GLOBAL FOOD INNOVATION INDEX

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DALHOUSIE UNIVERSITY
FACULTY OF AGRICULTURE

Agri-Food Analytics Lab

EXECUTIVE SUMMARY

The Global Food Innovation Index compares factors contributing to innovation in the food, beverage and agri-food industries across the following ten countries: Canada; the United States; Mexico; the United Kingdom; France; Germany; Italy; the Netherlands; Japan; and Australia. The Index is separated into four main pillars which are: Regulatory Environment; Business Competitiveness; Market Readiness; and Intellectual Property and Research & Development. Each pillar was divided into sub-pillars, with each sub pillar consisting of a number of criteria that countries would be evaluated on. Each criterion was worth three points, which were added to create a total possible score of 75 across all four pillars. Data was collected from mostly government websites, where available. Both language and national security concerns posed barriers to data collection, but this was noted in scoring

PILLAR 1 Regulatory Environment (15)	PILLAR 2 Business Competitiveness (24)	PILLAR 3 Market Readiness (18)	PILLAR 4 Intellectual Property and Research & Development (15)
1.1 Regulatory Environment (9)	**2.1 Business Competitiveness (12)**	**3.1 Training and education (12)**	**4.1 Proprietary protection (6)**
1.1.1 Approval Periods	**2.1.1** Trade Balance	**3.1.1** Student Incentives	**4.1.1** Patent Procedures
1.1.2 Food Safety Assurance	**2.1.2** CPI	**3.1.2** Education Trends	**4.2.2** Patent Protection
1.1.3 Transparency & Communication	**2.1.3** Economic Indicators	**3.1.3** Employment Trends	**4.2 Research and Development (9)**
1.2 Environmental Restrictions (6)	**2.2 Capital Credit and Credit Availability (6)**	**3.1.4** Job Retraining	**4.2.1** Federal Budget
1.2.1 Waste Management	**2.2.1** Government Grants and Loans	**3.2 Diversity and Inclusion (6)**	**4.2.2** National Data Strategies
1.2.2 EPA & ERA	**2.2.2** Foreign Direct Investment per Capita	**3.2.1** Incentives and Equitable Workplace Training	**4.2.3** Privacy Laws
	2.3 Distribution Networks (9)	**3.2.2** Pay Gap Analysis	
	2.3.1 Large-Scale Competitors		
	2.3.2 Private Labels		
	2.3.3 Shipping Capacity		

Regulatory Environment contributes to innovation through implementing guidelines and laws that businesses must follow when releasing new food products. Business competitiveness contributes to innovation through providing context of how new products may perform based on a country's economy, how products can be distributed within a country, and what the competition is like for new food products or businesses. Market readiness contributes to innovation through providing an overview of employment and earning prospects as well as incentives for minorities to enter the food production industry. Intellectual property contributes to innovation through examining how new inventions are protected, how information is shared, and what sort of funding exists to support innovators.

The findings concluded that the United Kingdom performed best overall with our Index with a total of 53 points, followed by the United States with 51, Canada with 47, Australia with 44, Germany with 43, France with 35, the Netherlands and Japan each with 32, Italy with 28, and Mexico with 19. But weighted results do better represent how countries performed when evaluating selected metrics. Weighted results do not penalize countries for which data was not available/accessible. Weighted results re-balance the data in order to more accurately reflect how countries are performing based on metrics we could find data for. With this ranking, Canada places fifth overall.

A priority for Canada should be enhancing our relationship with technological innovation in the broadest sense. The safety of new and existing food products being developed and manufactured in Canada can benefit from the technology applications that will ensure Canadians, and our export markets trust our products. Technological innovation means an intelligent engagement with software and systems, such as predictive analytics, AI and machine learning are utilized to enhance human decision-making and efficiency. This also means thinking and applying bold use of advanced machinery, equipment, packaging, and robotics that improve the quality of Canadian food products.

If Canada is to improve its ranking in Global food innovation, the costs of doing business for the food industry needs to be addressed head on. This ranges from everything from the cost of farm products, to the cost of manufacturing products, to the costs of distribution, the costs of listing products with retailers, and the costs of compliance with a range of regulations. The amount of Canadian food products (SKUs) developed and manufactured in Canada has continued to fall, and in 2017, 83% of the food products shipped to Canada were neither developed nor made here (Analysis Group, 2018).

As Canadians, we can look at the bright and bold initiatives underway across the country. An example is the food incubator in Calgary, District Ventures, which is fostering an ecosystem of new food start-ups. Canada needs to find a way towards greater cooperation between our industries, governments and research centres. We can also use the experience from the pandemic, and look to a future in a post-pandemic whereas Canadian food processors and innovators, we can think of how we add value to the broader economy, to sustainability, to health, to value for the dollar, and to a reputation for excellence and innovation in all the markets we serve, domestically or internationally.

Country	Sec. 1 /15	Rank Pillar 1	Sec. 2 Total /24	Rank Pillar 2	Sec. 3 Total /21	Rank Pillar 3	Sec. 4 Total /15	Rank Pillar 4	Total Score /75	Final Rank (weighted results)
Canada	9	5	14	6	14	2	10	4	47	5
United States	9	5	16	3	15	1	11	2	51	2
Mexico	1	10	12	8	0	10	6	7	19	8
United Kingdom	11	1	18	1	12	3	12	1	53	1
Italy	3	9	13	7	7	6	5	10	28	10
Germany	11	1	17	2	9	4	6	7	43	3
France	6	8	16	3	3	9	10	4	35	9
Netherlands	10	3	12	8	4	8	6	7	32	6
Japan	9	5	9	10	6	7	8	6	32	7
Australia	10	3	15	5	8	5	11	2	44	4

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PROJECT TEAM

The Agri-Food Analytics Lab (AAL) at Dalhousie University is distinctively designed to both broaden and deepen food knowledge. It is the first Lab in the country devoted solely to tackling our country's food issues along the entire agriculture and food continuum by collecting, monitoring, mining data continuously, in Canada's both official languages.

Proven analytical tools are the cornerstone guiding our studies to discover, interpret and communicate significative trends found in the gathered data. The primary focus is on the Canadian market while acknowledging that disrupting forces can come from abroad. Nationally and internationally the food landscape is changing fast and it is imperative to better understand the future of food and how we can connect agriculture and food communities together. As such, AAL offers current food knowledge and expertise to drive understanding, innovation and action on the world's food issues. Our goal is to better understand the future of food and how we can connect agriculture and food communities together.

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COUNTRIES

The countries included in the survey that comprises the International Food Innovation Index are Canada, the United States, Mexico, the United Kingdom, France, Italy, Germany, the Netherlands, Japan, and Australia. Each country was selected to provide geographic diversity within the sample, as well as a sample of mid to top performing countries in terms of GPD. Considering this index was generated from a Canadian context, countries were also selected based on trade capacities and competitiveness.

PILLARS

The following section outlines the criteria each country was evaluated on. These criteria each represent an aspect of regulations, organizations, monetary commitments, and training, which directly affect the culture of innovation within the food industry within a specific country. A visual chart of each pillar and its weighting is included in Appendix 1.

SECTION 1: REGULATORY ENVIRONMENT

1.1 REGULATORY ENVIRONMENT

1.1.1 Approval Periods for New and Novel Food Products

New and novel food products must undergo federal approval before being made available on the consumer market, to protect consumers from potentially harmful substances and ingredients. The length of time it takes for a novel food product to receive approval can impact innovation. Product approval times are largely publicly available through government websites. Each approval period was recorded, and an average was created. Longer approval periods may impede innovation, as they create barriers to manufacturers interested in releasing new products.

1.1.2 Food Safety Assurance Measures

Food safety assurance measures include: an analysis of each country's reporting structure for breaches of food safety; potential repercussions; and protocols enforced to ensure the quality of food being produced and distributed. Countries may implement additional protocols, such as audits or inspections as required. Information regarding food safety protocols is widely available through government websites, the websites of health and safety monitoring divisions, and reports from federal health and safety organizations. Food safety and monitoring is an important aspect of innovation, as consumers want assurance that the products they consume are safe and free from harmful additives or contaminants. Implementing proper food safety assurance measures could increase the quality of products produced, as well as the level of trust consumers have in food manufacturing businesses, impacting innovation through consumers trusting new products, as they can be assured the product has been tested and inspected for harmful materials.

1.1.3 Transparency and Communication

Each country was evaluated on the transparency of information, which includes the quantity, quality, and currency of publicly available information surrounding food processing laws, health and safety laws, and other industry information relevant to both consumers and producers. Transparency was evaluated on accessibility features of government websites, including available languages and features such as text-to-speech or text adjustment. Communication was evaluated based on the various communication methods governments use to disseminate crucial information regarding food safety or production, or methods in which governing bodies incorporate civilian and industry feedback into decisions regarding legislation affecting food production. All information for this section was found through systematically evaluating government websites and noting the accessibility features available on the home page, viewing site maps, and looking for contact forms or public engagement forums.

1.2 ENVIRONMENTAL RESTRICTIONS

1.2.1 Waste Management and Packaging Laws

This section examined the prevalence of laws regarding waste management and packaging, including legal responsibility of manufacturers to manage waste created by products throughout production or after consumption by the consumer. Packaging and waste laws may affect the creation of certain packaged and processed products, and restrictive packaging and waste laws may force producers to create new solutions to find more environmentally sustainable packaging solutions. This may affect innovation, as countries require materials that encounter food products to undergo environmental risk and health assessments, similar to the procedure of approving novel food products. At the same time, many consumers are becoming increasingly conscious of their environmental footprint and are interested in consuming environmentally responsible products. Laws that encourage companies to produce products in a more environmentally conscious manner may in turn increase the products appeal to more consumers (Maurizio & Silvia, 2020; Qasim, Liang, Guo, Saeed, & Badar, 2019).

1.2.2 Environmental Risk Assessments

Environmental risk assessments (ERAs) are procedures put in place by government divisions to ensure that the manufacturing, production, or distribution of new and novel food products do not have irreversible negative effects on the physical environment, including plant, animal, and human health. ERAs are often dependant on the type of product being proposed, and the requirements for environmental risk assessments vary based on country and product. While stringent ERAs may have longer observation or application procedures, less stringent ERAs may lead to companies releasing or creating products that are unsuitably harmful to the natural environment, or human, plant, or animal health. Information on ERAs is publicly available through federal environmental departments and government websites. ERAs were included as a metric, due to the fact that ERAs help mitigate health risks as well as environmental damage, and having clear policies ensures that companies are following laws and upholding their social responsibility to protect the environment and consumers to the best of their ability.

SECTION 2: BUSINESS COMPETITIVENESS

2.1 ECONOMIC INDICATORS

2.1.1 Exportation and Importation of Food Products

Statistics observing the quantity of food products being imported and exported are publicly available through a database hosted by MIT. Trade activity is tracked in a dollar amount, and the following trade areas were recorded: Foodstuffs, Vegetables, Animal products, and By-products. By quantifying the amount of food and food products countries import and export, it is better understood how the food and beverage industry contributes to a country's trade level (percentage of GDP exported) and trade balance (the difference between exports and imports).

2.1.2 Consumer Price Index

The consumer price index (CPI) measures the price of a specific basket of goods and, when compared to a base year, provides a measure of inflation. CPI is often recorded specifically for food products to provide a measure of food price inflation in a country. CPI is generally measured by government statistics departments and provided on their websites as annual measures. If it is not available there, a country's central bank may provide the measurement. The CPI contributes to an overall picture of the food market from the consumer's point of view. The CPI might also be worth considering in comparison to other countries, to determine where an innovator can receive a relatively higher price for their products, or to consider where price changes are more volatile and might not lead to a consistent income for their business.

2.1.3 Annual Long-term Interest Rate

The long-term interest rate measures the rates of government bonds traded on the market and provides an indication of the overall interest rates affecting business investments as markets are often integrated; the OECD measures the annual long-term interest rates for each country. While government funding may be available to innovators, the cost of bank loans is important for innovation and can be indicated by interest rates. Where a country experiences higher interest rates, borrowing money is costlier for innovators and can be a barrier to innovation or place more pressure on governments to provide funding.

2.1.4 Annual Exchange Rates

Most countries operate on a floating exchange rate, meaning the exchange rate changes in response to other countries' exchange rates. Exchange rates indicate the relationship between the price of domestic goods and the price of foreign goods. Exchange rates in terms of Canadian dollars are published by the Bank of Canada. An increase in the value of a country's currency relative to the Canadian dollar means the country's goods are relatively more expensive. This balance impacts a country's ability to import and export goods, including food.

2.1.5 Labour Productivity

Labour productivity measures the growth in GDP per hour worked. Data about the food sector's labour productivity can be collected from the OECD. This variable contributed to an overall picture of each economy's productivity and allowed for the assessment of innovation in countries with higher labour productivity relative to other countries.

2.2 CAPITAL CREDIT AND CREDIT AVAILABILITY

2.2.1 Government Grants and Loans

This section evaluated the prevalence of monetary support provided by federal bodies to businesses within the agri-food and food and beverage industries to incentivize innovation within established industries. This metric was measured by the availability of funding programs, how funding is dispersed, and the accessibility of information regarding federal funding. Information on funding was found through consulting government websites and through affiliated databases. Government loans are often provided at lower interest rates, reducing the cost of borrowing money for innovators. Furthermore, when government grants are available, innovators can take on less debt from the private sector and reallocate those funds into their innovations.

2.2.2 Foreign Investment

Foreign direct investment considers the inflow of foreign capital into another country. Annual foreign direct investment inflow data is available from the OECD. Foreign investments not only provide additional capital to companies, but along with the capital, there might also be increased economic growth and new technologies brought to the market because of foreign involvement. Population data was retrieved to create a measure of foreign direct investment per capita to compare across countries and account for different sizes in populations and economies. When it comes to innovation, new flows of capital and technology will be important for countries as they continue to grow.

2.3 DISTRIBUTION NETWORKS

2.3.1 Number of Large-Scale Competitors

The number of large-scale competitors was assessed based on the percentage of food market share in a country relative to other competitors and same-store sales. The number of large competitors indicates market structures that innovators face when introducing new products. Information about companies is available through company websites, statistics groups, and through governing bodies. Countries which have fewer large-scale competitors might see these companies having greater market influence. New innovations likely need to adhere to the standards and policies dictated by the large-scale corporations to be introduced through their networks.

2.3.2 Prevalence of Private Labels

This category assessed whether private labels exist in a country's grocery industry, and how successful the private labels are based on volume of private label products and the focus of these products. Data was available on companies' websites. Private label success will affect where innovation occurs. For example, if a private label is successful, it will be a barrier to market entry for a new product outside of the label. Innovation may, in that case, occur through the label rather than by new market entry.

2.3.3 Shipping Capacity

This category examined a country's access to ports, airports, and trains. Shipping capacity is important for products to get to market, both domestically and internationally. The number of ports, airports, or railways present in a country all affect a country's shipping capacities. Transportation information was found on the transportation agencies' websites, government websites, or third-party websites. Large-scale competitors already have distribution networks in place, but smaller innovators entering the market need access to transportation and shipping to distribute their products.

SECTION 3: MARKET READINESS

3.1 TRAINING AND EDUCATION

3.1.1 Incentives for New Students

The availability of federal grants to prospective students may affect their decisions to pursue post-secondary education, whether through university, college, trade school, or apprenticeships. As the cost of post-secondary education rises, young people are often forced to take out large loans to pay for education, although federal grants and scholarships can also be awarded to students seeking to further their education. Information on the availability of grants and scholarships was found through government websites and through education departments. Countries with lower tuition rates and more funding options may incentivize citizens to pursue higher education, as it creates less financial burden. Skilled labourers, technicians, technologists, and other skilled workers are needed in the agri-food and food and beverage industries. A lack of students pursuing higher education or training that could be applicable to these fields could result in future underemployment, lower productivity, and lower innovation.

3.1.2 Education Trends

This section examined graduate employment rates as well as the degree of education required to gain employment within the agri-food and food and beverage industries. Graduate employment rates can be found through analyzing employment statistics found on government websites through the education department or government open-data repositories. High employment rates indicate a need for professionals within a sector and may also incentivize prospective students to pursue careers in specific industries if they feel as though they are highly likely to gain employment after graduation. Graduate employment rates are often distinguished by level of education. If it is a trend within an industry to hire individuals with a high level of education, this could create a barrier to individuals looking to enter an industry, as pursuing higher education is costly and can be a lengthy process.

3.1.3 Employment Trends

This category examined the employment rate within agriculture and food manufacturing industries, and annual wages in comparison to the national average wage of each country. Average annual wages are available from the OECD; individual countries should collect employment data

by sector as well as wage data by sector. Countries with high employment rates or above average earnings could incentivize individuals to work in food manufacturing or agri-food industries, as they would likely gain employment and earn better wages. If employment and wages within these sectors are low, individuals may be discouraged from pursuing a career in these industries, as they would be less likely to gain employment or a good wage, thus potentially impacting innovation through fewer workers or inferior working conditions.

3.1.4 Job Retraining Programs

This category evaluated the prevalence of programs aimed at training individuals looking to switch careers or gain additional training to assist them in furthering their careers. Most job retraining programs are targeted toward veterans or individuals from marginalized communities who face barriers to accessing education, although the availability of federal incentives for job retraining varies based on country. Retraining incentives help individuals either advance in their current careers or change career paths, which affects innovation through potentially allowing more individuals to advance within their careers.

3.2 DIVERSITY AND INCLUSION

3.2.1 Incentives and Equitable Training Programs

This section examined benefits for individuals who identify as a minority (people who identify as Indigenous, POC, disabled, LGBTQIA+, or female) and for businesses that actively participate in creating diverse workforces through training, hiring, and earning certificates. Incentives such as grants or specialized jobs were examined; incentives, diversity statements, and equitable employment opportunities were often found through government websites or the department of labour. Included in this metric were incentives for businesses, which examined the prevalence of federal diversity training initiatives, anti-discrimination laws, and diversity statements. Having a clear, transparent, and easily accessible anti-discrimination law ensures that minorities can be protected within the workplace and can gain easy access to a document that outlines their rights. Federal diversity training initiatives often reward businesses that complete the training with certain certifications. Businesses that participate in the training may also have employee groups that act on the behalf of minorities to advocate for equal treatment or other types of support. Studies show that diversity within a workplace positively impacts innovation in addition to contributing to staff retention rates and overall employee satisfaction (Ahmed, Atif, Hossain, & Mia, 2019; Brimhall & Mor Barak, 2018; Sabharwal, 2014; Díaz-García, González-Moreno, & Sáez-Martínez, 2013).

3.2.2 Pay Gap Analysis

This category examined the wage discrepancy between male and female workers within an industry. Where industry-specific wage data was not available, overall earnings were used instead. Pay discrepancies were calculated as a percentage, then averaged to create an overall average gap. Countries with high wage gaps within the agri-food and food and beverage industries may discourage women from participating in the industry as they are less likely to earn high wages. Wage data is not available by race for any country other than the United States, so gender was the only factor included when calculating the gap.

SECTION 4: INTELLECTUAL PROPERTY AND RESEARCH AND DEVELOPMENT

4.1 PROPRIETARY PROTECTION

4.1.1 Patent Procedures

Patents protect new inventions, including the following: products, compositions, machines, processes, and any improvements in these categories (Canadian Intellectual Property Office, 2018).[1] Patents create incentives for research and development because they assure innovators that, for a limited time, they will have exclusivity over a product in the market. Patent procedures were measured by the length of time it takes for patents to be granted by the governing body, whether there are fees associated with the procedure, whether fee schedules provided allowances for different patent applications, the lifetime of the patent, and any other barriers. Information surrounding the patent procedure can be found on government websites. Patent grants that take a significant amount of time create barriers to innovation in a country because applicants may be hesitant to release a product into the market without patent protection.

4.1.2 Patent Protection, Enforcement, and Monitoring

Patents are protected by various schemes, including both domestic and international governing bodies and laws. This section examined the schemes that are available to patent holders; how patents are monitored and enforced; and, the recourse available if a patent is breached or the penalties that apply. In this variable, both domestic and international schemes, available on government websites, were considered. A patent will not spur innovation if it cannot be protected.

4.2 RESEARCH AND DEVELOPMENT

4.2.1 Federal Budgets for Research Spending

While the banks provide some funding, governments are an important contributor of research funding. This section focuses on government spending on research at a federal level. Research funding data was collected in two ways: (1) as total budgeted expenditure for the fiscal year 2019; and, (2) as a percentage of total government spending to allow researchers to compare a unitless measure of spending across countries. This variable focused on spending in food research.

1 Copyright protects artistic works, including paintings, drawings, and written works. Copyright law does not protect the idea itself, rather the expression of the idea. Trademarks protect "combinations of letters, words, sounds or designs that distinguish one company's goods or services from those of others in the marketplace" (Canadian Intellectual Property Office, 2016). As this study focuses on food innovation, the proprietary protection category will focus on patents instead of copyright or trademarks.

4.2.2 National Data Strategies

Countries were studied to determine whether the federal government had implemented a data policy or strategy which would be used across different sectors within the country. Data strategies were assessed considering the following: the scope of the strategy (is it for government or does it extend to the private sector); when the strategy was published; whether the strategy is complete; the action steps that are in the strategy and whether there is an accompanying budget for it; any unique factors to the strategy; and, finally which government department, if available, is responsible for the strategy. Data strategies were also evaluated on presentation and accessibility (length, language, use of graphics). While privacy laws are important for dictating how data might be collected, used, and disclosed, data strategies are also important to ensure that there is data to handle.

4.2.3 Data Privacy and Restrictions on Access

Data is important to innovators. Data privacy laws affect what data can be collected and how, and what that data may be used for, or how it may be shared. Data privacy laws for each country were evaluated in terms of prevalence, scope, stringency, and penalties for breaches. Data privacy laws are available on government websites. Data privacy laws should support innovation by allowing innovators access to data on their consumers while balancing citizens' rights to privacy.

METHODOLOGIES

Each pillar is assigned a weighting, based on the number of sub-pillars and on the number of criteria within each sub-pillar. For instance, section 1 is worth 15 points, based on the three criteria in section 1.1, each worth three points (3x3=9) and the two criteria in section 1.2, also worth three points (3x2=6). The total of 15 is reached by adding the total available amount of points for each sub-pillar together (9+6=15), reflecting the total number of points available per section. Scores were only calculated using whole points, and final performance ratings were based on a country's score within a pillar and overall score aggregating all four pillars. Scores of zero were only applicable when the researchers identified a lack of data needed to adequately score a country or encountered restrictions that prevented the researchers' access to the data. A value of N/A was given when the data may exist, but researchers could not access it due to language barriers.

Data was collected using both qualitative and quantitative methods. Qualitative data was analyzed using thematic coding in which common themes were observed to identify a baseline for procedures among the different countries. This baseline was used to create an average, or two out of the possible three points. Countries that have regulations or operations falling outside of the standard procedure were further studied to see if the procedures inhibited or benefited innovation. The outlying countries were again analyzed using thematic coding to identify superior practices or lack of practices, based on the standard procedure as identified through the first round of coding. Countries that took additional measures were awarded an additional point to make their score three out of three. Countries that lacked procedures in comparison to the standard were subtracted a point, making their score one. Quantitative data was analyzed by finding the average within the data presented, then adding or subtracting points for specific countries, based on their performance in relation to the average.

LIMITATIONS

The most significant limitation affecting data collection was language. While there is translation software available, in many cases countries or organizations did not use that technology. As a result, in some cases data was available but could not be accessed, or it was unclear whether the data existed. For example, the primary language in the US is English; however, some US Government websites were available in up to 16 different languages. Japan, as another example, is a country whose primary language is not English, yet most Japanese resources are available in English. In the case of Italy and France, EU countries, many of the government websites were not available in English. English is generally accepted as the international language of business, so when materials relating to innovation are not available in English, this may affect the success of new innovators and their entry into foreign countries.

Government policies on data sharing also posed a barrier to data access. For example, many governments do not share a public, detailed budget, reflecting a different level of comfort with and expectation of government transparency. Also, many governments do not share their transportation data, but this is likely for national security reasons.

RESULTS

1. REGULATORY ENVIRONMENT

1.1 Regulatory Environment

The regulatory environment category was based on new product approval periods, food safety assurance protocols and governing bodies, and transparency and communication. Each criterion is worth three points, for a total of nine points available.

Country	1.1.1 Approval Periods (/3)	1.1.2 Food Safety Assurance (/3)	1.1.3 Transparency and Communication (/3)	Section 1.1 Total (/9)
Canada	1	2	2	**5**
United States	1	1	3	**5**
Mexico	N/A	N/A	1	**1**
United Kingdom	2	2	2	**6**
Italy	2	N/A	1	**3**
Germany	2	2	2	**6**
France	2	N/A	1	**3**
Netherlands	2	3	2	**7**
Japan	3	1	2	**6**
Australia	3	2	1	**6**

1.1.1 Product Approval Period

The average length of time for a new product or additive to be approved is 17 months. All countries that are EU members, plus the United Kingdom, have a seventeen-month approval period, making this the average length of time for approvals. Therefore, all EU member states included in this study and the United Kingdom have been awarded two points out of the possible three points. Japan has an approval period of a year or more, whereas Australia has a tiered approval system, based on the level of procedure. All approval procedures in Australia take a year or less. Shorter approval periods may increase innovation within the food industry as new products are able to reach consumers more quickly. Therefore, both Australia and Japan have been awarded an additional point for their short approval periods. Canada does not have adequate publicly available data from an authoritative source to determine approval periods. Scientific reviews can take upwards of 13 months; however, this is just one aspect of product approval. The United States has two approval methods, one for ingredients generally recognized as safe (GRAS) but not actually FDA approved, and another approval period for food additives that require FDA approval. Applying for a GRAS notification can take 180 to 270 days, whereas approval from the FDA for a food additive can take up to two years or more. There is no set time frame for approval periods for colour additives. Given that slower approval periods can negatively impact innovation as it takes longer for products to reach consumers, both Canada and the United States were awarded one point for falling below the seventeen-month average. Mexico received an N/A due to a language barrier.

1.1.2 Food Safety Assurance Measures

Governing bodies and organizations responsible for the quality, health, and safety of food products have procedures that dictate how often businesses must undergo inspection as well as how inspections are carried out. Most countries have laws for food processors and producers at both a federal and provincial or state level, as well as some form of additional measure such as random inspections, traceability logs, or preventative plans. Countries were awarded two points if they had either planned or random inspections in conjunction with an additional safety measure. Countries gained an additional point if inspections were unplanned, meaning authorities could inspect a food production plant at any time, and if they had additional measures in place such as food traceability logs or preventative plans. Countries received one point if their procedures were vague, or if they failed to meet the standard procedure. Canada, the United Kingdom, Germany, and Australia all received two points, as they had clear policies on either planned or random inspections as well as a secondary safety measure, such as traceability logs or preventative plans. The Netherlands received three points, as they conduct random inspections and require businesses to keep a traceability log, meaning food products can be traced back to the point of contamination in the case of an outbreak. The United States received one point, as they conduct planned inspections and do not have a secondary control measure, such as traceability logs or preventative plans in place. Japan received one point, as their inspection procedure for locally produced foods is unclear, although inspections for imported goods are stringent. Italy, France, and Mexico were all awarded N/A due to a language barrier.

1.1.3 Transparency and Communication

Governing bodies were evaluated on how clearly and effectively they communicate with consumers regarding potential contaminations, outbreaks, and changes to approved ingredients. Most countries had information available on their website in two languages and websites contained a search feature. A variety of languages helps individuals from different backgrounds access information, while search bars and site maps allow users to find their information more easily. Countries which met both requirements received two points. Countries with only one available language received one point, as users who do not speak that language would not be able to access any information. If countries had more than two languages available as well as a public feedback period regarding decisions, they were awarded an additional point.

Canada, the United Kingdom, Germany, and Japan all received two points for having two languages and a search function available on their websites. The Netherlands received two points because, while their site is accessible in four different languages, they do not have a public feedback period regarding decisions. Mexico, Italy, France, and Australia all received one point as their websites were only available in one language. The United States received three points, as their site is accessible in 16 different languages, features a search bar, site map, and text size adjustment. The United States has a public feedback period.

1.2 ENVIRONMENTAL RESTRICTIONS

Environmental restrictions data was based on waste management, including wastewater and hazardous waste, laws, and packaging restrictions, as well as the existence of environmental risk assessments and environmental policies that companies must adhere to when developing new products.

Country	1.2.1 Waste Management (/3)	1.2.2 EPA/ERA (/3)	Section 1.2 Total (/6)
Canada	2	2	**4**
United States	2	2	**4**
Mexico	N/A	N/A	**N/A**
United Kingdom	3	2	**5**
Italy	N/A	N/A	**N/A**
Germany	3	2	**5**
France	1	2	**3**
Netherlands	2	1	**3**
Japan	1	2	**3**
Australia	2	2	**4**

1.2.1 Waste Management

Countries were assessed on waste management protocols, including the handling of hazardous waste, wastewater treatment, and policies aimed at reducing or eliminating product packaging. Most countries have implemented comprehensive waste management policies that are publicly available and can be found on government websites, often through the environmental ministry or similar governing body. Most waste management laws required businesses to properly dispose of waste through a registered waste management company; this is also applicable to hazardous waste. Laws and regulations may vary based on the type of waste generated by a business, but most countries had procedures for the various types of waste created. Canada, the United States, the Netherlands, and Australia all had publicly available and comprehensive waste management laws and policies available online and followed standard protocol; therefore, these countries scored two points. Countries were awarded an additional point if they had laws or regulations that were aimed at reducing or eliminating packaging or had a larger number of strict waste management protocols.

As consumers increasingly care about their environmental footprint and the ecological impact of the products they purchase, countries that create restrictions regarding packaging may help companies meet this desire of consumers. The United Kingdom has regulations that require businesses that handle a certain amount of packaging to be registered and follow specific packaging guidelines, the outcome being to protect both the product and the environment. Germany has also implemented a packaging regulation in which packaging materials are divided into different categories, each with different regulations. Germany's aim is to create a closed substance and waste cycle, and packaging laws can be found under the 2012 Circular Economy Act (Germany, 2018). Both Germany and the United Kingdom have been awarded three points due to their additional measures.

France has implemented significant regulations to reduce food waste; however, no legislation appears available on government websites pertaining to waste management or packaging. Japan has waste protocols, but the details of the legislation were vague without information specific to businesses or industrial waste. Therefore, both France and Japan were awarded one point, as their waste management protocols could not be confirmed to align with the standard. Italy was given an N/A, as the departmental website is available in Italian only.

1.2.2 Environmental Risk Assessments and Environmental Protection Acts

Most countries require businesses and industries to complete an Environmental Risk Assessment (ERA) when developing new products or organisms. ERAs exist to minimize potential environmental damage as well as to control any potential dangers to the environment. Many countries have an Environmental Protection Act (EPA) or similar act that outlines the actions companies must take to protect the natural environment. If countries require an ERA and have an EPA or similar protection act, they were awarded two points as this is the standard. These countries are Canada, the United States, the United Kingdom, Germany, France, Japan, and Australia. The Netherlands was awarded one point, as no information could be found pertaining to ERAs or similar procedures. Italy was given an N/A as the information was only available in Italian.

RECOMMENDATIONS: REGULATORY ENVIRONMENT

A recurrent issue expressed by experts and leaders of Canada's food industry is the regulatory burden that impacts the cost of doing business. Alternately, Canada can move towards a streamlining of regulations across the food industry spectrum to address bottlenecks and onerous rules in everything from food safety, to inter-provincial trade, to carbon taxes, waste, packaging, ingredients, inspection, and so forth. This will likely require a collaboration across various levels of government, different sections of the value chain, the private sector, and industry trade associations.

In the relationship between government regulation and food industry, a particularly important aspect to address is the needs and circumstances of small and medium-size enterprises. SMEs face greater challenges in compliance with regulations, whether it is the costs involved, the data required to manage, and the training involved. Programs, and support measures to address regulatory compliance, and ease business operability will make innovation, and getting more products to market by SMEs that much better.

In Canada, certain sub-sectors of the food industry have and maintain a competitive advantage within a broader global marketplace. Namely, Canadian processed meat and poultry, processed seafoods, and grains and oilseeds have traditionally been prominent. However, the ability to translate raw ingredients into more value-added, higher priced products will require regulatory innovation. This includes addressing the retail environment in Canada domestically (5 retailers control 80% of Canada's retail sales), interprovincial trade, transportation infrastructure, and export regulations to markets. Canadian leading food sub-sectors will need to be especially attuned to changing compliance rules and regulations, and also meet the demands of governments and consumers in our target markets (in 2019, China surpassed the USA as the world's largest beef imported, including in prepared and preserved beef) (FIC, 2020).

2. BUSINESS COMPETITIVENESS

2.1 BUSINESS COMPETITIVENESS

The business competitiveness category focused on a sampling of economic indicators to provide a score out of nine points. A country's trade balance for food items (the difference between exports and imports), and their CPI measure for food were each worth 3 points, accounting for 6 of the total 9 points. Then, three economic indicators were measured together to account for the final 3 points and provide a partial picture of each country's economy regarding interest rates, exchange rates and labour productivity.

Country	2.1.1 Trade Balance Food Exports-Imports (/3)	2.1.2 CPI Food (/3)	2.1.3 Economic Indicators (/3)			Section 2.1 Total (/9)
			2.1.3 Long-term Interest Rates	2.1.4 Exchange Rates	2.1.5 Labour Productivity	
Canada	3	2	2			**7**
United States	1	2	1			**4**
Mexico	3	1	3			**7**
United Kingdom	1	3	3			**7**
Italy	2	0*	1			**3**
Germany	1	2	3			**6**
France	3	2	3			**8**
Netherlands	3	3	3			**9**
Japan	1	0*	3			**4**
Australia	3	3	1			**7**

**No data available*

2.1.1 Trade Balance: Food Items (Exports-Imports)

Countries were assessed on the assumption that on average it is preferable to be a net exporter, and in terms of food innovation, to have a larger proportion of total imports and exports attributed to food items. Where countries have higher imports and exports of food, they might have better existing infrastructure for innovators new to the industry to leverage. For countries with a trade balance of effectively zero, they were awarded two points (Italy). Canada, Mexico, France, the Netherlands, and Australia all had positive net exports, and were therefore awarded one point. The US, the United Kingdom, Germany, and Japan all had negative net exports and therefore were awarded one point.

2.1.2 CPI Food Prices

The changes year over year for food price inflation were calculated for each country for four periods. In each period, an average food price inflation was calculated across all countries, to which each country was compared. The averages were 1% inflation in 2015-16, 2% in 2016-2017, 2017-18 and 2018-19. For both Canada and Germany, they maintained their two points, as they were on average for two periods, and then below average and above average each for one period. The US also maintained their 2 points as inflation was above average for one period and below average for two periods, but they were missing a data point so it is unclear whether they would have been mostly below average. Both Australia and the Netherlands had average inflation for two periods, and lower than average inflation for two periods so they received a score of three. The United Kingdom also received a score of three as in general, their inflation was below average. Italy and Japan both received a zero, as no data was available.

2.1.3 Economic Indicators

The three economic indicators, which are not specific to food, were grouped together to provide important context, but also to ensure that they did not outweigh other food-focused variables in the model. The three variables contributing to this measure are interest rates, exchange rates, and labour productivity.

The same methodology was followed for both interest rates and labour productivity. The median, minimum, and maximum value for each individual country's interest rates were calculated, then interest rates were averaged for each year from 2015-2019 across all 10 countries. All countries' medians, minimums and maximums were averaged to account for any outlying values, which may have skewed the mean. Each country's rate was compared to the average. Higher than average interest rates were scored lower as this means borrowing money is costlier for innovators. A higher than average rate of productivity was determined to be good for innovators because it indicated more productivity.

Where countries were approximately half of the time above the average and half of the time below for interest rates and productivity, they were given a score of two (Canada). Where countries performed more often better than the average rates, they received a score of three (the United Kingdom, France, Germany, the Netherlands, and Japan). Where countries performed more often below the average than above it, they received a score of one (the United States, Mexico, Italy, and Australia). Exchange rates were considered as a secondary variable to interest rates and productivity due to the lack of time series data. This consideration, however, did not change countries' scores.

2.2 CAPITAL AND CREDIT AVAILABILITY

To assess capital and credit availability, government grants and loans (worth a maximum of three points), and foreign direct investment per capita (also worth a maximum of three points) were considered. The final score was out of six.

Country	2.2.1 Government Grants + Loans (/3)	2.2.2 Foreign Direct Investment Per Capita (/3)	Section 2.2 Total (/6)
Canada	2	2	**4**
United States	3	2	**5**
Mexico	N/A	1	**1**
United Kingdom	2	2	**4**
Italy	1	1	**2**
Germany	2	1	**3**
France	1	1	**2**
Netherlands	0*	3	**3**
Japan	1	1	**2**
Australia	3	1	**4**

** Limited data available*

2.2.1 Government Grants and Loans

Government grants and loans were assessed on four criteria: (1) the number of programs researchers found; (2) the diversity in programs, i.e. whether they focus only on one sector or many; (3) the structure of the programs; and, (4) accessibility of application information for programs. On average, there were three to four programs for each sector (criteria 1), usually addressing agriculture, fisheries, and agri-food sectors (criteria 2), in the form of government grants (criteria 3). Generally, there was limited information on how to apply for funding (criteria 4). Countries were compared to this average.

Canada, the United Kingdom, and Germany were assessed to be on average and so they each maintained their two points. France, Italy, and Japan were also awarded one point. These countries all had very vague or almost no information on funding and how to apply for it. In the case of European countries, it appears that the EU might be responsible for significant funding; however, that still must be made clear through their own websites. The Netherlands lacked data on the variety of programs and structure as it was unclear whether they even offered funding. Mexico received a score of N/A as no data could be found due to language issues.

The US and Australia were each awarded three points. The US provided numerous and diverse programs, with a noticeably clear application process through a database. Similarly, Australia provided remarkably diverse funding programs (for artisanal products, Indigenous products or to commercialize existing products), and their structure was unique, as they offered the option of government-matched funding. From the perspective of innovators, this funding is important, and accessibility is crucial to their ability to leverage it.

2.2.2 Foreign Direct Investment

The OECD reports the amount of foreign direct investment (FDI) for each country in USD. Population data was collected from the OECD for the year 2018, so FDI per capita was calculated to compare across countries and account for the different sizes of countries and amounts of FDI. An average FDI per capita was calculated across all countries ($1123 USD per person). As the data has a large range ($30/person-$6,629/person) and therefore a skewed average, a country within +/- 30 percent of the average maintained their two points. For countries more than 30 percent above the average, they gained a point and countries more than 30 percent below the average lost a point. Though government policies impact the benefits or costs of FDI, a higher FDI is broadly understood to be beneficial for economic development, increasing links between countries and therefore helping to transfer knowledge, technology and other non-monetary benefits (OECD, 2002).

Canada, the United States, and the United Kingdom all had FDI per capita within 30 percent of the average, so they received two points each. Mexico, France, Germany, Italy, Japan, and Australia all had FDI per capita either below or well below the 30 percent threshold and therefore lost a point, receiving one point each. The Netherlands was the only country with significant FDI per capita well above average ($6629) and was thus awarded three points.

2.3 DISTRIBUTION NETWORKS

To examine distribution networks, researchers considered large-scale grocery competitors, private labels, and shipping infrastructure. Each variable was worth a maximum of three points, bringing the pillar total to nine points.

Country	2.3.1 Large-scale Competitors (/3)	2.3.2 Private Labels (/3)	2.3.3 Shipping Capacity (/3)	Section 2.3 Total (/9)
Canada	1	1	1	**3**
United States	3	2	2	**7**
Mexico	3	1*	1	**4**
United Kingdom	2	2	3	**7**
Italy	3	3	1	**7**
Germany	2	3	3	**8**
France	1	2	0**	**3**
Netherlands	1	3	0**	**4**
Japan	N/A	N/A	3	**3**
Australia	1	2	1	**4**

**Language barriers*

***No data available*

2.3.1 Large-scale competitors

To assess large-scale competitors, the number of large-scale competitors in each country and the cumulative market share held by those competitors were considered. Only those competitors holding a market share of 5 percent or more were included. The cumulative market share across the number of competitors was averaged to provide a rough average of the market share that large-scale competitors hold in a country. Finally, the same-store sales were averaged across all stores in a country. Same-store sales measures the growth in sales, year over year, across the existing number of stores; the measure eliminates the growth effects from opening new stores or closing existing stores.

The average market share held by large competitors across all ten countries was 87 percent of the market, with approximately 17 percent held by each large competitor. Where large competitors in a country held a higher cumulative market share relative to the average, this was considered to contribute negatively to innovation, as it reduces competition and can prevent entry of new competitors (innovators). Similarly, where the large-scale competitors held larger market shares, this was also viewed negatively, as it provides additional market control and can create barriers for innovators. For cumulative market share, there was a significant range (45-94 percent), which would affect the average. To account for this, where a country's cumulative market share was within +/- 10 percent of the average, they were considered average. For same-store sales, a higher rate relative to the average was viewed positively. The average for same-store sales was calculated as 2.8 percent.

Germany maintained their score of two: their cumulative market share was on average, their percentage held by each competitor was higher than the average, but their same-store sales rate was also higher. The United Kingdom also maintained their score of two, but for the opposite reason: their large-scale competitors held on average lower market shares, but their same-store sales ratio was below average.

Canada, France, the Netherlands, and Australia were each awarded one point. All four countries were mostly below average for all considerations. In the case of the Netherlands, they were also lacking data on same-store sales. Japan was awarded N/A due to limited data caused by language barriers.

The US, Mexico, and Italy were awarded three points each. All three countries were characterized by a lower cumulative market share held by their large-scale competitors, lower average market shares per individual large-scale competitor, and higher than average same-store sales. In the case of Italy and Mexico, many grocers did not report same-store sales, but instead sales growth with minimal changes in the number of stores. As such, however, their same-store sales are likely overestimated.

2.3.2 Private Label

The following criteria were considered: (1) the approximate number of private label product lines in each country across all large-scale competitors; (2) the purpose of the private label (discount, value added or innovation); and, (3) the range in private label offering. On average, countries had 18 different private labels (criteria 1), the general purpose was discount or value-added to existing products (criteria 2), and the range was on average from discount to value added (criteria 3). As this index is concerned with innovation, where a country's private labels focused on innovation rather than simply discount or value added, the country was awarded an additional point. Countries whose major focus across competitors was discount on existing products lost a point.

The United States, the United Kingdom, France, and Australia were all awarded two points. The four countries all had either an on-average or slightly below-average number of private label lines. The major focus of private labels in these countries appeared to be value-added to existing products, but also there was a range from discount to value-added.

Canada had on average fewer private labels, whose purpose was mostly discount with some value-added to existing products, and with a range on average of discount to value added. As such, Canada was awarded one point. Mexico was similarly focused on discount of existing products, but there was limited data. From what data was available, Mexico was awarded one point. Japan had limited data due to language barriers and could not be assessed, so they received N/A.

Germany, the Netherlands, and Italy all appear to use their private labels as a source of innovation. These countries have a large range of products. The purpose of products in Italy's Coop and Selex stores, for example, extends to different values, such as environmental sustainability, fair trade, and artisanal products to target unique customer segments.

2.3.3 Shipping Capacity

Data was collected on the number of ports and airports, and the number of kilometers of railway track in each country. A ratio was created for each category, comparing shipping capacity to the number of square kilometres in a country. For example, the ratio of ports per square kilometer was calculated for each country. In many cases countries did not share their data, and data was collected from secondary sources. Further, while these ratios provide some context, they are unable to account for how populations are dispersed across a country and how shipping accounts for this. For example, Canada has a large land mass with much of the population spread along its southern border with the US. An average was calculated for each measure and each ratio, to which each country was compared. Where most of the country's measures fell below the average, they were awarded one point. Where a country was partially above average and partially below average, they received two points. Where a country performed generally above average, they received three points. Where no data was available, zero points were assigned.

Canada, Mexico, Italy, and Australia all generally had less infrastructure than the average, so they were each awarded one point. Australia was also missing data for ports but had data for airports and rail. Similarly, Italy was missing data for airports, but had data for ports and rail. France and the Netherlands were each assigned zero points, as they had only rail data available.

The United Kingdom, Germany and Japan were each awarded three points. The United Kingdom had above-average infrastructure for all measures, except the country had fewer kilometers of railway track; however, the ratio of railway track per square kilometer was above average. Japan and Germany both displayed an identical outcome to the United Kingdom.

RECOMMENDATIONS: BUSINESS COMPETITIVENESS

For Canada to becoming a leading food innovation nation, we need reduce the risks associated with starting a food company or growing a company beyond its current size. Investors, whether domestic or international, may be averse to placing money behind the growth of a small food processor. The stated risks can be manifold, from regulations, to the cost of ingredients, to shipping costs, risks of take-over, etc. Each of these risks needs to be addressed in forums and focused discussions between industry leaders, the investment community, banks, and financial institutions. Initiatives such as District Ventures in Calgary, the Protein Industries Canada supercluster, and the Ocean Industries supercluster in Atlantic Canada are good examples of leading collaborations which can reduce the risk of growth and further scale in the Canadian food sector to reach competitive international standards.

Domestically in Canada the reality of a highly concentrated retail environment, with conditions and restrictions and costs associated with getting a listing, have implications for the initial growth trajectory of a company from small to medium to large. Industry trade associations, market experts, and companies could explore alternate routes to consumers, such as the growth of e-commerce, direct-to-consumer, and emerging market alternatives.

What will likely remain the most important factor towards the food innovation leadership of Canada, is increasing the capacity of Canadian food companies to develop, manufacture and delivered value-added food products that are in demand, domestically, and internationally. This endeavour has many elements to it. Federal government programs, such as the Scientific Research and Experimental Development program, are positive examples where public funding can direct capacity building, and incentives for private sector innovation. More research and application is required into understanding when Canadian companies are most likely to invest in new equipment, machinery and updates to their plants, and when or why, this does not happen. Especially for SMEs, plant modernization is critically important. Many Canadian food processors are continually at risk of take-overs by foreign firms. While this is not always a bad thing, it is also the ability of a Canadian plant to operate at international standards of efficiency, excellence and quality that can reduce the risk of acquisitions, take-overs, or obsolescence. How quickly can Canadian processors meet changing consumer and retail demands? Are supply chains adept at understanding what modifications they need to make to their operations, to their supply chains, to their distribution networks, and shipping infrastructure? Very often the demand signals from consumers, and in turn from retailers or wholesalers, is that some SKUs are dropped, and new opportunities emerge. The capacity to meet that new demand is the emerging currency of a new food industry. There also remains a critically important conversation about the balance between automation, digitization, and the use of advanced technologies for today's food industry. This has implications for jobs, job demand, skills, training, and the attractiveness of the industry to both mid-career, and recent graduates. How well paid will these jobs be, and can they compete with other industries. How effective are training and re-training programs? A study by the Analysis Group (2018) noted that between 2013 and 2017, that full time employment decreased by 7.3% across the Canadian food industry, which would equate to over 20,000 job losses. Company respondents to the survey noted labour relocation or outsourcing outside of Canada as the rationale. Additionally, in a study by CME (2020), FHCP stated that there are 'almost 28,000 job vacancies in food manufacturing in 2020, with one in ten jobs remaining unfilled. The result being that manufacturers need to re-think their operations and how to run their business, and governments how to invest in a combination of automation and job (re)training.

3. MARKET READINESS

3.1 TRAINING AND EDUCATION

Training and Education examined the level of education or training that individuals require to enter the food and beverage, agri-food, or food science industries, as well as retraining initiatives and average earnings by sector in comparison to the national average.

Country	3.1.1 Student Incentives (/3)	3.1.2 Education Trends (/3)	3.1.3 Employment Trends (/3)	3.1.4 Job Retraining (/3)	Section 3.1 Total (/12)
Canada	2	3	2	3	**10**
United States	2	3	3	2	**10**
Mexico	N/A	N/A	N/A	N/A	**N/A**
United Kingdom	1	2	1	3	**7**
Italy	0	2	1**	1	**3**
Germany	3	1*	3	1	**7**
France	1	1*	1**	1	**2**
Netherlands	1	1*	1**	1	**2**
Japan	1	1*	1**	2	**3**
Australia	3	1*	1**	2	**5**

**no data on graduate employment rates*

***insufficient data or available data not applicable*

3.1.1 Student Incentives

The category on student incentives examined the prevalence of bursaries, scholarships, grants, loans, and other financial or social supports that exist to encourage students to pursue post-secondary education. Rather than assigning values based on an average, values were awarded based on the number of supports countries had in place to encourage students to pursue post-secondary education, specifically in relation to providing support for racialized or otherwise marginalized individuals. All information was found through government websites on department of education pages, or similar offices. Most countries offer federal grants and loans to all students. Countries that only offer grants and loans and have no specific incentives to attract diverse audiences were awarded one point. These countries include the United Kingdom, France, the Netherlands, and Japan. Countries that offered federal grants and loans as well as additional incentives to individuals from lower socio-economic backgrounds, Indigenous students, or students from visible minorities were awarded two points. These countries are Canada, the United States, and Australia. In Germany, post-secondary school is often state subsidized, and most students can attend post-secondary education for free. Most graduate level programs have tuition fees; however, these are much lower in comparison to other countries. Students who do need to pay for tuition can apply for a zero-interest government loan as well as federally funded scholarships. As Germany offers largely free post-secondary education, they have been awarded three points, considering that lack of financial resources is often a barrier to students interested in pursuing post-secondary education (Long, 2014; Byrne & McCoy, 2011). Italy has been awarded

a zero, as the website for the department of education appears not to exist and no subsequent authoritative source could be found.

3.1.2 Education Trends

This category examined the level of education required to work in the field of food production, food manufacturing, and agriculture as well as graduate employment rates.

In Canada, graduates working in food production saw an 85-91% employment rate depending on level of education, with the lowest level of employment being those who had received a master's degree. Due to the high employment rates and the fact that the most employable individuals are those with either a college diploma or bachelor's degree, Canada earned three points. In the United States, most individuals working in food sciences and production have a bachelor's degree, while food science technicians often have a high school diploma or some post-secondary education but no degree. Employment rates are high and considering that individuals can enter the industry with various levels of education and training, the United States earned three points.

In the United Kingdom, food science graduates see a 71% employment rate, which is significantly lower than that in both Canada and the United States, earning the United Kingdom two points in this category. In Italy, 60% of students find work after completion of their degree while 15.6% of students were working before or during their degree bringing the total number of graduates working to 75.6%. This employment rate is like that of the United Kingdom; therefore, Italy earned two points in this category.

Germany, France, the Netherlands, Japan, and Australia do not appear to collect data on graduate employment rates and have therefore earned a score of one point in this section. No data could be accessed for Mexico due to language barriers and it therefore received a weighting of N/A.

3.1.3 Employment Trends

This category examined the expected annual income in the agri-food and food and beverage industry in relation to the national average yearly income across all industries (USD). A comparison of average annual incomes for OECD countries can be found on the OECD website (OECD, 2018).

Canada saw annual earnings ranging from $28,747 to $53,992 USD per year in the fields of agriculture, food production, and food science, with most employees earning an average of $39,119 USD per year. While employment rates are high, the average overall annual wage is $48,849 USD per year, making the wages earned by Canadians in food production much lower than the overall average annual income. Therefore, Canada received two points.

Individuals working in food sciences in the United States earn an average wage of $65,300 USD per year while food science technicians have an average income of $40,860 per year. The average annual income in the United States is $63,093, making the average wage for those in food production and food science higher than the national average. Furthermore, individuals have the potential to earn more money than Canadians working in food sciences or food production with lower educational requirements. The United States has an 8.3% unemployment rate in the agricultural sector. Because of the low unemployment rate, high earnings, and low educational requirements, the United States earned three points in this category.

The national average yearly income in the United Kingdom is $44,770 USD, while the average income for those working in food and beverage production is $693 per week or roughly $36,036 USD per year based on 52 work weeks. The average income for those working in agriculture is $531 per week or roughly $27,612 USD per year, making the earnings of both fields of employment

within the food industry below the national average of yearly earnings. Due to the lower employment rates and low income, the United Kingdom was awarded one point for employment rates and education trends.

In Germany, the average yearly income is $49,813 USD. The average yearly income for individuals in technical and scientific fields is $73,881 USD and $61,880 USD for those in manufacturing, putting the yearly earnings of individuals in those industries far over the national average. Overall, Germany has a 75.9% employment rate and a 3.4% unemployment rate. Germany has many apprenticeship programs and, as previously stated, offers free post-secondary education; however, the education level of employees is not stated in statistics. Information regarding the level of education required to work in these fields is not available. Therefore, Germany was awarded 2 points, as they have high employment rates and high wages, but educational requirements are not specified.

France was awarded one point, as average yearly income by sector could not be found and the ILO employment rate is 50.9%. Italy was also given one point, as the average yearly income is $37,752 USD overall, although individuals in technical and scientific professions make roughly $23,699 USD per year and those in manufacturing make $27,804 USD per year. Employment and unemployment rates for Italy are not publicly available. The Netherlands was given one point because, although they have an exceptionally low overall unemployment rate of 3%, no data regarding wages was available. Japan was also awarded one point, as the employment rate is 60% for individuals aged 15 and over, and data surrounding wages was not available. Australia received one point, as employment rates are recorded in numbers of people instead of percentages, making the data unusable for these purposes, and the average yearly income is $53,349 USD, although individuals in manufacturing make roughly $43,923 USD per year and those in technical and scientific professions make roughly $56,140 USD per year.

3.1.4 Job Retraining Strategies and Professional Development

This category examined federal incentives and programs available to individuals looking to gain new skills or build upon existing skills to advance their careers within their current industry, or to change career paths. Most countries offer job retraining targeted toward at least two of the following groups of individuals: Indigenous people, youth, seniors, and veterans. Therefore, countries which offer job training to at least two of these groups received two points. Countries that offered programs to more groups of people or had broader retraining strategies received three points. Countries that only offered incentives toward one group or had no specific training programs for any group of people, received one point. The United States, Australia, and Japan all received two points. Canada received three, because it offers several training programs aimed at veterans, youth, and Indigenous people. The United Kingdom received three points because of its recently implemented national retraining scheme, which provides job training to low-income individuals over the age of 24 without a degree, as well as a government graduate scheme. Italy, Germany, France, and the Netherlands all received one point as their retraining programs were not clear and only information regarding apprenticeships could be found.

3.2 DIVERSITY AND INCLUSION

Diversity within a workplace positively affects innovation and contributes to overall employee satisfaction and retention (Ahmed, Atif, Hossain, & Mia, 2019; Brimhall & Mor Barak, 2018; Sabharwal, 2014; Díaz-García, González-Moreno, & Sáez-Martínez, 2013). By offering federally supported training programs, employers can earn certificates and gain access to resources to support employees from different backgrounds. Employees from diverse backgrounds may have more incentive to seek employment at businesses which openly support minorities and diversity.

Country	3.2.1 Equitable Training Programs and Incentives (/3)	3.2.2 Pay Gap (/3)	Section 3.2 Total (/6)
Canada	3	1	4
United States	3	2	5
Mexico	N/A	0**	0
United Kingdom	2	3	5
Italy	1	3	4
Germany	1	1	2
France	1	0*	1
Netherlands	2	0**	2
Japan	3	0**	3
Australia	2	0**	2

**France does not collect gender-based data*

***Wage and earnings data not available*

3.2.1 Incentives and Equitable Training Programs

The category of incentives for minorities examined the prevalence of financial support available to individuals from minority groups to pursue education, continue education or open businesses. This category also examined diversity and inclusion statements on government websites and any initiatives taken to encourage diverse workplaces. The equitable training programs category examined the prevalence of federally funded diversity training programs that businesses partake in. On average, most countries had a diversity statement or anti-discrimination legislation. Australia, the United Kingdom, and the Netherlands all have diversity statements and anti-discrimination legislation clearly found on their websites, thus these countries all earned two points. Canada, the United States, and Japan all have anti-discrimination legislation, diversity statements, as well as at least two federal initiatives aimed at diversifying the workforce, and therefore earned an additional point. No diversity statements or legislation could be found for Germany, Italy, or France; therefore, these countries received one point. The information available in English for both France and Italy was limited.

3.2.2 Pay Gap

This category examined pay discrepancies between men and women and presented them as a percentage. The percentages were then averaged, and countries were assigned points based on their relation to the average. Countries with a smaller pay gap ranked higher, and those with a larger pay gap ranked lower. The average pay discrepancy between males and females is 18.7%. Countries that fell between 15% and below 20% pay discrepancy were awarded two points. The United States was given two points, with a 16.9% pay gap on average. Germany has a pay gap of 20%, Canada a gap of 29.8%, and Australia a pay gap ranging from 34% in technical and scientific fields to 39% in manufacturing; each of these countries earned one point. The United Kingdom has a gap ranging from 6.5% in agriculture to 12.1% in food manufacturing, and Italy has a wage discrepancy of 7.1% for scientific and technological fields and 13.9% for manufacturing; both of these countries earned three points, due to their relatively small wage gaps. France does not record data based on gender, and wage data for Mexico, the Netherlands, and Japan was unavailable, earning these four countries a zero.

RECOMMENDATIONS: MARKET READINESS

One of the most pressing aspects recommended to rise Canada's ranking in food innovation is the need for training and re-training an adaptive workforce in relation to continually emerging technologies and automation. We need people to create the culture, quality and character of a Canadian food industry that has the respect, and demand of the world, however, the effective utilization of technologies that improve processes, data management, operations, distribution and logistics, and communication are more important than ever. A combination of training and skills development by companies themselves, along with the offerings at colleges, universities and training centres needs to be attuned and adaptive to what is required next. Each sub-sector will look slightly different, whether that is processed meats and poultry, processed seafood, vegetables, fruits, grains and oilseeds, pulses, or pet foods. Each sub-sector will have its own unique needs in terms of new skills, and process pressures.

To be market ready and innovative, Canadian food processors can also apply foresight planning to their value-chains. As the pandemic has made clearly evident, supply chains can be disrupted, inventories, and ingredients can be delayed. Operations leaders need end-to-end vision, and need to collaborate more effectively and responsively. With the right tools and applications, food processors can prepare high-quality demand forecasts, better understand demand uncertainty, model risks in their supply chains, plan for the potential of disruptions, and have back-up plans with internal teams, customers and suppliers (Vanguard, 2020).

Canada can also strengthen its market readiness for value-added products, for domestic and global markets. In the case of SMEs, which form most food processing operations in Canada, collaborations between smaller brands, and contract manufacturers, or co-product development can be creative methods by which to reach scale. An orientation towards value-added processing will also further attract the higher paid jobs and expertise to the industry at-large.

4. INTELLECTUAL PROPERTY AND RESEARCH & DEVELOPMENT

4.1 PROPRIETARY PROTECTION

This category focused on patent application procedures (a maximum of three points), and patent protection and enforcement monitoring (a maximum of three points). The pillar generates a score out of six.

Country	4.1.1 Patent Procedures (/3)	4.1.2 Patent Protection (/3)	Section 4.1 Total (/6)
Canada	2	1	**3**
United States	3	2	**5**
Mexico	2	2	**4**
United Kingdom	2	3	**5**
Italy	2	2	**4**
Germany	2	2	**4**
France	1	1	**2**
Netherlands	2	1	**3**
Japan	1	3	**4**
Australia	2	2	**4**

4.1.1 Patent Procedures

This category examined the approximate length of the patent application process, whether fee schedules differed by an applicant organization's size, the lifetime of the patent, and any additional fees or barriers to patent applications. The baseline across all ten countries showed that on average, patent applications take 36 months, there is no differentiation in fees, and the patent lasts 20 years. Countries were compared to this baseline to determine whether in general they outperformed the average (three points), performed to the average (two points) or performed below average (one point).

Canada, Mexico, the United Kingdom, France, Germany, the Netherlands, and Italy all received two points. While Canada creates a lower fee schedule for smaller entities, the patent application process and lifetime were in line with the average, with no additional barriers or fees. The United Kingdom, Germany, the Netherlands, and Italy all performed to the average on all criteria.

Japan, Australia, and France each received one point. While Japan performed to the average for almost all criteria, they have additional translation fees for patent applications in a foreign language (the fourth criteria). This requirement creates a barrier to patent applications in the country and places a cost on innovators, so Japan received only one point. Australia performed to the average for fee schedules and patent lifetime with no additional barriers, but it was unclear from government websites how long the application process is. If innovators are going to engage in a patent process, it is important they know how long the process is, so they can budget time and resources appropriately. France created lower fees for non-profit organizations focused on research or teaching, but they also required patent applications to be submitted in French. The length of the French patent process was unclear, so the country received one point.

4.1.2 Patent Protection, Enforcement and Monitoring

This section considered the available schemes for patent protection, the monitoring and enforcement mechanisms that were in place, the recourse available if a patent was breached, penalties for a breach, and the limitation periods on legal action. Across all ten countries, federal legislation was in place to protect patents, with the responsibility on the patent owner or a licensee to bring forth legal action. Where countries differed was in how they addressed patent breaches. In most countries, regular courts as opposed to specialised patent courts, hear patent breach actions. Penalties in most countries constitute injunctions, damages, or various orders. The average limitation period is five years in most countries. Countries were compared to this average.

The US, Mexico, Germany, Italy, and Australia were all awarded two points. The US performed to average, except for a limitation period one year above average on legal actions for patent breaches. Mexico has specialized courts, but they have a noticeably short limitation period of two years on legal action, so their points remained unchanged. A significantly reduced limitation period places pressure on patent owners to assess and identify a breach, then accumulate the necessary resources to access the justice system in a shorter period to enforce their patent rights. Italy performed to average, as did Australia. Germany, on the other hand, has specialized patent courts, and administrative boards to hear patent breach cases, which can reduce costs. The country, however, includes imprisonment as a punishment when a patent has been breached. Imprisonment appears disproportionate to the crime of patent infringement across countries in this study. Prison can be very stigmatizing for individuals who have committed a crime that is generally not harshly penalized, and harsh penalties incentivize non-disclosure.

Canada, the Netherlands, and France each received one point. All three countries performed to average, except for their penalties: all three countries include imprisonment for breach of patent. As such, the countries were deducted a point due to the negative repercussions of severe punishment, outlined above.

4.2 RESEARCH AND DEVELOPMENT

Research and development were considered in three contexts, each worth three points: federal budgets, national data strategies, and data privacy and access. The category generates a score out of nine points.

Country	4.2.1 Federal Budgets	4.2.2 National Data Strategies	4.2.3 Data Privacy & Access	Section 4.2 Total (/9)
Canada	2	3	2	**7**
United States	3	3	0**	**6**
Mexico	N/A*	1	1	**2**
United Kingdom	3	1	3	**7**
Italy	N/A*	0*	2	**2**
Germany	N/A*	0	2	**2**
France	N/A*	1	2	**3**
Netherlands	2	3	2	**7**
Japan	1	1	2	**4**
Australia	3	3	1	**7**

**Language barrier*

***No data available*

4.2.1 Federal Budget

This section included the funding programs available for food innovation in the most recent federal budget, the total budgeted expenditure on these programs, the percentage of total government budget expenditures, and how easily accessible information on budgetary measures were. Data under this variable was largely inaccessible, so an average could not be defined. The total expenditure in each country's budget for food research and innovation was recorded, then used to calculate that value as a percentage of total budget expenditure; however, complete data from government budgets could be found only for Canada, the United States, the United Kingdom, the Netherlands, and Australia. In many cases the budgets were not available (Mexico, France, Germany, Italy) or contained very vague information (Japan). To award points, if it was possible for an innovator to simply find out whether there was new funding for food innovation research or projects, the country received two points. An additional point was awarded if it would be possible for an innovator to determine which specific initiatives were being awarded funding. If it was not entirely clear that the funding was for food research or innovation projects, the country received one point. Where there was no data for the country, due to language issues, they received an N/A.

Canada and the Netherlands each received two points. Canada had limited new food innovation and research funding programs, and it was moderately difficult to find the information. The Netherlands had broad categories of funding, but it was difficult to navigate their budgetary information. In both cases, an innovator could be aware that there was food research funding available.

Japan received one point, as there was some information available, but it was unclear and unspecific. France, Mexico, Germany, and Italy each received N/A, as there was no data available or none could be found, perhaps due to a language barrier.

Finally, the United States, the United Kingdom, and Australia were each awarded three points. In all three cases, it was clear where the funding was going, and the documents containing information were easily accessible.

4.2.2 National Data Strategy

To examine national data strategies, the following criteria were considered: whether a complete data strategy existed; which years it covered; whether it applied to both private and public sectors; whether it contained concrete steps and/or a budget; and the strategy's accessibility. Across all ten countries, for those with data, there was some sort of data strategy – complete or not. On average, strategies were from 2016 or more recent, lacked concrete steps and lacked budgets; however, they were otherwise accessible. On average, strategies only applied to the public sector (covering only one sector). Countries were compared to this baseline.

No countries performed to the average, so no countries received two points. Mexico, the United Kingdom, France, and Japan all received one point. While Mexico's strategy applied to both the private and public sectors, it was incomplete, dated from 2013, had no concrete steps, no budget, and was difficult to find. The United Kingdom's data strategy was also incomplete, as it is currently being developed. The United Kingdom's strategy will apply to both sectors, and information about it was easily found, but at this time there are no concrete steps or budgets. France's strategy was difficult to find with no concrete steps or budget. Finally, Japan's strategy was difficult to find, is unclear which sector it applies to, and is from 2012-13. It is possible that the country is now using legislation instead of policy, but that move should be clarified. Data was not available for either Germany or Italy, so each country received zero points.

Canada, the United States, the Netherlands, and Australia were each awarded three points. While precise actions were not evident in Canada's strategy and there is no budget, it was easy to find, complete and recent, and applies to both sectors. The United States was one of the unique budgets to have both clear actionable steps and a budget, but it only applies to government. The Netherlands produced two separate strategies for the public and private sector in 2019 with budgets and clear actionable items that are easy to find. Australia has no budget, but the strategy was easy to locate, applies to both sectors with concrete steps, and covers 2015-2020.

4.2.3 Data Privacy and Restrictions

Laws pertaining to data privacy and use in countries were recorded. Laws were assessed by examining which level of government implements the scheme, who is responsible for oversight, the scope of both laws (public and/or private sector), and the penalties for breaches of data privacy. Most countries have a federal act, with government actors performing oversight activities, applying to both sectors, and with fines as a penalty.

Canada was awarded two points. Canada has separate laws for the public and private sectors, acknowledging the different contexts. The penalties for government breaches of privacy laws, however, appear to be only recommendations and consist in investigations by another government entity. It is unclear whether this penalty should be or needs to be higher.

The EU countries (the United Kingdom, France, Germany, the Netherlands, and Italy) all fall under the same EU regulation and oversight body. As such, this reduces costs for innovators who must only understand one data privacy and handling law for all EU countries. The penalties under

the regulation differ for each country. The United Kingdom was awarded three points as they benefitted from the supranational EU scheme, and otherwise performed to average, with fines in the case of a breach. France was awarded two points, as penalties can include "any security measure necessary," which appears to be a vague and broad discretionary power. Germany was awarded two points because, while they benefit from the singular EU law, their penalty for breach of the law can be imprisonment, which is much harsher than the average penalty (fines) indicating it might be too severe. Finally, both the Netherlands and Italy were awarded two points because there was no information available on penalties. It is important that those handling data be clear on what they can and cannot do with the data, but also aware of the consequences of their actions.

Japan was awarded two points as they performed to average, but penalties were far more severe than the average penalty of fines. Penalties for a breach can include imprisonment or work terms, and imprisonment for government officials.

The United States was given zero points as states handle data privacy laws, so there was no federal data available. This scheme increases costs for innovators who must understand multiple different laws within a single country to innovate across state boarders.

Mexico and Australia were both given one point. Mexico only has one law, applying only to the private sector and there was no information on the penalties available if there is a breach. In Australia, there is a combination of federal and state legislation for data laws. The federal legislation applies only to the public sector and any organization making over $3 million AUD annually. Like the United States, a myriad of state laws can increase costs for innovators within a single country.

RECOMMENDATIONS: INTELLECTUAL PROPERTY AND RESEARCH & DEVELOPMENT

Canada can build on some of the momentum which has been infused into the agri-food industry in recent years with major studies, such as the federal Barton report, and the major investments into initiatives such as the Protein and Oceans superclusters. Food processors can also collaborate with leaders in advanced manufacturing, and AI, to build further capacity. Indeed, the example from the Netherlands is testament to how innovation has been built from cross-industry collaboration. The Netherlands has become a global leader in horticulture, greenhouses and exporting of agri-food products. Government initiatives, and infrastructure have been set up to increase productivity and remove obstacles to growth. There are well organized supply chains and transport infrastructure to road and sea. The Netherlands have also established a branded region, The Food Valley, where leading private, public and research centres work together on advancing all aspects of the food chain. In Canada, we have the ability to develop regional nodes of innovation, including those in Atlantic Canada, Quebec, Ontario, the Prairies and British Columbia.

CONCLUSION

Based on the scores for each pillar, the results were weighted not to penalize countries for which data was not available/accessible. Weighted results re-balance the data in order to more accurately reflect how countries are performing based on metrics we could find data for. It has thus been concluded that the United Kingdom ranked first, the United States second, Germany third, Australia fourth, Canada fifth, the Netherlands sixth, Japan seventh, Mexico eighth, France ninth, and Italy tenth.

Country	Sec. 1 /15	Rank Pillar 1	Sec. 2 Total /24	Rank Pillar 2	Sec. 3 Total /21	Rank Pillar 3	Sec. 4 Total /15	Rank Pillar 4	Total Score /75	Final Rank (weighted results)
Canada	9	5	14	6	14	2	10	4	47	5
United States	9	5	16	3	15	1	11	2	51	2
Mexico	1	10	12	8	0	10	6	7	19	8
United Kingdom	11	1	18	1	12	3	12	1	53	1
Italy	3	9	13	7	7	6	5	10	28	10
Germany	11	1	17	2	9	4	6	7	43	3
France	6	8	16	3	3	9	10	4	35	9
Netherlands	10	3	12	8	4	8	6	7	32	6
Japan	9	5	9	10	6	7	8	6	32	7
Australia	10	3	15	5	8	5	11	2	44	4

Rankings for Pillar One (regulatory environment) are as follows: The United Kingdom and Germany placed first; the Netherlands and Australia second; Japan, Canada, and the United States third; France fourth; Italy fifth; and Mexico sixth. Rankings for Pillar Two (business competitiveness) are as follows: The United Kingdom placed first; Germany second; the United States and the Netherlands third; Australia fourth; Canada fifth; Mexico and France sixth; Italy seventh; and Japan eighth. Rankings for Pillar Three (Market Readiness) are as follows: The United States is first; Canada second; the United Kingdom third; Germany and Australia fourth; Italy and Japan fifth; the Netherlands sixth; France seventh; and Mexico eighth. Rankings for Pillar Four (intellectual property and research and development) are as follows: The United Kingdom is first; the United States and Australia second; Canada third; Japan fourth; Mexico, Italy, and Germany fifth; France sixth.

APPENDIX 1: INTERNATIONAL FOOD INNOVATION INDEX METRICS

PILLAR 1 Regulatory Environment (15)	PILLAR 2 Business Competitiveness (24)	PILLAR 3 Market Readiness (18)	PILLAR 4 Intellectual Property and Research & Development (15)
1.1 Regulatory Environment (9)	**2.1 Business Competitiveness (12)**	**3.1 Training and education (12)**	**4.1 Proprietary protection (6)**
1.1.1 Approval Periods	**2.1.1** Trade Balance	**3.1.1** Student Incentives	**4.1.1** Patent Procedures
1.1.2 Food Safety Assurance	**2.1.2** CPI	**3.1.2** Education Trends	**4.2.2** Patent Protection
1.1.3 Transparency & Communication	**2.1.3** Economic Indicators	**3.1.3** Employment Trends	**4.2 Research and Development (9)**
1.2 Environmental Restrictions (6)	**2.2 Capital Credit and Credit Availability (6)**	**3.1.4** Job Retraining	**4.2.1** Federal Budget
1.2.1 Waste Management	**2.2.1** Government Grants and Loans	**3.2 Diversity and Inclusion (6)**	**4.2.2** National Data Strategies
1.2.2 EPA & ERA	**2.2.2** Foreign Direct Investment per Capita	**3.2.1** Incentives and Equitable Workplace Training	**4.2.3** Privacy Laws
	2.3 Distribution Networks (9)	**3.2.2** Pay Gap Analysis	
	2.3.1 Large-Scale Competitors		
	2.3.2 Private Labels		
	2.3.3 Shipping Capacity		

APPENDIX 2: SCORES BY PILLAR

PILLAR 1

Country	1.1.1	1.1.2	1.1.3	1.1 Total /9	1.2.1	1.2.2	1.2 Total /6	Pillar 1 /15
Canada	1	2	2	5	2	2	4	9
United States	1	1	3	5	2	2	4	9
Mexico	N/A	N/A	1	1	N/A	N/A		1
United Kingdom	2	2	2	6	3	2	5	11
Italy	2	N/A	1	3	N/A			3
Germany	2	2	2	6	3	2	5	11
France	2	N/A	1	3	1	2	3	6
Netherlands	2	3	2	7	2	1	3	10
Japan	3	1	2	6	1	2	3	9
Australia	3	2	1	6	2	2	4	10

PILLAR 2

Country	2.1.1	2.1.2	2.1.3	2.1 Total /9	2.2.1	2.2.2	2.2 Total /6	2.3.1	2.3.2	2.3.3	2.3 Total /9	Pillar 2 /24
Canada	3	2	2	7	2	2	4	1	1	1	3	14
United States	1	2	1	4	2	2	4	3	2	2	7	16
Mexico	3	1	3	7	N/A	N/A		3	1	1	5	13
United Kingdom	1	3	3	7	3	2	5	2	2	3	7	18
Italy	2	0*	1	3	N/A	1		3	3	1	7	12
Germany	1	2	3	6	3	2	5	2	3	3	8	17
France	3	2	3	8	1	2	3	1	2	0*	3	13
Netherlands	3	3	3	9	2	1	3	1	3	0*	4	16
Japan	1	0*	3	4	1	2	3	N/A	N/A	3	3	9
Australia	3	3	1	7	2	2	4	1	2	1	4	15

**no available data*

PILLAR 3

Country	3.1.1	3.1.2	3.1.3	3.1.4	3.1 Total /12	3.2.1	3.2.2	3.2 Total /6	Pillar 3 /18
Canada	2	3	2	3	10	3	1	4	14
United States	2	3	3	2	10	3	2	5	15
Mexico	N/A	N/A	1**	N/A	1	N/A	0***	0	1
United Kingdom	1	2	1	3	7	2	3	5	12
Italy	0	2	1**	1	4	1	3	4	8
Germany	3	1*	3	1	8	1	1	2	10
France	1	1*	1**	1	4	1	0***	1	5
Netherlands	1	1*	1**	1	4	2	0***	2	6
Japan	1	1*	1**	2	5	3	0***	3	8
Australia	3	1*	1**	2	7	2	1	3	10

**no graduate employment rates available, overall employment rate compared instead*

***limited data available*

****no data found*

PILLAR 4

Country	4.1.1	4.1.2.	4.1 Total /6	4.2.1	4.2.2	4.2.3	4.2 Total /9	Pillar 4 /15
Canada	2	1	3	2	3	2	7	10
United States	3	2	5	3	3	0	6	11
Mexico	2	2	4	N/A	1	1	2	6
United Kingdom	2	3	5	3	1	3	7	12
Italy	2	2	4	N/A	0	2	2	6
Germany	2	2	4	N/A	0	2	2	6
France	1	1	2	N/A	1	2	3	5
Netherlands	2	1	3	2	3	2	7	10
Japan	1	3	4	1	1	2	4	8
Australia	2	2	4	3	3	1	7	11

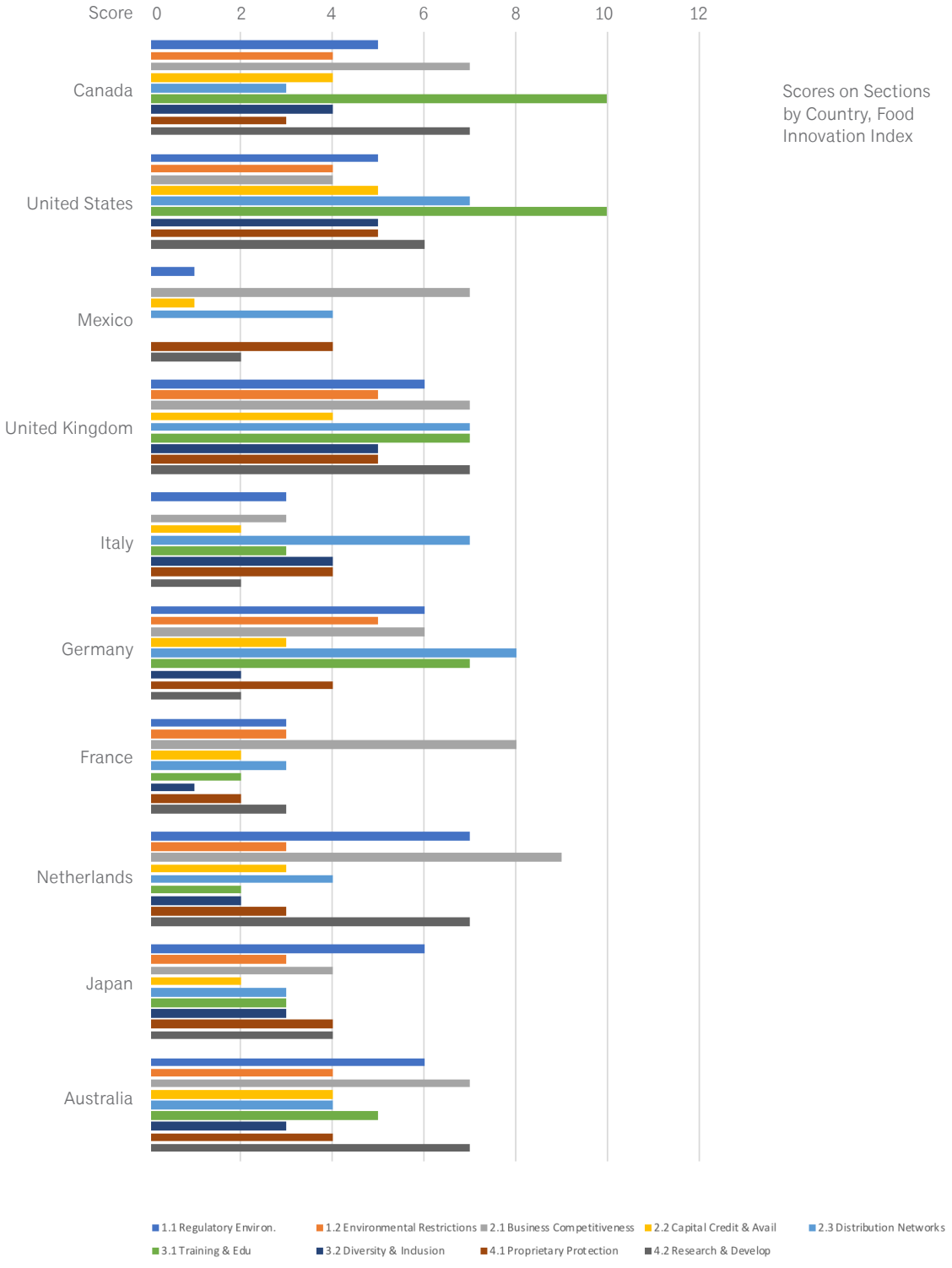
APPENDIX 3: RESULTS

Country	Sec. 1 /15	Rank Pillar 1	Sec. 2 Total /24	Rank Pillar 2	Sec. 3 Total /21	Rank Pillar 3	Sec. 4 Total /15	Rank Pillar 4	Total Score /75	Final Rank
Canada	9	5	14	6	14	2	10	4	47	3
United States	9	5	16	3	15	1	11	2	51	2
Mexico	1	10	12	8	0	10	6	7	19	10
United Kingdom	11	1	18	1	12	3	12	1	53	1
Italy	3	9	13	7	7	6	5	10	28	9
Germany	11	1	17	2	9	4	6	7	43	5
France	6	8	16	3	3	9	10	4	35	6
Netherlands	10	3	12	8	4	8	6	7	32	7
Japan	9	5	9	10	6	7	8	6	32	7
Australia	10	3	15	5	8	5	11	2	44	4

WEIGHTED RANKING

Country	Total Score /75	# criterias wt points	Weighted total	Final Rank (weighted results)
Canada	47	24	47	5
United States	50	24	50	2
Mexico	19	11	41.455	8
United Kingdom	54	24	54	1
Italy	21	18	36	10
Germany	45	55	49.091	3
France	28	18	37.333	9
Netherlands	40	21	45.714	6
Japan	33	19	41.684	7
Australia	44	22	48	4

APPENDIX 4: SCORES BY COUNTRY



Scores on Sections by Country, Food Innovation Index

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