase; though greater gains could be made with the development of “convenience” or partially prepared foods. There are already examples of successful “Indian” snacks and cookies being made in Canada for domestic and overseas markets.</p>

Innovation Methods

Factors that Affect Ability to Innovate

The **incentive to innovate** for Brar is to continue to produce a top quality product that meets the needs of a changing market, and demographics. Both suppliers and customers were innovating to retain customers, improve food safety, increase efficiency and continue to grow.

The companies initially **generate ideas** in-house through discussions with their staff and listening to the needs of their customers. Moving forward with innovations was done in cooperation and partnership with customers, equipment suppliers, professionals and researchers.

Obstacles to innovation were the usual “money, time and expertise”. For the companies on the customer side of the chain time was the most important consideration; once the investment was justified by potential returns, money could be found. For Brar it is a challenge to find technical expertise in their specialty products, as they are not part of the Canadian mainstream.

Innovation Linkages

Innovation linkages were generally open and informal in this supply chain, with a free flow of information. With proprietary innovations or research, non-disclosure agreements are made.

External information sources were customers and close members of the supply chain. Brar and The Andersons Inc. also use industry and university research resources. Portco Packaging continuously evaluates market segments, trends and new technology; they stay informed through trade-show and Association memberships for packaging equipment and materials, commodities, food and retail.

Through the supply chain the relationships were seen as between cooperative and coordinated, with **strong stable relationships** along the chain in a vertical fashion. Brar is linked to producers through their suppliers and to consumers through their retail and food service customers. Within the pulse industry as a whole Pulse Canada represents growers and processors; the International Year of Pulses is seen as an opportunity for all parts of the industry (including competitors) to get to know each other as they work together towards a common goal.

Limits to Growth

Brar Natural Flour Milling has grown steadily as a company over the years and is projected to keep growing. Their North American customer base in the south Asian community should remain stable in the future, through the younger generation and continued immigration. There are opportunities for growth in sales into the non-Asian community and through exports to the UK potentially to gulf countries as well.

Consumers are willing to pay more for products they believe in; that they can trust. Even through the recession, niche companies with strong branding have achieved growth. Brar is well positioned to continue to grow with their emphasis on pure natural, high quality products.

Awareness of the health benefits of foods is growing amongst the general population and particularly those with chronic conditions such as diabetes and heart disease. Commodities, food processors and manufacturers that can scientifically demonstrate that their products help with such conditions will earn the right to put “health benefits” labeling on retail packaging; which will increase sales, and improve people’s health.

Brar Natural Flour Milling is a niche food processor, milling specialty flours for the south Asian market in North America. They have successfully replicated the tastes and functionality of these ingredients so they can be used in traditional Indian recipes.

Their innovations have centred on perfecting a range of flour products from different starting grains and pulses; and continue with efforts to develop multigrain atta and “healthier” atta flour with a lower glycemic index. They and their supply chain are also constantly innovating to meet their customers’ needs, stay competitive and keep up with changes in technology and food safety.

There are opportunities for Brar to grow, through expanding their market through exports and developing new products. They and other manufacturers of pulse product may gain from increased awareness of the health and sustainability benefits of pulses from IYOP 2016.



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