



## Driving Innovation For Small and Medium Sized Food & Beverage Enterprises

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## **II. Introduction**

1. Objective
2. Research methodology

## 2.1. Objective

The objective of this study was to examine the current innovation landscape in Canada and abroad. In this context, the study reviewed the food processing industry's structure, function, products and processes.

In particular, the researchers explored the current resources (private and public research facilities, information sources, funding and business development programs, etc.) that are available to the Canadian food processing industry, as well as to industries in other countries. This study also examines barriers and supports for innovation, especially as they related to other food industry factors.

The research for this report involved a multi-faceted methodology, including:

- A review of relevant published food and beverage innovation literature
- Comprehensive investigation of web-based resources both nationally and internationally
- Primary research conducting interviews with 30 experts in industry, government, universities, food tech centres, and other stakeholder organizations;
- Analysis of existing case studies

The Food Industry Innovation Forum recommended a number of actions:

- Develop an innovation strategy for the food and beverage processing sector
- Organize workshops and an annual innovation forum
- Develop an innovation portal
- Undertake an inventory of training opportunities
- Support access to funding for innovation and pursue regulatory modernization
- Create opportunities for collaboration through a pre-competitive analysis

The objectives of this survey were as follows:

- To determine the organization's perception of innovation and its importance to the company and to the food industry in general
- To understand the structure and function of the organization, its stakeholders and environment
- To determine the main supports for and barriers to innovation
- To understand the nature of and the needs for a company's human resources
- To determine what supports/resources the company now uses to empower its employees to innovate
- To determine what supports/resources a company could further employ to achieve a greater level of empowerment and innovation

## 2.2. Research methodology

Food processing companies across Canada identified as innovative were selected for telephone or personal interviews. These organizations ranged from very small, family-owned companies to large multinationals. The definition of a small company by Statistics Canada is an organization with less than 50 employees and medium companies have fewer than 100 employees. Given this definition, over 98 per cent of food processing firms in Canada are small- and medium-sized enterprises (SMEs).

The list of interview subjects included a balance of food processing companies, government groups, universities, colleges, trade associations, Food Tech Centres, ingredient suppliers, fee- for-service organizations and consultants. In addition, some of the committee members for this research project were interviewed.

The researchers invited 56 organizations to participate and 30 organizations agreed to provide interviews. The people interviewed included farmers, food scientists, chefs, civil servants, professors, and former and current company owners, presidents or other high-level managers in food companies. An effort was made to gain knowledge from those in organizations at various stages of the value chain and from those who provide resources for that value chain.

Individuals were contacted by email and personal or telephone interviews arranged. In some instances, follow-up phone calls and emails were required to identify the appropriate interviewees. This was a qualitative survey containing open-ended questions tailored to the type of organization.

For example, in a mid-sized company, a query on training programs might involve a discussion on in-house training given to new employees. However, when speaking to a representative of a college or university, a training question would focus on short courses available to the industry.

	Interviews Requested	Interviews Held
British Columbia	4	1
Alberta	6	2
Saskatchewan	3	1
Manitoba	1	0
Ontario	22	17
Quebec	8	2
PEI	2	2
New Brunswick	2	0
Nova Scotia	4	2
Newfoundland	1	0
National	2	2
Europe	1	1
<b>Total</b>	<b>56</b>	<b>30</b>
Food Company	32	11
Government	5	3
Innovation Centres	4	2
Academia	7	6
Trade Association	4	4
Consultant	4	4
<b>Total</b>	<b>56</b>	<b>30</b>

Table 2.1. Interview Distribution

### **III. Executive summary**

1. Overview
2. Key elements of innovation
3. How to select an innovation model that meets your needs
4. What to consider when adapting an innovation model
5. How to apply and operationalize innovation
6. Existing resources for Canadian innovation
7. Resources for international innovation

### 3.1. Overview

The Food Processing Human Resource Council (FPRHC) has undertaken a multi-faceted project to support innovation in Canada’s food processing industry. Through this project, the Council is working to create learning materials to help small- and medium-sized enterprises (SMEs) in the sector empower their employees to innovate and become more competitive.

This study — *Driving Innovation For Small and Medium Sized Food & Beverage Enterprises* — is the foundation for the first key initiative of this innovation project. It provides information to support development of a training roadmap and toolbox to assist in the enhancement of the innovation process. The report examines the current innovations landscape in Canada and abroad, various innovations models, new products, technologies and packaging trends, funding that currently exists for companies, barriers for SME’s to innovate, and what HR resources currently exist. The information gathered will determine the support in the development of a training roadmap, management education, and toolbox to assist in the enhancement of the innovation process and culture.

The study is based on a comprehensive investigation of published research and web-based resources on the food processing sector and the innovation landscape — both in Canada and internationally. Evaluation of secondary sources was followed by qualitative interviews with 30 stakeholders.

#### The Innovation Landscape Today

Companies needs for innovation and their approach to innovation is strongly dictated by management’s receptivity and the size and structure of the company. In large companies, innovation is often compartmentalized. In small companies innovation is more ad hoc and blends in with other functions.

Food companies are shifting in their attitudes about how to undertake innovation. Open innovation and its variations have now become a credible way for large companies to partner with small for mutual advantage. Companies have become more accepting of outside research and less accepting of “not invented here” attitudes. This new approach to research is most apparent in Europe where groups are clustered and clusters are networked to maximize innovation and realize research benefits for those involved.

#### Top 25 Countries for Innovation

In a report by the International Monetary Fund (IMF), the Organisation for Economic Cooperation and Development (OECD) and the United Nations (UN), the authors constructed an Innovation Capacity Index (ICI) to rate countries on overall innovation. The score reflects more than 60 factors that are seen to impact a country’s innovative capabilities. The factors include institutional environment, human capital endowment, the presence of social inclusion, the regulatory and legal framework, the R&D infrastructure, and the adoption of information and communications technologies, among others<sup>1</sup>.

Using this very comprehensive analysis, the group rated 131 countries and highlighted the top 25 (Table 4.1). Sweden is ranked as number one, the United States is number 5, and Canada ranks number 7. Canada placed ahead of the United Kingdom, Japan, Australia and many of the European countries.

Sweden <b>80.3</b>	New Zealand <b>71.3</b>
Switzerland <b>78.1</b>	United kingdom <b>71.3</b>
Singapore <b>76.7</b>	Japan <b>70.2</b>
Finland <b>76.1</b>	Australia <b>69.4</b>
United States <b>74.8</b>	Ireland <b>69.1</b>
Denmark <b>74.3</b>	Iceland <b>69.0</b>
Canada <b>73.6</b>	Germany <b>68.9</b>
Netherlands <b>72.8</b>	Israel <b>67.5</b>
Taiwan <b>72.5</b>	Austria <b>66.7</b>
Luxembourg <b>72.2</b>	Belgium <b>66.1</b>
South Korea <b>72.1</b>	France <b>65.3</b>
Norway <b>72.0</b>	Estonia <b>60.5</b>
Hong Kong <b>71.4</b>	

<sup>1</sup> What are the Best Countries for Innovation?, Sloane, P., July 18, 2012, <http://www.innovationexcellence.com>

### 3.2. Key elements of innovation

**Culture** - Strategy and innovation can sometimes be seen as opposing forces in an organization. True innovation usually happens in the corners of the business and works its way up. If there is too much strategy involvement, the chances of innovation are greatly reduced. Innovation should be allowed to build horizontally to gain momentum and generate tangible results. In this way the developers of the innovation have a much better chance of building a case with senior leaders.<sup>2</sup>

Several survey respondents for this report relayed humorous anecdotes about their involvement with top-down directives and “secret innovations”. One respondent told us about his company’s creation, which had the secret working title of SFSP. Senior management had requested an upscale and high-margin soup. To achieve both objectives, the product developers (the company’s innovators) put utility-grade soup in a fancy package with a fancy name. The innovators called it SFSP (Soup for Stupid People). Perhaps if the innovators had been allowed to innovate, results would have been different.

**Product** - The emphasis on mini-meals, snacks and convenience, as well as trends such as the desire for local, organic, natural and “free-from” foods, will continue to widen channels of distribution. Supermarkets still account for the majority of retail sales; however, big-box stores, online sales, grocery delivery, health food stores, and farmers’ markets are increasing their share.

Organizations that have identified key new food product trends include Innova Market Insights based in the Netherlands, Datamonitor in the U.S. and Leatherhead Food Research in the United Kingdom

Current trends emphasize several dichotomies: old versus young, convenience versus lower price, and health versus affordable luxuries. One common theme in these trend lists is the concept of “clean” food, a trait that consumers link to foods that are natural, organic, local and fresh. In the consumer’s mind, the synonyms for clean are “real”, “pure” and “whole.”

**Future Foods** - What’s in store for the future? Some trends will persist; the focus on clean and natural foods, for example, is pervasive and likely to endure. At the same time, some new consumer trends will arise, for example:

- Foods that are “mobile”: Foods that are portable from place-of-purchase or at place-of-consumption. Examples include microwavable complete meals, complete children’s lunches and a mobile gourmet-cupcake truck.
- Foods that tell a story: Foods with an interesting history and context that can strengthen consumer interest and loyalty, for example, honey made from a specific flower species.
- Foods that represent “local”, while being global: Foods that are globally available but have local variations, for example, beer from microbreweries and wine from craft wineries in our community, local cheeses and the trend to buy local produce.

**Packaging Trends** - In the U.S. in 2008, food and beverage packaging was 55 per cent to 65 per cent of the \$130 billion value of all packaging. The food processing and packaging industries spend an estimated 15 per cent of their total variable costs on packaging materials.

According to a number of company representatives interviewed for this report, packaging and processing innovation is often as important as improvements to the food products, themselves. The trends that influence packaging innovation include consumers’ increased life expectancy, fewer organizations investing in food production and distribution, and a regionally abundant and diverse food supply.<sup>3</sup>

One respondent in the survey for this report indicated that there is a push for sustainable packaging, particularly because packaging has high visibility for the consumer, even though its actual carbon

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<sup>3</sup> *Innovative Packaging Solutions*, Institute of Food Technology, October 2008, <http://www.ift.org/knowledge-center>

footprint is not significant. In terms of sustainability, the emphasis is now on Life Cycle Assessment where the product's packaging is evaluated from its inception to its destruction for input of water, energy and other factors contributing to its footprint.

Another interesting innovation is the Tetra Recart developed by Tetra Pak. Tetra Recart is the first "retortable" carton (enabling filled product to be sterilized within the package), and may revolutionize the flagging soup market, which canned goods has traditionally dominated. Tetra Pak is now working with 75 global brands on use of the technology and some private-label soup brands have already begun producing soups in this new package.<sup>4</sup> This innovation is unique, as it is a combined processing and packaging system designed for in-container sterilization of food; the package may be sterilized using the traditional canning process.

**Knowledge sharing and HR practices** - Companies need to know how to train, support and enable the flow of knowledge needed for innovation.<sup>5</sup> In addition to administrative functions, HR should be strategically aligned with senior management while it develops, oversees and shows, by example, innovative practices for the rest of the company.

A statistical study was undertaken in the U.K. that included companies from both the manufacturing and service sectors. The goal of the study was to determine whether organizations coherently use HR policy in promoting innovative behaviours to enhance competitive performance.<sup>6</sup>

The study found that although companies attach importance to innovation, they fail to consistently apply this importance to HR policy. Non-managerial staff members likely to receive training and performance management with respect to innovation, but the selection and recruitment process is less likely to emphasize these areas. At more senior levels, more focus is put on individual innovation, with much less support for training. Companies assume that mid- to senior-level employees in the organization will innovate. The hierarchical application of HR policies leads to disconnect, resentment and inability to work productively in a team environment.

Small companies are closer to the customer and therefore, more continuously aware of customer needs and how they are changing with time. Smaller companies have a simpler organizational structure, allowing them to react to situations more quickly and with more flexibility. With simpler structure, there is less employee specialization and shorter lines of communication; employees share more tasks and work as a team.

**HR and the innovation process** - Interviews conducted for this report showed that recruiting is a very important function. Companies tend to hire employees that fit with the existing company culture; seldom are new employees hired to change ways of doing things. Inclusiveness, teamwork, idea-sharing and a simpler system of acknowledgement, and reward for performance all contribute to a successful innovative environment in a smaller company.

Smaller companies have simpler innovation models and systems because much of what they achieve is innate. For small companies, the more important requirements are for access to financial support, information and connections in a timely manner. A roadmap and tool kit for small companies should be easy and quick to use.

The ways in which HR re-invents itself and takes on a more effective role in supporting innovation are going to vary by company, although the overall objective to empower employees to enhance innovation is common to all companies. In designing HR support for innovation, Randall MacDonald, Senior Vice-President of Human Resources at IBM, has generated the following guidelines:<sup>7</sup> HR should serve as the guardian of an innovation culture that promotes a sense of urgency, appropriate risk-taking, and a comfort with ambiguity. HR should facilitate idea generation and

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<sup>4</sup> Tetra Pak, Innovation with the World's First Retortable Carton, *Supermarket News*, July 2012, <http://expert.supermarketnews.com/tetrapak/2011/page/1/>

<sup>5</sup> HR's Strategic Role in Innovation, <http://www.innovationexcellence.com/blog/2010/12/21>

<sup>6</sup> Supporting Innovation through HR Policy: Evidence from the UK, Searle, R.H. and Ball, K.S., Alternative Minds Ltd., <http://www.alternativeminds.com>

<sup>7</sup> HR's Strategic Role in Innovation, <http://www.innovationexcellence.com/blog/2010/12/21>

assume a proactive role. HR initiatives should be created for and in collaboration with business leaders, not served to them.

**Technology** - The impetus for development of innovative food processing technologies is the potential for energy savings, along with increased quality and safety of the food product. An article in *Innovation: Management, Policy & Practice* described a number of food processing innovations.<sup>8</sup>

**Radio Frequency Heating (RFH):** This technique is similar to microwave heating, but uses a lower frequency that penetrates the food more deeply. RFH is good for thawing, controlled pre-heating, blanching, cooking, roasting and baking. It can be used in selective heating, automatic cooking, and development of packaged and microwave sterilized meats.

**High Pressure Processing:** This method of food preservation applies intense to inactivate most microbial cells and viruses, while maintaining freshness. It could be used for higher-quality foods with longer shelf life, pasteurizing probiotics, improvement of protein functionality without the use of chemicals, modification of texture and treatment of food with potential parasites.

**Pulse Electric Field (PEF):** This is a non-thermal process that uses high-voltage electric field pulses to inactivate microbes in liquid foods, without compromising flavour or colour. PEF is being evaluated for doubling the life of pasteurized milk, increasing the shelf-life of fresh fruit juices and the pasteurization of eggs and bioactives without protein denaturation.

**Ultrasound:** Ultrasound can be generated at 20kHz to 1 MHz on commercial food processing equipment and can be used to enhance the performance of nozzles in extruders and spray dryers, to defoam without chemical agents, to enhance food and waste treatment fermentation processes, to improve the cleaning of pasteurization systems and enhance oxidation.

**Cool Plasma Technology:** This emerging technology is good at destroying microbes on equipment, packaging and food surfaces at low temperature with no liquid. It could also be used to extend the shelf life of baked goods.

### **3.3. How to select an innovation model that meets your needs**

All companies are subject to competition and to an environment with many other variables that can change over time. Furthermore, many projects are time-dependent, for example, in cases where being “first to market” is critical. The product-development model a company chooses must allow for and be sensitive to timing imperatives.

This observation is supported by Smith and Reinertsen,<sup>9</sup> who suggest that as techniques such as cross-functional teams and concurrent engineering become widespread, these approaches to shortening the development cycle lose their competitive edge. Decisive advantage will come from employing techniques that competitors are not using.

Their suggestions include that when choosing a product-development model, the company should be flexible about process. The correct approach can only be selected when a clear project vision exists. Managing development time versus technical risk is a decision trade-off. The authors also advise being on guard for complexity, making decisions based on economics and shortening the thinking stage. In their view the “fuzzy front-end” of a project can absorb 50 per cent of the project development cycle before development is authorized.

In summary: product development models can be very complex and their usage is subject to a host of variables. Choosing a product-development model is itself, a complex process. One size does not fit all. In the end, what is important to keep in mind is that every company has unique needs in terms of its nature and market position. Incremental innovation looks to improve processes with continual

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<sup>8</sup> Processing Technology Innovation in the Food Industry, Fryer, P., *Innovation: Management, Policy & Practice*, July, 2008, <http://www.innovation-enterprise.com/archives/vol/10/issue/1/article/2285/processing-technology-innovation-in-the-food>

<sup>9</sup> Shortening The Product Development Cycle, Preston G. Smith and Donald G. Reinertsen, *Research Technology Management*, May-June 1992

small changes. Radical innovation will change technology and business models concurrently. Semiradical innovation falls in between, with a change to only one of the business model or the technology at the same time.

**Models for Open Innovation** –Two companies with leading proprietary innovation models are Stage-Gate [the Stage-Gate® Process] and The Product Development Advantage Group’s MPT Model. It is worth looking at these popular models as a beginning to the review of innovation model process.

“A Stage-Gate Process is a conceptual and operational roadmap for moving a new-product project from idea to launch.”<sup>10</sup> Its developers claim it is the world’s most widely implemented and trusted product innovation process. “Stage-Gate divides the effort into distinct stages separated by management decision gates. Cross-functional teams must successfully complete a prescribed set of related cross-functional tasks in each stage prior to obtaining management approval to proceed to the next stage of product development.”<sup>11</sup>

The full Stage-Gate Process starts with ideas and involves 5 decision gates: Initial screen, Second screen, Decision on business case, Post development review and Decision to launch.

Stages are where the action occurs. Cross-functional teams complete activities to advance the project to the next gate. Gates are where “Go/Kill” and prioritization decisions are made. Mediocre projects are culled and resources are allocated to the best projects. As with any model, there are inherent problems to consider. Common problems include: too many projects classified as “must do”; no mechanism to kill projects; decision criteria that have not been established or have been set up incorrectly; and senior people who have not been engaged.

Authors such as Hobcraft<sup>12</sup> suggest that the Stage-Gate process can work well for incremental and well-planned innovation but may “stutter” when you need “new-to-the-world” breakthroughs. In breakthrough cases, he argues, there are too many unknowns to run them through a system. Stage-Gate is, therefore, not a model for all projects.

Open innovation is a challenging concept for many companies that have historically used a closed innovation model, in which intellectual property (IP) has accumulated within the company. This new “open” way of doing business suggests that companies should sell internal IP that does not fit their business model and buy external IP that does.<sup>13</sup> Companies handle such legal collaborations in a number of ways. For example, some firms enter into partnerships, while others set up venture funds to invest in start-ups with new technologies.

To make these types of collaborations work, firms must make changes to attitudes and internal communications. NineSigma is an organization that facilitates collaboration between two open-innovation partners. The organization’s vice-president, Kevin Stark, says, “It is one thing to have accepted that your R&D department does not have a monopoly on good ideas, and that working with others can get better products to the market faster. It is quite another to make collaboration part of your culture, organization chart and product-development process.”<sup>14</sup>

### **3.4. What to consider when adapting an innovation model**

The Food Industry Innovation Forum found that two of the most significant factors for success were product introductions and process changes. For firms using a strategy to support product and process innovation, the three largest factors were internal teams, suppliers and people dedicated to innovation.<sup>15</sup> It becomes apparent that human resources (internal teams, dedicated people) are critical factors to a company’s successful innovation.

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<sup>10</sup> What is the Stage-Gate Process? [http://www.stage-gate.com/knowledge\\_pipbenefits.php](http://www.stage-gate.com/knowledge_pipbenefits.php)

<sup>11</sup> Ibid.

<sup>12</sup> What Product Development Style is Right for You? [http://www.pd-advantage.com/images/Product\\_Development\\_Styles.pdf](http://www.pd-advantage.com/images/Product_Development_Styles.pdf)

<sup>13</sup> What is Open Innovation? Crowdsourcing? User Innovation? Co-Creation? Lindegaard, S. Sept. 22, 2010. <http://www.innovationexcellence.com>

<sup>14</sup> Partnering for Innovation, Erickson, P., *IFT*, January 2008, Vol. 62, No.1, <http://ift.org/Food-Technology/Past-Issues>

<sup>15</sup> Food Industry Innovation & Profitability - The Next Ten Years, Food Industry Innovation Forum 2011

As with this study, the Forum study found that companies most preferred government support from R&D grants and tax credits for product and process improvements. Other forms of government support (e.g., export assistance, FedDev funding, RED) were less significant. Finally — and also consistent with this study’s findings — time, money and regulations all held back food processing innovation, as did lack of the right skills and people.<sup>16</sup>

There are six areas to take into consideration as a company looks to adapt an innovation model to meet their business requirements:<sup>17</sup>

- Access to Affordable Capital
- Access to Competitively Priced Inputs
- Market Access
- Regulatory Environment
- Customer Concentration
- Scientific Research and Experimental Design Tax Credit

Keeping these six areas under consideration can make adapting an innovation model

### **3.5. How to apply and operationalize innovation**

Value chains have the potential to be powerful mechanisms for innovation, as they bring together the combined talents and efforts of a group of businesses that have similar goals. Designed to ultimately create value for the consumer, the value chain vertically links together producers, processors, distributors, food service companies and retailers, along with supporting members such research groups and suppliers.

Creating a workable value chain is a complicated process and all members must agree on the objectives and the process to optimize collective benefit. It is best, therefore, to have a champion of the value chain to lead the effort. The formation of a value chain involves creating a business plan for the collaborators together as one business. It also entails balancing risk and reward, which could be different for each member in the chain.

The Alberta Value Chain Guidebook<sup>18</sup> suggests a three-part approach to building a value chain. The first part is to identify the opportunity. At this point it is important to map the company’s existing chain, develop a project goal, gain support of chain members and name the leader or champion of the chain. The second part entails developing a pilot plan, where the chain confirms goals, members, plans and measurements and selects a manager. The third part is to try out the pilot plan, and monitor, evaluate and change to accommodate to full scale, if the plan is feasible and desirable. Typically, value chains are most associated with adding value to commodity products to distinguish such products from others at the farm-gate level. There are many successful cases where the consumer has enjoyed a value-added product from such efforts.

### **3.6. Existing Resources for Canadian Innovation**

A number of resources are available in Canada to support innovation activities in the food processing sector. The information presented here is an overview of the some of these resources and is not intended to be all inclusive.

**Food Technology Centres-** Governments in Canada have established 12 technology and innovation centres that are spread across the country. The 12 food technology centres have come together to form an umbrella organization, FOODTECH Canada.<sup>19</sup> FOODTECH Canada maintains a searchable database that allows clients to search across all 12 members for specific equipment, services and

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<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

<sup>18</sup> Value Chain Guidebook: A Process for Value Chain Development

<sup>19</sup> FOODTECH Canada, P.O. Box 2000, 101 Belvedere Ave., Charlottetown, PE C1A 7N8, [www.foodtechcanada.ca](http://www.foodtechcanada.ca)

expertise. This database represents more than 200 scientists; 250,000 sq. ft. of laboratories, pilot plants and commercial space; and in excess of \$65 million in equipment.<sup>20</sup>

**Colleges and CÉGEPS** - Governments in Canada have invested heavily in the community college system. Community colleges have established applied research institutes that target the needs of small- and medium-sized companies. Numerous colleges are engaged in applied food research while partnering with industry clients.

In addition to applied research, a number of colleges offer training courses targeted at the food industry, with many of the courses related to culinology or food-preparation skills. Of interest to the food processing sector — the Institute of Food Processing Technology at Conestoga College has just commissioned a \$2.3 million pilot plant solely dedicated to hands-on training of students and food industry workers in a real-world work environment.<sup>21</sup>

**Universities** - As a resource for Canadian food and beverage companies, the 10 universities in Canada with food science programs are a source of well-trained graduates. These graduates take positions in a variety of functional areas and offer superior performance that supports innovation and improved business performance. Food science majors are likely to become the product-development leaders of the future. In addition, universities are a source of research knowledge and intellectual property that companies can buy or license for use in future developments.

**Agriculture and Agri-Food Canada (AAFC)**- Agriculture and Agri-food Canada (AAFC) employs more than 4,000 people, including nearly 600 scientists working at AAFC's offices in Ottawa or out of 19 Research Centres across the country. These employees support a broad mandate: "Agriculture and Agri-Food Canada (AAFC) works to ensure the Canadian agriculture and agri-food sector has the best chance to thrive in both domestic and international markets. Its mandate is to provide information, research and technology, as well as policies and programs to achieve security of the food system, health of the environment and innovation for growth."<sup>22</sup>

**Private Sector Resources** - To support innovation programs, food processing companies can also access private sector resources. Typically, these resources include food-ingredient companies, equipment suppliers, packaging suppliers, and small businesses that offer specialized services. These services range from customized product development and quality systems, to regulatory-approval support. Given that these service providers are for-profit organizations, their services are skewed towards the larger players in processing sector where the most business potential lies.

One ingredient supplier interviewed for this research report said their company maintains technical service laboratories and staff dedicated to assisting clients to incorporate their ingredients into the client's formulations. This service is offered exclusively to clients that are large enough that ingredient-sales volumes will allow the ingredient supplier to recover the costs of offering the technical services.

**Financial Resources for Canadian Innovation** - The food processing industry, like many other sectors of the Canadian economy, can benefit from a large number of support programs available from several levels of government. Typically, the funding available to a company depends on a number of factors, such as company size, industry sector, funded activity and geographical location. Fortunately, the Canada Business Network<sup>23</sup> maintains a database of government programs that is searchable by geographic location (province or territory), industry sector and type of funding desired.

To develop a sense of the total number of programs available to food processors, the database was searched using the filters: all provinces and territories; all six types of support (equity investments, grants, loan guarantees, loans/cash advances, tax refunds/credits and wage subsidies); and specialized food manufacturing.

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<sup>20</sup> Ibid.

<sup>21</sup> Institute of Food Processing Technology. <http://aofp.wordpress.com/2012/02/10/111/>

<sup>22</sup> Natural Sciences and Engineering Research Council of Canada, Agriculture and Agri-Food Canada, [http://www.nserc-crsng.gc.ca/Students-Etudiants/PD-NP/Laboratories-Laboratoires/AAFC-AAC\\_eng.asp](http://www.nserc-crsng.gc.ca/Students-Etudiants/PD-NP/Laboratories-Laboratoires/AAFC-AAC_eng.asp)

<sup>23</sup> Canada Business Network, Find Government Grants, Loans and Financing, <http://www.canadabusiness.ca/eng/program/search/>

**Growing Forward** - Agriculture and Agri-Food Canada coordinate agriculture policy in Canada by negotiating a five-year federal/provincial/territorial initiative called *Growing Forward*.<sup>24</sup> The current agreements cover the period 2008–2012 and *Growing Forward 2* is under negotiation with the provinces.

All of the *Growing Forward* agreements will address seven common program areas: agriculture regulatory action plan, business development, business risk management, environment, food safety, markets and trade, and science. They will, however, differ in the details and reflect regional requirements.

**Industrial Research Assistance Program (IRAP)** - The Industrial Research Assistance Program (IRAP) is a national program delivered by the National Research Council of Canada (NRC). Its objective is to support. IRAP participants are assigned an Industrial Technology Advisor who mentors the client through the development process. This one-on-one, individualized support is important for SMEs.

**Scientific Research & Experimental Development (SR&ED)** - Scientific Research & Experimental Development (SR&ED) is a program that reduces the cost of innovation. Its intent is to encourage R&D in Canada that will lead to new, improved or technically advanced products or processes.<sup>25</sup> A Canadian-controlled private corporation can receive an investment tax credit of 35 per cent on the first \$3 million of qualified expenditures and 20 per cent on any excess. To qualify for SR&ED tax credits, a project must advance the understanding of scientific relations or technologies; address scientific or technological uncertainty; and incorporate systematic investigation by qualified personnel.

**Canadian Agricultural Adaptation Program (CAAP)** - The Canadian Agricultural Adaptation Program (CAAP) has been delivered by a network of Adaptation Councils across Canada. Every province and territory has an Adaptation Council that has a mandate to attract projects, evaluate and approve appropriate projects that meet CAAP criteria, and manage the funding. While the program focuses on primary agriculture, projects from other parts of the industry are considered, provided they show a benefit to agriculture. For example, a large industrial baker evaluating a new wastewater treatment technology received funding.

**Business Networking** - Business networking should not be discounted as a resource for innovation. There are many reasons for networking and many approaches to networking. Paul Yates<sup>26</sup> describes the following benefits of networking:

- On average, 70 per cent of all new business is gained through word-of-mouth and positive recommendation.
- Free consultancy: People like to help people and are willing to impart their expertise and advice to people they have gotten to know.
- Knowing who to turn to when you need help: By getting to know reliable contacts who can provide you with what you want or who can be trusted to recommend others is worth so much in terms of time and money.
- Break down barriers to success: As you develop your contacts, you find people who have experienced problems similar to yours and who can point you in the right direction for solutions.

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<sup>24</sup> Agriculture and Agri-Food Canada, *Agriculture Policy Framework, Growing Forward*, <http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1200339470715&lang=eng>

<sup>25</sup> Scientific Research and Experimental Development, Canada Revenue Agency, <http://www.cra-arc.gc.ca/txcrdt/sred-rsde/bts-eng.html>

<sup>26</sup> What is networking? Paul Yates, EL2 Ltd., <http://www.business-networking-techniques.com/what-is-networking.html>

### 3.7. Resources for International Innovation

This section is a review of selected examples from the food innovation environment in a number of international jurisdictions. It provides additional information and points of comparison to the Canadian landscape.

**Europe** - In 2008, the Europe Innova Innovation Watch program published a report called *Prospective Innovation Challenges in the Food and Drink Sector*.<sup>27</sup> Key points in the report include:

- Regulatory and legislative constraints exist, especially for SMEs.
- The food and drink industry is “low tech” as expressed by R&D expenditures.
- Many SMEs are informal innovators with a strong motivation to invest in their own businesses.
- Many SMEs hold an opportunistic innovation strategy.
- The challenge is to redirect more SMEs towards a business model centred on the value of technical change and the search for new products.
- Policy-makers should focus on improving in-house capabilities of the workforce rather than focusing on R&D activity to increase innovation activity among SMEs.
- Food and drink companies employ fewer workers with higher education, as compared to other industries.
- A prospective challenge for the sector is difficulty in attracting and hiring qualified employees, and in filling vacancies in R&D departments.

**Clusters** - Over the last several decades, a large number of cluster organizations have been formed throughout Europe. A cluster is a public-private organization set up in a geographical region to improve the growth and competitiveness of its members. Typically, clusters consist of businesses in a particular sector, academia, government, and research organizations with expertise in the technologies that support the sector.

**Independent Laboratories** - Many jurisdictions will have independent food research laboratories of varying sizes. Europe certainly does and three are particularly well known

NIZO food research BV<sup>28</sup> is an independent food research company located in the Food Valley area of the Netherlands. NIZO has 200 employees, a pilot plant, research labs and industrial kitchens. It offers expertise in many food disciplines, including probiotics, fats and oils functionality, protein functionality, fermentation, taste and texture.

**United States** - Nine Food Innovation Centers in the U.S. are based at universities.<sup>29</sup> They are:

The Northeast Center for Food Innovation, Cornell  
Food Industries Center, Ohio State  
Center for Advanced Food Technology, Rutgers  
Institute of Food Science and Engineering, Arkansas  
Institute of Food Science and Engineering, Texas A&M  
Oklahoma Food and Agricultural Products Research and Technology Center  
Center for Crops Utilization, Iowa State  
Food Processing Center, Nebraska  
Food Innovation Center, Oregon State

These centers offer a range of services to food entrepreneurs that typically include product development and pilot plant services, analytical support, and in some cases, business mentoring and market development support.

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<sup>27</sup> Prospective Innovation Challenges In the Food and Drink Sector, <http://archive.europe-innova.eu/index.jsp?type=page&previousContentId=9741&cid=9946&lg=EN>

<sup>28</sup> NIZO food research BV, <http://www.nizo.com/contact-us/contact-details/>

<sup>29</sup> Proposal for the establishment of The Food Product Innovation and Commercialization Center, <http://www.curriculumsystems.uga.edu/UCC/FoodProdInnovCommCtr.pdf>

[Institute of Food Technologists \(IFT\)](#) - Another U.S. resource that is available to food entrepreneurs is the Institute of Food Technologists (IFT). This organization provides a wealth of technical information on food, as well as training and networking support to members.

[Australia](#) - The scale of Australia's food processing industry is similar to that of Canada and Europe; it is a major component of the manufacturing sector and one of the largest employers.

The food and beverage, grocery and fresh produce industry is Australia's largest manufacturing sector and represents 26 per cent of total manufacturing.<sup>30</sup> The industry employed 312,900 people or 3 per cent of the workforce in 2010-11. In 2008-2009, turnover was A\$86.5 billion and the industry invested A\$368 million in R&D.

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<sup>30</sup> Australia Food and Grocery Council, <http://www.afgc.org.au/our-industry/facts-stats.html>

## **IV. Recommendations**

## IV. Recommendations

**1. Market development:** Throughout most of 1990 to 2009, Canada's public support for agriculture and agri-food R&D — as a percentage of sector output — was the highest among its major trading partners,<sup>31</sup> however, the ratio has declined since 2009.

- Canada needs to invest more in support for agriculture and agri-food R&D. By 2009, Canada's ratio had declined from over 1.8 per cent to about 1.3 per cent.
- Australia has become the leading supporter of public R&D in the sector, with a ratio of more than 1.5 per cent and innovative sector development strategies and increased investments by government and industry in innovation.

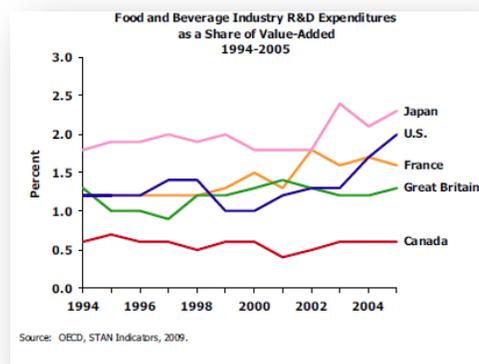


Figure 2.1

### Recommendation:

- Develop an engagement program to lobby the Federal government to restore, or at least partially restore, funding investments for R&D in food processing and encourage a focus on funding for SMEs within the sector.
- Develop an innovation fund and funding process with contributions from industry, government and producers to help bring to market food processing initiatives with significant growth potential.

**2. Investments in innovation:** Companies are more likely to invest in innovation that impacts products or processes.

- Organizational innovation occupies a middle position. In addition, marketing innovation is the least common investment. Companies in the fruit and vegetable preserving sector are the most likely to invest in innovation and those in the seafood processing sector are the least likely to make innovation investments. Companies need to be encouraged to expand innovation investments beyond product and process, and outside of the fruit and vegetable preserving sector.
- A key complication to estimating ROI is that enterprise performance is affected by a myriad of factors, unrelated to training. The larger the enterprise, the greater the number of potential variables that can influence performance, quite apart from any skills intervention. Any approach must therefore be robust enough to allow for this.
- A key focus in terms of the project approach, and preparation for later phases, will be enterprise-based case studies. In their own right, these case-studies can provide very strong evidence of ROI for specific enterprise types and circumstances. This will also help it harmonize with a successful sector innovation model and increase the prospect for successful outcomes.

Recommendations:

- Develop a model to calculate ROI on marketing innovation and other forms of innovation, in addition to product or process innovations. The model will provide guidance as to the direction required to estimate robust ROI estimates for feasible activities within areas of innovation. It will provide a traffic light approach for undertaking a staged project to investigate and accurately estimate ROI for training undertaken by enterprises.

Return on Innovation Investment						
Dividend summary						
Navigation bar: <span>How To Guide</span> <span>Benefits</span> <span>Cost</span> <span>Dividend</span> <span>Evidence</span>						
<b>Benefit</b>						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Ongoing Annual benefit from <b>Benefit</b> sheet	\$0	\$0	\$0	\$0	\$0	
% of total benefit achieved each year						
Benefit achieved each year	\$0	\$0	\$0	\$0	\$0	\$0
One Off Benefits	\$0					\$0
<b>Total benefits achieved</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Cost</b>						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cost of implementation	\$0					\$0
Cost of Maintaining Change	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total costs</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Dividend</b>						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
<b>Annual Return on Investment \$</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
Discount Factor/Time Adjustment	3.50%	The percentage by which the annual return depreciates per year				
<b>Net Present Value \$</b>	<b>\$0</b>	The cumulative return expressed at today's value				

Figure 2.2. Return on Innovation Investment Calculator (sample)

- Using a robust approach to ROI will remove the need for reactive evidence gathering by consistently developing a clear evidence base on which to build the business case for improvement. This tool calculates the return on investment (ROI) of a quality improvement initiative using the financial benefits and costs data you insert from your project.
  - Used correctly, the ROI calculator can be used at the start of a project to provide an estimate of the costs for upfront justification and again towards the end of a project as a measure for the success of the improvement project (not only by confirming initial costing validity but also by validating any ongoing project maintenance and sustainability costs). Indeed, ROI can be used throughout the life of an innovation initiative to continually see if benefits are being realised and make decisions about whether to continue, modify, amplify or terminate a project.
  - While ROI is usually thought of as being purely about “financial” benefits, it is helpful to start by thinking about the quality benefits of investments. Many seemingly ‘non-financial’ benefits already have a financial element (for example, reducing product development or production costs often results in more efficient outcomes. Though calculations of ROI only use benefits that can be expressed financially, it is important that all benefits are captured and recorded.

- Develop a food innovation process and feedback intelligence program to help regional offices to identify local products (i.e. shellfish, fruit) and work with all willing producers to consider additional markets and identify barriers.
- Develop a model that helps connect the food processing industry, emerging consumer preferences and producers in an eco-system of collaborative innovation.

**3. Culture change:** An organization's capability to maximize innovation is best realized by first of all, having the right employees in the right job functions. Secondly, a team approach to innovation is best served when each individual understands the mindsets of the others, as well as his/her own.

- Strategy and innovation can sometimes be seen as opposing forces in an organization. True innovation usually happens in the corners of the business and works its way up. If there is too much strategy involvement, the chances of innovation are greatly reduced.
- 
- Innovation should be allowed to build horizontally to gain momentum and generate tangible results. In this way the developers of the innovation have a much better chance of building a case with senior leaders.<sup>32</sup>
  - Innovation cannot be 'legislated'; the culture needs to adapt to allow innovation to foster among employees and gradually gain traction. An organization should not always be looking for one big, bold idea.
  - A key driver of an innovation culture is to build trust. Avoid situations that engender reactionary or judgemental behaviours. Promote feedback and the sharing of personal strengths and weaknesses.
  - Hiring staff with diverse skills, competencies, and personalities will catalyze the idea generation process and foster diversity of views and strengthen the ability of the industry to develop, deploy and measure the impact of innovation initiatives.
  - A focussed and balanced vision Ensure should include a process where everyone works together and know their contribution to the effort. This requires an established environment which welcomes approved risk-taking with clearly defined accountabilities but also acceptable risks.
  - A high level of autonomy will increase the respect employees have for each other and also give them more responsibility and flexibility in job performance. A driver of engagement is also to have employees provide feedback on the progress of their activities.
  - A strong recognition and reward program gives credit for new ideas. Employees will be more engaged and motivated if their contributions are acknowledged and rewarded where appropriate.
  - A key driver of innovation is ensuring staff are given the time to innovate by assigning innovation the same priority as other employee functions.

<sup>32</sup> Building a Culture of Innovation. Ross, P. June 25, 2012. Posted presentation. <http://www.pamross.ca/2012/04/26>

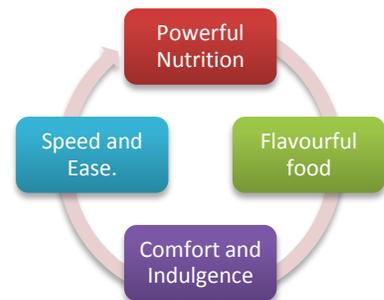
<sup>49</sup> 40 Reasons Why We Struggle with Innovation, van Wulfen, G., Dec.8, 2011, <http://www.innovationexcellence.com/2011/12/0>

## Recommendations

- Develop an innovation culture handbook and training program to guide the Canadian Food Processing sector's HR professionals in the process of hiring, training and managing innovative team environments and increase innovation productivity.

**4. Product development:** For Boomers, health and fitness are top priorities, and they are very loyal to their brands. In the coming years, they are likely to want fortified foods with easy-to-read labelling and easy-to-open packaging.

- Addition of Omega 3s and fibre to food products are examples of two large emerging functional food categories targeted at everyone, but particularly at the older population — for brain and heart health, and good functioning of the GI tract. Boomers, however, are more reluctant than other population groups to try fortified foods.
- Foods that tell a story are likely to grow more quickly in the future. Foods with an interesting history and context that can strengthen consumer interest and loyalty, for example, honey made from a specific flower species are likely to engage consumer more than other generic offerings.
- Foods that represent "local", while being global are also likely to grow. Foods that are globally available but have local variations, for example, beer from microbreweries and wine from craft wineries in our community, local cheeses and the trend to buy local produce are growing segments.
- Millennials, recognized for their "here and now" mentality, are strongly driven by convenience, and look for attributes such as fresh, healthy, variety, natural and organic.
- The emphasis on mini-meals, snacks and convenience, as well as trends such as the desire for local, organic, natural and "free-from" foods, will continue to widen channels of distribution. Supermarkets still account for the majority of retail sales; however, big-box stores, online sales, grocery delivery, health food stores, and farmers' markets are increasing their share.
- One common theme in these trend lists is the concept of "clean" food, a trait that consumers link to foods that are natural, organic, local and fresh. In the consumer's mind, the synonyms for clean are "real", "pure" and "whole."



## Recommendations

- For the immediate future, focus should be on finding ways to promote foods that are both as close to fresh/unprocessed as possible.
- Innovation may be changing the method of preparation and simplifying process. Past innovations – such as turning dairy into a "processed cheese food" – may need to be revoked and teaching consumers how to convert raw product into other foods – as their grandparents did - may be innovative.

**5. Packaging improvements:** The trends that influence packaging innovation include consumers' increased life expectancy, fewer organizations investing in food production and distribution, and a regionally abundant and diverse food supply.<sup>33</sup>

<sup>33</sup> *Innovative Packaging Solutions*, Institute of Food Technology, October 2008, <http://www.ift.org/knowledge-center>

- According to a number of company representatives interviewed for this report, packaging and processing innovation is often as important as improvements to the food products, themselves.
- One respondent in the survey for this report indicated that there is a push for sustainable packaging, particularly because packaging has high visibility for the consumer, even though its actual carbon footprint is not significant. In terms of sustainability, the emphasis is now on Life Cycle Assessment where the product's packaging is evaluated from its inception to its destruction for input of water, energy and other factors contributing to its footprint.
- Food producers should be aware of their packaging options, and partner with processors and packagers, to ensure that their product is packaged to its best advantage.

#### Recommendations

- Develop a Life Cycle Assessment process, model and tool to help food processing companies manage product lifecycles through inception, launch, growth and maintenance phases.
- Develop a centre of excellence and community of practice to encourage collaboration between producers and packagers, as well as end consumers, to determine optimal packaging for existing (and new) products.

#### **6. Knowledge sharing and HR practices:** At more senior levels, more focus is put on individual innovation, with much less support for training.

- Companies assume that mid- to senior-level employees in the organization will innovate. The hierarchical application of HR policies leads to disconnect, resentment and inability to work productively in a team environment.
- The study found that although companies attach importance to innovation, they fail to consistently apply this importance to HR policy. Non-managerial staff are likely to receive training and performance management with respect to innovation, but the selection and recruitment process is less likely to emphasize these areas.
- Companies consider themselves most effective at measuring innovation outputs such as revenue growth, shareholder returns and brand impact, while they consider themselves far less successful at tracking innovation inputs (dedicated resources, such as people and funds invested) and the quality of their innovation processes.
- Innovation is often seen as "someone else's job". People in management positions expect those underneath them in the organizational hierarchy to bring innovation to them while people lower on the totem pole may expect that the strategic thinkers/decision makers will bring innovation to their process.

#### Recommendations

- Create and share an innovation commitment charter that could be signed by all members of an organization that acknowledges that every member of a company is able to contribute.
- Encourage independent thinking and improvement of process ownership with a knowledge management strategy and portal which may lead to increased confidence to share ideas that may lead to productive innovation.

#### **7. Process improvement:** HR should encourage intelligent risk-taking in spite of the potential consequences. Employees should be encouraged to think rationally and to justify their choices.

- The Food Industry Innovation Forum recommended a number of actions, including development of an innovation strategy for the food and beverage processing sector,

workshops and an annual innovation forum, an innovation portal, an inventory of training opportunities, support access to funding for innovation and pursue regulatory modernization and create opportunities for collaboration through a pre-competitive analysis.

- These recommendations are based on the results of the survey undertaken by the Forum. Those results were similar to those of the survey done for this report, keeping in mind that both surveys were qualitative and not statistically significant. For example, both surveys found the main drivers for change were the need to increase market share, decrease costs and reach new markets. The food industry seeks change and innovation to achieve profits.
- Failure and smart risks are fine but should be iterative. Eventual success should outdistance short-term failures.
- Strike a balance between an innovative culture that is neither too exploratory nor restrictive. Within budgetary guidelines, HR should reward innovators and promote greater trust for innovators' future accomplishments. Types of compensation and other motivational tools need to be established.
- Benchmarking can be strategic, but only in moderation. HR needs to examine best practices for balancing risk with innovation. Benchmarks should be tailored to company strategy and organizational needs.
- HR departments can drive innovation by encouraging it culturally but also by providing the tools that assist in measuring input, cost and risk.

#### Recommendations

- Develop and distribute a process improvement tool box containing items such as score sheets and ROI calculators to HR designates in the food processing industry to help evaluate which innovations should be pursued and which may not be feasible or that may need to be "given away" to an industry partner to pursue.

**8. Technology development:** The impetus for development of innovative food processing technologies is the potential for energy savings, along with increased quality and safety of the food product.

- The key driver of innovation in technology related areas is an eco-system where industry, government and universities can collaborate and incubate ideas. For example, incubators for emerging technologies such as Radio Frequency Heating (RFH), High Pressure Processing, Pulse Electric Field (PEF), Ultrasound and Cool Plasma Technology may offer innovation opportunities to Canadian Food Processing companies.

#### Recommendations

- Develop a model and portal to facilitate and encourage collaboration between the developers of these technologies, government, universities and Food Processing companies in order to ensure the awareness of opportunities exist. Some partnerships may even enable cost reduction or make the use of the technology in the Canadian marketplace more cost-effective.
- Develop a Canadian Food Processing technology co-operative to bring specific technologies from other markets into specific regions in Canada whereby companies share the cost of implementing as well as any profits generated.

## V. Key Findings

1. Definition of Innovation
2. Market overview
3. Key elements of innovation
  - a. Culture
  - b. Product
  - c. Packaging
  - d. Knowledge sharing and HR practices
  - e. Processes
  - f. Technology
4. Innovation process
  - a. Models for open innovation
  - b. How to select an innovation model that meets your needs
  - c. What to consider when adapting an innovation model
5. How to apply and operationalize innovation

## 5.1. Definition of Innovation

### Defining and Understanding Innovation

"Innovation is the process of creative destruction." --Schumpeter 1934

"Products don't innovate, people do." --Center for Advanced Human Resource Studies, Cornell University

"Innovation is the successful exploitation of ideas into new products, processes, services or business practices, and is a critical process for achieving two complementary business goals of performance and growth, which in turn will help to close the productivity gap."

--U.K. Department of Trade and Industry

"Innovation" has taken on a host of meanings. The word is often confused with two other key terms: creativity and invention.

If innovation is the implementation of something new, then we can define the other two terms as follows<sup>34</sup>:

**Creativity** is the capacity or act of conceiving something original or unusual.

**Invention** is the development of something new that has never been made before and is recognized as the product of some unique insight.

Creation is displayed in new concepts or ideas, but there is no innovation until something is implemented from those concepts. If a system, product or device arises where there was none before, this is an invention. Thus every invention is an innovation, but every innovation is not necessarily an invention. An innovation can occur as long as it is new to the situation.

The respondents in the survey conducted for this report had a good understanding of innovation. Most agreed that innovation could be represented by product-line extensions or cost reductions as much as by a totally new product or process. The respondents also understood that innovation has broad applications and can occur in any part of the organization.

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<sup>34</sup> What's the Difference between Creativity and Innovation?, Sloan P., Aug.4, 2012, <http://www.innovationexcellence.com>

## 5.2. Market Overview

In 2010, innovation expert Stefan Lindegaard ranked the top five countries for “open innovation.”<sup>35</sup> In his assessment, the U.S. ranked first, followed by the Netherlands and the United Kingdom. Canada ranked fourth and South Korea fifth. He noted that Canada had one of the first successes in a type of open innovation called “crowdsourcing”, which draws upon a number of different individuals or groups (rather than traditional employees or suppliers) to collectively develop products or services — frequently, through online communities.

These international rankings indicate that overall, Canada is a good country for innovation, which is particularly relevant to the food processing sector, as it is composed almost entirely of small- and medium-sized enterprises (SMEs). Such smaller companies could benefit from an environment like Canada that promotes innovation.

### Food Processing Industry Overview

The Canadian food and beverage processing industry is a large and diversified component of a larger agriculture and agri-food supply chain. The total food supply chain (primary production, food-related manufacturing and food-related services) is one of the country’s largest employers and makes an important contribution to the Canadian economy.

In 2009, the agriculture and agri-food system contributed \$98 billion to Canada’s Gross Domestic Product (GDP). This represented 8.2 per cent of total GDP.<sup>36</sup> The total food system grew at an average annual rate of 2.3 per cent between 1997 and 2009 — below the 3.0 per cent annual growth rate for the economy as a whole.

In 2009, food retail/wholesale was the largest segment within the agriculture and agri-food system, representing 2.5 per cent of GDP, followed by processing at 2.0 per cent of GDP (**Figure 1.1**).

In 2009, the total agriculture and agri-food supply chain employed over 2 million people, representing about 12.6 per cent of total Canadian employment (**Figure 1.2**). Between

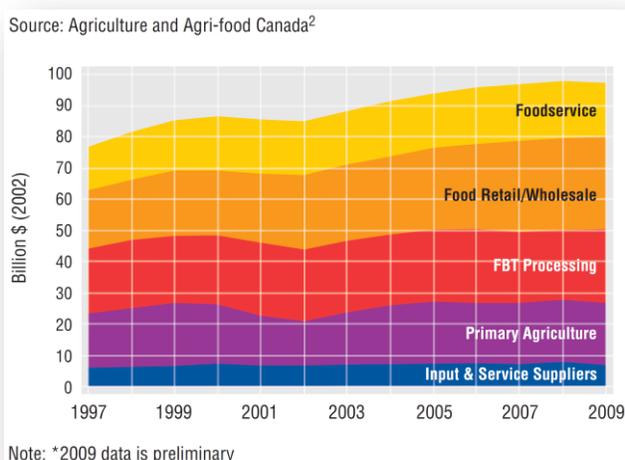
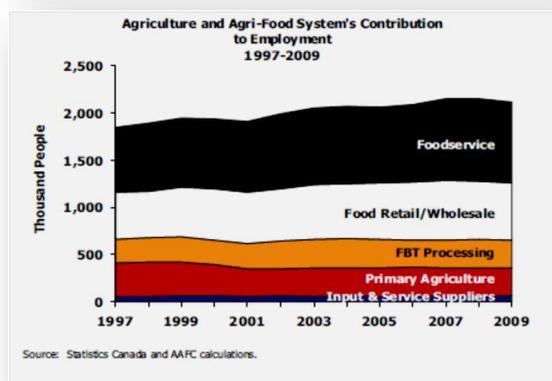
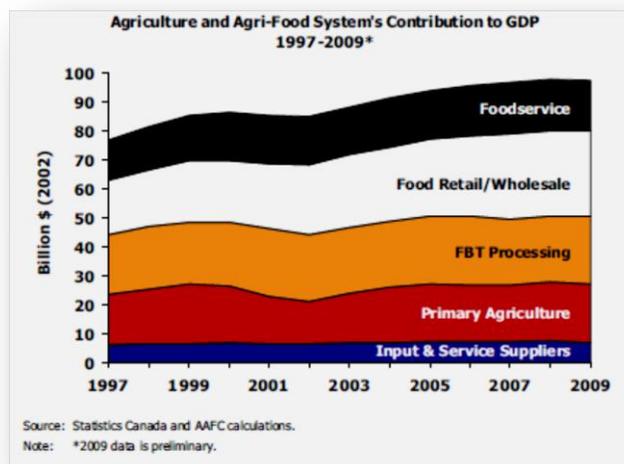


Table 1.1. Agriculture and Agri-Food System’s Contribution to GDP 1997-2009\* Source: Agriculture and Agri-food



<sup>35</sup> Top 5 Countries for Open Innovation, Lindegaard, S., Sept. 29, 2010, <http://innovationexcellence.com>

<sup>36</sup> *An Overview of the Canadian Agriculture and Agri-Food System 2011*, Publication 11279E, Page 18, Research and Analysis Directorate, Strategic Policy Branch, Agriculture and Agri-food Canada

1997 and 2009, employment across the system increased by an average of 1.2 per cent each year, compared to 2.0 per cent for the labour force as a whole. Employment in primary agriculture declined over the period, while processing employment increased at an annual rate of about 1.2 per cent.

Food services are the largest employer in the system and have the fastest rate of growth at 2.0 per cent per annum. Food processing and primary agriculture each account for 1.8 per cent of the Canadian labour force.

The agriculture and agri-food system makes an important contribution to the GDP of all provinces but the size of this contribution varies — ranging from slightly less than 2 per cent to more than 13 per cent. The food system is particularly significant for the economies of Saskatchewan, Prince Edward Island and Manitoba.

### Innovative Food Companies

Every year, Forbes Magazine ranks the world's most innovative companies. The ranking is based on an "innovation premium", which is a measure of investor expectation of stock price change based on future innovation. Of the top 100 companies in the 2012 ranking, there are 16 companies whose products are all or predominantly food products (**Table 5.1**).

**Table 2.2 2012 Forbes Ranking of Innovative Food Product Companies<sup>18</sup>**

6	Hindustan Unilever	50	PepsiCo
10	Monsanto	53	Anheuser-Busch
11	Reckitt Benckiser	57	Kellogg
16	Pernod Ricard	65	Campbell Soup
19	Starbucks	74	Unilever NV
31	General Mills	79	Syngenta
35	Danone	82	Kraft Foods
46	Hershey	100	Conagra

Rank based on innovation premium 1 to 100.  
Innovation premium is investor expectation of change in stock price based on future innovation.

**Table 2.3 2012 Rankings of the 10 largest Canadian Food Products Companies**

Company (Year End)	Revenue (\$Billions)
McCain Foods (Ju11)	6.093
Saputo Inc. (Ma11)	6.026
Maple Leaf Foods (De11)	4.913
Nestle Canada (De11)	2.540
Cott Corp. (De11)	2.333 (U.S.)
Olymel (Oc10)	2.160
Canada Bread Co. (De11)	1.596
Premium Brand (De11)	0.794
General Mills (My11)	0.770 (U.S.)
Lassonde Indust. (De11)	0.761

*The Globe and Mail (Report on Business Magazine) Jul/Aug, 2012*

The companies are multinationals with sales in the billions of dollars. It is no surprise that they are largely headquartered in the most innovative countries. All of these companies have a presence in Canada and some, such as Campbell's and Kraft, have local product-development operations.

In July/August 2012, *The Globe and Mail Report on Business Magazine* published its 2012 ranking of the largest companies in Canada, including the 10 largest food companies (**Table 5.2**) and the 5 largest food distribution (retailing) companies (**Table 5.3**).<sup>37</sup>

**Table 2.4 2012 Rankings of the 5 largest Canadian Food Distribution Companies**

Company (Year End)	Revenue (\$Billions)
Loblaw Cos. (De11)	31.365
Couche-Tarde (Ap11)	18.989 (U.S.)
Sobeys Inc. (My11)	15.771
Metro Inc. (Se11)	11.477
Canada Safeway (De11)	6.707 (U.S.)
North West Co. (Ja12)	1.499

*The Globe and Mail (Report on Business Magazine) Jul/Aug, 2012*

In terms of sales, the distributor/retailers are much larger than the manufacturers; Loblaw Companies Limited (Loblaw Cos.), for example, is twice as large as the next-largest retail competitor and five

<sup>37</sup> <http://www.theglobeandmail.com/report-on-business/rob-magazine/top-1000/2012-rankings-for-food-products-and-food-distribution-companies/article4358400/>

times as large as the largest manufacturers. The market power of the distributor/retailers is obvious in this comparison and will be discussed elsewhere in this report.

### Government and Industry Investments in Innovation

In 2011, the Canadian federal government recognized the need to enhance innovation and commissioned a team, led by Tom Jenkins, to review current policies and programs, and to bring forth recommendations to identify areas for improvement. The report *Innovation Canada: A Call to Action*, released in 2012, makes the following recommendations:<sup>38</sup>

1. Create an Industrial Research and Innovation Council to deliver the federal government's business innovation programs.
2. Simplify SR&ED for small and medium-sized businesses.
3. Make business innovation one of the core objectives of procurement.
4. Transform the institutes of the National Research Council.
5. Improve access to risk capital through the Business Development Bank of Canada.
6. Establish a clear federal voice for innovation.

The published literature contains abundant information about innovation enhancements and about barriers to innovation within organizations. However, it is always useful to move beyond the literature to gather the perceptions of people “in the field”. The authors conducted a series of interviews to obtain first-hand impressions and information from people in and associated with the food processing industry. A summary and an analysis of their comments are presented below. For the most part, the results reflect the literature; however, there are some uniquely Canadian perspectives among the responses.

From 1990 to 2009, the federal government accounted for approximately 70 per cent of public-sector research and development (R&D) investments in agriculture and agri-food, and the provinces accounted for 30 per cent (Figure 5.4)

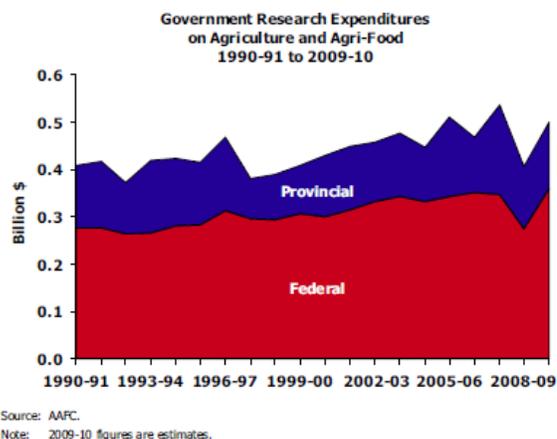


Figure 5.4 Source: Agriculture and Agri-food Canada<sup>1</sup>

Throughout most of this period, Canada’s public support for agriculture and agri-food R&D — as a percentage of sector output — was the highest among its major trading partners.<sup>39</sup> However, by 2009, Canada’s ratio had declined from over 1.8 per cent to about 1.3 per cent. Australia has become the leading supporter of public R&D in the sector, with a ratio of more than 1.5 per cent.

On the industry front, the Canadian food and beverage processing industry makes a relatively low level of investment in R&D compared to major trading partners.

Canada’s industry invested about 0.5 per cent of value-added in research and development from 1994 to 2005 (Figure 5.5). This level of investment was stable throughout the period. Major trading partners invested at rates between

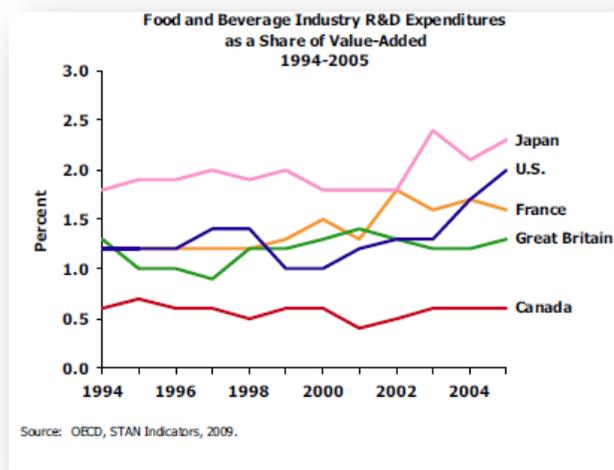


Figure 5.5 Source: Agriculture and Agri-food Canada<sup>1</sup>

<sup>38</sup> Jenkins Expert Study, <http://rd-review.ca/eic/site/033.nsf/eng/home>

<sup>39</sup> An Overview of the Canadian Agriculture and Agri-Food System 2011, Page 37

1.0 per cent and 2.5 per cent of value-added, and their levels of investment in R&D are increasing. Furthermore, according to Agriculture and Agri-food Canada (AAFC), fewer than 50 per cent of Canadian food and beverage firms invest in original research and development.<sup>40</sup>

In spite of this performance, AAFC<sup>41</sup> reports that Canadian food and beverage processing firms have been making productivity gains. The department suggests this could be due to Canadian firms benefiting from R&D taking place at foreign head offices or being very adept at adopting technologies developed by supply-chain partners outside the country.

**Table 5.4** shows the level of innovation in the food manufacturing industry as a whole and in eight defined sub-sectors. The definition used for innovation in the survey that resulted in this data was very broad — covering product and process innovations, as well as organizational and marketing innovations. This broad definition of innovation is in line with the results of the 30 stakeholder interviews discussed later in this report.

INDUSTRY	PRODUCT	PROCESS	ORGANIZATIONAL		MARKETING
			% of Business Units		
Food Manufacturing	60	47	40		28
Animal Food	55	50	42		18
Grain & Oilseed Milling	56	39	42		14
Sugar & Confectionery Products	60	48	36		40
Fruit & Veg. Pres. & Spec. Food	69	71	56		38
Dairy Products	66	42	28		25
Meat Products	63	58	47		38
Seafood Products	38	31	27		17
Bakeries & Tortilla	68	48	43		35
Other Food	61	39	37		20

Source: Statistics Canada, Survey of Advanced Technology, 2007.

**Table 5.4** Source: Agriculture and Agri-food Canada<sup>1</sup>

Key observations from this data include:

- Companies are more likely to invest in innovation that impacts products or processes.
- Organizational innovation occupies a middle position.
- Marketing innovation is the least common investment.
- Companies in the fruit and vegetable preserving sector are the most likely to invest in innovation.
- Companies in the seafood processing sector are the least likely to make innovation investments.

<sup>40</sup> *An Overview of the Canadian Agriculture and Agri-Food System 2011*, Page 42

<sup>41</sup> *Ibid.*

### 5.3. Key elements of innovation

#### a. Culture

One interesting approach to innovation is to see it through the mindsets of other people.

Understanding how to manage innovation in an organization means understanding that employees have different levels of readiness for change. A recent article in *Fast Company* described four different mindsets with respect to innovation:<sup>42</sup>

**Fix and Maintain:** This mindset is characterized by, “If it ain’t broke, don’t fix it.” This is a minimalist approach to innovation, where change happens only out of necessity.

**Build and Develop:** People in this group are more open to innovation and are receptive to incremental improvement or building something better. They especially focus on process improvement, such as taking a paper-based process and making it paperless.

**Transitional:** The people with a transitional mindset are concerned about the current forces around them and want to stay current. They are proactive and willing to change. An example would be to move training from a class-based delivery to a virtual approach.

**Transformative:** Those with a transformative mindset are open to ideas that look completely different from what currently exists. One example would be taking a rail system whose primary purpose is delivering people from point A to point B and creating a tourist attraction by upgrading the appointments and advertising the scenic views.

None of the mindsets is “better” than the others; they all make a contribution. An organization’s capability to maximize innovation is best realized by first of all, having the right employees in the right job functions. Secondly, a team approach to innovation is best served when each individual understands the mindsets of the others, as well as his/her own.

Strategy and innovation can sometimes be seen as opposing forces in an organization. True innovation usually happens in the corners of the business and works its way up. If there is too much strategy involvement, the chances of innovation are greatly reduced. Innovation should be allowed to build horizontally to gain momentum and generate tangible results. In this way the developers of the innovation have a much better chance of building a case with senior leaders.<sup>43</sup>

Several survey respondents for this report relayed humorous anecdotes about their involvement with top-down directives and “secret innovations”. One respondent told us about his company’s creation, which had the secret working title of SFSP. Senior management had requested an upscale and high-margin soup. To achieve both objectives, the product developers (the company’s innovators) put utility-grade soup in a fancy package with a fancy name. The innovators called it SFSP (Soup For Stupid People). Perhaps if the innovators had been allowed to innovate, results would have been different.

Innovation does not always come easily. One well-known innovation expert conducted a survey to uncover the barriers to innovation, particularly on the front or “fuzzy” end of innovation.<sup>44</sup>

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<sup>42</sup> The Number One Killer of Corporate Innovation, Blanchard, K. and S., July 23, 2012, <http://www.fastcompany.com/1843245>

<sup>43</sup> Building a Culture of Innovation. Ross, P. June 25, 2012. Posted presentation.

<http://www.pamross.ca/2012/04/26>

<sup>49</sup> 40 Reasons Why We Struggle with Innovation, van Wulfen, G., Dec.8, 2011,

<http://www.innovationexcellence.com/2011/12/0>

## Barriers to Innovation

- **Culture:** Employees are entrenched in habits, are unclear and lack direction, are not interested or curious, and are subject to inertia.
- **Uncertainty:** New innovations are subject to ridicule or envy. There is fear of failure or fear of not conforming. Employees don't understand company objectives or strategy.
- **Support:** There is no one with whom to communicate or sponsor/share ideas. Employees are unsure of the needs of internal stakeholders..
- **Market Insights:** The consumer doesn't know what he wants. How do we find out true consumer needs?
- **Process and Tools:** There are too many ideas, or no way to filter ideas or focus on a plan. There is no organization, and no process to transfer thoughts to action.
- **Team:** How do we keep a team on track with company strategy? We do not have the right mix of people or access to the necessary resources.

To counter such barriers, one well-known HR trainer has suggested actions to help build a viable culture of innovation.<sup>45</sup> These include:

- **Build trust:** Avoid situations that engender reactionary or judgemental behaviours. Promote feedback and the sharing of personal strengths and weaknesses.
- **Hire diverse people:** Hire people with a variety of skills, personal backgrounds and personalities. Idea generation is important, but so too, is the ability to implement.
- **Ensure that all are aligned to the same vision:** Everyone should be working together and know their contribution to the effort.
- Establish an environment which welcomes approved risk-taking: Outline accountabilities but also acceptable risks.
- **Provide autonomy:** Respect employees and allow them responsibility and flexibility in job performance. Engage employees and provide feedback on their activities.
- **Give credit for new ideas:** Employees will be more engaged and motivated if their contributions are acknowledged and rewarded where appropriate.
- **Provide time for innovating:** Time should be allocated for innovating, as it is for other tasks. Innovating should have the same priority as other employee functions.

None of the survey respondents mentioned innovation in the context of an organization's human resources (HR) department. Seemingly, this should be the department where employees have a mandate to promote and support change. With such a mandate, HR — while adhering to the goals of the organization — could be the source of company-wide changes for new procedures and systems in order to empower personnel to innovate.

A research paper in the Cornell HR Review<sup>46</sup> stressed the idea that HR should be innovative and drive changes and progress within its own function. The authors observed, however, that in reality, HR departments tend to be reactive and mostly concerned with administrative duties.

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<sup>45</sup> Building a Culture of Innovation. Ross, P. June 25, 2012. Posted presentation. <http://www.pamross.ca/2012/04/26>.

<sup>46</sup> Driving Innovation in Times of Growth, Komati M. et al., October 21, 2011, *Cornell HR Review*, <http://www.cornellhrreview.org>

### 5.3. Key elements of innovation

#### b. Product

#### Product Trends

The food processor’s drive for innovation is ultimately based upon the consumer. To stay competitive, food processors must create products within the value chain that will satisfy continually changing consumer needs. The health of the economy, the impact of competition, shifts in attitudes and even weather (e.g., crop damage caused by the drought in the U.S. Midwest) affect consumer needs and companies’ ability to satisfy these needs.

Changing demographics in North America and Europe are having a strong impact on food manufacturers and retailers. The next decade will see a balancing act between the rise of the Millennials or Generation Y (born between 1982 and 2001) and the still-influential Baby Boomers (born between 1946 and 1964).

For Boomers, health and fitness are top priorities, and they are very loyal to their brands. In the coming years, they should want fortified foods with easy-to-read labelling and easy-to-open packaging. Currently, the addition of omega 3s or fibres to food products are two large functional food categories targeted at everyone, but particularly at the older population — for brain and heart health, and good functioning of the GI tract. Boomers, however, are more reluctant than other population groups to try fortified foods.

Millennials, recognized for their “here and now” mentality, are strongly driven by convenience, and look for attributes such as fresh, healthy, variety, natural and organic. Their needs include powerful nutrition, flavourful food, comfort and indulgence, and speed and ease.

The emphasis on mini-meals, snacks and convenience, as well as trends such as the desire for local, organic, natural and “free-from” foods, will continue to widen channels of distribution. Supermarkets still account for the majority of retail sales; however, big-box stores, online sales, grocery delivery, health food stores, and farmers’ markets are increasing their share.

Organizations that have identified key new food product trends include Innova Market Insights based in the Netherlands, Datamonitor in the U.S. and Leatherhead Food Research in the United Kingdom

Current trends emphasize several dichotomies: old versus young, convenience versus lower price, and health versus affordable luxuries.

One common theme in these trend lists is the concept of “clean” food, a trait that consumers link to foods that are natural, organic, local and fresh. In the consumer’s mind, the synonyms for clean are “real”, “pure” and “whole.”

**Table 2.5 Innova Market Insights (Netherlands): Food Trends for 2012<sup>23</sup>**

“pure” – The New Natural
Green is Given
Location
Premium Stands Out
Seniors Draw Attention
Forty is the New Twenty
Grounded in Science
Regulators Force a Rethink
Unmeasurable Niches
Room for Protein

**Table 2.6 Leatherhead Food Research (United Kingdom): 2012 Food and Drink Trends<sup>24</sup>**

Health and Wellness
Sustainability
Convenience
Flavour Solutions
Free-From Foods
Natural
Affordable Luxuries
Quality Linked to Location
The Over 55 Age Group
Softer Claims

## Future Foods

What's in store for the future? Some trends will persist; the focus on clean and natural foods, for example, is pervasive and likely to endure. At the same time, some new consumer trends will arise, for example:

**Foods that are "mobile":** Foods that are portable from place-of-purchase or at place-of-consumption. Examples include microwavable complete meals, complete children's lunches and a mobile gourmet-cupcake truck.

**Foods that tell a story:** Foods with an interesting history and context that can strengthen consumer interest and loyalty, for example, honey made from a specific flower species.

**Foods that represent "local", while being global:** Foods that are globally available but have local variations, for example, beer from microbreweries and wine from craft wineries in our community, local cheeses and the trend to buy local produce.

In the face of issues such as rising food prices, global population growth and environmental concerns, "food futurologists" foresee some dramatic shifts in food consumption. Predictions about some of the foods we might be eating in 20 years appeared in a July 2012 article published by *BBC News Magazine*.<sup>47</sup> These future food sources include:

**Insects:** Researchers at Wageningen University in the Netherlands are researching development of insect farms. Insects provide as much nutritional value as ordinary meat and cost less to raise than cattle and have a minimal carbon footprint. Some experts suggest that insects such as crickets and grasshoppers could be ground down and used as ingredients in hamburgers and other food products.

**Sonic-enhanced food:** Food is a sensory experience and it is documented that appearance and smell/flavour play a role in its attraction. Scientists are experimenting with sound and its influence on food. For example, chips packed in crunch packaging give the impression of a fresher product and wave sounds make seafood taste fresher.

**Lab-grown meat:** Dutch scientists using stem cells from cows are hoping to create the first "test tube hamburger" by the end of 2012. Growing meat in a lab rather than raising animals would significantly decrease greenhouse gases, water, energy and land use. As well, in-vitro meat could be customized to increase nutrients and decrease fat content.

**Algae:** The bottom of the food chain could become the solution to complex problems, including food shortages. Algae can feed humans and animals, and biofuel derived from algae could reduce the need for fossil fuels.

With our fat, sugar and salt "phobias", demand for allergen-free and guilt-free snacks, mobility and convenience needs, and desire for comfort and luxury foods counter-balancing these unusual ideas for future food products, food manufacturers have a lot to consider for food innovations, now and in the years to come.

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<sup>47</sup> Future foods: What will we be eating in 20 years' time? Winterman, D., *BBC News Magazine*, July 29, 2012, <http://www.bbc.co.uk/news/magazine-18813075>

### 5.3. Key elements of innovation c. Packaging

#### Packaging Trends

In the U.S. in 2008, food and beverage packaging was 55 per cent to 65 per cent of the \$130 billion value of all packaging. The food processing and packaging industries spend an estimated 15 per cent of their total variable costs on packaging materials.

According to a number of company representatives interviewed for this report, packaging and processing innovation is often as important as improvements to the food products, themselves. The trends that influence packaging innovation include consumers' increased life expectancy, fewer organizations investing in food production and distribution, and a regionally abundant and diverse food supply.<sup>48</sup>

One respondent in the survey for this report indicated that there is a push for sustainable packaging, particularly because packaging has high visibility for the consumer, even though its actual carbon footprint is not significant. In terms of sustainability, the emphasis is now on Life Cycle Assessment where the product's packaging is evaluated from its inception to its destruction for input of water, energy and other factors contributing to its footprint.

This respondent identified a number of packaging innovations:

- Powder imbedded in the cap of a beverage container, which drops down to create a flavorful, nutritious drink
- Use of antimicrobial agents imbedded into packaging walls for slow release to prolong shelf-life
- Use of a sachet which emits protective gas

The respondent also pointed to innovations in processing techniques, including modified atmosphere storage, high-pressure processing and ultraviolet light for sterilization.

A recent article on food packing innovations<sup>49</sup> indicated that some of the 2011 innovations focused on the development of new formats such as flexible packaging, pouches with safer reclosable packets and more portable containers. Additionally, the use of innovative packaging materials such as metalized film has increased.

Another interesting innovation is the Tetra Recart developed by Tetra Pak. Tetra Recart is the first "retortable" carton (enabling filled product to be sterilized within the package), and may revolutionize the flagging soup market, which canned goods has traditionally dominated. Tetra Pak is now working with 75 global brands on use of the technology and some private-label soup brands have already begun producing soups in this new package.<sup>50</sup> This innovation is unique, as it is a combined processing and packaging system designed for in-container sterilization of food; the package may be sterilized using the traditional canning process.

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<sup>48</sup> *Innovative Packaging Solutions*, Institute of Food Technology, October 2008, <http://www.ift.org/knowledge-center>

<sup>49</sup> Q&A: Food Packaging Innovations, Coblenz, L., March 2012, <http://www.manufacturing.net/articles/2012>

<sup>50</sup> Tetra Pak, Innovation with the World's First Retortable Carton, *Supermarket News*, July 2012, <http://expert.supermarketnews.com/tetrapak/2011/page/1/>

### 5.3. Key elements of innovation

#### d. Knowledge sharing and HR practices

#### Human Resources and Innovation

Companies need to know how to train, support and enable the flow of knowledge needed for innovation.<sup>51</sup> In addition to administrative functions, HR should be strategically aligned with senior management while it develops, oversees and shows, by example, innovative practices for the rest of the company.

A statistical study was undertaken in the U.K. that included companies from both the manufacturing and service sectors. The goal of the study was to determine whether organizations coherently use HR policy in promoting innovative behaviours to enhance competitive performance.<sup>52</sup>

The study found that although companies attach importance to innovation, they fail to consistently apply this importance to HR policy. Non-managerial staff members are likely to receive training and performance management with respect to innovation, but the selection and recruitment process is less likely to emphasize these areas. At more senior levels, more focus is put on individual innovation, with much less support for training. Companies assume that mid- to senior-level employees in the organization will innovate. The hierarchical application of HR policies leads to disconnect, resentment and inability to work productively in a team environment.

A Boston Consulting Group study focused on measuring innovation.<sup>53</sup> Companies seeking to improve their return on investment in innovation spending need to be able to measure that investment; however, many companies struggle to do so – unclear about what to measure, how to collect the data and how to use that data to make decisions. Highlights of the study include:

- Only 32 per cent of executives are satisfied with their company's innovation measurement practices.
- 73 per cent believe innovation should be tracked as rigorously as other business operations, but only 46 per cent say their company does so.
- Only 27 per cent of companies attempt to drive innovation by linking employee incentives to innovation metrics.
- The most widely tracked components of innovation are overall company profitability (79 per cent), overall customer satisfaction (75 per cent), and incremental revenue from innovation (73 per cent).

Companies consider themselves most effective at measuring innovation outputs such as revenue growth, shareholder returns and brand impact, while they consider themselves far less successful at tracking innovation inputs (dedicated resources, such as people and funds invested) and the quality of their innovation processes.

In reviewing companies robust enough to have an identified HR department, and progressive enough to formally invest in innovation, it appears it is necessary to support the HR effort; the emphasis should be on developing the appropriate HR tools to encourage and support innovation, as well as to track it. Effective HR policies could yield more innovative companies and maximize profit. It should be remembered, however, that effective HR policies can only thrive in a culture of innovation. The directives to develop and sustain a culture of innovation come from top management, who must have a continuing role in this endeavour.<sup>54</sup>

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<sup>51</sup> HR's Strategic Role in Innovation, <http://www.innovationexcellence.com/blog/2010/12/21>

<sup>52</sup> Supporting Innovation through HR Policy: Evidence from the UK, Searle, R.H. and Ball, K.S., Alternative Minds Ltd., <http://www.alternativeminds.com>

<sup>53</sup> Measuring Innovation 2009, The Need for Action, Andrews. et.al., The Boston Consulting Group, <https://www.bcgperspectives.com/content/articles/innovation>

<sup>54</sup> Governing Innovation in Practice - The Role of Top Management, *IM Newsletter*, <http://www.innovationmanagement.se/2012/09/03>

Innovation in smaller companies is handled differently. Usually, start-ups and small companies lack an official HR function or the awareness of or interest in developing HR policies. The company's culture derives from the owner/manager.

Small companies do have some advantages over large companies. One HR expert expresses it as: "Small business people may think they don't have the resources to innovate. In fact, constraints are a friend to innovation, not a foe. More promising innovations have been killed by too much time and money and too many people than have been killed by the lack of any of these."<sup>55</sup> Indeed, interviewees from several larger companies for this report indicated that organizational structure and silo-building have been impediments to innovation.

Small companies are closer to the customer and therefore, more continuously aware of customer needs and how they are changing with time. Smaller companies have a simpler organizational structure, allowing them to react to situations more quickly and with more flexibility. With simpler structure, there is less employee specialization and shorter lines of communication; employees share more tasks and work as a team.

The interviewees found that some respondents resisted the idea of engaging outside knowledge-building resources, whether training programs for factory workers, seminars for product developers or how-to business courses for company managers. It seems that decision-makers must be firmly sold on the idea of a return on investment, whether that investment be employee time, company money or both. One respondent who offers state-of-the-art factory training has heard the comment, "If I take my people off the line to take your training course, then I'll have to pay them more." This, of course, is a short-sighted perspective, but one that persists in the low-margin food processing industry. Respondents also commented that the courses given by the Food Technology Centres are too expensive, but were hard-put to explain when asked, "Relative to what?" One way of empowering employees to be innovative is to provide access to knowledge. This carries risk, but to innovate is to accept that risk that is inherent in the return on a company's investment.

The employer-employee relationship is one tempered by supply and demand. In these post-recessionary times, one tends to think of high unemployment as a universal problem. In Canada, however, employment levels are greatly affected by location and the local economy. In the Maritimes, the manufacturing base is small and employment is seasonal for many workers. Quebec and Ontario have suffered a reduction in manufacturing and a higher unemployment rate year-round. The prairies are more even, with a relatively low population and an agricultural base, while B.C. has pockets of growth based on population increases, as the real estate market confirms.

Alberta is different. One respondent indicated that the provincial population is increasing by 16,000 people per month. Wages are high at double the minimum rate and companies still cannot find enough unskilled labour. There is active recruiting to bring in workers from the South, particularly Mexico. The human resource situation and the capacity to innovate are very different in a heated, fast-moving economy like Alberta. Given the diverse labour situation across Canada, it would be a challenge to formulate a "one-route only" roadmap that satisfies everyone's human resources situation.

One last comment in this context involves employee reduction in companies. The trend over the last years, particularly with the recession, has been for "lean" staffing in organizations. One respondent indicated that in smaller companies with a culture of younger, technology-proficient employees, the tendency is to replace factory workers with machines. Companies are, therefore, changing the innovative culture, as a fewer number of highly trained and educated employees are taking the place of a larger number of unskilled or semi-skilled workers.

Another trend among larger companies is to contract out for various services, including product development. It is more cost-effective to eliminate the overhead of older, highly paid and educated employees, by replacing them with an outsourced product-development group as required. Again, this leads to a change in culture. Not only does it deplete the capacity to innovate on a continuous basis,

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<sup>55</sup> Innovative Lessons for Small Business, Waldeck, A. and Hopkins R., *Forbes Magazine*, <http://www.forbes.com/2009/02/03>.

but it also eliminates the opportunity for older employees to mentor younger ones. Often, internal technology transfer does not take place and corporate know-how is lost.

The tendency to automate and the tendency to outsource for technical development will change the complexion of organizations in the future. This is worth considering, when designing a resource tool to help the food processing industry to innovate. It appears that the need for highly skilled factory workers will increase, as will the need to have more comprehensive access to outside resources.

### 5.3. Key elements of innovation

#### e. HR and the innovation process

Interviews conducted for this report showed that recruiting is a very important function. Companies tend to hire employees that fit with the existing company culture; seldom are new employees hired to change ways of doing things. Inclusiveness, teamwork, idea-sharing and a simpler system of acknowledgement, and reward for performance all contribute to a successful innovative environment in a smaller company.

Smaller companies have simpler innovation models and systems because much of what they achieve is innate. For small companies, the more important requirements are for access to financial support, information and connections in a timely manner. A roadmap and tool kit for small companies should be easy and quick to use.

The ways in which HR re-invents itself and takes on a more effective role in supporting innovation are going to vary by company, although the overall objective to empower employees to enhance innovation is common to all companies. In designing HR support for innovation, Randall MacDonald, Senior Vice-President of Human Resources at IBM, has generated the following guidelines:<sup>56</sup> HR should serve as the guardian of an innovation culture that promotes a sense of urgency, appropriate risk-taking, and a comfort with ambiguity. HR should facilitate idea generation and assume a proactive role. HR initiatives should be created for and in collaboration with business leaders, not served to them.

**Employee champions of innovation and diversity of thought need to be protected.** HR should set accountability, but also actively empower and safeguard the risk-takers who drive innovation in an organization. There should be advocacy for diversity and protection from backlash.

**Failure and smart risks are fine but should be iterative.** HR should encourage intelligent risk-taking in spite of the potential consequences. Employees should be encouraged to think rationally and to justify their choices. Eventual success should outdistance short-term failures.

**Change agents should focus on relationship-building.** HR should make champions aware of the importance of internal stakeholder priorities. Innovators need to build relationships, establish credibility with early wins, maybe settle for incremental modifications, and keep in line with strategic goals.

**Strike a balance between an innovative culture that is neither too exploratory nor restrictive.** Within budgetary guidelines, HR should reward innovators and promote greater trust for innovators' future accomplishments. Types of compensation and other motivational tools need to be established.

**Benchmarking can be strategic, but only in moderation.** HR needs to examine best practices for balancing risk with innovation. Benchmarks should be tailored to company strategy and organizational needs.

Randall MacDonald's insights reinforce the key role of HR professionals in setting the foundation for innovation. HR must not only successfully secure risk-takers for the organization, but encourage and reward such risk-takers by building supportive culture and leadership. The tasks of HR are a continuing process and HR should lead by example. In this way, HR can truly promote innovation throughout all levels of the organization.

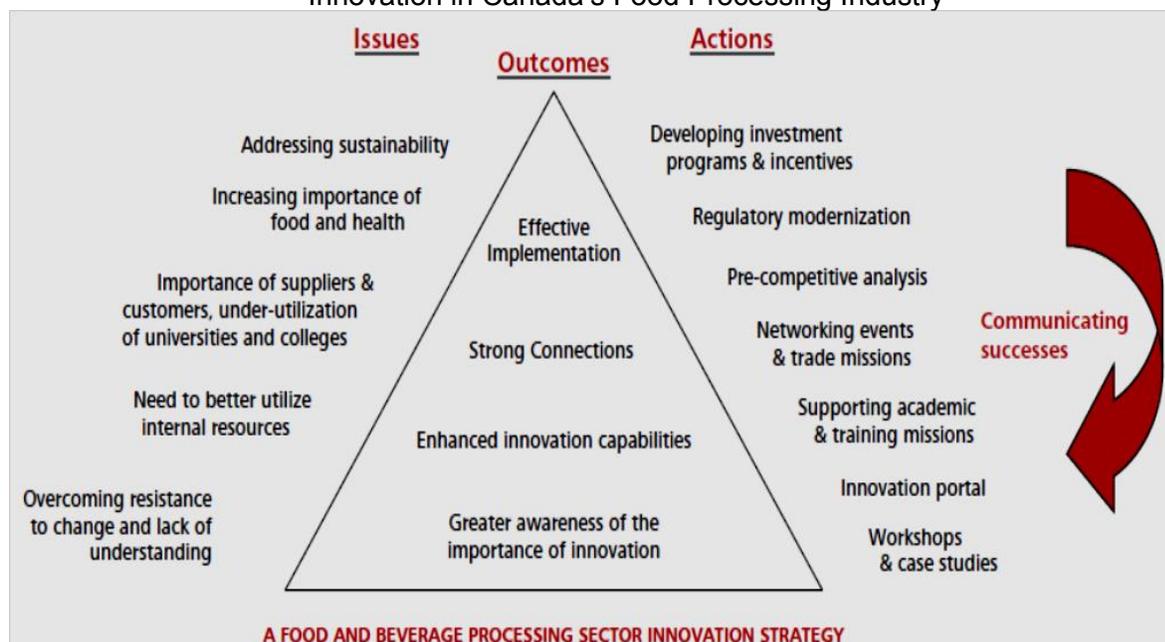
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<sup>56</sup> HR's Strategic Role in Innovation, <http://www.innovationexcellence.com/blog/2010/12/21>

## Human Resources in the Food Processing Industry

One of the most recent studies undertaken by the Food Industry Innovation Forum, "Food Industry Innovation & Profitability—The Next Ten Years"<sup>57</sup>, shows the same dynamics as the earlier AAFC study. The Forum's study contains a figure detailing food industry innovation issues, actions and outcomes; it very cohesively sums up a very complex situation. The members of the committee for the Forum project foresee a new approach to innovation, based on enhanced capabilities, stronger connections and effective implementation.

**Figure 5.6**  
Innovation in Canada's Food Processing Industry



The Food Industry Innovation Forum recommended a number of actions:

- Develop an innovation strategy for the food and beverage processing sector.
- Organize workshops and an annual innovation forum.
- Develop an innovation portal.
- Undertake an inventory of training opportunities.
- Support access to funding for innovation and pursue regulatory modernization.
- Create opportunities for collaboration through a pre-competitive analysis.

These recommendations are based on the results of the survey undertaken by the Forum. Those results were similar to those of the survey done for this report, keeping in mind that both surveys were qualitative and not statistically significant. For example, both surveys found the main drivers for change were the need to increase market share, decrease costs and reach new markets. The food industry seeks change and innovation to achieve profits.

<sup>57</sup> Food Industry Innovation & Profitability - The Next Ten Years, Food Industry Innovation Forum 2011, Growing Forward, AOFI, CTAC, Ontario, Quebec

### 5.3. Key elements of innovation f. Technology

#### Processing Trends

The impetus for development of innovative food processing technologies is the potential for energy savings, along with increased quality and safety of the food product. An article in *Innovation: Management, Policy & Practice* described a number of food processing innovations.<sup>58</sup>

**Radio Frequency Heating (RFH):** This technique is similar to microwave heating, but uses a lower frequency that penetrates the food more deeply. RFH is good for thawing, controlled pre-heating, blanching, cooking, roasting and baking. It can be used in selective heating, automatic cooking, and development of packaged and microwave sterilized meats.

**High Pressure Processing:** This method of food preservation applies intense to inactivate most microbial cells and viruses, while maintaining freshness. It could be used for higher-quality foods with longer shelf life, pasteurizing probiotics, improvement of protein functionality without the use of chemicals, modification of texture and treatment of food with potential parasites.

**Pulse Electric Field (PEF):** This is a non-thermal process that uses high-voltage electric field pulses to inactivate microbes in liquid foods, without compromising flavour or colour. PEF is being evaluated for doubling the life of pasteurized milk, increasing the shelf-life of fresh fruit juices and the pasteurization of eggs and bioactives without protein denaturation.

**Ultrasound:** Ultrasound can be generated at 20kHz to 1 MHz on commercial food processing equipment and can be used to enhance the performance of nozzles in extruders and spray dryers, to defoam without chemical agents, to enhance food and waste treatment fermentation processes, to improve the cleaning of pasteurization systems and enhance oxidation.

**Cool Plasma Technology:** This emerging technology is good at destroying microbes on equipment, packaging and food surfaces at low temperature with no liquid. It could also be used to extend the shelf life of baked goods.

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<sup>58</sup> Processing Technology Innovation in the Food Industry, Fryer, P., *Innovation: Management, Policy & Practice*, July, 2008, <http://www.innovation-enterprise.com/archives/vol/10/issue/1/article/2285/processing-technology-innovation-in-the-food>

## 5.4. Innovation Process

### a. Models for Open Innovation

#### Proprietary Models

Two companies with leading proprietary innovation models are Stage-Gate [the Stage-Gate® Process] and The Product Development Advantage Group's MPT Model. It is worth looking at these popular models as a beginning to the review of innovation model process.

"A Stage-Gate Process is a conceptual and operational roadmap for moving a new-product project from idea to launch."<sup>59</sup> Its developers claim it is the world's most widely implemented and trusted product innovation process. "Stage-Gate divides the effort into distinct stages separated by management decision gates. Cross-functional teams must successfully complete a prescribed set of related cross-functional tasks in each stage prior to obtaining management approval to proceed to the next stage of product development."<sup>60</sup>

The full Stage-Gate Process starts with ideas and involves 5 decision gates:

- Initial screen
- Second screen
- Decision on business case
- Post development review
- Decision to launch

Stages are where the action occurs. Cross-functional teams complete activities to advance the project to the next gate. Gates are where "Go/Kill" and prioritization decisions are made. Mediocre projects are culled and resources are allocated to the best projects. As with any model, there are inherent problems to consider. Common problems include: too many projects classified as "must do"; no mechanism to kill projects; decision criteria that have not been established or have been set up incorrectly; and senior people who have not been engaged.

Authors such as Hobcraft<sup>61</sup> suggest that the Stage-Gate process can work well for incremental and well-planned innovation but may "stutter" when you need "new-to-the-world" breakthroughs. In breakthrough cases, he argues, there are too many unknowns to run them through a system. Stage-Gate is, therefore, not a model for all projects.

The Product Development Advantage Group takes a different approach, suggesting there are three fundamental organizing principles underlying any multi-disciplinary project — primary reliance on the project's **Management**, the project's **Processes** or the power of the project's **Team**. Thus, the model is titled **MPT**. Although all three principles may be present in any effort, one usually predominates.

**Management-centric** organizations have an unambiguous leader for each project. This leader is responsible for all areas of the project. Although there may be notions of process or teams, they are clearly secondary to the leader. The challenge with this style of project management is that complex, multidisciplinary projects may exceed the capacity or capabilities of the leader.

**Process-centric** organizations have enough history that they have crafted a prescriptive process that has incorporated past lessons and should deliver good results when the process is followed. This process works best with incremental development and can form the basis of continuous improvement. For new-product development, the interdependencies in a complex environment make it almost impossible to create a totally prescriptive process.

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<sup>59</sup> What is the Stage-Gate Process? [http://www.stage-gate.com/knowledge\\_pipbenefits.php](http://www.stage-gate.com/knowledge_pipbenefits.php)

<sup>60</sup> Ibid.

<sup>61</sup> What Product Development Style is Right for You? [http://www.pd-advantage.com/images/Product\\_Development\\_Styles.pdf](http://www.pd-advantage.com/images/Product_Development_Styles.pdf)

**Team-centric** organizations have opted not to create a totally prescriptive process and do not count on finding a manager who can do it all. They rely on a team to figure out what cannot be prescribed. Typically Team approaches have some Management and Process characteristics.

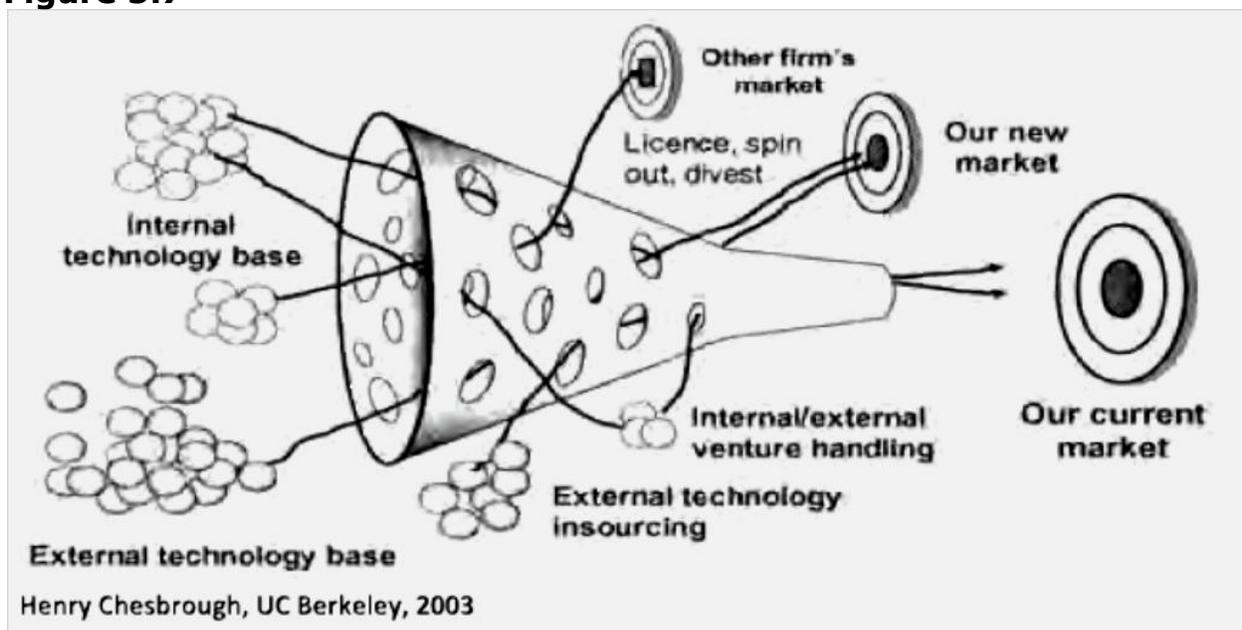
During our interviews for this report, several companies indicated they have successfully used a Management-centric approach to innovation. One suggested they tried a Process approach and abandoned it as too rigid, while another said they are successfully using a Team approach for the largest innovation effort in the company's history.

Henry Chesbrough — sometimes called the “father of open innovation” — made an interesting observation in a recent article.<sup>62</sup> He notes that in 2003, a Google search of the term “open innovation” yielded no results, while in 2012, the same search generated 483-million links that addressed open innovation as a distinct model of innovation. The rapid rise of this concept has engendered hundreds of papers, conferences, training programs and graduate-level studies.

According to Professor Chesbrough, “Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and external and internal paths to market, as firms look to advance their technology.”<sup>63</sup> He has developed a model of his perception of open innovation (**Figure 5.7**) — a dynamic and complicated 3D view of how problems are solved through collaboration.

Open Innovation Model: Henry Chesbrough

**Figure 5.7**



Professor Chesbrough's model illustrates a multidimensional process, with multiple markets and multiple interactions with other groups throughout the innovation process.

He describes two types of open innovation — Outside-In and Inside-Out. In the case of Outside-In, a company opens its internal innovation processes to many kinds of external inputs and contributions. This type of open innovation is well known and has received the greatest attention and use. Inside-Out is less well known; in this type, a company allows unused and under-utilized ideas to go outside the organization for others to employ in their businesses.

<sup>62</sup> Open Innovation Past and Present: An Exclusive Interview with Henry Chesbrough. Pop, O.-M., July 5, 2012. <http://www.innovationmanagement.se>

<sup>63</sup> Open Innovation Past and Present: An Exclusive Interview with Henry Chesbrough. Pop, O.-M., July 5, 2012. <http://www.innovationmanagement.se>

Open innovation is a challenging concept for many companies that have historically used a closed innovation model, in which intellectual property (IP) has accumulated within the company. This new “open” way of doing business suggests that companies should sell internal IP that does not fit their business model and buy external IP that does.<sup>64</sup> Companies handle such legal collaborations in a number of ways. For example, some firms enter into partnerships, while others set up venture funds to invest in start-ups with new technologies.

To make these types of collaborations work, firms must make changes to attitudes and internal communications. NineSigma is an organization that facilitates collaboration between two open-innovation partners. The organization’s vice-president, Kevin Stark, says, “It is one thing to have accepted that your R&D department does not have a monopoly on good ideas, and that working with others can get better products to the market faster. It is quite another to make collaboration part of your culture, organization chart and product-development process.”<sup>65</sup>

Many companies must break down barriers within their own companies to allow outside innovation to occur. In the process, they discover that allowing employees from separate departments inside the organization to relate with one another fosters new product development internally.

#### **Model 1: Crowdsourcing:**

“Crowdsourcing” is the act of outsourcing tasks traditionally performed by an employee or contractor to a large group of people or community (a crowd), through an open call.<sup>66</sup> It is a way to bring external input into the organization, much like contracting.

#### **Model 2: User-driven:**

Another model called user-driven innovation is a technique in which companies gain insight from users; the users are experts and replace use of questionnaires and focus groups.

#### **Model 3: Co-creation:**

Yet another model is called co-creation, where markets are viewed as forums where firms and active customers can share, combine and renew each other’s resources and capabilities. This process creates value through new forms of interaction, service and learning mechanisms. The co-creation model can be seen as eliciting proactive responses for both parties, using social media to network, among other activities.<sup>67</sup>

### Open Innovation in the Food Industry

Open innovation in the food industry is seen to typically involve a large company taking the lead to solicit the involvement of smaller companies on specific projects. A number of large food companies have developed specific platforms for that purpose. General Mills is probably the best known and most successful.<sup>68</sup> In 2005, General Mills developed its Worldwide Innovation Network (G-WIN) team, which is the primary contact with the company’s business teams seeking external capabilities. The G-WIN team searches for patented and patent-pending technologies and commercialized products that have applications for GM’s various brands and businesses. The G-WIN team also helps to identify opportunities and solve technical challenges. It takes a proactive stance on reviewing technologies submitted to its on-line portal. General Mills has collaborated with both partners and suppliers. Some recent product introductions stemming from this innovation process have included Fiber One bars, Reduced Sodium Progresso soups, Yo-Plus Yoghurt and Green Giant Bites.<sup>69</sup>

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<sup>64</sup> What is Open Innovation? Crowdsourcing? User Innovation? Co-Creation? Lindegaard, S. Sept. 22, 2010.

<http://www.innovationexcellence.com>

<sup>65</sup> Partnering for Innovation, Erickson, P., *IFT*, January 2008, Vol. 62, No.1, <http://ift.org/Food-Technology/Past-Issues>

<sup>66</sup> What is Open Innovation? Crowdsourcing? User Innovation? Co-Creation? Lindegaard, S.

<sup>67</sup> One Food Company’s Foray into Open Innovation, Erickson, P., *PDMA Visions Magazine*, June 2008, <http://www.innovationedge.com>

<sup>68</sup> *Ibid.*

<sup>69</sup> One Food Company’s Foray into Open Innovation, Erickson, P.

Other multinationals in the food sector have taken the lead on open innovation. BASF, with its “customer-centric innovation”, is moving forward with a new North American nutrition and health division. Bunge uses collaboration in its new state-of-the-art culinary kitchen in Illinois, and DSM, with its Think Tank, has partnered through NineSigma with Sight and Life and the World Food Program to create safe packets of vitamins and minerals for undernourished populations.

Ingredion — a recent merger of Corn Products and National Starch — uses its now-formidable range of ingredients to partner with customers on development. Kraft Foods has a website featuring its Collaboration Kitchens, where a company with 15 major R&D centres worldwide and 3,300 food scientists, chemists and engineers is reaching out for new ideas. Leatherhead Food Research in the U.K. has started Food Launch, designed to help small and mid-sized companies get their ideas to market. Tate and Lyle are exploring open innovation through a number of arrangements, including licensing, joint venture and acquisition.

In 2009, Unilever launched an on-line portal, similar to that of General Mills, called Challenges and Wants. Although Unilever has worked with suppliers and partners for years, providing public information for projects where they seek collaboration is a new, more transparent approach for this company.

## 5.4. Innovation Process

### b. How to select an innovation model that meets your needs

All companies are subject to competition and to an environment with many other variables that can change over time. Furthermore, many projects are time-dependent, for example, in cases where being “first to market” is critical. The product-development model a company chooses must allow for and be sensitive to timing imperatives.

This observation is supported by Smith and Reinertsen,<sup>70</sup> who suggest that as techniques such as cross-functional teams and concurrent engineering become widespread, these approaches to shortening the development cycle lose their competitive edge. Decisive advantage will come from employing techniques that competitors are not using.

Their suggestions include that when choosing a product-development model, the company should be flexible about process. The correct approach can only be selected when a clear project vision exists. Managing development time versus technical risk is a decision trade-off. The authors also advise being on guard for complexity, making decisions based on economics and shortening the thinking stage. In their view the “fuzzy front-end” of a project can absorb 50 per cent of the project development cycle before development is authorized.

Innovation is not always about being revolutionary. Small adjustments to existing processes may be enough which is why using HR policies to maximize the organizational attitude to those conditions that allow innovation to thrive may sometimes be enough.

Some principles to follow in selecting an innovation model are:

- Does it allow us to measure innovation so that innovation can be rewarded? Rewarding innovation helps insure further innovation.
- Does it offer us conceptual tools that can be used in more than one situation? Is it just going to help with this one marketing task in the immediate future or can it later be leveraged in operations, finance, etc?
- Are we concerned with solely a business model change or are there technical/equipment modifications that we need to comprehend in our model?

As a company structures its innovation model it should keep in mind efficiency (which minimizes time to market), alignment (ensuring all stakeholders are working towards a common goal), communication (all stakeholders are able to be in touch with those they need to be without barriers, internally and externally) and learning (so that all areas of the company can benefit from the change.)

In summary: product development models can be very complex and their usage is subject to a host of variables. Choosing a product-development model is itself, a complex process. One size does not fit all. In the end, what is important to keep in mind is that every company has unique needs in terms of its nature and market position. Incremental innovation looks to improve processes with continual small changes. Radical innovation will change technology and business models concurrently. Semiradical innovation falls in between, with a change to only one of the business model or the technology at the same time.

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<sup>70</sup> Shortening The Product Development Cycle, Preston G. Smith and Donald G. Reinertsen, *Research Technology Management*, May-June 1992

## 5.4. Innovation Process

### c. What to consider when adapting an innovation model

The Food Industry Innovation Forum found that two of the most significant factors for success were product introductions and process changes. For firms using a strategy to support product and process innovation, the three largest factors were internal teams, suppliers and people dedicated to innovation.<sup>71</sup> It becomes apparent that human resources (internal teams, dedicated people) are critical factors to a company's successful innovation.

As with this study, the Forum study found that companies most preferred government support from R&D grants and tax credits for product and process improvements. Other forms of government support (e.g., export assistance, FedDev funding, RED) were less significant. Finally — and also consistent with this study's findings — time, money and regulations all held back food processing innovation, as did lack of the right skills and people.<sup>72</sup>

There are six areas to take into consideration as a company looks to adapt an innovation model to meet their business requirements:<sup>73</sup>

- **Access to Affordable Capital:** Small and mid-sized companies need to make investments now but such needs may be difficult to meet. Can a company draw on the necessary financial resources to make innovation a success?
- **Access to Competitively Priced Inputs:** The Canadian processing industry requires competitive access to the following inputs: dairy ingredients, sugar, potato starch, energy and packaging.
- **Market Access:** The industry requires improved access, in particular to the U.S. market. Enhanced export support better suited to the food processing industry and improved import labelling compliance is needed.
- **Regulatory Environment:** The approval process for novel food, fortification, health claims and additives must be simplified to facilitate innovation.
- **Customer Concentration:** The high level of concentration is increasing the business costs and restricting access for smaller companies.
- **Scientific Research and Experimental Design Tax Credit:** The program should better address the needs of the sector and its administration should be simplified.

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<sup>71</sup> Food Industry Innovation & Profitability - The Next Ten Years, Food Industry Innovation Forum 2011

<sup>72</sup> Ibid.

<sup>73</sup> Ibid.

## 5.4. Innovation Process

### d. How to apply and operationalize innovation

#### Value Chains and Innovation

“The strength of the team is each individual member. The strength of each member is the team.” -- Phil Jackson

“If you have an apple and I have an apple and we exchange these apples then you and I will still have each one apple. But if you have an idea and I have an idea and we exchange these ideas, than each of us will have two ideas.” --George Bernard Shaw

Value chains have the potential to be powerful mechanisms for innovation, as they bring together the combined talents and efforts of a group of businesses that have similar goals. Designed to ultimately create value for the consumer, the value chain vertically links together producers, processors, distributors, food service companies and retailers, along with supporting members such research groups and suppliers.

Creating a workable value chain is a complicated process and all members must agree on the objectives and the process to optimize collective benefit. It is best, therefore, to have a champion of the value chain to lead the effort. The formation of a value chain involves creating a business plan for the collaborators together as one business. It also entails balancing risk and reward, which could be different for each member in the chain.

The Alberta Value Chain Guidebook<sup>74</sup> suggests a three-part approach to building a value chain. The first part is to identify the opportunity. At this point it is important to map the company’s existing chain, develop a project goal, gain support of chain members and name the leader or champion of the chain. The second part entails developing a pilot plan, where the chain confirms goals, members, plans and measurements and selects a manager. The third part is to try out the pilot plan, and monitor, evaluate and change to accommodate to full scale, if the plan is feasible and desirable. Typically, value chains are most associated with adding value to commodity products to distinguish such products from others at the farm-gate level. There are many successful cases where the consumer has enjoyed a value-added product from such efforts.

#### Case study

One example is The Little Potato Company in Edmonton, Alberta. The story of this company demonstrates taking a creative idea to commercialization through the successful and innovative use of a value chain.<sup>1</sup>

Sixteen years ago, Jacob van der Schaaf wanted to purchase locally, the type of small potatoes he enjoyed from his European background. Unable to do so, he grew a one-acre test plot, sold the small produce through farmers’ markets, gained consumer feedback through restaurants and approached the first retailer — who took the entire crop. At that point there was no looking back. Van der Schaaf carefully managed relationships with seed breeders, potato producers, distributors, and both retail and food service customers. A value chain was formed with the members all working towards the same goal. The result was a premium product brought to the consumer market, often while reducing costs. The Little Potato Company has secured such large accounts as Costco, Safeway and IGA (Sobeys) with 10 branded varieties of little potatoes in bags.

The company took a standard commodity and worked closely with an ever-expanding chain, to manage all aspects of sourcing, quality control, competition and other factors. Today, the company has added a processed-potato product in the form of a microwavable side dish. It has also developed an extensive social media campaign to support its products. The Little Potato Company is truly a success story.<sup>1</sup>

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<sup>74</sup> Value Chain Guidebook: A Process for Value Chain Development

Other businesses that have successfully employed value chains share several similarities with The Little Potato Company. First, the entrepreneur is the champion for the value chain and second, the impetus for the innovation that creates the value chain most often arises from the producer of a commodity product, who wishes to add value.

Another similarity is that the value chain starts with few members. This is true for The Little Potato Company, which started out as producer, supplier, packager and distributor for its product in a farmer's market, where the family directly sold to the consumer. As time went on, the value chain grew with the infusion of financial and physical resources, and marketing and technical know-how. The need for support from government, academia, and other outside resources is greatest in the stage where the value chain is growing. There is also a greater need for organization and coordination at this stage, perhaps supplied by roadmaps.

In a mature market with large established enterprises, value chains are more complex and more difficult to develop. Often, there are competing models that better serve the existing situation. For example, large retailers like Loblaw's vertically integrate by owning their processing companies. They also buy expertise through companies that supply product for their private labels. Some companies acquire smaller companies and integrate their expertise into the larger business, thus growing through merger and acquisition. Still others have their own sourcing at the farm-gate level.

In mature markets, it is often the ingredient and equipment suppliers — frequently large companies or multinationals themselves — that supply expertise and help their customers to innovate. Larger companies have in-house technical and marketing expertise that would otherwise be sourced from chain members or outside resources. Some companies also use open innovation, which is a partnership rather than a supplier-customer relationship along the chain.

## 5.4. Innovation Process

### e. Existing resources for Canadian innovation

A number of resources are available in Canada to support innovation activities in the food processing sector. The information presented here is an overview of the some of these resources and is not intended to be all inclusive.

Innovation-supporting resources in this country fall into five main categories:

- Canada’s 12 technology centres
- Colleges and CÉGEPS that engage the food processing sector
- Universities that feature food technology programs
- Agriculture and Agri-Food Canada’s research centres
- Private-sector resources

#### Food Technology Centres

Governments in Canada have established 12 technology and innovation centres that are spread across the country (**Table 5.7**).

The 12 food technology centres have come together to form an umbrella organization, FOODTECH Canada.<sup>75</sup> FOODTECH Canada maintains a searchable database that allows clients to search across all 12 members for specific equipment, services and expertise. This database represents more than 200 scientists; 250,000 sq. ft. of laboratories, pilot plants and commercial space; and in excess of \$65 million in equipment.<sup>76</sup>

Each centre offers a wide variety of services and broad food-technology expertise. A number of the more highly specialized process capabilities include oil-seed crushing and vegetable-oil refining, UHT processing and aseptic packaging, single and twin screw extrusion, meat processing, dairy processing and fish processing. One centre (GFTC) offers the only packaging testing and evaluation service in Canada that is not part of the packaging industry.<sup>77</sup>

Training is a critical success factor for food companies in general and for SME’s in particular. The requirement to stay current on food technology issues, new technologies, regulatory changes, food safety systems, export requirements and a variety of other issues offers the technology centres an opportunity to utilize their expertise to develop and deliver training to the industry as a whole. Most of the technology centres engage in fee-for-service training to some degree. For some, such training is a major portion of their business model. Many of the technology centres also offer consulting services.

#### Colleges and CÉGEPS

Governments in Canada have invested heavily in the community college system. Community colleges have established applied research institutes that target the needs of small- and medium-sized companies. Numerous colleges are engaged in applied food research while partnering with industry clients.

Technology Centre	Location
Food Processing Development Centre	Leduc, Alberta
POS Bio-Sciences	Saskatoon, Saskatchewan
Saskatchewan Food Industry Development Centre	Saskatoon, Saskatchewan
Food Development Centre	Portage La Prairie, MB
Canadian International Grains Institute	Winnipeg, MB
Guelph Food Technology Centre	Guelph, ON
Cintech agroalimentaire	Saint-Hyacinthe, QC
Merinov	Gaspé, QC
BioFoodTech	Charlottetown, PE
Canadian Institute of Fisheries Technology	Halifax, NS
Centre for Aquaculture and Seafood Development	St. John’s, NL
Food Innovation Centre of BCC	Chilliwack, BC

Table 5.7. Food Processing Centres

<sup>75</sup> FOODTECH Canada, P.O. Box 2000, 101 Belvedere Ave., Charlottetown, PE C1A 7N8, [www.foodtechcanada.ca](http://www.foodtechcanada.ca)

<sup>76</sup> Ibid.

<sup>77</sup> Guelph Food Technology Centre, Guelph, ON, [www.gftc.ca](http://www.gftc.ca)

The applied research activities of the colleges are important for many reasons. These are discussed in detail in a report available on the ACCC website.<sup>78</sup> Summarizing these discussions in the report, *Applied Research Environmental Scan 2010-11*, leads to three important points:

- The primary mandate of the colleges is education. Graduating knowledgeable, inquisitive and well-prepared students is critically important to fulfilling that mandate. In 2010-11, 13,585 students participated in applied research at the colleges.<sup>79</sup>
- As the colleges engage in applied research, they improve both their physical and human resources. Experience and success justifies further investments by government, which leads to improved facilities, staff that is more experienced with conducting applied research and an organization with deeper industry contacts.
- The Conference Board of Canada has stated that colleges' applied research helps small- and medium-sized enterprises overcome barriers to innovation and achieve positive outcomes. It further states that applied research collaborations stimulate new activities that would not otherwise occur.<sup>80</sup>

In addition to applied research, a number of colleges offer training courses targeted at the food industry, with many of the courses related to culinology or food-preparation skills. Of interest to the food processing sector — the Institute of Food Processing Technology at Conestoga College has just commissioned a \$2.3 million pilot plant solely dedicated to hands-on training of students and food industry workers in a real-world work environment.<sup>81</sup>

The strength of applied research at Canadian colleges offers great value to small- and medium-sized companies in Canada and creates numerous opportunities for the food processing sector, which is dominated by SMEs.

## Universities

As a resource for Canadian food and beverage companies, the 10 universities in Canada with food science programs are a source of well-trained graduates. These graduates take positions in a variety of functional areas and offer superior performance that supports innovation and improved business performance. Food science majors are likely to become the product-development leaders of the future. In addition, universities are a source of research knowledge and intellectual property that companies can buy or license for use in future developments.

The researchers for this report interviewed senior managers (Assistant Dean, Department Chair) from two of the universities offering food science programs — Guelph and Laval. Their key comments include:

- Virtually all graduates of both institutions find employment in the food industry. Bachelor- and master's-level graduates often stay in the province, while doctorate-level graduates very often leave the province or the country to find a suitable position. This trend for doctorate graduates was stronger in Ontario than in Quebec.
- Short courses (one week) are offered to industry in a number of different technologies such as cheese making, ice cream, wheat flour properties, etc.
- The Food Science and Business/Economics departments at Guelph have developed a two-semester course where student teams choose a product concept and then develop both the business case and the actual product.
- The Faculty of Agriculture and Food Sciences at Laval has established the Institute of Nutraceuticals and Functional Foods (INAF). The INAF is well known and research intensive, and partners with companies large and small, domestic and international.

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<sup>78</sup> Applied Research Environmental Scan 2010-11, [http://www.accc.ca/xp/index.php/en/component/docman/doc\\_download/40-college-and-institute-applied-research--incremental-innovation-for-growth-and-prosperity](http://www.accc.ca/xp/index.php/en/component/docman/doc_download/40-college-and-institute-applied-research--incremental-innovation-for-growth-and-prosperity)

<sup>79</sup> Ibid., Page v.

<sup>80</sup> *Applied Innovation Next Steps for Colleges*, May 2011, The Conference Board of Canada, 255 Smyth Road, Ottawa, ON, K1H 8M7

<sup>81</sup> Institute of Food Processing Technology. <http://aofp.wordpress.com/2012/02/10/111/>

## Agriculture and Agri-Food Canada (AAFC)

Agriculture and Agri-food Canada (AAFC) employs more than 4,000 people, including nearly 600 scientists working at AAFC's offices in Ottawa or out of 19 Research Centres across the country. These employees support a broad mandate: "Agriculture and Agri-Food Canada (AAFC) works to ensure the Canadian agriculture and agri-food sector has the best chance to thrive in both domestic and international markets. Its mandate is to provide information, research and technology, as well as policies and programs to achieve security of the food system, health of the environment and innovation for growth."<sup>82</sup>

AAFC's Science and Innovation Strategy is built on the following strategic goals and objectives:<sup>83</sup>

- Focus on National Priorities
- Excellence in Science & Science Management
- Build Partnerships for Impact
- Extend S&I capacity to the bio-based economy
- Accelerate adoption and commercialization of science knowledge
- Enhance leadership and stewardship
- Improve decisions through science

Sixteen of the AAFC Research Centres are focused on primary agriculture, two Centres are focused on food and one Centre does both.<sup>84</sup> The Guelph Food Research Centre specializes in food safety, quality and nutrition. Its research covers all aspects of food production, as well as the potential for conventional foods to offer nutritional and therapeutic benefits. The Centre is a partner in collaborative projects with industry, farm groups and universities in many areas.

The Food Research and Development Centre in Saint-Hyacinthe, Quebec focuses on methods to preserve food and maintain quality, while maintaining safety and efficiency. Researchers are also investigating food ingredients that have health benefits beyond basic nutrition. Through its Industrial Program, the Centre in Saint-Hyacinthe leases its pilot plants to companies, in support of small-scale processing and testing needs.

The Atlantic Food and Horticulture Research Centre focuses on the horticultural needs of Atlantic Canada. It also conducts pilot-plant processing on foods and investigates issues around consumer safety.

## Private Sector Resources

To support innovation programs, food processing companies can also access private sector resources. Typically, these resources include food-ingredient companies, equipment suppliers, packaging suppliers, and small businesses that offer specialized services. These services range from customized product development and quality systems, to regulatory-approval support. Given that these service providers are for-profit organizations, their services are skewed towards the larger players in processing sector where the most business potential lies.

One ingredient supplier interviewed for this research report said their company maintains technical service laboratories and staff dedicated to assisting clients to incorporate their ingredients into the client's formulations. This service is offered exclusively to clients that are large enough that ingredient-sales volumes will allow the ingredient supplier to recover the costs of offering the technical services.

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<sup>82</sup> Natural Sciences and Engineering Research Council of Canada, Agriculture and Agri-Food Canada, [http://www.nserc-crsng.gc.ca/Students-Etudiants/PD-NP/Laboratories-Laboratoires/AAFC-AAC\\_eng.asp](http://www.nserc-crsng.gc.ca/Students-Etudiants/PD-NP/Laboratories-Laboratoires/AAFC-AAC_eng.asp)

<sup>83</sup> *Science and Innovation Strategy, Agriculture and Agri-Food Canada*. Page 4. <http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1175602657035>

<sup>84</sup> Natural Sciences and Engineering Research Council of Canada, Agriculture and Agri-Food Canada, [http://www.nserc-crsng.gc.ca/Students-Etudiants/PD-NP/Laboratories-Laboratoires/AAFC-AAC\\_eng.asp](http://www.nserc-crsng.gc.ca/Students-Etudiants/PD-NP/Laboratories-Laboratoires/AAFC-AAC_eng.asp)

Some co-packers utilize processing technologies that are sophisticated enough that they must offer potential clients assistance to adapt their recipes to the process. Protenergy Natural Foods, for example, offers this type of service to companies wishing to utilize its UHT aseptic packaging production capabilities.<sup>85</sup>

Process and packaging equipment manufacturers are another source of expertise for the food processor. An enormous array of equipment is available and the suppliers are willing to offer valuable information to potential customers to enhance their reputations and improve the probability of being chosen as a supplier. The Packaging Association of Canada has taken this approach a step further by offering training courses to the industry, as courses in this area are not offered by the colleges. A number of private laboratories in Canada offer specialized expertise. The owner of one of these facilities described his competitive advantages as specialized expertise, operational flexibility and speed.

Finally, there are a large number of consulting firms and individuals in the market that offer services to the food processing industry. These services include custom formulation, trouble shooting, quality systems and auditing, certifications and regulatory support.

### **Financial Resources for Canadian Innovation**

The food processing industry, like many other sectors of the Canadian economy, can benefit from a large number of support programs available from several levels of government. Typically, the funding available to a company depends on a number of factors, such as company size, industry sector, funded activity and geographical location. Fortunately, the Canada Business Network<sup>86</sup> maintains a database of government programs that is searchable by geographic location (province or territory), industry sector and type of funding desired.

To develop a sense of the total number of programs available to food processors, the database was searched using the filters: all provinces and territories; all six types of support (equity investments, grants, loan guarantees, loans/cash advances, tax refunds/credits and wage subsidies); and specialized food manufacturing.

The search returned 267 results. This large number of programs suggests there is a wealth of support available for food processing companies. It also suggests that a focused search is necessary to obtain a manageable number of programs for further investigation.

The database was searched a second time specifying "grants", "Nova Scotia" and "seafood product preparation and manufacturing", as the filters. This search yielded 23 results. Appendix 2 contains both the search criteria and a listing of the 23 results.

A large, all-encompassing, manual list of funding programs is not a viable tool, especially for SMEs, as the time and effort to manually search the list would be significant. It would seem more appropriate to trust the Canadian Business Network to keep its database up-to-date and search electronically, as required.

During the interview portion of this project, several interviewees mentioned three financial support programs: Industrial Research Assistance Program (IRAP), Scientific Research and Experimental Development (SR&ED) tax credits and the Canadian Agricultural Adaptation Program (CAAP), which has been delivered by the Agricultural Adaptation Council network. There were also numerous mentions of AAFC's *Growing Forward* and *Growing Forward 2*.

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<sup>85</sup> Protenergy Natural Foods Corp, Richmond Hill, ON, L4B 4R3, <http://www.protenergyfoods.com/prodform.htm>

<sup>86</sup> Canada Business Network, Find Government Grants, Loans and Financing, <http://www.canadabusiness.ca/eng/program/search/>

## Growing Forward

Agriculture and Agri-Food Canada coordinate agriculture policy in Canada by negotiating a five-year federal/provincial/territorial initiative called *Growing Forward*.<sup>87</sup> The current agreements cover the period 2008–2012 and *Growing Forward 2* is under negotiation with the provinces.

All of the *Growing Forward* agreements will address seven common program areas: agriculture regulatory action plan, business development, business risk management, environment, food safety, markets and trade, and science. They will, however, differ in the details and reflect regional requirements. The reason for mentioning *Growing Forward* is that this program lies behind some of the funding programs identified by the Canadian Business Network search.

## Industrial Research Assistance Program (IRAP)

The Industrial Research Assistance Program (IRAP) is a national program delivered by the National Research Council of Canada (NRC). Its objective is to support. IRAP participants are assigned an Industrial Technology Advisor who mentors the client through the development process. This one-on-one, individualized support is important for SMEs.

IRAP offers three important funding programs to clients:

- Digital Technology Adoption Program: up to \$100,000 grant for adoption or customization of new technology that will increase competitiveness
- Accelerated Review Process: \$50,000 grant to support software implementation, product development, market assessment and productivity improvements
- Youth Employment Program: up to \$20,000 or 50 per cent funding to support hiring a recent graduate for a one-year internship

IRAP also has a large network of business experts that they can connect to clients.

## Scientific Research & Experimental Development (SR&ED)

Scientific Research & Experimental Development (SR&ED) is a program that reduces the cost of innovation. Its intent is to encourage R&D in Canada that will lead to new, improved or technically advanced products or processes.<sup>88</sup> A Canadian-controlled private corporation can receive an investment tax credit of 35 per cent on the first \$3 million of qualified expenditures and 20 per cent on any excess. To qualify for SR&ED tax credits, a project must advance the understanding of scientific relations or technologies; address scientific or technological uncertainty; and incorporate systematic investigation by qualified personnel.

A number of stakeholders interviewed for this report said that it is becoming more difficult to receive approval for SR&ED applications. Systematic project design and record-keeping over the project duration are important criteria for securing approval.

## Canadian Agricultural Adaptation Program (CAAP)

The Canadian Agricultural Adaptation Program (CAAP) has been delivered by a network of Adaptation Councils across Canada. Every province and territory has an Adaptation Council that has a mandate to attract projects, evaluate and approve appropriate projects that meet CAAP criteria, and manage the funding. While the program focuses on primary agriculture, projects from other parts of the industry are considered, provided they show a benefit to agriculture. For example, a large industrial baker evaluating a new wastewater treatment technology received funding.

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<sup>87</sup> Agriculture and Agri-Food Canada, *Agriculture Policy Framework, Growing Forward*, <http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1200339470715&lang=eng>

<sup>88</sup> Scientific Research and Experimental Development, Canada Revenue Agency, <http://www.cra-arc.gc.ca/txcrdt/sred-rsde/bts-eng.html>

In April 2012, it was announced that the 14 regional councils will be collapsed and delivery of the program will be brought in to AAFC in Ottawa. The CAAP program remains open and is accepting projects; however, it expires in 2014 and it remains to be seen what will replace it.

## Business Networking

Business networking should not be discounted as a resource for innovation. There are many reasons for networking and many approaches to networking. Paul Yates<sup>89</sup> describes the following benefits of networking:

- On average, 70 per cent of all new business is gained through word-of-mouth and positive recommendation.
- Free consultancy: People like to help people and are willing to impart their expertise and advice to people they have gotten to know.
- Knowing who to turn to when you need help: By getting to know reliable contacts who can provide you with what you want or who can be trusted to recommend others is worth so much in terms of time and money.
- Break down barriers to success: As you develop your contacts, you find people who have experienced problems similar to yours and who can point you in the right direction for solutions.

Members of the food processing industry have enormous opportunities to network. Agriculture and Agri-Food Canada maintains a listing of Canadian Industry Associations that is organized by product category.<sup>90</sup> Many of the listings are most relevant to primary agriculture but the list does contain the following categories:

- Distributors, Manufacturers and Processors
- Grocers, Restaurants and Food Service
- Exporting and Marketing
- Food Safety and Inspection
- Research
- Other Associations and information

Entries in these categories are both national and regional. This listing provides access to good networking opportunities appropriate to the needs of an individual business.

One category that small food-business owners and managers should consider is the provincial food processor associations. These organizations offer a variety of services that are usually similar to those offered by the Alberta Food Processors Association, which are:<sup>91</sup>

- Training and Consulting
- Food Safety & Quality
- Workplace Health & Safety
- Business & Human resource Development
- Government Relations: collective voice raises profile to influence government policy on issues and positively affect regulatory, trade and funding issues
- Marketing and Events: opportunities for business development and networking

Another organization of interest to SME food processing companies is the Canadian Institute of Food Science and Technology (CIFST).<sup>92</sup> The CIFST is a national organization of 1,200 food professionals, consisting of scientists and engineers from industry, government and academia. The CIFST has an annual meeting that features scientific and industry-related papers and presentations, as well as a trade show. The regional sections typically organize two technical meetings per year that offer

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<sup>89</sup> What is networking? Paul Yates, EL2 Ltd., <http://www.business-networking-techniques.com/what-is-networking.html>

<sup>90</sup> Canadian Industry Associations, Agriculture and Agri-food Canada, <http://www.ats-sea.agr.gc.ca/pro/asso-eng.htm>

<sup>91</sup> Alberta Food Processors Association, Services, [http://www.afpa.com/page\\_services.html](http://www.afpa.com/page_services.html)

<sup>92</sup> Canadian Institute of Food Science and Technology, <http://www.cifst.ca/>

interesting scientific information as well as networking opportunities. The regions also offer a supplier table-top event, which is a very effective venue for suppliers and potential customers from the processing community to meet, interact and network.

The Excellence in Manufacturing Consortium (EMC) is another organization that offers value to food processors.<sup>93</sup> This national group has 140,000 individual members and 900 corporate manufacturing members, and conducts over 1,000 industry events annually. The EMC has a Food and Beverage Network and targets the creation of peer-to-peer networks. One of its main operating approaches is to organize Strategic Interest Group (SIG) meetings hosted locally by members, where a small group of people can discuss issues of common interest.

It is worth noting that stakeholders in many areas of the country are encouraging the networking of businesses, academia and government into clusters. One well-developed cluster is in Saint-Hyacinthe, Quebec. Located in this community are 100 food and bioproduct companies, an extensive primary agriculture sector, an AAFC research laboratory, the AAFC Food Research Program management, the University of Montreal Faculty of Veterinary Medicine, Cintech agroalimentaire, CÉGEP Saint-Hyacinthe, and a 10-million square foot business park.

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<sup>93</sup> Excellence in Manufacturing Consortium, <http://www.emccanada.org/about>

## 5.4. Innovation Process

### f. Resources for international innovation

This section is a review of selected examples from the food innovation environment in a number of international jurisdictions. It provides additional information and points of comparison to the Canadian landscape.

#### Europe

##### Innovation Challenges

In 2008, the Europe Innova Innovation Watch program published a report called *Prospective Innovation Challenges in the Food and Drink Sector*.<sup>94</sup> Key points in the report include:

The sector in Europe has a comparatively weak performance internationally, showing low productivity and growth rates, slow value-added growth and low R&D investments.

- Regulatory and legislative constraints exist, especially for SMEs.
- The food and drink industry is “low tech” as expressed by R&D expenditures.
- Many SMEs are informal innovators with a strong motivation to invest in their own businesses.
- Many SMEs hold an opportunistic innovation strategy.
- The challenge is to redirect more SMEs towards a business model centred on the value of technical change and the search for new products.
- Policy-makers should focus on improving in-house capabilities of the workforce rather than focusing on R&D activity to increase innovation activity among SMEs.
- Food and drink companies employ fewer workers with higher education, as compared to other industries.
- A prospective challenge for the sector is difficulty in attracting and hiring qualified employees, and in filling vacancies in R&D departments.

Many of these descriptions would also apply in the Canadian context.

#### Clusters

Over the last several decades, a large number of cluster organizations have been formed throughout Europe. A cluster is a public-private organization set up in a geographical region to improve the growth and competitiveness of its members. Typically, clusters consist of businesses in a particular sector, academia, government, and research organizations with expertise in the technologies that support the sector.

The European Cluster Organization Directory<sup>95</sup> contains information on over 1,300 cluster organizations across 220 regions in Europe. The clusters are indexed by more than 141 industry categories, as well as by country. The Food/General food category lists 45 food clusters in Europe. Clusters are also indexed by country.

Food Valley in the Netherlands is a very good example of a food cluster.<sup>96</sup> It links knowledge, entrepreneurship and innovation. Wageningen University and Research Centre is at the core of Food Valley and is joined by seven other educational institutions, including the University of Arnhem and Nijmegen. Nizo Food Research, a private food research centre, is also part of this cluster, as are 117 food companies including Avebe, Heinz, Cargill, Bunge, Danone, Silliker, Suiker and many smaller businesses.

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<sup>94</sup> Prospective Innovation Challenges In the Food and Drink Sector, <http://archive.europe-innova.eu/index.jsp?type=page&previousContentId=9741&cid=9946&lg=EN>

<sup>95</sup> European Cluster Organization Directory, [http://www.europe-innova.eu/c/document\\_library/get\\_file?folderId=148901&name=DLFE-9316.pdf](http://www.europe-innova.eu/c/document_library/get_file?folderId=148901&name=DLFE-9316.pdf)

<sup>96</sup> Food Valley, <http://www.foodvalley.nl/default.aspx>

The Food Valley Knowledge Portal offers companies the opportunity to work directly with students, through a system of direct matches among entrepreneurs, students and researchers. Entrepreneurs can put a question to the Portal; Portal consultants then articulate the question for presentation to the educational institutions. The entrepreneur receives an offer from the university and if agreeable, a contract is prepared and the project begins. When completed, the result of the project is delivered to the customer and evaluated.

The food sector is the largest manufacturing sector in Europe. It employs 4.3 million people and has a very strong regional dimension and impact.<sup>97</sup> There is a desire to further strengthen the sector by developing an EU network of regions. Cooperating, ambitious food regions can learn from each other, strengthen the EU food research area and increase the competitive advantage of the EU by building interregional projects based on their regional strengths.

### **Independent Laboratories**

Many jurisdictions will have independent food research laboratories of varying sizes. Europe certainly does and three are particularly well known

NIZO food research BV<sup>98</sup> is an independent food research company located in the Food Valley area of the Netherlands. NIZO has 200 employees, a pilot plant, research labs and industrial kitchens. It offers expertise in many food disciplines, including probiotics, fats and oils functionality, protein functionality, fermentation, taste and texture.

Campden BRI<sup>99</sup> is the UK's largest independent, membership-based organization carrying out research and development for the food and drink industry. Membership is about 2,100 companies, many from countries other than the UK, and services include technical services of all types, R&D, knowledge and networking.

Leatherhead Food Research<sup>100</sup> was founded in 1919 and is a membership-based organization. Leatherhead has 1,500 member food and beverage companies worldwide that range from multinationals to SMEs. Services include regulatory advisory services on a global level, food innovation, nutrition R&D, food safety and sensory.

### **United States**

Nine Food Innovation Centers in the U.S. are based at universities.<sup>101</sup> They are:

- The Northeast Center for Food Innovation, Cornell
- Food Industries Center, Ohio State
- Center for Advanced Food Technology, Rutgers
- Institute of Food Science and Engineering, Arkansas
- Institute of Food Science and Engineering, Texas A&M
- Oklahoma Food and Agricultural Products Research and Technology Center
- Center for Crops Utilization, Iowa State
- Food Processing Center, Nebraska
- Food Innovation Center, Oregon State

These centers offer a range of services to food entrepreneurs that typically include product development and pilot plant services, analytical support, and in some cases, business mentoring and market development support.

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<sup>97</sup> Towards a more complete EU network of regions with ambitions in food, Food-cluster initiative, [http://www.foodclusterinitiative.eu/uploads/files/FCI\\_upd-brochure\\_FOOD-CLUSTER.pdf](http://www.foodclusterinitiative.eu/uploads/files/FCI_upd-brochure_FOOD-CLUSTER.pdf)

<sup>98</sup> NIZO food research BV, <http://www.nizo.com/contact-us/contact-details/>

<sup>99</sup> Campden BRI, Overview, <http://www.campden.co.uk/campdenbri/overview.htm>

<sup>100</sup> Leatherhead Food Research, About Us, <http://www.leatherheadfood.com/about-us>

<sup>101</sup> Proposal for the establishment of The Food Product Innovation and Commercialization Center, <http://www.curriculumsystems.uga.edu/UCC/FoodProdInnovCommCtr.pdf>

## Institute of Food Technologists (IFT)

Another U.S. resource that is available to food entrepreneurs is the Institute of Food Technologists (IFT). This organization provides a wealth of technical information on food, as well as training and networking support to members.

## Australia

The scale of Australia's food processing industry is similar to that of Canada and Europe; it is a major component of the manufacturing sector and one of the largest employers.

The food and beverage, grocery and fresh produce industry is Australia's largest manufacturing sector and represents 26 per cent of total manufacturing.<sup>102</sup> The industry employed 312,900 people or 3 per cent of the workforce in 2010-11. In 2008-2009, turnover was A\$86.5 billion and the industry invested A\$368 million in R&D.

According to the Australian Food and Grocery Council (AFGC), the industry is dealing with a number of pressures. These are similar to the issues food processors are facing in Canada and Europe:

- Rising costs for wages, water and energy
- Carbon tax
- High global commodity prices
- Strong Australian dollar making imports cheaper
- Intense supermarket discounting and private-label growth — both impacting manufacturers' margins

Australia also has public-sector programs to support SMEs. The Australian government agency responsible for research and development is the Commonwealth Scientific and Industrial Research Organization (CSIRO). CSIRO has an SME engagement program<sup>103</sup> called the Small and Medium Enterprise Engagement Centre (SME-EC). The SME-EC is a team of business and technically qualified managers that work across CSIRO. They also work with partner organizations in government and the private sector to help SMEs effectively navigate and engage with CSIRO and others in the National Innovation System.

The key objectives of SME-EC are to:

- Help SME's connect with research and development to grow their businesses
- Help SMEs to define their technical issues and identify the best way to deal with them
- Facilitate access to CSIRO and others in the National Innovation System

SME-EC does not charge smaller companies for services related to discussing, evaluating and determining how to address technical issues.

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<sup>102</sup> Australia Food and Grocery Council, <http://www.afgc.org.au/our-industry/facts-stats.html>

<sup>103</sup> Small and Medium Enterprise Engagement Centre, Commonwealth Scientific and Industrial Research Organization, <http://www.csiro.au/en/Portals/Partner/SMEEngagement.aspx>

## **VI. Appendix**

1. Tools for Learning and Assessment
2. Agriculture and Agri-Food Canada's Research Laboratories
3. Canada Business Network Search Government Grants
4. Bibliography

## 6.1. Tools for Learning and Assessment

A range of resources are available to assist small companies. Many of these involve developing strategic or innovation plans and conducting business and/or innovation assessments.

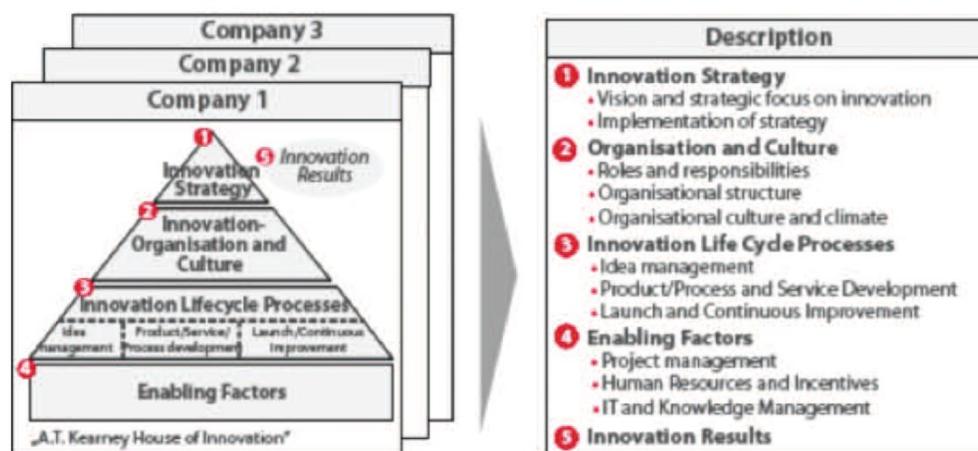
Included are examples of learning materials currently being used to support SMEs — focusing on potential toolbox components that are already targeted at small food processors or could be adapted to them.

Secondary research and interviews conducted for this report have shown that the main features of materials and programs that effectively support SMEs are: one-on-one, flexible, customizable learning opportunities, and materials that are efficient in terms of both time and money.

IMP<sup>3</sup>rove is a website-based tool that focuses on innovation management in companies. It is designed to support growth through innovation, especially in SMEs. IMP<sup>3</sup>rove operates on a four pillar strategy: assessment, training, networking and research.<sup>104</sup>

The assessment tool allows SMEs to benchmark their innovation management performance against companies from the same industry, sector, country, size and age. The structure of the tool is based on the A.T. Kearney “House of Innovation” model. The assessment tool is available to companies with five to several hundred employees, which have been in business at least two years. There is no charge for the assessment and it appears that international companies can access the tool.

**Figure 6.1** depicts the A.T. Kearney House of Innovation Model.



Source: IMP<sup>3</sup>rove Core Team, 2010 ; [www.improve-innovation.eu](http://www.improve-innovation.eu); IMP<sup>3</sup>rove is a registered trademark

A.T. Kearney House of Innovation Model.

## The Business Model Canvas<sup>105</sup> (109)

The Business Model Canvas is described as a strategic management and entrepreneurial tool that displays a company’s business model. It allows the user to describe, design, challenge and invent new business models — all on a single-page template. The canvas contains spaces for 9 business model components (**Figure 6.2**).

<sup>104</sup> SME Self-Assessment Tools, Council of European Bioregions, <http://www.cebr.net/sme-self-assessment-tools>

<sup>105</sup> The Business Model Canvas, <http://www.businessmodelgeneration.com/canvas>

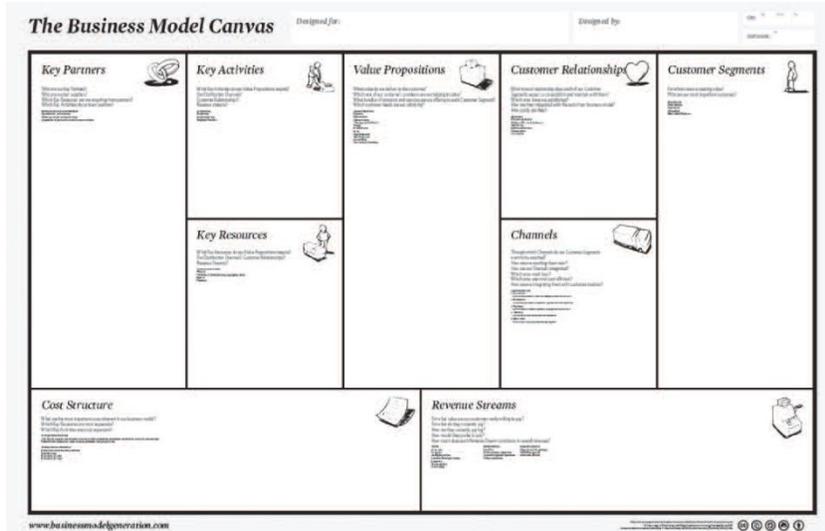


Figure 6.3. Business Model Canvas

The user fills in the information required for each box:

- Customer Segments: All the people and organizations for which the company creates value
- Value Propositions: Bundles of products and services for each segment that create value for the customer
- Channels: All the touch points and interactions with customers while delivering value
- Customer Relationships: Types of relationships established with customers
- Revenue Streams: Pricing models for capturing value
- Key Resources: Infrastructure required to create, deliver and capture value — identify key assets
- Key Activities: Things the business must perform well
- Key Partners: Who can help leverage the business as all necessary resources will not be internal
- Cost Structure: Once the infrastructure is understood, the business has a good idea of its cost structure

Workshops and training courses are available for those who choose to use this model.

The Business Model Canvas is used by the Processing Industry Business Development Branch of the Alberta Ministry of Agriculture and Rural Development in its work with entrepreneurial food processing businesses.

### ProGrid “My Advisor Business Plan” Evaluation<sup>106</sup>

ProGrid is an Edmonton, Alberta based company that has developed business decision-making software for a number of applications. The Business Plan Evaluation version has several attributes relevant to this report. It is useful as a tool to screen alternative business plans and as a tool to identify a business plan’s strengths and weaknesses.

“My Advisor Business Plan” is the standard version and uses 12 fixed evaluation criteria to evaluate a business plan. These criteria are grouped into three areas — Business Elements, Implementation and Results — each of which contains four evaluation criteria. Sample evaluation forms and an evaluation report are downloadable from the ProGrid website.<sup>107</sup>

In the evaluation process, the business-plan owner does a self-evaluation on their own business plan and up to eight external advisors will evaluate the plan as well. The software evaluates all the input

<sup>106</sup> ProGrid, My Advisor Business Plan Evaluation, <http://www.progrid.info/software/myadvisor%E2%84%A2-business-plan-evaluation>

<sup>107</sup> Ibid.

and compares the results of the self-evaluation against those of the external evaluators; areas of strength and areas for improvement are thus identified.

The Advisor SL version of the software allows for modification and optimization of the decision criteria and for up to 25 external evaluators. This version is intended for organizations that do a large volume of decision making, such as granting agencies.

If well-qualified evaluators are used, their input will be very valuable. It also means that all business plans are treated individually; there are no database comparisons as is the case with IMP<sup>3</sup>rove. However, the need for outside evaluators also makes the system more cumbersome to use.

### **PEI Bioalliance Cluster<sup>108</sup>**

The PEI Bioalliance is a cluster on Prince Edward Island, composed of leaders from the bioproducts business sector, research, government and academia. The PEI bioscience industry accounts for over \$90 million in sales and employs 1,000 people.

The \$30-million Biocommons Research Park is under construction and will offer 60,000 square feet of space that will include:

- An accelerator centre
- Incubation laboratory space
- Commercialization services
- Scale-up laboratories

Human resources have been identified as a priority for the cluster, due to strong growth in the bioproducts sector, both in PEI and nationally. Attracting and retaining skilled staff is more challenging than in other locations in Canada. A strategic HR study issued in 2010<sup>109</sup> identified the issues and made several recommendations:

- Support recruitment and retention of quality people.
- Provide HR support to bioscience companies.
- Encourage skills development in bioscience.

The study led to development of a toolkit, which is available on the cluster website.<sup>110</sup>

The PEI BioAlliance has an HR Specialist to administer the toolkit and to offer guidance and support to companies. The toolkit reflects the fact that the biosciences sector is heavily populated by small companies that often lack formal human resources expertise, and the cluster is providing background and support in this important area.

### **Institute of Food Technologists (IFT)**

The Institute of Food Technologists (IFT) is a professional organization that was founded in 1939 to promote communications among professionals. Since then, it has grown into an organization with over 18,000 members from over 100 countries.<sup>111</sup>

With respect to human resources and innovation, the IFT has a substantial section of its website dedicated to its Knowledge Center, which provides access to scientific journals and books, online courses, scientific papers, and learning and networking events.

The IFT offers online courses in the areas of: Food; Health and Nutrition; Food Safety and Defence; Product Development and Ingredient Innovations; and Public policy and Regulations. It also provides

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<sup>108</sup> PEI Bioalliance Cluster, <http://www.peibioalliance.com/index.php>

<sup>109</sup> Becoming a Somewhere: Developing, Attracting and Retaining High Quality Staff, <http://www.peibioalliance.com/pdf/BioScienceHumanResourceStrategy.pdf>

<sup>110</sup> PEI BioAlliance HR Tool Kit, <http://www.peibioalliance.com/hr-tool-kit/>

<sup>111</sup> Institute of Food Technologists, <http://www.ift.org/>

live and on-demand webcasts on topics that include: food chemistry, food engineering, health and nutrition, microbiology, processing and packaging. In 2011, IFT delivered 15 live webcasts. In a different vein, the organization offers an eMentoring program that encourages connections between emerging and seasoned professionals. The objective is to encourage long-term, multi-generational professional relationships.

## 6.2. Agriculture and Agri-Food Canada's Research Laboratories<sup>112</sup>

### British Columbia

- Pacific Agri-Food Research Centre (Agassiz and Summerland, British Columbia)

### Alberta

- Lacombe Research Centre (Lacombe, Alberta)
- Lethbridge Research Centre (Lethbridge, Alberta)

### Saskatchewan

- Saskatoon Research Centre (Saskatoon, Saskatchewan)
- Semiarid Prairie Agricultural Research Centre (Swift Current, Saskatchewan)

### Manitoba

- Brandon Research Centre (Brandon, Manitoba)
- Cereal Research Centre (Winnipeg, Manitoba)

### Ontario

- Southern Crop Protection and Food Research Centre (London, Ontario)
- Eastern Cereal and Oilseed Research Centre (Ottawa, Ontario)
- Guelph Food Research Centre (Guelph, Ontario)
- Greenhouse and Processing Crops Research Centre (Harrow, Ontario)

### Quebec

- Dairy and Swine Research and Development Centre (Sherbrooke (Lennoxville Sector), Quebec)
- Food Research and Development Centre (St. Hyacinthe, Quebec)
- Soils and Crops Research and Development Centre (Quebec, Quebec)
- Horticulture Research and Development Centre (Saint-Jean-sur-Richelieu, Quebec)
- New Brunswick
- Potato Research Centre (Fredericton, New Brunswick)
- Prince Edward Island
- Crops and Livestock Research Centre (Charlottetown, Prince Edward Island)
- Nova Scotia
- Atlantic Food and Horticulture Research Centre (Kentville, Nova Scotia)

### Newfoundland and Labrador

- Atlantic Cool Climate Crop Research Centre (St. John's, Newfoundland and Labrador)

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<sup>112</sup>Agriculture and Agri-Food Canada, Natural Sciences and Engineering Research Council of Canada, [http://www.nserc-crsng.gc.ca/Students-Etudiants/PD-NP/Laboratories-Laboratoires/AAFC-AAC\\_eng.asp](http://www.nserc-crsng.gc.ca/Students-Etudiants/PD-NP/Laboratories-Laboratoires/AAFC-AAC_eng.asp)

### 6.3. Canada Business Network Search Government Grants<sup>113</sup>

Find government grants, loans and financing

Top of Form

Type of Financing (optional)

- Equity investments
- Grants, contributions and financial assistance
- Loan guarantees
- Loans and cash advances
- Tax refunds and credits
- Wage subsidies

Your Province/Territory (optional)

British Columbia

Type of Business (optional)

Lookup your industry by keyword and select the best match.

Seafood product preparation and manufac

Search

Search Results

23 Results

[Industrial Research Assistance Program – Digital Technology Adoption Pilot Program](#)

Find out how you can add digital technologies to your business operations to increase productivity.

[Value-Added Manufacturing Program](#)

APPLIES TO: Nova Scotia

You could receive funding of up to \$300,000 for your diverted-waste innovation.

[Productivity and Innovation Voucher Program](#)

APPLIES TO: Nova Scotia

Get free help from a Nova Scotia university or college to make your business more productive and innovative.

[CEED – SEED Capital Loan Program](#)

APPLIES TO: Nova Scotia

You get financing of up to \$20,000 to start, expand or modernize your urban business.

[Commercial Solar Heating Rebate](#)

APPLIES TO: Nova Scotia

Apply for a 15% rebate on the cost of an installed solar air and/or water heating system for your business.

[Youth Employment Program](#)

You could obtain financial assistance to hire a skilled post-secondary graduate to work on your innovative project.

[Canada Summer Jobs](#)

If you hire students for the summer, this subsidy could help you cover 50% of their wages.

<sup>113</sup> Canada Business Network, Find Government Grants, Loans and Financing, <http://www.canadabusiness.ca/eng/program/search/>

[Co-operative Development Initiative — Innovative Co-op Projects](#)

Are you interested in testing the co-operative model in innovative ways? If so, your project may qualify to receive up to \$75,000 per year until 2013.

[Opportunities Fund for Persons with Disabilities](#)

If you are a person with disabilities who wants to start a business or if you are an employer who would like to hire someone with a disability, you could qualify for funds.

[The LEAN + Energy Efficiency and Environment Program](#)

APPLIES TO: Nova Scotia

Apply for funding to hire a qualified productivity and energy efficiency consultant for your manufacturing or export business.

[Translation Assistance Program](#)

APPLIES TO: New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador

You could get up to \$5,000 to translate your promotional material into French or English.

[Job Creation Partnerships](#)

APPLIES TO: Nova Scotia

You may be eligible for funding to hire unemployed workers.

[Labour Market Partnerships](#)

APPLIES TO: Nova Scotia

You could be eligible to receive funding to help with labour force issues and human resources planning.

[TEAM Work Opportunity Fund](#)

APPLIES TO: Nova Scotia

If you have a self-identified disability, you could access funding to help you become an entrepreneur.

[Research and Development Program \(Waste Diversion\)](#)

APPLIES TO: Nova Scotia

Receive research funding of up to \$75,000 for your solid waste diversion idea.

[Go-Ahead Program for exporters](#)

APPLIES TO: Nova Scotia

You could get help covering the costs of follow-up visits to prospective markets found through provincial government trade missions, shows or conferences.

[Canadian Agricultural Adaptation Program](#)

As a Canadian farmer or processor, you could receive funding for projects that solve problems other farmers face or that help them grow or market their products.

[Enterprise Cape Breton Corporation](#)

APPLIES TO: Nova Scotia

If you live in the Cape Breton or Mulgrave areas, you could get money to help you start or grow your business or to upgrade your website.

[Nova Scotia Business Development Program](#)

APPLIES TO: Nova Scotia

You could qualify for a government rebate to help vitalize your start-up or existing business.

[ExportAbility Program](#)

APPLIES TO: Nova Scotia

Apply for funding to increase your competitive know-how in the global marketplace.

[Export Prospector Program](#)

APPLIES TO: Nova Scotia

Benefit from the core advantages of a trade mission designed specifically for your business.

[Sustainable Development Technology Fund](#)

Do you need money to develop and test a new energy technology? You could qualify for funding to create clean technology products that fight climate change.

[Aboriginal Business Canada](#)

Apply for financing to start or grow your Aboriginal business.

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