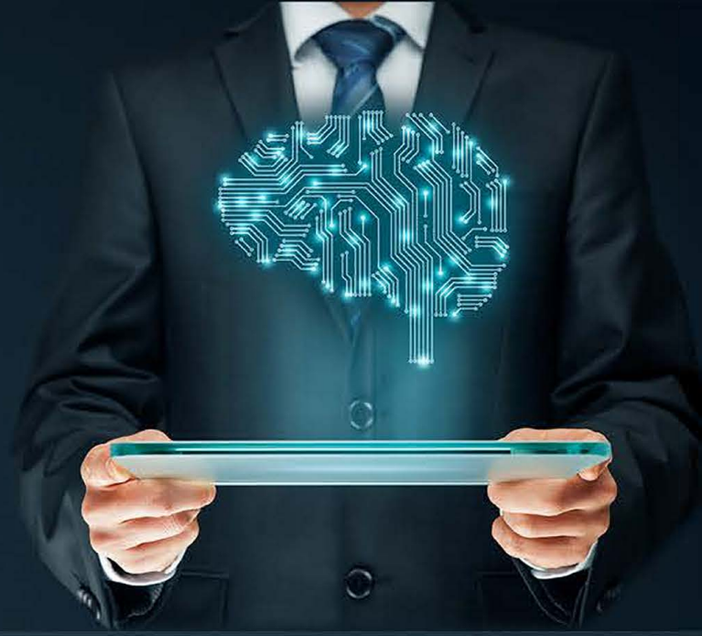
FUTURE SKILLS
IN FOOD PROCESSING

EDUCATION TECHNOLOGY EQUIPMENT DIGITAL



ROUND TABLE REPORT
Identifying the Skills of Tomorrow

2018

FPSC FOOD PROCESSING SKILLS CANADA COMPÉTENCES TRANSFORMATION ALIMENTAIRE CANADA

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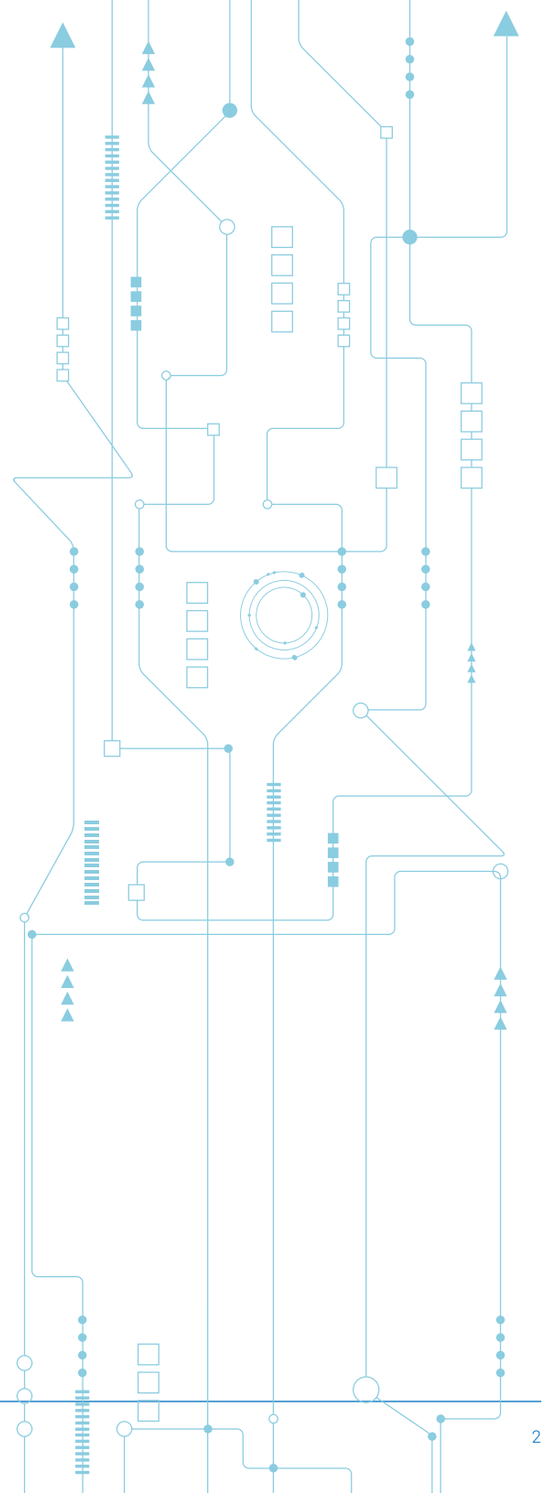

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INTRODUCTION

The Opportunities: A Growing Global Middle Class and the Canadian Agri-Food Advantage

A little over a year ago, the Advisory Council on Economic Growth identified Canada's agri-food sector as key to the country's continued prosperity. Its analysis suggests that the sector is exceptionally well-positioned to take advantage of historic opportunities, such as the exploding emerging market demand for higher-value food (e.g. proteins, functional foods). The council is also sanguine about the supply side of the equation, pointing to tightening production constraints (e.g., arable land, clean water, low-cost energy, sustainability, climate change) that are disproportionately affecting many of Canada's competitors.[1]

"We have highlighted the agriculture and food sector as one example where Canada has the potential for substantial growth and export improvement and the opportunity to become the trusted global leader in safe, nutritious, and sustainable food for the 21st century."

The Path to Prosperity Executive Summary, Advisory Council on Economic Growth, Feb. 6, 2017.

The Challenges: Filling Labour Shortages and Closing the Innovation Gap

The food and beverage processing industry forms a big part of Canada's agriculture and agri-food sector. It produces goods valued at more than $105 billion each year and is the largest manufacturing industry in the country, accounting 250,000 jobs nationwide.[2] For all its strength and potential, however, the industry must overcome significant challenges if it is to fully capitalize on the opportunities created by an anticipated 70 per cent growth in global food demand by 2050.[3] Arguably, the two greatest challenges faced by this industry are 1) filling labour shortages and 2) closing the innovation gap.

Leading organizations such as the Food Processing HR Council (FPHRC) and Food and Beverage Ontario (FBO) have identified labour shortages as a major impediment to growth. For instance, on-going research by FPHRC reveals that labour shortfalls have caused many large meat processors to turn down orders, scale back production, and/or ship meat products abroad to receive value-added cuts elsewhere.[4] The same research is also showing that Atlantic Canada's fish and seafood processors are facing a similar dilemma.

Governments and businesses in Canada have long grappled with the innovation question and its link to productivity, but challenges persist. A 2017 study of innovation in Canada's food and beverage processing industry, funded by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) - University of Guelph Partnership, found that Canadian processors lag far behind their U.S. counterparts in investment in technology.[5]

INTRODUCTION

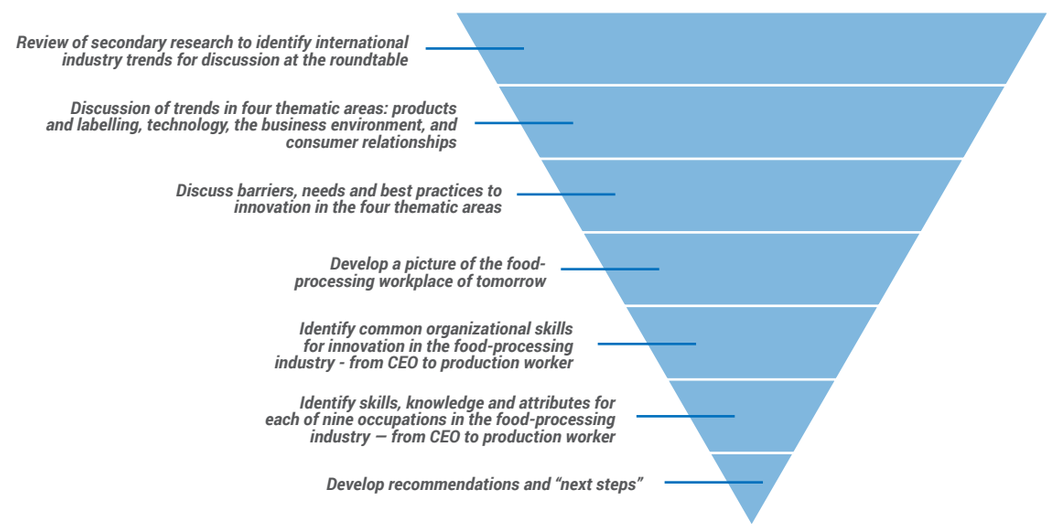
Moving Forward: Identifying the Skills and Knowledge Required to Further Innovation in the Food-Processing Industry

The industry's labour market and innovation challenges are tightly connected. Simply put: innovation often requires new or augmented skills and knowledge at all levels of an organization. Governments, businesses, universities, and groups such as FPHRC, FBO and Food Innovation Canada (FIC) have been working hard to address these industry challenges; for example, the Government of Canada's Innovation Superclusters Initiative will see close to $2 billion invested between 2017-2022 to support innovation in five areas, including protein industries, advanced manufacturing and oceans.[6]

This report summarizes the results of another initiative, which culminated in the Future Skills Roundtable held in Ottawa, Ont., Feb. 20-21, 2018. Its aim was to identify the skills and knowledge required to spur and facilitate innovation in the food-processing industry. A total of 32 representatives from the realms of education, technology/equipment and food processing attended the event.

Conceptualization and Approach

The graphic below illustrates how the challenge was conceptualized, as well as the steps taken to arrive at recommendations.



[1] Unleashing the Growth Potential of Key Sectors, Advisory Council on Economic Growth, Feb. 6, 2017

[2] Ibid

[3] Unlocking Innovation to Drive Scale and Growth, Advisory Council on Economic Growth, February 2017.

[4] Meat of the Matter: Labour Market Information and HR Best Practices Assessment of Canada's Remote Meat Processors, FPHRC, June 2017

[5] Innovation Investment Needed to Grow Canada's Food Processing Sector, Ontario Agricultural Collage, March 2017. https://www.uoguelph.ca/oac/news/innovation-investment-needed-grow-canada%E2%80%99s-food-processing-sector

[6] Canada's New Superclusters, Government of Canada, February 2018. https://www.ic.gc.ca/eic/site/093.nsf/eng/00008.html

"Innovation is a broad term that includes categories like product, process, marketing and organization. It has a clear and positive impact on the productivity of firms. Innovative economies are 'more productive, more resilient, more adaptable to change and better able to support higher living standards.' Innovation is the 'secret sauce' driving productivity across the economy and is often the foundation of job-creating clusters and Canadian champions. Canada's corporations, on average, do not innovate nor adopt innovation as quickly as those in other developed economies."

Unleashing the Growth Potential of Key Sectors, Advisory Council on Economic Growth, Feb. 6, 2017.

EXECUTIVE SUMMARY

The Canadian agri-food sector, including the food-processing industry, has the potential of becoming the trusted global leader in safe, nutritious, and sustainable food for the 21st century. Several barriers must be overcome, however, if Canadian food processors are to participate fully in this opportunity. Foremost among these are the linked challenges of labour shortages and innovation.

To help the food-processing industry address these challenges, FPHRC hosted the Future Skills Roundtable in Ottawa. Over two days in February 2018, 32 representatives of food processors, educational and research institutions, and technology- and equipment-focused organizations worked together to identify the skills and knowledge required to facilitate innovation in the food-processing industry over the next three to 10 years.

Working in breakout groups and facilitated plenary sessions, roundtable participants discussed trends, barriers and opportunities, envisioned the workplace of tomorrow, identified common organizational skills, identified skills/knowledge/attributes for nine food-processing occupations and developed recommendations. The product of the roundtable's thinking is summarized below.

Trends

The following trends we identified as most likely to shape the demand for skills and knowledge in the food-processing industry:

- Products and Labelling: food transparency ("clean labelling"), more "good fats"/less sugar in products, alternative protein sources and a demand for new and unusual flavour profiles.
- Technology: increasing automation, non-traditional technologies, biotechnology and nanotechnology, packaging and new applications for data.
- Business Environment: increased competition and consolidation, increased cost of ingredients, global market uncertainty, regulators struggling with innovative product and rising expectations of social responsibility and sustainability.
- Consumer Relationship: acceleration of consumer intelligence gathering and analysis, acceleration of food information and tools for consumers, the protection of consumer data, and development of new sales relationships.

Culture of the New Workplace

Many organizations are already in the beginning stages of transitioning to this new way of working. The culture of the future will:

- Have an organizational design that reflects openness and flexibility.
- Create an environment of continuous learning.
- Be open to diversity and change.
- Be risk-oriented.
- Allow failure and learning.
- Be solution-focused instead of problem-focused.
- Be creative.
- Encourage all employees to develop change management skills.
- Empower all employees to make decisions.

EXECUTIVE SUMMARY

Future Organizational Skills Needed in Food Processing

Participants identified the following nine skills and characteristics, which food-processing companies will require to succeed over the next 10 years:

1. The ability to think and act as a global business.
2. The ability to act as a good global citizen.
3. The ability to collaborate with others involved in innovation.
4. The ability to effectively analyze risk and reward.
5. The ability to adapt to a diverse workforce.
6. The ability to create a positive, solution-focused workplace.
7. The ability to quickly reformulate and/or deliver new products that meet customer preferences.
8. The ability to develop and track effective direct relationships with the consumer.
9. The ability to integrate new technology and processes into existing systems.

Future Occupational Skills Needed in Food Processing

Participants identified the following key skills and characteristics that core occupations in food processing companies will require to succeed over the next 10 years:

- CEOs/Owners will need enhanced strategic planning, risk analysis and change management skills to ensure their organization adapts.
- Production Supervisors will require enhanced collaborative and digital skills, and an inclusive/adaptable approach to work.
- Production Workers would benefit from enhanced mechanical and digital skills to cope with automation, and enhanced critical thinking and communication skills.
- Students with a positive attitude and complementary essential/transferrable skills can make excellent employees.
- Sales and Marketing Professionals will need to be 'storytellers' to engage consumers with the product and the organization, while also keeping-up with social media platforms and trends in 'big data' analytics.
- Purchasers will require more cross-cultural communication skills to trade internationally, in addition to
- Critical thinking and problem-solving skills, and enhanced knowledge of product ingredients/inputs.
- Food Safety Professionals will need to continuously update their knowledge to keep abreast of evolving national and international regulations, as well as new methods of food safety risk analysis.
- Human Resources Professionals must continue to work with all parts of their organization, develop innovative ways to retain and attract employees from an increasingly diverse workforce, help manage change, and lead retraining efforts.
- Food Scientists/Product Developers will need to help their organizations to stay relevant by researching product ideas and working closely with colleagues throughout the organization.

EXECUTIVE SUMMARY

Recommendations and Summary

The roundtable session was engaging and productive. Participants from a wide range of perspectives discussed current and upcoming trends and identified skills that will be needed as organizations transition to be more forward-thinking and innovative. They identified a number of barriers to, and needs and best practices for, an innovative workplace. They briefly discussed the characteristics of the culture of food-processing organizations of the future. These discussions resulted in the following recommendations:

1. Update/revise existing National Food and Beverage Processing Competency Framework. As the framework is the basis for all training and tools developed by the industry, this foundational activity should be completed to integrate the skills identified during the Future Skills roundtable into the framework itself.
2. Develop training and/or tools to address skill gaps to help organizations build their internal capacity. Some examples of potential skill gap areas include: digital skills, change management skills, motivating a diverse workforce.
3. Take advantage of opportunities to collaborate to benefit the sector as a whole. Many suggestions for collaboration were generated, including: development of an online hub for comprehensive program information, working with public education on consumer education and career awareness, advocating for streamlined regulatory processes for new products, etc.
4. Continue periodic discussions (future roundtables) regarding skill gaps and innovation. It was suggested that similar roundtables be held on a periodic basis, e.g. annually or biannually, so that the sector can identify skill gaps and discuss issues and solutions

TRENDS IN THE FOOD-PROCESSING SECTOR

TRENDS IN FOOD PROCESSING

Prior to the February 2018 Future Skills Roundtable, secondary research was conducted into current trends into the food-processing sector nationally and internationally. As innovation focuses on many areas, not simply technology or automation, a number of topics were investigated. While the research was not intended to cover all trends that exist in the sector, it provided a basis for foundational discussions at the roundtable.

Break-out groups discussed four main trend subject areas:

- Products and Labelling
- Technology
- Business Environment
- Consumer Relationship

"Making connections, and networking outside of our own industry, sector and country is critical to finding opportunities related to innovation and technology."

TREND 1: PRODUCTS AND LABELING
OVERVIEW

Consumers are increasingly showing preferences for certain products, such as those identified as more healthy or sustainable, driving a demand for the development of new products and reformulation of existing products. These preferences also affect marketing and labeling of these products.

Food Transparency ("Clean Labels")

Consumers and governments are demanding more traceability and transparency in the food system. This additional scrutiny also requires products that are perceived as safe and healthy/ whole/natural.

More Good Fats, Less Sugar in Products

There is an overall trend to add healthy fats in products as consumer trends reveal a focus on health and shift away from sugar and simple carbohydrates.. The food-processing sector (especially in the U.S.) is also trying to get ahead of changes to nutritional guidelines and potential regulation tied to the changes.

High Protein/Alternative Protein Sources

Consumer interest in how, where and what types of proteins they consume is an on-going trend, driving development of protein enhanced products around the globe.

New or Unusual Flavour Profiles, Especially Global Flavours

Increasing consumer demand for unique and/ or authentic global flavours.

TREND 1: PRODUCTS AND LABELING

Discussion Highlights

Transparency and Clean Labeling

There will **be increased legal requirements for transparency on labels** as of 2020 when the federal government plans to introduce new regulations requiring product labels with front-of-package symbols that warn consumers if the product contains more than 15 per cent of the daily recommended amount of fat, sodium or sugar. There are current discussions around serving size and how to regulate the labelling of unpackaged food such as pizza and cookies sold at delis and in bulk sections. **These regulations will require food processors to conduct more testing and analysis to verify amounts of these ingredients and to generate new label designs.**

Participants agreed that **consumers want and deserve to understand what is in packaged food and what different ingredients are used for.** Common names should be used for ingredients (e.g. baking soda) rather than their chemical name (e.g. sodium bicarbonate). They suggested following Europe's example to include an explanation of the purpose of ingredients on labels.

Consumers are afraid of preservatives, but without them shelf life decreases while safety risks and waste increases. In response to consumer demand to eliminate chemical preservatives, companies and research centres are investigating alternative methods to extend food product shelf life. Currently, these positive results are limited to research on meat and juice products. There are other technologies worth exploring that can increase shelf life as well as decrease the amount of processing required.
The cost of producing food with a clean label, traceability and healthy ingredients is high. In consumer studies, respondents indicate they are willing to pay for a more expensive product with transparent labelling, but when they make a purchase, they select products according to their price tag instead. It is risky for food processors to implement changes on their products and ingredients when faced with contradictory consumer behaviour.

More Good Fats, Less Sugar and Consumer Education

According to participants, the trend for more good fats and less sugar in processed food reflects a world of consumers who don't know enough about healthy food and their bodies.

As an example, the current focus on the ill-effects of over-consumption of sodium is driving people away from it completely. Rather than just cutting back, they are excluding it entirely from their diets. They do not understand that science has proven that the human body needs some sodium.

A lot of information is available to consumers about food but most of it is provided by people who are not experts. In Asia, well-known food bloggers impact what consumers buy, as do celebrities in North America. There are many voices that tell consumers what is healthy and what is not and some advice is contradictory.

Many consumers are confused about food and don't know what to believe or who to trust. Their lack of understanding often results in extreme responses to food trends.
Participants agreed that more information about the health risks involved in eating different types of fat is needed. **Researchers could benefit from working together and industry could benefit from researchers sharing more of their findings with them**.

The lack of reliable food education presents an opportunity for food processors to build trust with customers by educating them with accurate information. One way for food companies to build trust is by directing consumers to food alternatives that better suit their needs.

Determining the best way to present accurate information to the public will require creativity.

TREND 1: PRODUCTS AND LABELING

Discussion Highlights

High Protein/Alternative Protein Sources and Research

A participant raised the idea that Canada's food-processing industry should be **taking more advantage of its strengths**, in particular pulses which have high protein content. More research needs to be done in how pulses could be used, how to get value-added products to market and how technology could assist in the process.

> ***"The Food-Processing Sector is based on trust and trade secrets."***

There is research being conducted, but its benefits are not reaching the whole sector because organizations do not share information. Participants wanted to see **more co-operation between food processors, as well as more collaboration between academia and industry.**

There was a call for **long-term support for pre-competitive research** to benefit the Canadian food-processing industry and the health of Canadians. An example is the Consortium for Research, Innovation and Transformation of Agri-Food at McGill University. One project currently underway is working on extending shelf life with natural ingredients.

Another way the Canadian government can reduce the cost of research and development is to **revisit the approval process used to award companies tax credits for R&D.**

An **inconsistency in regulations related to proteins** was described. According to current legislation, companies producing crackers are not allowed to refer to protein content on package labels, while other food types are. Some organizations are using their marketing skills to get the information out in other ways, such as on a website or through an app.

Global Flavours

The demand for new or unusual flavour profiles is stronger among young consumers who are constantly seeking something new and exotic. This is a result of several forces coming together at the same time, including increased global travel, less attachment to the traditional foods and flavours of their region or culture and frequent sharing of experiences on social media. It is predicted that this trend will continue to grow in strength. Consumers are becoming more educated and will expect authenticity in flavours and ingredients, which will drive changes in product development, purchasing and marketing ("telling the story" of the product). **Food processors will need to respond by continuing to develop new products with global influences.**

TREND 2: TECHNOLOGY
OVERVIEW

Research and development for new technology for the lucrative agri-food sector is growing at an exponential rate, as governments and private businesses seek to position themselves to take advantage of the growing global marketplace.

Increasing Automation

Increasing automation in the food-processing sector is creating efficiencies, but requires significant capital outlay. Decisions around automation need to be made carefully and implemented smartly. As automation replaces tasks previously performed by humans, it is also consolidating tasks previously done by several pieces of equipment into one.

Novel/Non-traditional Technologies Applied to Food Processing and New Applications for Existing Technology

Since the beginning of the 19th century, the food sector has been centred on heating, refrigeration, freezing, drying, smoking and salting of foods to preserve and process food on a broad industrial scale. "Novel" food-processing technologies go a step further. The food-processing sector is beginning to look outside of traditional sources for new technology. Technology in other sectors is being examined for its potential application to needs in the sector. Examples include: 3D printing, 3D vision technology, plasma technology.

Biotechnology and Nanotechnology

While sometimes controversial, the use of biotechnology is a trend in the food-processing sector. It has several benefits, including assisting with food preservation (and by association food availability/security). This trend is in opposition to the trends toward "non-GMO" "clean labelling" preferred by some consumers. Nanotechnology is "science, engineering, and technology conducted at the nanoscale, which is about 1 to 100 nanometers." (nano.gov) Like biotechnology, nanotechnology can contribute to food preservation. It can also be used to increase the nutrition in food. There are some concerns about the use of nanotechnology in the consumer marketplace.

Packaging

Changes to packaging are being driven by the need to extend the usability of products, and to meet consumer demands for convenience and sustainability. The development of new packaging technology is an area with a lot of growth, and new options are being developed rapidly. Examples: active packaging.

New Applications for Data and Data Collection

Data is being collected for a number of reasons, such as for various regulators, but is being underutilized. Processors need to analyze and use this data in a way that capitalizes on all of its potential benefits, e.g. marketing, consumer education.

TREND 2: TECHNOLOGY

Discussion Highlights

Increasing Automation

Automation can occur in any aspect of an organization from production to distribution. Participants felt there was a lot to be learned from other sectors, which have adopted automation technologies. Not every technology is appropriate for every organization. It is important that decision-makers have a thorough understanding of the entire process and any potential impacts on food safety.

> ***"The quality of jobs goes up but the quantity of jobs goes down."***

While it is generally easier and more attractive for larger organizations to automate, this is not always the case. The capital investment sometimes does not warrant the change process. Unions can also be an impediment to installing automation. Where large companies do automate, **they need to have clear plans for employee retraining.** There are potentially negative public relations issues for some organizations if they are laying off large numbers of people, and they would also be losing the intellectual capital in their experienced employees.

Participants identified a few examples where mid-large companies automated and retrained their staff for other areas, such as quality assurance, which were needed with the increased productivity.

Small companies have to reach a level of scale in order to justify investing in automation. Rather than invest in the technology themselves, **smaller organizations may partner with research institutes, research centres or other processors.** Some industries are also seasonal and equipment might be shared across different products, which have staggered seasons.

"Novel"/Non-traditional Technologies Applied to Food Processing and New Applications for Existing Technology

Technologies that exist in other industries are being explored. 3D printing is being used for developing trial models for packaging and novelty food production. Currently, 3D printing is too expensive for mass production. Its main advantage is reduced modeling costs.

Research and innovation centres develop new technologies and innovations with industry partners, **but the dissemination of findings and research often occurs in "silos"** because research/innovation tech centres are linked to post-secondary educational institutions and are funded at the provincial level. **This regionalism is a barrier to information sharing.** Provinces are not working together to leverage their funding or co-ordinate research, which can result in duplication of research efforts.

Participants identified the need for a **national, centralized, digitally accessible information hub.** This would be a repository for innovation technology information about, for example, research being conducted, resources, expertise that industry can access, but also a forum to share knowledge and experiences. It does not necessarily have to be food manufacturing specific.

Sometimes small companies collaborate with research centres to find solutions to issues. However, there is also a **reluctance to participate** because of a loss of ownership of intellectual property, and the inability of research centres to be responsive to industry needs and time frames, e.g. pilot plant closes at 4:30 p.m.

Participants identified a need for **governmental support of value-add industries.** They noted that government policies and programs are pro-commodity production and export. Statistics indicate that we are improving in the export of raw materials and semi-processed goods.

> ***"Innovation is a continuous process, taking new ideas/concepts/processes forward through the stages of development quickly. There is a need to identify what you need to know and learn fast to take advantage of that knowledge in the marketplace."***

TREND 2: TECHNOLOGY

Discussion Highlights

Biotechnology and Nanotechnology

Through the years, fermenting processes were carried out in a variety of different ways around the world, e.g. use of enzymes (rennet for cheese-making) and bacterial aging. Biotechnological processes are now being applied in a multitude of innovative ways, e.g. kombucha, a current fermented beverage food trend.

Biotechnology and nanotechnology innovations are **often caught in the cross-fire of consumer demand and consumer criticism.** Biotechnology and nanotechnology innovations can address global health issues, such as vitamin A deficiencies using fortified rice, but are under a barrage of criticism for introducing "foreign species' components" into other foods – such as the GMO controversy for certain foods, e.g. corn, non-browning apples.

These innovations are **creating issues for labelling and for regulators,** where innovations are outstripping the relevance of regulations or there is an absence of regulations. Regulatory approval is an expensive endeavour requiring "deep pockets" and patience.

Any competitive advantage is often lost due to an inability to gain regulatory approval to bring innovations to market quickly.

Packaging

Many of the innovations in packaging and handling are **based on new materials (nanotechnology) and/or sensor-technology innovations within packaging materials,** which allow data collection and internal package environment control to increase shelf life and maintain the quality of food products longer.

Sensors can help maintain quality assurance through faster detection of the presence of certain bacteria, which can lead to faster testing and implementation of mitigation strategies that could improve food safety and quality.

The sector is being **responsive to consumer demands for corporate social responsibility** for packaging and are adopting circular economy principles to provide sustainable packaging, which still performs its primary function of food safety.

Packaging is also a means to innovate the product. It can provide a competitive edge in the marketplace.

"Biotechnology and nanotechnology innovations are very science-driven innovations that attempt to balance food safety with food quality (colour, texture, taste). Commercialization can be very expensive and usually involves collaboration with research facilities."

TREND 2: TECHNOLOGY

Discussion Highlights

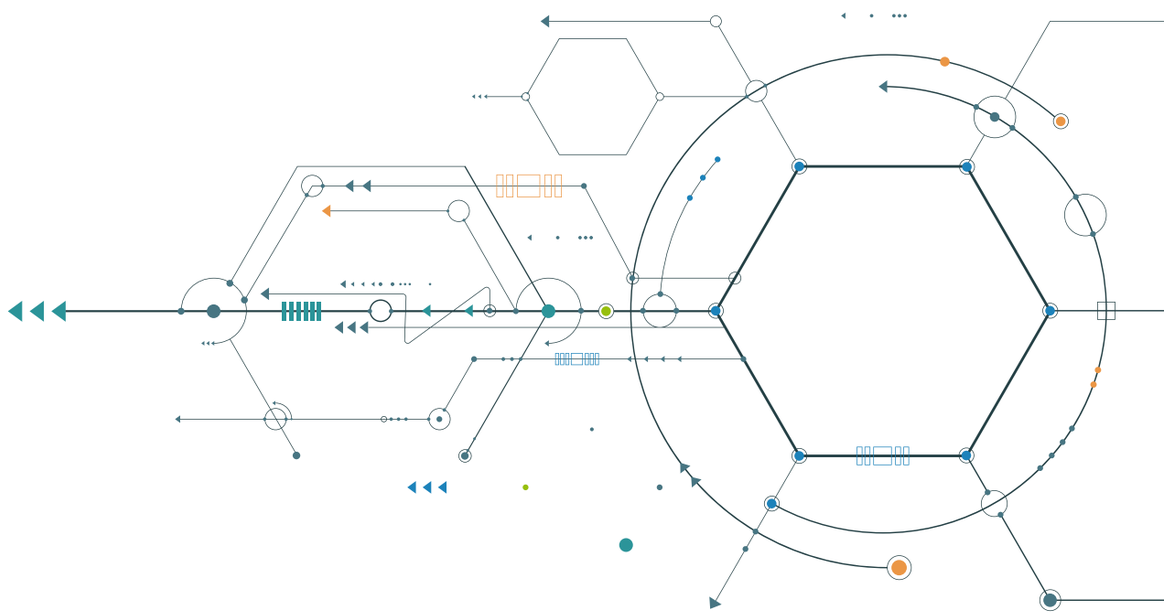
New Applications for Data and Data Collection

This topic was identified by the breakout group. The food-processing sector is required to collect data for various regulators and government departments. This data being collected is used to inform regulators and feed government statistics. This and other data being collected **should be used by the sector to improve transparency and build consumer trust.**

Collected data can be **used as a foundation for future research for innovative technologies.** It can help to identify trends that may be indicative of an issue, which needs improvement. Agreed-upon data sets could also be **shared by organizations** to improve the sector.

Data can be used to improve the transparency of the industry to consumers, for example: markers in feed and genetics can be used to trace and collect data that identify the type of feed a specific animal has consumed, where it is from, who raised it, its age, where it is was caught, what boat it was on, etc. which can be added to labels. These labels can be scanned by smartphones to provide detailed information to the consumer about their food.

"Taking advantage of these new applications will require personnel with the skills to read, understand, and analyze the collected data to maximize its use."



TREND 3: BUSINESS ENVIRONMENT OVERVIEW

As the sector becomes increasingly global, and as more and more players are attracted to the agri-food sector, stressors are put on the existing marketplace, which must be addressed by all food processors.

Increased Competition and Consolidation

Increased competition in the sector, especially as multiple organizations and startups are being launched. Food processing is starting to resemble the tech sector. "Megadeals" and large-scale consolidations are becoming increasingly common in the food-processing sector. This impacts the companies supplying to or sourcing from the organizations effected; also has large-scale implications for companies that are themselves merged with other organizations.

Increased Cost of Inputs/Ingredients

Increased costs of inputs/ingredients/ commodities in some sectors are putting pressure on pricing and profit margins.

Global Market Uncertainty Increasing

Global political instability, especially in the U.S. and the E.U., puts some existing trade deals and planned future trade deals in doubt; and may increase protectionist policies that create barriers for Canadian food processors. A demographic shift toward Asia in the long-term will affect where processing occurs and who are the main consumers of food products.

Regulators Struggling with Addressing Innovative Products

As new and innovative products are being developed at a fast rate, governments and regulating bodies are struggling to keep up with the processes needed to approve the products for market. New products cause regulatory and food-safety challenges, which can delay their release to market.

Increased Expectation of Sustainability/ Social Responsibility

Consumers increasingly expect organizations to act as good citizens, taking action that protects and promotes sustainability and social responsibility.

TREND 3: BUSINESS ENVIRONMENT

Discussion Highlights

Competition and Consolidation

There are many small organizations and startups entering the sector. Many of them either lack business skills or food-processing and food-safety knowledge and skills. **For sustained growth, there needs to be an ability to grow knowledge and skills in gap areas.** Smaller organizations tend to have more generalists on staff. Larger organizations have individuals who are more specialized. It can be difficult for larger organizations to adapt at the pace the sector is now requiring. Large companies are often responding to this by buying out the intellectual property/operations of smaller organizations. Some smaller organizations refuse to sell, and some of those fail because they do not have skills to scale up.

How do processors create differentiation? Success comes in two forms — a cult-like status or a market of constant innovation. This is achieved through marketing and product launches. Successful marketing often focuses on identity, emotion and ties to culture or subculture. With the rise of the minimum wage in many provinces, costs are increasing so products MUST be unique. **There is a lot of pressure to differentiate product.**

> ***"If you're not unique, you better be cheap."***

Organizations are also in competition for labour. Recruitment and retention programs are becoming increasingly important.

Larger organizations are more automated, while smaller organizations are more hands on/manual. **There is sometimes a conflict between the desire to employ people and to increase productivity.** There are some small operators who are happy with the status quo, with providing local employment and are not interested in automating or increasing efficiency. Some small operators end up being purchased and being consolidated into larger companies, forcing them to automate.

Increased Cost of Inputs

The pressure of increased costs is **driving organizations to reanalyze and reformulate products;** for instance, creating a recipe that has five ingredients instead of seven. This requires the focus of product development. The result is that input prices are lower, and that there is also less purchasing effort required. By using fewer ingredients, it can also help to guard the organization against issues with ingredient scarcity.

It is also causing them to implement equipment solutions; to introduce technology to replace manual labour. To do this, senior managers must be able to identify what the potential equipment is, and assess whether it meets the needs of the organization.

Adjusting to these realities means that all employees must have **skills in change management.**

> ***"It is a good idea for organizations to have a productivity assessment done to analyze their current state"***

TREND 3: BUSINESS ENVIRONMENT

Discussion Highlights

Global Market Uncertainty

Participants felt that a **co-ordinated effort was needed to compete globally.** Small to medium organizations trying to grow globally on their own does not work very effectively in many cases. Some smaller organizations address this by getting together to function as a co-operative, pooling the demand.

There is a role for government to address this issue and to help organizations become more competitive globally. The federal government is now providing cluster-based or packet-based funding. The processes to access government funding are also becoming more accessible in a timely manner. Many funders are trying to make programs easier to access, sparked by a conversation instead of long, tedious forms.

"Probably 7,000 out of 8,000 food-processing operators are not aware of the programs they may be eligible for."

The problem is that **most operators are not aware of the programs they can access.** Funders can tend to work with the same companies over and over. Organizations need to build skills internally to research and access programs. They also need to be proactive in assigning this responsibility to a job role. The creation of an online information hub with program information would also help to address this need.

Regulators Struggling with Approval of Innovative Products

There are many examples of products that have been **delayed to market because of delays in the regulatory process.** For instance, marijuana edibles are new products that currently have no defined regulatory/sensory requirements to get them approved for market. There are more and more examples of innovative/new products that the regulatory system is not set up to address.

"The regulatory process can take longer than product development."

Some organizations are developing products without process validation, and some of them have been developed in a way that is not safe. Organizations **need to ensure that food safety is part of innovation.** Too many times this is not considered in product development, which creates further delays for sectors because some operators are not ready to have their products fully approved and are taking up the attention of the regulator.

There is going to be an immediate shift in the Safe Food for Canadian Act in summer 2018. This will require risks assessment. There will be many organizations trying to find people who can conduct a risk assessment. This will apply to all products and processes.

Internally, organizations are going to **need to be adaptable to shifting regulatory changes. They will need to find or access resources and anticipate what changes** will be coming to stay ahead.

TREND 3: BUSINESS ENVIRONMENT

Discussion Highlights

Sustainability/Social Responsibility

There is a large trend to buy local. Many consumers do not want to purchase foreign food products. Some food processors don't even have enough product to export globally because the local demand is so high.

The millennial consumer is especially concerned about sustainability. There is a "feel good" aspect to purchasing products, and many are willing to pay more for this.

> ***"Consumers want to feel close to a product or company. Products need to be meaningfully unique. Consumers ask: 'Is there a unique story?" Can I Instagram it?' "***

Consumers are conscious of health trends, and want to know what ingredients go into the products and where they originate from. This trend is tied to the traceability trend in products and labelling.

There is an emerging trend toward ensuring fair labour practices, especially when ingredients or products are purchased internationally. Consumers are aware of issues with other sectors, such as the textile industry, and want to ensure they are contributing to a positive/safe work environment and fair labour practices.

TREND 4: CONSUMER RELATIONSHIP OVERVIEW

With the advent of social media and instant communication, consumers are expecting a more direct relationship with food processors.

Acceleration of Consumer Intelligence Gathering and Analysis Technology

Gathering and Analysis Technology Consumer intelligence gathering technology is accelerating across all sectors. Developing or acquiring systems that can collect and analyze data provides leaders with more information on which to base decisions than ever before.

Acceleration of Food Information and Tools Available to Consumers

Just as organizations have access to information about the end users of their products, consumers now have product information, reviews and corporate information at their fingertips. Technology allows consumers to make better decisions for themselves (e.g. for their health) and provide feedback on their likes and dislikes —not only about the products, but the way that manufacturers operate. Consumers have a greater voice that allows them to be more involved in directing the manufacturing of food products, which suit their needs and desires, e.g. consumer-driven movements for organics, and the 100 mile-diet. The consumer relationship with the manufacturer is becoming closer.

Protection of Customer Data/ Security of Data

There is a world-wide concern regarding the collection and security of data. The food-processing sector also needs to address these concerns and ensure that their internal data systems are secure, and that they can reassure customers and vendors that information is being kept safe.

New Sales Relationships

The selling of food to consumers is changing as consumers are using technology and new sales models to make food purchases. Consumers are interacting more directly with producers.

TREND 4: CONSUMER RELATIONSHIP

Discussion Highlights

Consumer Intelligence Gathering and Analysis Technology

"Big Data" gathering is happening on the retail side, such as grocery store loyalty programs, which are collecting data about consumer preferences. They provide key consumer data, including what is being bought, where the consumers live, etc. Some of these programs could not be maintained and failed. Instead, **many retail organizations are partnering with others,** such as Airmiles, which collect similar data.

Food processors may be able to access similar pools of data. For instance, the Canadian Centre for Food Integrity conducts outreach to gather information about public trust issues among consumers, such as animal welfare, non-GMO, etc. Processors can use the information collected from these surveys/research to identify issues that are top-of-mind with consumers. They can produce products and/or marketing efforts that meet these preferences.

"Processors need to be educated about Big Data – what it is, how you gather it, and how you use it"

Historically, retailers keep consumer data close to their chests, so **processors are going to the consumer directly through existing social media platforms to gather direct feedback.** This feedback leads to consumers relating more on a personal level with a product/company. Some brands have developed a cult-following through social media.

Processors are also using their existing packaging to gain consumer intelligence. They gather intelligence in a multiple of ways, such as placing a URL on the package, placing a contest on a label and posing a question to be answered online.

Processors are tracking their website data, monitoring various social media platforms and engaging with consumers to stay on top of trends and issues.

Food Information and Tools for Consumers

Some consumers, especially in niche markets, are **looking for more information about processors and their products.** They are looking to connect on a more personal level. This has led to more of a **story-telling marketing strategy,** illustrating who the company is and what they stand for.

The desire for a **personal relationship between processor and consumer** has impacted marketing strategies. There are more online marketing activities, which allow consumers to communicate directly with the processor.

Unlike the past, **online marketing is becoming the main marketing strategy.** It is more than just a website. Food processors have social media platforms like Twitter, Instagram, and Facebook. They are more involved in real-time marketing than just developing a print and media campaign and letting it run for a year.

Processors must be able to **respond quickly to complaints or issues** that arise via their social media. In the past, to lodge a complaint about a product, a consumer would have to call a 1-800 number, and the issue was private. Now they can just post the issue on social media and it can trend publicly within minutes. Processors must be ontop of their media and have the flexibility to respond to issues as they arise.

TREND 4: CONSUMER RELATIONSHIP

Discussion Highlights

Protection of Data

While it is an international trend, participants **did not identify security of data as a large concern in the Canadian marketplace.** They indicated that many consumers are willing to share a large amount of personal data without concern.

However, organizations need to be cautious and ensure the follow regulations relating to protection of privacy and use of data. They need to develop mechanisms, which ensure that legal requirements are in place to allow for the consumer to share their information freely.

New Sales Relationships

Some processors are **beginning to bypass retailers and ship directly** to the consumer, usually through an online store. This allows the processor to make direct linkages with the consumer. Examples provided included meat companies, wineries and breweries, which ship directly to consumers.

Direct sales open the doors for exclusive offerings, limited product runs and direct product testing. **This new relationship with consumers provides a test market for new product innovation.**

Soon, labelling on every package will have a certain type of barcode that will be on other technology company's servers. With a Samsung smart fridge, for example, the fridge will be able to send a message to a consumer's phone indicating that they are "getting low on milk." This type of information is already being collected and used by applications and technologies like Google Home. **Smart labels will be the next innovation and will change the nature of traceability programs,** which will be used for applications other than strictly food safety.

READINESS TO CAPITALIZE ON OPPORTUNITIES FOR INNOVATION

READINESS TO CAPITALIZE ON OPPORTUNITIES FOR INNOVATION

Although the focus of the roundtable was the discussion of skills needed for the future, during the two-day session many ideas were generated related to the readiness of Canadian food-processing organizations to capitalize on innovation opportunities. The group discussed many barriers in this area, as well as a number of needs and best practices. These discussions focused around four themes: Skills Development and Internal Capacity, Collaboration, Rapid New Product Improvement and Development and Leveraging Technology to Develop Direct Relationships with Consumers.

1. Skills Development and Internal Capacity

Skills development and internal capacity was identified by the group as the most significant of the four areas being explored. There was a general feeling that food-processing organizations need to build themselves up internally; to find and/or develop needed skill sets and to develop a workplace culture, which is forward-looking and supports new ideas.

Need to attract and retain talent, especially new perspectives. It is increasingly difficult to attract and retain good talent. Food processors find themselves in tight competition for the talent that is available. There is going to be a future focus on finding and hiring new perspectives, such as individuals from other sectors or with complementary skill sets (e.g. multi-media, digital skills). Retaining talent is also an ongoing and increasingly challenging activity. To grow an organization and support innovation, there needs to be a stable pool of talent in the organization.

Need to build a culture of innovation and collaboration inter-departmentally. Food processors need to develop and/or shift toward a workplace environment that supports innovation. This is discussed later in this report in the "workplace culture' section, but includes a capacity for risk and failure as part of learning and growing.

Need for change management skills at all levels. Change management is becoming an everyday reality. It is not something that occurs periodically, as it was in the past, but is now a constant part of operating. This demands new skills from individuals at all levels of an organization. There is a driving need to enhance and develop change management skills.

Need to motivate an increasingly diverse workforce. This idea is related to the idea of talent retention. To achieve success, organizations need to understand the perspectives and needs of an increasingly diverse workforce. As the workplace will contain increasing diversity in generational, cultural, religious and other perspectives, the organization needs to adjust to these changing needs. This will require increasing the knowledge base of supervisors and managers as it relates to different perspectives, as well as enhancement of leadership skills.

Need for enhanced analysis skills in the organization, such as strategic planning, return on investment (ROI), "big data." Flexible companies will be successful organizations in the future. To adjust to changing circumstances quickly, organizations will need enhanced analysis skills, especially at the management or executive levels; although in some form these skills will be needed at all levels of an organization. Individuals will need to be able to sort, analyze and interpret an increasing quantity and variety of data quickly to make effective decisions.

Need to research and access available funding programs. For many small-medium organizations the task of researching and accessing funding programs is not clearly assigned as a responsibility to a particular role. Many times, this task was simply assigned to a person who stumbled across the information or who was deemed the least busy at the time. Many small-medium organizations missed out on opportunities in the past because they didn't make a concerted effort to find and/or access these programs, or discovered right before a submission deadline. . Incorporating this responsibility into the organizational structure/job roles will be important, as will developing skills in this area. In addition, there is a need for a central repository where program information may be found (see hub recommendation in the Collaboration section).

2. Collaboration

Collaboration was a theme that came up many times during the roundtable sessions. There was a clear acknowledgement that to grow as a sector, and even for individual organizations to achieve greater success, that different parties need to work together. Traditionally food-processing organizations are inward-looking and very protective of their internal information; they are a sector based on "trust and trade secrets." Trust may be built slowly, but organizations need to be reaching out to others to fulfil their potential. There were several specific instances of collaboration that were touched upon during the roundtable.

Need to create an online hub, a repository of information on funding programs and a sharing platform for processors across the country. To address barriers to accessing program funding, it was felt that the creation of an online hub would be incredibly useful. This hub would contain information on past, current and upcoming funding initiatives; as well as containing a capacity for forums where organizations can ask questions and share knowledge.

Need to address barriers to academic/government institutions and food processors working together. There are barriers that currently exist between academic/government institutions and food processors. Institutions can become frustrated at processors lack of engagement in research and development, because processors are protective over their intellectual property and concerned about losing control over the process and products. Processors are frustrated over academic/government institutions' limitations in the way that they operate. For instance, while food processors may run 24 hours a day, seven days a week, a research facility may only operate according to office hours: 9 a.m. to 5 p.m., five days a week. This can make it impossible to simulate a real operational environment. Participants felt there was a need for both sides of this equation to discuss these barriers and jointly work to overcome them.

Need to work with others, including public education, to increase consumer education around the industry and its products. There is frustration at the level of consumer education around the industry and its products. They identified that there has been a lot of negative press regarding the industry, for instance many expose-type documentaries released in the last five years. They felt that a collaborative effort to educate the public about the practices of the industry, general nutrition, and the purpose of additives (e.g. food safety) is important. It was thought that an effort to educate young people through collaborative efforts with the public education system could be very effective.

Need to work with others to increase the profile of the sector in terms of career awareness. Food processing is not being viewed as a lucrative career in the general population. There is a need to collaborate with others, such as other processors, educational institutions and career counsellors, to raise the profile of the industry in terms of career potential. Clear messaging around career progression/laddering would be helpful towards this goal.

Need to explore opportunities for individual processors to work together. One breakout group identified that more cross-collaborative efforts between individual processors could be helpful to the overall sector. For instance, they suggested that things, such as bulk purchasing platforms be developed to take advantage of economies of scale to benefit individual processors. It was recommended that an investigation into the development of an online purchasing platform be conducted as a tool, which may protect information about the activities of individual processors, while providing great cost benefits to all.

3. Rapid New Product Improvement and Development

There is a requirement for increasingly rapid new product improvement and development. Consumers expect to be listened to, and to be able to access better and cutting-edge products in a timely manner. This is putting pressure on processors to innovate as at an increasingly faster rate.

Need for smaller organizations to access food science expertise, so they can grow and commercialize in safe manner. It is extremely important that smaller organizations be supported in their development activities. In particular, it was felt that smaller organizations often lack access to food science expertise within their organization. This makes it extremely difficult to scale up or commercialize their operations quickly. It often leads to mistakes that can have disastrous consequences for public safety and for the organization itself. Participants wanted to see program that will make it easier for smaller organizations to access food science expertise.

Need to reformulate products quickly due to scarcity or cost. Related to the idea above, participants felt there was also pressure to reformulate products quickly due to issues of food/ingredient security. Ingredients or inputs can be difficult to obtain, or the rising costs can make them prohibitive, requiring reformulation or product replacement.

Need to advocate for a more streamlined and clear regulatory process for innovative products. Many new and innovative products are severely delayed in reaching the market because the regulatory processes to address them are not in place, or slow to develop. This has negative consequences for organizations and creates a disincentive in the push to innovate. The sector needs to organize to advocate for regulatory change, so that both the regulatory agencies and the food processors can help safe, new products get to market more quickly.

Need to respond quickly to shifting consumer preferences. Consumer preferences are changing at an increasingly rapid rate. This puts pressure on organizations to be in a constant process of improvement and development, and to increase their research activities to stay ahead of the trends as much as possible. This requires the allocation of more resources to these activities and a higher-level skill set in research and development.

4. Leveraging Technology to Develop Direct Relationships with Consumers

Finally, participants identified the need to leverage technology to develop direct relationships with consumers. Consumers are requiring instant information, and they want a "story" about the product and the processor. To keep up with these demands, organizations need to be able to operate in a different way to capitalize on new technology.

Need to use internal data in novel ways. Organizations need to make the most of the large amount and type of data that is available to them. Or instance, using traceability data in a consumer-friendly way to provide product origin information. An example was provided of an app with which the consumer can scan the product label, and it will provide the origin information for the product on the consumer's smartphone as they stand in the retail outlet making their purchasing decision.

Need to communicate product and organization information, including social responsibility and sustainability information, directly through new and shifting channels. Organizations need to obtain, through hiring or training, the skills to capitalize on new media channels to the consumer. They will need employees who can develop new and innovative messaging around their "story" – what the processor stands for, what they do, how they do it, and what's behind the products they sell. Many consumers are looking for organizations and products that align with their personal goals, and want to see evidence of social responsibility and sustainability.

In a brief follow-up survey, roundtable participants were asked to rank the importance of the topics in this section.

They identified them in priority area as presented in this report. The overall themes in terms of most important to least according to this survey are:

1. ***Skills Development and Internal Capacity***
2. ***Collaboration***
3. ***Rapid New Product Improvement and Development***
4. ***Leveraging Technology to Develop Direct Relationships with Consumers***

FUTURE SKILLS NEEDED IN FOOD PROCESSING

FUTURE SKILLS NEEDED IN FOOD PROCESSING

"The sector is working toward a flatter, more collaborative, outward-looking, and creative work environment."

Through secondary research and discussions at the Future Skills Roundtable, many themes arose regarding the enhanced and new skills, which will be required by Canadian Food Processors in the short-medium term. These skills are "over and above" those found in the sector's competency framework.

These skill areas are identified in the box opposite on this page, and are referred to throughout this section. Similar to the themes identified in discussions regarding readiness for innovation, some overarching ideas were present. These include the ideas of cultural competence, digital intelligence, adapting to an increasingly diverse workforce, and enhanced strategic planning and change management skills.

At the roundtable, breakout groups discussed these themes in nine specific groupings. They discussed the future skills needed by:

- CEOs/Owners
- Production Supervisors
- Production Workers
- Students (potential employees with secondary education)
- Sales and Marketing Professionals
- Purchasers
- Food Safety Professionals
- Human Resources Professionals
- Food Scientists/Product Developers

Details on each, related to the themes, are presented on the following pages.

Organizational Skills for the Future

1. The ability to think and act as a global business. This means developing products and flavours that appeal to a diverse and educated consumer. It requires business relationships that allow for sourcing from and sales to the global market place. It requires the ability to work in a cross-cultural environment.

2. The ability to act as a good global citizen. This means spear-heading processes and developing programs, which promote social and environmental responsibility and sustainability. The activities also need to be communicated to a concerned public.

3. The ability to collaborate with others involved in innovation. This skill will be critical for success. Collaborating with research centres, post-secondary institutions, original equipment manufacturers (OEMs) and other food-processing organizations is necessary to move forward. This includes collaborating internally within an organization.

4. The ability to effectively analyze risk and reward. Careful analysis of the return on investment, the pros and cons of any individual initiative, may mean the difference between success and failure for an organization.

5. The ability to adapt to a diverse workforce. The workforce in increasingly diverse in age, culture, religion, gender, ability, etc. Successful organizations will access these unique perspectives through recruitment and keep their workers motivated.

6. The ability to create a positive, solution-focused workplace. To adapt to the changing market and workforce, food processors will need to organize their businesses in new ways that promote a solution- focused rather than problem-focused operation.

7. The ability to quickly reformulate and/or deliver new products that meet customer preferences. With increased competition and consolidation in the marketplace, successful food-processing organizations will need to be able to adapt and deliver quickly to maintain and grow their customer base.

8. The ability to develop and track effective direct relationships with the consumer. Consumers don't want to just buy a product; they want to participate in a relationship with an organization, they want to be part of a story. This requires that organizations find new ways to communicate and interact with end consumers.

9. The ability to integrate new technology and processes into existing systems. New technology requires a revisioning of standard operating procedures, and sometimes requires a complete retraining of the workforce. The ability to set out and deliver on a clear change management plan will be increasingly important.

CEO/OWNER

CEOs/Owners are going to need enhanced strategic planning, risk analysis and change management skills. The pace of change is increasingly rapid, and they are responsible for ensuring their organizations adapt and remain successful.

Skills

1. **The ability to think and act as a global business**
   - Demonstrate cultural competence
   - Apply enhanced negotiation skills, e.g. unions, global contracts
2. **The ability to act as a good global citizen**
   - Develop and maintain social responsibility/ sustainability policies and procedures
   - Assess all activities against principles of the organization, e.g. outside vendors for fair treatment of labour
3. **The ability to collaborate with others**
   - Access experts for information outside of industry/sector
   - Collaborate with external organizations, e.g. research institutes, equipment manufacturers, other processors
4. **The ability to effectively analyze risk and reward**
   - Apply experiences of other industries and organizations to see how transitions where handled when new innovations were brought in and adapt to own situation
   - Identify strategies used by other industries/ sectors
   - Research changes to legislation/regulations
   - Analyze applicability of innovative options to current state, including cost
     - Keep up to date with trends in IT, e.g. social media platform, apps
   - Take advantage of tax credits and funding opportunities
5. **The ability to adapt to a diverse workforce**
   - Attract the right people and skills
   - Retain the right people and skills
   - Manage and motivate a diverse workforce
   - Create collaborative teams across departments
   - Provide opportunities for employees to work cooperatively with industry partners, research facilities, organizations, outside of organization
   - Establish virtual relationships with outsource service providers
   - Use new methods of communication, e.g. texting, webinars, virtual meetings
6. **The ability to create a positive, solution-focused workplace**
   - Create an empowering and positive workplace culture
   - Employ organizational structures to keep employees connected, e.g. open space, direct lines of communication
   - Implement workplace culture shifts

9. **The ability to integrate new technology and processes into existing systems**
   - Identify new applications for technologies outside of its intended use
   - Research, source, adapt, install and train on new technology
   - Analyze data (data analytics)

Knowledge

- International/global perspective with regards to culture, education, workplace behaviour
- New technologies and innovations being applied in other sectors/globally
- Relevant experts outside the sector/ country
- Regional/national/international research and innovation centers
- Change management best practices in own and other industries/sectors
- What motivates a diverse workforce
- Opportunities outside of organization to foster employees
- Pros and cons of different organizational structures and management styles
- Broad IT knowledge
- Industry and market trends
- Social media and how it can be used to support the organization
- Financial intelligence
- Where to access funding
- How to access tax credits
- Where to find up-to-date and soon to be implemented legislation/regulations
- Know different messaging platforms and how to best use them

Attributes

- Open to change
- Continuous learner
- Accepts failure as learning
- Team player/collaborator
- Curious
- Able to be vulnerable
- Flexible
- Creative
- Supportive of employee interests
- Trusting of other's efforts and abilities
- Respectful of boundaries
- Able to synthesize wide range of information from different sources
- Environmentally responsible

PRODUCTION SUPERVISOR

Production Supervisors are going to need enhanced collaborative and digital skills. They will need to be inclusive, adaptable and open to viewing failure as a method of learning.

Skills

3. **The ability to collaborate with others involved in innovation**
   - Integrate their work and the work of their team with others, e.g. product development, marketing and sales
   - Lead or participate in collaborative teams and on research projects with outside organizations and research facilities• Use enhanced documentation and reporting skills, e.g. provide clear feedback for preventative measures
   - Use enhanced presentation skills
   - Use enhanced business communication skills
4. **The ability to effectively analyze risk and reward**
   - Analyze process data for risk analysis and rationales
   - Identify process areas that will require subjective decision-making by production workers
5. **The ability to adapt to a diverse workforce**
   - Motivate a changing and multi-faceted workforce
   - Provide continuous feedback
   - Employ strategies to ensure knowledge transfer
6. **The ability to create a positive, solution-focused workplace**
   - Think critically
   - Use enhanced skills to work collaboratively with other departments, e.g. integrate plans
   - Use enhanced time-management skills
   - Use enhanced problem-solving skills
9. **The ability to integrate new technology and processes into existing systems**
   - Apply digital intelligence
   - Implement change-management plans

Knowledge

- Advanced food safety knowledge
- Types of data collected
- Scope of process sensors
- Strengths and weaknesses of new technology
- Desktop applications and how they should be used/not used
- Diversity of employees
- Relevant cultural norms and behaviour
- Knowledge transfer strategies, e.g. cross training, shadowing, mentoring

Attributes

- Creative
- Curious
- Inclusive
- Team player/collaborative
- Flexible
- Perceptive
- Supportive
- Respectful
- Solution-focused
- Open to change
- Accepts failure as learning
- Mechanical aptitude
- Multi-tasker (cognitive flexibility)

PRODUCTION WORKER

Production Workers are going to need enhanced mechanical and digital skills, as the sector moves away from manual labour toward automation. They will need to troubleshoot and apply critical-thinking skills to everyday workplace tasks to solve problems. They will need high-level communication skills to describe issues with technology and to integrate their work with others.

Skills

3. **The ability to collaborate with others involved in innovation**
   - Participate in collaborative teams within and outside of organization
5. **The ability to adapt to a diverse workforce**
   - Work effectively with co-workers, supervisors and managers from diverse backgrounds
6. **The ability to create a positive, solution-focused workplace**
   - Identify and communicate potential risks
   - Use enhanced problem-solving and critical-thinking skills
   - Use enhanced verbal communication skills, e.g. to explain issues with technology clearly and in detail
   - Able to respectfully move through conflict
9. **The ability to integrate new technology and processes into existing systems**
   - Apply digital intelligence
   - Make subjective decisions to facilitate processes
   - Collect and document data using digital interfaces
   - Troubleshoot issues without assistance

Knowledge

- Up-to-date information about equipment systems and their operation
- Parameters for decisions that need to be made
- Strengths and weaknesses of new technology
- Types of data collected
- Holistic knowledge of the entire food-processing process, and where their task fits within it
- Enhanced product knowledge
- Enhanced quality control and quality assurance knowledge

Attributes

- Open to learning
- Able to learn new tasks quickly
- Accepting of diversity
- Creative
- Curious
- Self-motivated
- Continuous improvement mindset
- Open to feedback
- Mechanical aptitude

STUDENT

(potential employee, secondary school graduate or in college program)

Students are an ideal employee source for the food-processing industry. Even those with no experience in the sector can add important skills to an organization, such as up-to-date knowledge of digital platforms and the ability to quickly synthesize information. By hiring students with a positive attitude and complementary essential/transferrable skills, organizations become more adaptable to change.

Skills

5. **The ability to adapt to a diverse workforce**
   - Work effectively with individuals from diverse backgrounds
6. **The ability to create a positive, solution-focused workplace**
   - Synthesize information from multiple sources
   - Problem-solve without assistance
   - Locate the information needed without assistance
   - Use enhanced verbal communication skills
   - Respectfully move through conflict
9. **The ability to integrate new technology and processes into existing systems**
   - Apply digital intelligence, e.g. use variety of interfaces, act in ethical manner online
   - Use advanced numeracy skills
   - Active in online communities

Knowledge

- Up-to-date software, hardware and online platforms, e.g. social media
- Different cultures
- Gender issues
- Emotional and physical disabilities
- Digital intelligence, e.g. knowledge of online security, how to determine if information is accurate, ethics around participation in online communities, etc.

Attributes

- Curious
- Culturally sensitive
- Accepts failure as learning
- Self-motivated
- Team player/collaborative

SALES AND MARKETING

Sales and Marketing is one area that is being revolutionized as consumers demand a direct relationship with their products and producers. Individuals in this area need to be "storytellers" and engage consumers in the story of the product and the organization. It is critical that sales and marketing remains up-to-date with social media platforms and can apply innovative thinking to the "big data," which is now being collected.

Skills

1. **The ability to think and act as a global business**
   - Demonstrate cultural competence
2. **Ability to act as a good global citizen**
   - Able to "tell the story" of the organization and the products in new and innovative ways, including social responsibility, sustainability
3. **The ability to collaborate with others involved in innovation**
   - Collaborate with research and development to improve and develop new products
   - Collaborate with product developers and purchasers to identify product attributes to promote innovation
   - Use enhanced presentation skills
   - Collaborate with retailers to reflect different forms of distribution
   - Use enhanced business communication skills
8. **The ability to develop and track effective direct relationships with the consumer**
   - Facilitate consumer connection to food source
   - Develop multi-faceted approaches, e.g. involving public relations, event management and digital/mobile aspects
   - Launch and manage digital-marketing initiatives
   - Launch and manage social-selling programs
   - Analyze and use data in new ways, e.g. traceability information for a consumer app that shows product origin
9. **The ability to integrate new technology and processes into existing systems**
   - Apply digital intelligence
   - Use sales and marketing research and data to monitor innovation trends
   - Keep up-to-date on trends, e.g. consumer preferences, social media, apps
   - Implement change management plans

Knowledge

- Enhanced, detailed product knowledge
- Cultural knowledge, including product preferences, methods of communication
- Generational difference as it relates to product preferences
- Potential international markets
- Story of company's products
- Standards for products' certifications, e.g. fair trade, organic, GMO free, gluten free, kosher, halal
- Packaging regulatory requirements
- Trending consumer concerns regarding social responsibility and food security, e.g. environment, fair trade, use of additives, waste disposal
- What data analytics to use for what purpose
- Pay-per-click (PPC) advertising and its applications
- Search engine optimization (SEO)
- Digital display advertising
- Mobile marketing/advertising

Attributes

- Open to diversity
- Flexible
- Creative
- Able to work independently, including remotely
- Self-motivated
- Reliable

PURCHASERS

Purchasers will often need to complete more direct purchasing tasks, which will require the ability to communicate effectively with persons from other cultures, and to manage all the nuances involved in international trade. Critical thinking and problem-solving skills will become increasingly important, as the nature of what it is being purchased, as well as where and who it is being purchased from, may change rapidly. Maintaining the quality of the ingredients/inputs has the potential to become more challenging for purchasers.

Skills

1. The ability to think and act as a global business
- Demonstrate cultural competence
- Research suppliers in-person in international settings
- Use enhanced negotiation strategies, e.g. global contracts

2. Ability to act as a good global citizen
- Able to apply social responsibility and sustainability policies to shifting purchasing situations
- Source in a way that contributes positively to food security

3. The ability to collaborate with others involved in innovation
- Collaborate with food safety, operations management, finance to align activities
- Collaborate with product developers to understand purchasing requirements
- Collaborate with marketing to ensure suppliers meet branding and corporate image requirements
- Communicate information from suppliers re: new products/ingredients to product development
- Use enhanced business communication skills

4. The ability to effectively analyze risk and reward
- Monitor trade environment
- Research changes to legislation/ regulations in all relevant jurisdictions/ countries
- Keep up-to-date with trends in IT, e.g. social media platform, apps
- Conduct supplier audits
- Take advantage of tax credits and funding opportunities
- Use financial tools, such as forward contracts to hedge currency fluctuations

9. The ability to integrate new technology and processes into existing systems
- Apply digital intelligence, e.g. use variety of interfaces, act in ethical manner online
- Use technology to keep up-to-date on system developments

Knowledge

- Cultural knowledge, including methods of communication
- Potential new sources of ingredients/ inputs
- Trending consumer concerns regarding social responsibility and food security, e.g. environment, fair trade, use of additives, disposal of waste
- Ethical purchasing practices
- Trends related to adulteration of ingredients/inputs, e.g. dilution
- Up-and-coming allergens and potential allergens in ingredients/inputs
- Digital purchasing options
- Legal and financial risks
- Where to find up-to-date information regarding food sector-related supply chain issues
- Sustainability of supply
- Cost fluctuations
- Trending financial and supply chain practices, e.g. block chain (cryptocurrency)
- Status of trade agreements
- Up-to-date regulations in all relevant jurisdictions/countries
- Stability of supplier's operating environment

Attributes

- Patient
- Adaptable/flexible
- Creative
- Accepting of diversity
- Team player/collaborative
- Detail-oriented
- Open to learning
- Continuous improvement mindset
- Fluency in languages other than English is desirable

FOOD SAFETY PROFESSIONALS

Food Safety Professionals must be involved in innovation to protect the public and the organization. This is an area of extreme rapid change. National and international regulations are changing quickly and must be adhered to. New methods of risk analysis and food safety risks are constantly being discovered, and food safety professionals need to know the latest information.

Skills

3. **The ability to collaborate with others involved in innovation**
   - Collaborate with operations management, finance, purchasing to ensure safety and security of the entire process during operational changes
   - Collaborate with product developers to ensure recipes meet new and upcoming regulations
   - Use enhanced business communication skills
4. **The ability to effectively analyze risk and reward**
   - Interpret legislation to identify its impact on the organization
   - Keep up-to-date with trends in food safety internationally
   - Use predictive modeling
   - Apply new methods of detection
   - Complete increasingly in-depth risk assessments
6. **The ability to create a positive, solution-focused workplace**
   - Identify solutions to potential and actual food safety issues, e.g. develop alternatives
9. **The ability to integrate new technology and processes into existing systems**
   - Apply new methods of detection
   - Complete detailed data analysis

Knowledge

- New commodities available and their associated risks
- Validation process for predictive models
- Enhanced, detailed knowledge of microbiology
- New methods of detection of spoilage and pathogens on the production line
- Detailed knowledge regarding factors involved in spoilage and shelf-life extension
- Surrogates (organisms, particles, or substances used to study the fate of a pathogen in a specific environment)
- New and up-and-coming food-processing techniques, e.g. thermal processing
- Equipment information, especially as concerns parameters and operating procedures

Attributes

- Proactive
- Solution-focused
- Creative
- Continuous learner
- Detail-oriented
- Team player/collaborative
- Continuous improvement mindset

HUMAN RESOURCES

Human Resources Professionals will be required to integrate their efforts with all parts of the food-processing organization. They will need to respond to the changes required to attract, motivate and retain an increasingly diverse workforce. They will be very involved in change management processes and will often be required to spearhead ongoing retraining initiatives.

Skills

1. **The ability to think and act as a global business**
   - Demonstrate cultural competence
2. **The ability to act as a good global citizen**
   - Contribute to development of social responsibility/sustainability policies and procedures
3. **The ability to collaborate with others involved in innovation**
   - Collaborate with all departments
   - Collaborate with educational institutions to provide opportunities for co-op students in relevant programs to gain work experience
   - Collaborate with HR third party providers to create innovations in service
   - Contribute to "systems thinking" and potential new organizational structures
   - Coach others not traditionally coached, e.g. peers
   - Use enhanced business communication skills
5. **The ability to adapt to a diverse workforce**
   - Recruit from non-traditional labour markets
   - Motivate a changing and multi-faceted workforce
   - Develop new retention strategies
   - Develop proactive, ongoing training programs that foster innovation and collaboration
6. **The ability to create a positive, solution-focused workplace**
   - Develop new and innovative reward and recognition systems
9. **The ability to integrate new technology and processes into existing systems**
   - Use new and emerging recruitment methods
   - Contribute to retraining the workforce, as necessary

Knowledge

- What motivates a diverse population, e.g. generational, cultural differences
- Cultural/religious needs and expectations of the workforce
- Industries and sectors where skills may be transferable
- Non-traditional labour pools, e.g. ex-cons, persons with disabilities
- How other sectors are modernizing their approach to HR, e.g. best practices in attraction, retention
- International regulations and trends related to labour

Attributes

- Proactive
- Solution-focused
- Creative
- Open to learning
- Continuous improvement mindset
- Self-motivated
- Focus on reward/recognition rather than discipline
- Inclusive/accepting of diversity

FOOD SCIENTIST/ PRODUCT DEVELOPER

Food Scientists/Product Developers will be required to improve existing and develop new products at an increasingly rapid pace. In order for the organization to stay relevant and to anticipate consumer preferences, scientists/product developers will need to constantly research new ideas and co-ordinate their work with other departments.

Skills

3. **The ability to collaborate with others involved in innovation**
   - Advocate for regulatory approval by providing risk mitigation and product validation data
   - Collaborate with research and innovation hubs
   - Integrate activities with all other departments
   - Use enhanced business communication skills, including providing rationale for recommendations
   - Use enhanced presentation skills
4. **The ability to effectively analyze risk and reward**
   - Interpret legislation to identify its impact on the organization
   - Research options in packaging processes and materials, process automation, software and hardware
   - Analyze applicability of options to current state, including cost
   - Take advantage of tax credits and funding opportunities
7. **The ability to quickly reformulate and/or deliver new products that meet consumer preferences**
   - Research new and unusual ingredient information
   - Merge product lines/consolidate to create efficiencies
   - Use holistic approach to develop new products
   - Develop "personalized" products, e.g. different levels of food sensitivities
   - Keep up with the rapid pace of change
9. **The ability to integrate new technology and processes into existing systems**
   - Apply digital intelligence

Knowledge

- Research institutions
- Cooperative project opportunities where to find up-to-date information regarding regulations, e.g. labeling changes
- Current options for automation
- 'Floor realities' of processing
- New packaging processes and options, e.g. biodegradable, incorporating nanotechnology
- Enhanced knowledge of nutrition
- Product risk assessment data
- Culinary knowledge
- Social awareness
- Environmental considerations
- Product utilization
- Options for software/hardware and their associated costs
- Shifting consumer preferences and
- Consumer preferences in new targeted global markets

Attributes

- Adaptable
- Team player/collaborative
- Curious
- Solution-focused
- Detail-oriented
- Creative
- Persistent
- Continuous learner

THE CULTURE OF THE NEW FOOD-PROCESSING WORKPLACE

CULTURE OF THE NEW FOOD-PROCESSING WORKPLACE

While it wasn't anticipated or an agenda item, discussions about innovation and the skills needed for the future led to additional discussions about workplace culture and how it is, by necessity, changing to support innovation. Several ideas were generated about the workplace of the future and what that will look like. Many organizations are starting to implement change management processes to steer their workplace culture in this new direction already. It is hoped and expected that this new workplace culture will be an open one that encourages employees to stay with the organization, and that it will help to drive the organization to be proactive and successful.

The Workplace Culture of the Future will:

- Have an organizational design that reflects openness and flexibility, involving peer relationships rather than an hierarchical ladder. This includes a rethinking of job titles and roles, e.g. "director of ideas" and "coaches" rather than "supervisors"
- Create an environment of continuous learning, where employees have specialized skills in many areas, and that training and professional development budgets are not the first line items to be cut in lean times
- Be open to diversity and change.
- Be risk-oriented. Employees at all levels will be involved in assessing risk, not just management or executive level.
- Allow failure and learning. A tolerance for failure was identified as an important aspect of innovation.
- Be solution-focused instead of problem-focused.
- Be creative. Foster creativity at all levels, instilling creative curiosity in the workforce
- Encourage all employees to develop change management skills.
- Empower all employees to make decisions.

There is also the potential that more subcontractors will be used in the workplace, which will potentially require a new management style.

RECOMMENDATIONS AND SUMMARY

FUTURE SKILLS ROUNDTABLE RECOMMENDATIONS AND SUMMARY

The roundtable session was engaging and productive. Participants from a wide range of perspectives discussed current and upcoming trends (products and labelling, technology, business environment, consumer relationships) and identified skills that will be needed as organizations transition to be more forward-thinking and innovative. They identified many barriers to, and needs and best practices for, an innovative workplace. They briefly discussed the characteristics of the culture of food-processing organizations of the future. These discussions have resulted in the following recommendations for next steps to take this conversation into action:

1. Update/revise existing National Food and Beverage Processing Competency Framework.

There were many skills that were identified as needed for the future workplace. Some of these skills already appear in the National Food and Beverage Processing Competency Framework, but need to be enhanced or added to to meet the predicted needs. Others exist as gap areas, for instance there is the potential for a category area focusing on innovation, with skills such as “build an innovative culture”; or a new area that includes knowledge and skills related to needs analysis, research, installation and integration of new technology. As the Competency Framework is the basis for all training and tools developed for the industry, this foundational activity should be completed to integrate the skills identified during the Future Skills Roundtable into the Framework itself.

2. Develop training and/or tools to address skill gaps

Once the skills and knowledge have been clearly defined within the Competency Framework, training and tools may be developed to help organizations address areas where skill gaps related to innovation exist. These may take the form of curriculum design that combines skills from various diciplines creating “hybrid” programs, online training , or on-the-job human resource tools to help identify gaps and build capacity. Some examples of potential need areas include:

- Digital skills
- Change management skills
- Attract, motivate and retain a diverse workforce
- Development of social responsibility and sustainability practices and programs
- Data analysis and interpretation skills
- Critical thinking/problem solving skills

Funding from Google.org to Toronto-based MaRS will see the creation of the Employment Pathway Platform. "The platform is meant to help workers navigate a changing job market and develop a path to establish or transition to a new career. It will pull together data skills and training options from multiple sources, and then analyze a user's existing skills and employment preferences against them."

- MaRS receives $1 million from Google to train workers impacted by automation, Jessica Galang, Betakit's

3. Take advantage of opportunities to collaborate

As discussed throughout this report, participants identified many opportunities for collaboration that will serve the sector as it focuses on innovation and securing more global business. Some recommended actions that came out of these discussions include:

- Creation of an online hub that contains all national, provincial and regional funding program information and allows for sharing of information/discussion between individual organizations
- Conduct a process/discussion through which education/government institutions and food processors can address their individual concerns when working together on research projects.
- Work with public education and/or others to increase consumer education around the sector, nutritional information, and the purpose of food additives.
- Work with public education, government, other food processors to create heightened career awareness about the sector and its potential; so that individuals view it as a viable career option rather than a job to do until something else comes along.
- Advocate as a sector to work toward more streamlined regulatory processes for new and innovative product approvals.
- Seek opportunities for individual organizations to work as a group, such as an online bulk processing platform, to benefit all.

4. Continue periodic discussions (future roundtables) regarding skill gaps and innovation

Feedback from participants indicated a desire to hold similar roundtable discussions in the future at regular intervals. They found value in the cross-sector discussions and felt that the discussion should be revisited in the future, perhaps annually, biannually, or some other interval so that skill gaps can be identified and the sector can discuss issues, solutions and new ideas.

ACKNOWLEDGMENTS

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High Liner Foods	Scott Brown	Director of Product Development	Nova Scotia
Ice Age Glacial Water Company	Jaewon Yon	Quality Assurance Manager	British Columbia
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ACKNOWLEDGMENTS

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