

PROJECT 6b:
INNOVATION INSIGHTS

**Talent, Skills and People:
Enabling Innovation
in Food Processing**

A DISCUSSION PAPER



May 2014

About the CAPI Processed Food Research Program

Food and beverage processing is one of the country's largest manufacturing sectors and an essential channel for Canadian agricultural products. Companies are succeeding yet the sector has been facing challenges, including record trade deficits in secondary processing. Working closely with a variety of partners, CAPI's research is focused on better understanding the issues and opportunities facing this sector and their implications for policy and strategy, and to generate a dialogue on ways to support the sector's future growth and competitiveness.

Project 6b: Talent, Skills and People: Enabling Innovation in Food Processing: One of the issues facing the food manufacturing sector has to do with labour, skills and talent. There is considerable complexity around addressing these matters and they are not necessarily unique to food manufacturing. Given that food manufacturing is the largest manufacturing sector in Canada by employment, we want to ensure that processors have access to the labour and highly-skilled people they need to remain viable, innovative and competitive.

PHASE 1 Diagnosis	PHASE 2 Inspiring practices	PHASE 3 Competitive advantage
1a. Diagnosing the trade deficit 1b. Reasons for the trade deficit 2. Explaining the trade deficit 3a. Food manufacturing performance 3b. Plant openings, closings & investments	4a. Case studies on company success 4b. Cross-case study analysis 5. Consumers and markets 6a. Capital investment 6b. Talent, skills and people 6c. Innovation and off-grade food	7. Conclusions 8. Implications for policy & strategy 9. Dialogues on outcomes

All completed projects, along with supporting material and data, can be found online at www.capi-icpa.ca.



Telephone: 613-232-8008
 or toll-free 1-866-534-7593

www.capi-icpa.ca
info@capi-icpa.ca

David McInnes, President & CEO: mcinnesd@capi-icpa.ca
 Daniel Yeon, Vice-President, Operations: yeond@capi-icpa.ca

Core funding provided by Agriculture & Agri-Food Canada. A complete list of supporters and contributors is available on our website: www.capi-icpa.ca



How can we enable food processors to get access to or hire the labour and the skilled people they need to help companies innovate, compete and grow?

One of the issues facing the food manufacturing sector is the management of labour, skills and talent. There is considerable complexity around addressing these matters and they are not necessarily unique to food manufacturing. Given that food manufacturing is the largest manufacturing sector in Canada by employment, we want to ensure that processors have access to the labour and highly skilled people they need to remain viable and competitive. There are three aspects to the employment issue: strengthened leadership, access to the right labour pool, and access to specialized employees to help companies innovate.

This framing paper from the Canadian Agri-Food Policy Institute (CAPI) is part of a comprehensive research program on the country's processed food sector. CAPI's work focuses on better understanding the issues and opportunities facing this sector and their implications for policy and strategy, and generating a dialogue on ways to support the sector's future growth and competitiveness.

The need to change¹

- Owners and investors require world-class food executive talent.
- Companies want or expect to have access to employment-ready people.
- Companies have some difficulties finding employees and highly skilled people in specialized fields (e.g., scientists) and in a timely fashion.
- The labour supply issue is particularly acute in western Canada, given provincial labour market dynamics.
- Companies may not be fully utilizing the talent advantage available in Canada. The higher-skilled and diverse immigrant community and Canada's ethnic make-up could be catalysts for new food innovations.
- The nature of work is changing with the increased use of automation and robotics. Fewer employees are needed on the plant floor and on processing lines, yet the demand for skilled labour has increased due to the higher levels of skills required to operate the machinery.

"With increased competition globally in the food processing industry and increasing skill sets among competitor nations, particularly those which would not have competed in high-end/high-technology goods, the availability of talented labour (management, professional, technological, as well as manufacturing workforce) becomes as critical or more so, than competing at low wage levels. [...]"

For those food processing firms with either the scale of production, or competing in higher technology goods, the capacity to adapt and invest more successfully in improved human resource policies and programs, so as to attract and sustain a capable work force, may become one of the key competitive conditions for this industry."

George Morris Centre

- Graduates often do not necessarily think of food processing as an employment opportunity.
- The nature of jobs and skills in the marketplace is changing and educators cannot remain current enough with the specified skills/employment needs food processors require.
- There are many programs and initiatives to fund skills training and learning and to support innovation yet the challenge of being more innovative and competitive is seemingly perpetual.

Context

Efforts are underway to address employment challenges. Government programs fund skills development and placements, and industry, the innovation community and educators already work together in an attempt to match supply (graduates) with demand (marketplace employment needs). Additionally, organizations exist to create connections among companies, educators and government programs. Nonetheless, challenges remain.

While many factors influence the competitiveness of the sector, employment and labour market challenges run deep. Further research would be useful to learn about how other jurisdictions are responding to similar matters. However, there is also a pressing need to respond and act sooner than later so companies can better leverage programming, or initiatives can be tailored, to meet their needs within an ever-changing marketplace.

The recruitment and retention of skilled labour has been an issue within the food processing industry for many years, not unlike constraints felt in other sectors. But it is not just processing labour that is required. Canada lags significantly behind other developed countries in undertaking innovative new product development, according to a report by The Food Processing HR Council (FPHRC).² Increased competitiveness in the industry relies on skills needed to innovate and develop new products that will drive growth. How can we enable innovation by matching skilled people with food processors? Different approaches may be required to respond to recruitment and retention requirements of employers and connect with potential workers.

“Leaders of Canadian food companies interviewed were essentially unanimous in their concern over the supply of labour for their companies in the future. Of particular note was the competition for labour with the high-paying energy sector in Western Canada. Companies support the use of temporary foreign worker programs to fill short-term needs, particularly in the Prairies. However, as a longer-term solution they would like the opportunity to convert more temporary foreign workers to longer-term status. Companies across Canada are concerned about meeting the growing need for skilled labour. Greater use of apprenticeships and training programs might help companies address this growing challenge. These programs would be most effective if they are created by government and industry working together.”

Ivey Business School

Action

One organization, Mitacs, is positioned to foster innovation by matching skilled people with food processors. Mitacs' mandate is to be demand-driven to work with industry to create research and training development activities. As one benchmark measure, last year Mitacs' co-funded projects directed to the food sector totalled approximately 2.2% of its portfolio (an investment of approximately \$600,000),³ which is significantly less than the size of the agri-food sector's total contribution to the national GDP (at 8%). The appendix presents some examples of Mitacs-funded initiatives (along with industry support) in the food segment.

"Not unlike other manufacturing sectors, processors are finding themselves in a growing employee deficit scenario. Jobs are available, however trained or experienced individuals are in shortage."

Alliance of Ontario Food Processors

Finding new ways to support the food processing sector, such as helping firms attract the talent they need to innovate, has merit given the sector's role as a major employer in the Canadian economy. Making the share of financial support given to the sector proportionate to its size also deserves consideration and would be a concrete step toward addressing some of the talent issues facing the sector over the short and medium term.

Establishing an advisory group of innovation influencers and advocates for change in the sector (such as companies with innovative track records, key food processing associations and universities, other educators and researchers, and innovation-dedicated centres) would assist in these efforts. This body could help design new initiatives that support improving innovation, including strengthening executive talent, improving productivity, accessing new markets, improving access to highly skilled people and assisting in better target programming and support (both funds and network) to solve research and innovation challenges more effectively by working with sector representatives.

"63% of employers consider hiring new employees an HR challenge."

"59% of employers indicated that there is a lack of candidates with proper training."

"One in every four workers are immigrants. The food and beverage processing industry has more immigrant workers than any other industry in Canada."

Food Processing HR Council

The initiative noted above is but one approach. Through dialogue, and stronger links between food processors and HR specialists, researchers across Canada may identify additional ways to collaborate and improve the culture of innovation in the sector.

Summary

This paper is intended to provide a high-level framing of a complex issue. There are multiple labour, skills and talent issues to address. This paper focuses on adding momentum to the dialogue that is now underway on how this matter can be addressed in concrete terms and on spurring champions to take this matter forward with on-the-ground solutions.

Appendix

Food Industry Examples of Mitacs Research Projects⁴

Plastics packaging materials with antifungal/microbial properties

Partner: Imaflex/Faspac Plastiks/Boulangerie St-Méthode

Program: Mitacs Accelerate

University: McGill University

Plastic packaging materials are needed in many food products to prevent spoilage and extend shelf life. The project focused on developing plastic packaging materials for bread that prevent bacterial and fungal growth on the inside surface of the plastic packaging without affecting taste or texture. It required the use of natural preservatives, no compromises on the optical and mechanical properties of the packaging film, and no negative environmental impact upon disposal.

Lab-on-a-chip for detection of Listeria in food samples

Program: Mitacs Globalink

University: University of Alberta

Food safety is of paramount importance to Canada. The project focused on creating a device that detects Listeria bacteria in ready-to-eat meats, with testing done within just a few hours. The device integrates microfluidics and a biosensor on a single platform, commonly referred to as a Lab-on-a-Chip (LOC). The project involves design, analysis and fabrication of the LOC, to provide timely early warning to any possible Listeria outbreaks in meat products.



Mapping changes to starch in products during baking in a commercial oven

Partner: Kraft Canada Inc.

Program: Mitacs Accelerate

University: University of Guelph

The project investigated the chemical changes to products, specifically starch, during baking on a commercial conveyor oven. The study brings better understanding of structure, texture, sensory attributes and shelf life of the food product. The research could also lead to more energy-efficient processes in commercial facilities. Knowledge generated from the study will help determine key parameters to develop new products using efficient technologies.

New business development: Food service applications for earthcycle packaging

Partner: Earthcycle Packaging

Program: Mitacs Accelerate

University: University of British Columbia

The research examined the market potential for a new product line of biodegradable plates by Earthcycle Packaging for the airlines, hospitals, restaurants and other institutions. The internship focus was on dissecting these markets to establish metrics for competing products. The competitive landscape was also analyzed to evaluate the current and potential market for these applications and any identified future possible directions.

Development of a new technique to predict functionality of wheat flour blends for baked products

Partner: Kraft Canada Inc.

Program: Mitacs Accelerate

University: University of Guelph

The project addresses a key quality issue common in most baking operations. Typically different wheat types are blended to achieve a desired protein content. However, the quality of the protein in the blends is not always similar. Researchers have developed a new technique that has the potential to predict flour functionality by using a high-shear mixing technique: the gluten peak tester. The project studied functionality of flour blends through baking testing to assess their predictive aspects.



Characterizing the sensory properties of whole wheat pasta for use in macaroni and cheese

Partner: Kraft Canada Inc.

Program: Mitacs Accelerate

University: University of Guelph

There are growing trends of companies producing foods made from whole wheat because of their abundance in B vitamins, dietary fibre, and essential fatty acids. They also possess polyphenols that reportedly have a preventative effect against cancer and cardiovascular diseases. A drawback to using whole wheat in breads and pastas is a change in appearance, flavour, and texture, which may decrease consumer acceptability. This research is crucial for food companies wishing to reformulate products as they must ensure that the use of whole wheat in their formulations does not significantly alter the sensory properties of their product. The research looked at the sensory properties of macaroni in Kraft Dinner made from a variety of wheat. A panel established the sensory attributes of the whole wheat pasta, which was then tested with a consumer panel.



Sobeys supply chain sustainability

Partner: Sobeys Inc.

Program: Mitacs Accelerate

University: Dalhousie University

Sobeys has made significant progress in reducing the environmental impacts of its operations through reductions in greenhouse gas emissions and waste production. The corporation is now ready to expand its efforts to the supply chain, where the vast majority of environmental impacts originate. The research examined ways that Sobeys can further its progress in sustainability measures by shifting the focus from direct retail operations to the product supply chain, in order to increase environmental and social sustainability of Sobeys product sourcing.

The research asked: As a large food retailer concerned with the global impacts of its operations, what are the areas of the product supply chains with the greatest environmental impacts and where is there potential for improved sustainability? The research aimed to develop employee engagement strategies to educate about best practices for supply chain sustainability.



Modeling microwave heating of food

Partner: NuWave Research Inc.

Program: Mitacs Accelerate

University: Simon Fraser University

Small food pieces have different properties when absorbing microwave energy. This affects the design of antennas used to heat the food. The research looked to measure dielectric properties of different food types and sizes and then do computer modeling to determine the optimum design of antennas which will deliver the microwaves to the food. With larger pieces, the food conducts the heat throughout averaging out the hot and cold temperatures. The challenge is to achieve even heating in a group of pieces. The research aimed to improve the energy efficiency by optimizing the absorption of the microwaves.

A novel solvent-free approach for production of bean protein fractions

Partner: Advanced CERT Canada

Program: Mitacs Accelerate

University: University of Waterloo

The research examined how to increase protein-rich flour from beans without using solvents or chemicals, an approach that significantly reduces the capital and operating costs. It preserves the bio-functionality of the protein, and averts the likelihood of toxic microbial contamination common in currently used wet processes. This proposal aims to build a previous proof-of-concept project, funded by Mitacs Accelerate. Motivated by the promising preliminary results, the industrial partner, Advanced CERT Canada, is willing to conduct process optimization, fine-tuning, and scale-up studies to move towards designing and evaluating a pilot scale (dry) protein extraction plant.

Tracking seafood from fish harvesters to consumers

Partner: Ecotrust Canada

Program: Mitacs Accelerate

University: Simon Fraser University

From oceans to supermarkets, seafood products are tracked from the time they are caught, all the way to the supermarket. But now, as a consumer, you can even send a note directly to the fisherman that caught your fish. Through research with Mitacs Accelerate and Simon Fraser University, Ecotrust Canada has launched the Thisfish website. It allows customers to trace products back to the fisherman who caught it, view photos of the boat and crew and learn about the gear used and the fishing area where the catch took place. The website is being used by Thrifty Foods and Sobeys to increase awareness about seafood products.



Growing a brighter future

Partner: GE Lighting Solutions

Program: Mitacs Accelerate

University: McGill University

Commercial greenhouses provide significant benefits over traditional outdoor crop growing, particularly in cool climate countries such as Canada. But one of the biggest costs greenhouse operators face is the energy required to run their lighting systems. GE Lighting Solutions, based in Lachine, Qué., sought to develop a new range of LED lighting applications for the greenhouse industry that not only cuts down on energy use but also increases plant growth and yields. Through Mitacs-Accelerate and researchers from McGill University, GE developed LED arrays with specific light wavelengths that help maximize plant growth and energy efficiency. The lights are now being trialed for commercialization.



Endnotes

1. Presenting the case for change and defining our options going forward are based on a series of dialogues and significant input from the Food Processing HR Council as well as quotations from "Who is Processing Your Food", Report Highlights, 2011 Food & Beverage Labour Market Information Survey, Food Processing HR Council: (www.fphrc.com/uploads/lmi/whos_processing_report_e_web.pdf).

The George Morris Centre and the Ivey Business School are acknowledged for their views on this labour/talent issue in their respective reports in partnership with CAPI on the competitiveness of the processed food sector; quotations are sourced from: Drivers of Canadian Food Processing Competitiveness: Macro Factors and Micro Decisions (GMC), and The Changing Face of Food Manufacturing in Canada: An Analysis of Plant Closings, Openings and Investments (Ivey).

The Alliance of Ontario Food Processors elaborated upon the human resources issues and presented ideas to move forward in their report, Ontario's Food and Beverage Processing Industry Strategy: The NEW Engine of Ontario's Economy, 2013.

CAPI also acknowledges input from Mitacs.

2. "Who is Processing Your Food?", p. 11, Food Processing HR Council.
3. The value of the current projects is approx. \$600,000 of which half comes from industry and the balance from Mitacs. Doubling it in 2 years we would have an investment in food sector R&D through Mitacs programs of approx. \$1.2M, of which half comes from industry. (Communication with Karen Booth, Mitacs, March 2014.)
4. Examples supplied by Mitacs.

Partners

CAPI expresses its appreciation to its partners for helping to make this project possible:

