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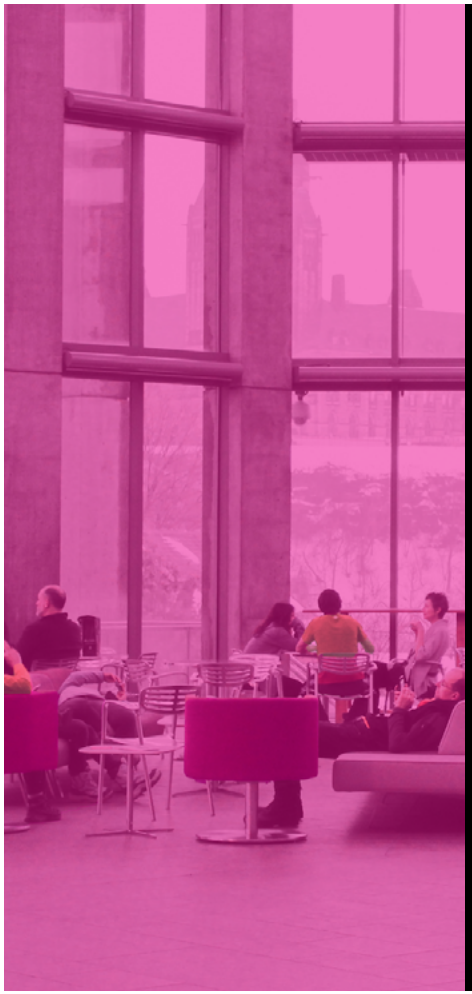
From Knives to Knobs

Advancing Sustainability in the Meat Value Chain with Smart Manufacturing Skills

Issue briefing | June 23 2025



Future Skills Centre | Centre des Compétences futures

The Future Skills Centre – Centre des Compétences futures (FSC-CCF) is a forward-thinking centre for research and collaboration dedicated to preparing Canadians for employment success. We believe Canadians should feel confident about the skills they have to succeed in a changing workforce. As a pan-Canadian community, we are collaborating to rigorously identify, test, measure, and share innovative approaches to assessing and developing the skills Canadians need to thrive in the days and years ahead.

The Future Skills Centre was founded by a consortium whose members are Toronto Metropolitan University, Blueprint, and The Conference Board of Canada.

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Contents

Key findings

- Smart manufacturing presents meat processors with the opportunity to bolster their sustainability performance while enhancing product quality and productivity. But for meat processors to harness smart manufacturing, their workers need the right skills.
- Based on the sustainability disclosures of North American and European meat processors, grocery retailers, and food service retailers, most high-priority sustainability issues in the downstream meat value chain have a social dimension. Environmental and governance issues remain important but less dominant.
- At their core, the dominant social issues in the downstream meat value chain are related to the health, safety, and wellbeing of workers, as well as the delivery of consumer value through measures of product quality and safety.
- The most pressing environmental issues across the value chain are emissions reductions, climate change, and waste reduction strategies.
- The highest priority sustainability issues for the downstream value chain segments of meat processors, grocery retailers, and food service retailers overlap considerably. For instance, while the ranking of the top five issues may vary across these value chain segments, they are nearly identical in composition. These issues include animal health and welfare, human resources, waste reduction strategies, emissions and climate change, and supply chain management.
- By leveraging robotics, automation, and digitization, smart manufacturing can address several of these high-priority sustainability issues in the downstream value chain. As such, smart manufacturing can make it possible for meat processors to not only address their own sustainability issues, but also broader value chain issues, including those facing their key customer segments (i.e., grocery retailers and food service retailers).
- To address the high-priority sustainability issues, workers in meat processing plants will have to develop new skills in robotics, such as robotic operations, control, and maintenance, as well as material management and verification.

Sustainability matters

Sustainability underpins the future of meat. Consumers, especially in high-income countries, are increasingly conscious of the environmental and social impacts associated with meat consumption. The meat industry should confront these issues to safeguard its social licence and remain competitive.

Smart manufacturing presents meat processors with an opportunity to bolster their sustainability performance, while enhancing quality and productivity. But for meat processors to harness smart manufacturing, their workers need the right skills.

While the meat processing industry plays a crucial role in global food security and nutrition, the meat value chain also faces serious sustainability challenges. For instance, beef production is the leading cause of tropical deforestation globally.[1] In Canada, beef production uses 74 per cent of the crop and pastureland that wildlife relies on for reproduction.[2] Over 30 per cent of global methane emissions are from livestock farming—methane's warming of the planet is at least 28 times greater than CO_2.[3,4]

But the industry's impacts are not solely environmental.

Meat processors face several social challenges. For instance, in Alberta (which accounts for 70 per cent of beef production in Canada), workers in the meat processing industry had the highest claims of joint and muscular inflammation illnesses, as well as musculoskeletal injuries.[5] The wages of meat product manufacturers in the province were also 25 per cent lower than the national average.[6,7]

Challenging working conditions, including the handling of large animals, exposure to extreme temperatures, and work in damp environments, all contribute to the difficulties faced by meat processors across Canada. These conditions make it difficult to attract and retain workers, as well as maximize their productivity.

This research examines the extent to which smart manufacturing can mitigate high-priority sustainability issues in the meat value chain, while highlighting the worker skills needed to realize its full potential. We looked at the sustainability disclosures of 50 companies in the downstream segment of the meat value chain to establish the highest priority sustainability issues. Our focus was primarily on large meat processors that either produce beef alone or alongside other meat products (e.g., pork or chicken).

1 World Wildlife Fund, "What Are the Biggest Drivers of Tropical Deforestation?"
2 Aboagye and others, "An assessment of the environmental sustainability of beef production."
3 UN Environment Programme, "Methane emissions are driving climate change."
4 Environment and Climate Change Canada, "Reducing methane emissions."
5 Government of Alberta, *Workplace injury, illness and fatality statistics*.
6 Innovation, Science and Economic Development Canada, "Meat product manufacturing."
7 Statistics Canada, "Employee wages by industry, annual."

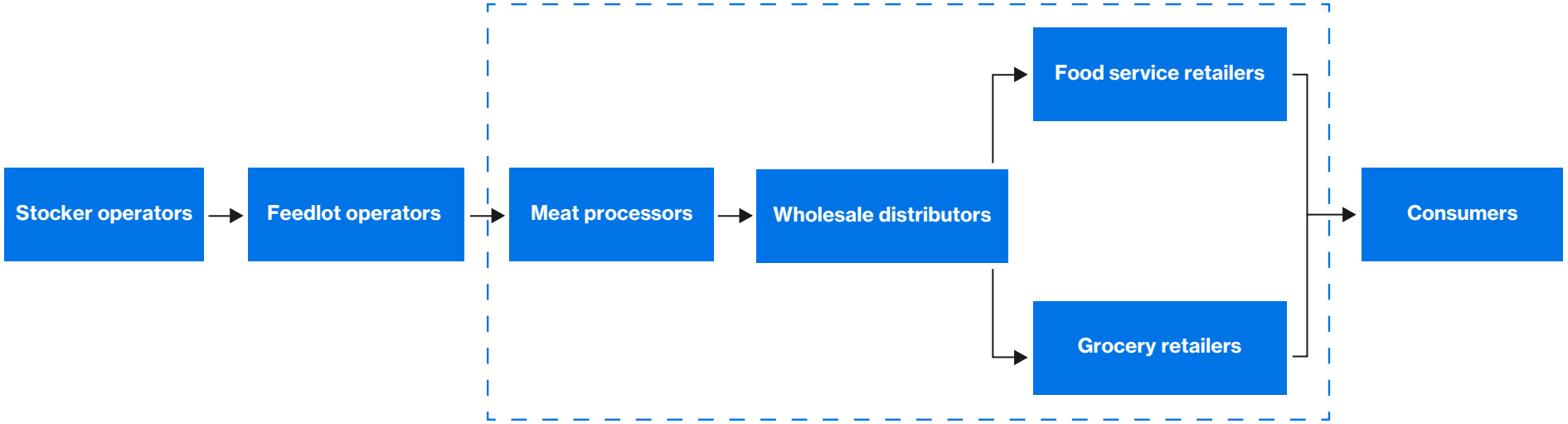
In Canada, large beef processors account for 95 per cent of production.[8] The beef industry has the highest product value of all meat industries, and is facing sustainability issues.

Leveraging innovation and skills

Smart manufacturing uses an automated, digital, and sustainability-conscious business model to increase the efficiency of traditional manufacturing approaches. The result is a more agile and productive industry.[9] Smart technologies streamline operations while ensuring high-quality products.

Some of Canada's largest meat processors, such as Cargill and JBS Foods Canada, are adopting smart manufacturing—including the use of robotics, automation, and digital technologies—in their processing plants.[10] While the potential productivity and efficiency gains are clear, the impact that smart manufacturing will have on a company's sustainability performance is relatively unexplored. Increasingly, meat processors have to focus on sustainability issues in their industry as well as high-priority issues in the broader meat value chain. (See Exhibit 1.) Smart manufacturing can aid sustainability performance.

Exhibit 1
Components of the beef value chain



Note: This diagram illustrates the major components in the beef value chain. Our study focuses on the downstream segment of the value chain, with the blue dotted line marking its boundary.
Sources: Lowe and others; Cowley; The Conference Board of Canada.

8 Mosby and Rotz, "As meat plants shut down, COVID-19 reveals the extreme concentration of our food supply."
9 Thompson, "What is smart manufacturing?"
10 For instance, Cargill has invested $100 million in its Factory of the Future systems, which combines advanced automation and data systems. Additionally, JBS Foods Canada has partnered with Scott Technologies for a $71-million dollar project focused on automating warehouse operations.

But there is often a skills mismatch. From a survey of 1,500 global manufacturers, including those in the food and beverage industry, a lack of skills to implement and optimize smart manufacturing was cited as the second and third most important barriers to its adoption.[11] Furthermore, skills in smart manufacturing were cited as the number-one factor for a company to obtain a competitive advantage. Thus, its adoption in meat processing plants can only be effective and sustained if workers are equipped with the required skills.

On the whole, Canada lags behind its peers in adopting robotics—ranking last among the G7 countries in 2022 and 15th globally.[12,13] The main barrier to robotics adoption is recruiting skilled workers.[14]

11 Rockwell Automation, *9th Annual State of Smart Manufacturing Report*.
12 International Federation of Robotics, "World Robotics 2023 Report."
13 Chatti and others, "Robotics Technologies Adoption."
14 Chatti and others.

The meat value chain: A processor's perspective

In Canada, meat processing is the largest industry by GDP and employment in food and beverage manufacturing. Grocery and food service retailers account for 70 per cent of sales from the Canadian food manufacturing and beverage industry.[15] Grocery and food service companies are not only major drivers of demand, but key customer segments. Increasingly, these retailers are exerting pressure on meat processors to improve their social and environmental performance.

Many retailers prioritize sustainably sourced products because they enhance supply chain resilience, reduce environmental and social regulatory risks, and, more importantly, meet the sustainability demands of their customers and investors. For instance, Metro has committed to sourcing 3 million pounds of beef from the Canadian Roundtable for Sustainable Beef, which measures sustainability on five guiding principles, including animal welfare and others.[16,17] Additionally, Restaurant Brands International, which owns Tim Hortons and Burger King amongst other brands, is procuring sustainable beef by accounting for issues such as, climate action, ethical labour and animal welfare.[18]

Meat processors are being challenged to demonstrate how their operations and products support the sustainability priorities of their customers.

Establishing sustainability imperatives in the meat value chain

Companies prioritize the sustainability issues that are most relevant to their segment of the meat value chain. For meat processors, this siloed approach fails to account for the full range of sustainability issues the meat processing industry faces. Furthermore, it does not account for the sustainability concerns of key customer segments (e.g., grocery retailers and food service retailers). Meat processors need a broader perspective.

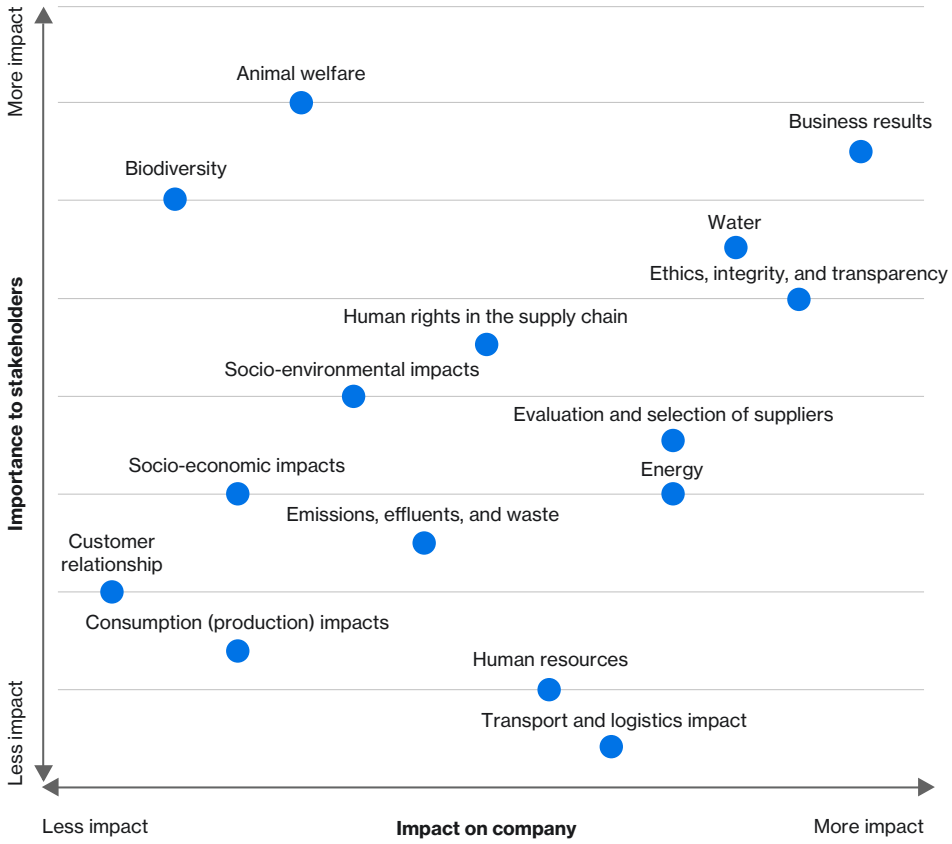
To help establish the high-priority issues, we developed an integrated materiality matrix (IMM) (see "What is a materiality matrix?") and conducted a relevance analysis. This relevance analysis sets the highest priority sustainability themes based on how frequently they appear in company sustainability disclosures and reports (see "Methodology—Relevance analysis" for additional details). These two methods are based on the public disclosures of 50 companies involved in meat processing, grocery retail, and food service retail in North America and Europe. The companies examined are provided in the Methodology section.

15 Food Processing Skills Canada, "At the Crossroad to Greatness."
16 Metro, "Metro Ontario expands its beef sustainability sourcing."
17 Aboagye and others, "An assessment of the environmental sustainability of beef production."
18 Restaurant Brands International Inc., "Beef Sustainability."

What is a materiality matrix?

Companies assess sustainability issues that are material for their business to identify opportunities and manage risks. These sustainability issues are often categorized as environmental, social, or governance (ESG) issues. Materiality matrices allow companies to illustrate, in a two-dimensional graph, the relative priority of ESG issues from the perspective of the business and its stakeholders. An example of a company's materiality matrix is illustrated in Chart 1.

Chart 1
Company materiality matrix



Note: This materiality matrix is reproduced from Marfrig, with some variation in the positions of the sustainability issues from the original disclosure.
Sources: Marfrig Global Foods; The Conference Board of Canada.

The prime issues

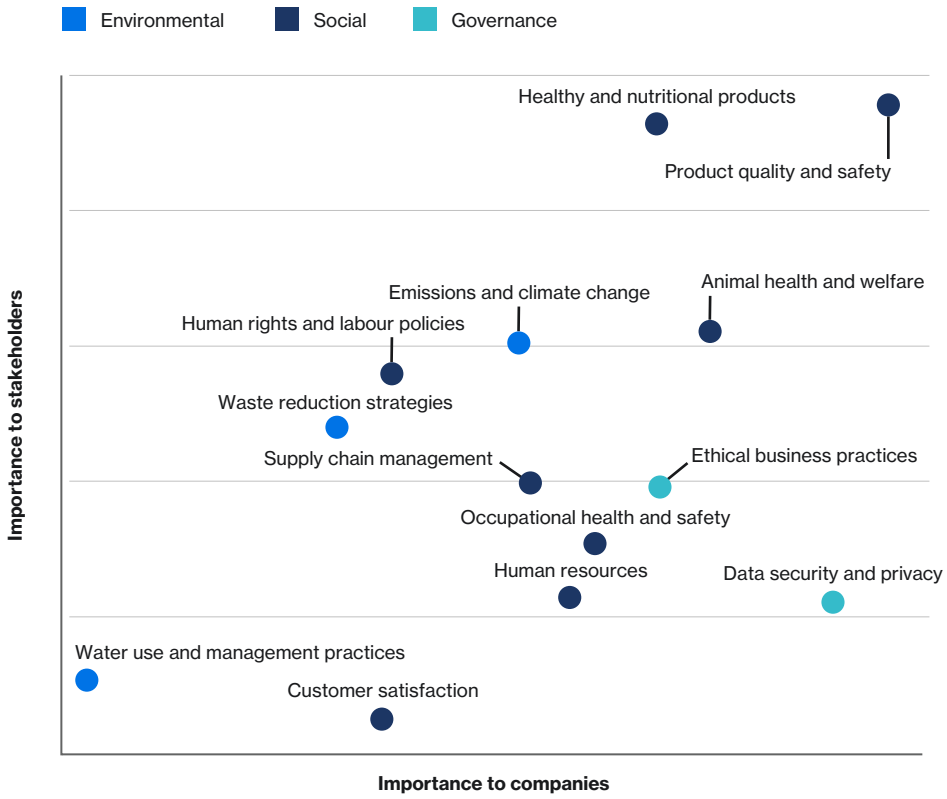
Based on the results from the IMM and the relevance analysis, the majority of high-priority sustainability issues in the downstream meat value chain have a social dimension. Environmental sustainability issues are also a priority. Governance–related issues remain important, but are less so compared to social and environmental issues.

Workers and consumers

The sustainability issues across the materiality matrices of 29 companies were categorized into themes (see Methodology). The IMM produced 13 ESG themes that are of the highest priority for meat processors, grocery retailers, and food service retailers. (See Chart 2.) Eight of these themes have a social dimension. The social themes are concentrated in two core areas—workers and consumer value.

Occupational health and safety, human rights and labour policies, and human resources all affect workers directly, while healthy and nutritious products, product quality and safety, and customer satisfaction all relate to consumer value. When it comes to environmental issues, climate change and resource efficiency for waste and water are core thematic areas.

Chart 2
Social themes dominate the sustainability priorities of the downstream meat value chain

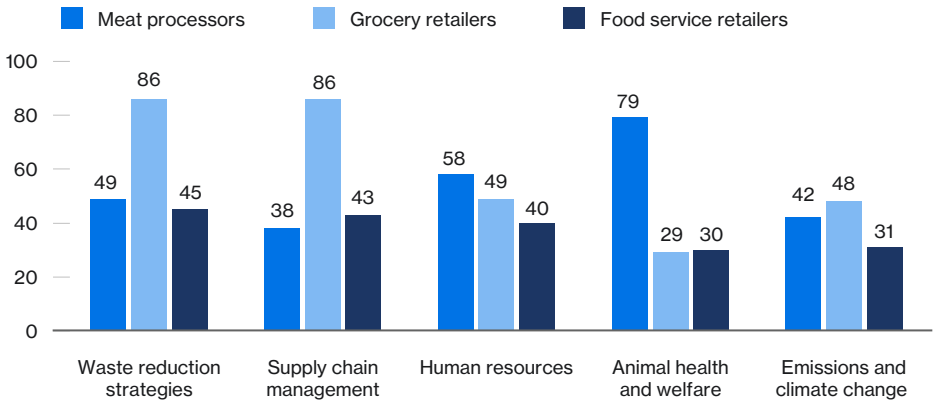


Sources: Twenty-nine publicly available company reports and sustainability disclosures; The Conference Board of Canada

Themes in balance

The relevance analysis illustrates a more balanced representation of social and environmental themes at the highest levels of priority. (See Chart 3 and Methodology—Relevance analysis.) The themes illustrated in Chart 3 have the five highest frequencies of occurrence across the downstream value chain. Unlike the IMM, the relevance analysis largely reflects the company perspective rather than its stakeholders. Animal health and human resources are the dominant social themes. Waste reduction strategies and climate change are prominent environmental themes. Supply chain management is a confluence of social, environmental, and governance issues, particularly with the increasing digitization of supply chains.

Chart 3
Sustainability issues with the highest frequencies show a balance between social and environmental themes



Sources: Reports and sustainability disclosures of 50 companies; The Conference Board of Canada.

Despite their differences, both the IMM and relevance analysis highlight similar high-priority themes. The top five themes in the relevance analysis are all included in the IMM. Across value chain segments there is also considerable commonality in the key themes. The top five themes for meat processors, grocery retailers, and food service retailers have differences in ranking but are almost identical in composition. (See Table 1.)

Table 1
Top 10 themes for each value chain segment

Position	Meat processors	Grocery retailers	Food service retailers
1	Animal health and welfare	Supply chain management	Waste reduction strategies
2	Human resources	Waste reduction strategies	Supply chain management
3	Waste reduction strategies	Human resources	Human resources
4	Emissions and climate change	Emissions and climate change	Emissions and climate change
5	Supply chain management	Community investment	Animal health and welfare
6	Community investment	Energy and fuels consumption	Community investment
7	Water use and management practices	Animal health and welfare	Product quality and safety
8	Sustainable agriculture	Water use and management practices	Sustainable agriculture
9	Product quality and safety	Sustainable agriculture	Renewable energy
10	Energy and fuels consumption	Product quality and safety	Water use and management practices

Note: These ranking results are based on the relevance analysis.
Source: The Conference Board of Canada.

Smart manufacturing: New capabilities

Smart manufacturing can help to address several of the high-priority sustainability themes that emerged from the IMM and relevance analysis. Three examples are outlined below.

Safeguarding workers

A 2023 study published in *The International Journal of Life Cycle Assessment* identified worker health and safety as the most improved social category after autonomous robotic systems were implemented in meat processing.[19] Furthermore, this capability is evident in specific unit operations at meat processing plants. For example, in the scribing of beef carcasses, the use of robots reduces the high strength requirement needed to carry out this operation. It also results in two important outcomes. First, it reduces the physical strain and intensity of the operation for workers—thereby minimizing the likelihood of fatigue-related injuries. Second, it broadens the pool of workers who can carry out this task.

Reducing waste

Smart grading systems use 3D imaging technology and artificial intelligence algorithms to grade carcasses.[20] The system predicts product yield from individual carcasses and minimizes waste by ensuring that the cuts meet customer demands. Automated case packing systems also reduce packaging and material waste,[21] as well as the risk of injuries to workers, as packaged boxes can weigh over 100 pounds.

Ensuring product safety

Smart manufacturing systems can track each part of an animal from breakup to packaging stages in meat processing plants.[22] Smart product tracing increases the operational resilience of processors. It allows them to keep product lines running for uncompromised batches, while identifying those with a high risk of contamination.

19 Valente and others, "Social performance and impact assessment of an autonomous system."
20 Frontmatec, "Fully automated beef classification system."
21 JLS Automation, "Osprey Case Packing System."
22 Marel, "StreamLine for beef."

Enabling skills

Despite its transformative potential, smart manufacturing cannot be adopted and sustained in meat processing plants without the required worker skills. (See Table 2.)

Workers in meat processing who are used to conventional operations will need to acquire new skills in robot operations, maintenance, and control, among others. These advanced technical and digital skills will require higher educational requirements, including college diplomas in engineering and robotics. Some current skills will be made obsolete, while other skills will continue to be relevant in both conventional and smart meat processing plants.

Table 2
Workers' skills for high-priority sustainability issues

Smart manufacturing skills	High-priority sustainability issues addressed	Rationale
Operating and controlling the robot	Occupational health and safety	**Occupational health and safety:** Robotic operation skills can reduce physical interaction between workers and processing machinery that can cause severe injuries. For instance, carcass splitting bandsaws and knives will be replaced by a fully automated splitting robot. This shift decreases the risk of injuries and enhances workers' health and overall working conditions.
	Emissions and climate change	**Emissions and climate change:** The use of robotics by workers is expected to reduce emissions and energy intensity by increasing labour productivity. For instance, meat packaging robots operate more efficiently than humans. Producing more goods with fewer resources reduces overall energy use and emissions generated.
	Waste reduction strategies	**Waste reduction strategies:** Robotic operation skills of workers can improve the accuracy of cuts and reduce the amount of carcass reworking. Replacing bandsaws with automated rotary knives reduces product waste during processing.* This also generates additional monetary value for meat processors.
Performing routine maintenance on robot	Occupational health and safety	**Occupational health and safety:** The productivity and availability of robots is maintained through preventive maintenance. Sensors and artificial intelligence (AI) are used to predict issues before they occur. This contrasts with maintenance in conventional meat processing plants, which depends on human inspection and observation of blades, saws, knives, and machinery. Reducing intervention by humans strengthens worker safety.
	Water use and management practices	**Water use and management practices:** The ability of workers to maintain robots enables effective operations and reduces ineficiencies that could lead to excessive water use e.g., during evisceration operations. The enhanced diagnostics for smart maintenance compared to conventional maintenance, also reduces downtime from operational issues that may lead to extensive repairs.†
Verifying the operation of automated equipment sanitation	Product quality and safety	**Product quality and safety:** Equipment sanitation is necessary to ensure high product safety in meat processing plants. Thoroughly sanitizing the robotic equipment reduces food-borne illnesses and contamination. This is a key skill for workers. Also, compared to conventional processing plants, robots reduce the risk of contamination by minimizing human contact with meat products.
Managing the appropriate use of resources, including equipment	Emissions and climate change	**Emissions and climate change:** Managing material resources by adjusting the speed of robots optimizes energy use. The use of robots requires less human involvement, potentially lowering energy and emissions compared to conventional processing.‡ The ability of workers to regulate material resources in this manner optimizes energy use and consequently reduces emissions. This is an important management skill.
Quality control—inspecting products to verify robot cut quality	Product quality and safety	**Product quality and safety:** Processing images using AI algorithms to detect meat characteristics (e.g., freshness, colour, texture) enhances quality control of the products.§ Many operations in smart meat plants are automated with high-resolution cameras and deep learning algorithms.§ These technologies increase speed and accuracy compared to conventional quality control methods.
	Customer satisfaction	**Customer satisfaction:** AI is likely to have a higher degree of rigour and consistency in quality assurance standards (e.g., size, texture, colour). This ensures that consistent meat products are produced compared to conventional production.¶ This decreases product variability and ensures that customers receive consistent, safe, and high-quality meat.

* Seaton.
† Barbut.
‡ E-Fatima and others.
§ Alvarez-García and others.
¶ Barbar and others.
Note: The smart manufacturing skills were obtained from The Conference Board of Canada's Smart Skills Framework. This framework identifies the skills that workers need to operate smart technologies in meat processing plants.
Source: The Conference Board of Canada.

Getting to the cutting edge

Meat processors can take steps to fully leverage smart manufacturing to tackle key sustainability challenges in the downstream meat value chain. While some actions apply across the board, our focus is on large companies. These companies are more likely to have the capital, value chain relationships, sustainability strategies, and scale needed to drive meaningful change.

Build a talent transition program

Meat processors will need a talent transition and upskilling program for their existing workforce, as most of the smart manufacturing labour force will likely be drawn from those already employed in meat processing. Despite the potential for increased wages along with improved working conditions and safety, it is unlikely that most of the required robotics and digital skills will be drawn from talent outside the industry, especially in the short to medium term.

Processors should conduct a skills inventory to compare the current skills of their workforce against the required skills for smart manufacturing. To upskill workers, the internal expertise of processors in robotics and digital technologies should be leveraged. This can be complemented with the engagement of technology vendors and external experts. To ensure high engagement of workers, processors should communicate the safety and working environment benefits of smart manufacturing.

Partner with colleges and governments

Credentialling and certification programs, particularly in robotic operations, automation, and digital skills, will be needed to transition and upskill workers. Processors can partner with colleges and polytechnics, ideally in the communities where they operate, to develop the necessary programs. Many processors are located in rural areas, and almost half of workers in meat processing are low-skilled individuals who may not have a high school education.[23] Some large processors in Canada employ almost 3,000 workers at a single plant. Therefore, maximizing the potential of these workers will require processors to engage governments and build partnerships to fund and support post-secondary institutions in these communities for capacity building.

Select vendors strategically

Many smart manufacturing technologies incur a substantive upfront investment with an extended payback period. The long-term financial stability, the intellectual property (IP) portfolio, and the sustainability metrics of vendors and their technologies are important considerations for processors. Vendors will also play a crucial role for on-the-job training, operational troubleshooting, and the change management needed to refine the skills and productivity of workers. Processors should manage the "lock-in" risk with vendor technologies by ensuring compatibility and adherence to the dominant standards and communication protocols for robotics and digital infrastructure.

Take a value chain perspective

Meat processors tend to assess smart manufacturing technologies in terms of their ability to address specific company needs. This inward focus is too narrow. Smart manufacturing technologies should be assessed using a value chain perspective. Given their common sustainability priorities, which smart manufacturing can address, processors should engage grocery and food service retailers to leverage capital, share risks, and collaborate on product positioning strategies for the value chain. Pilots could be rolled out to test these strategies, which would help to innovate new technologies and reduce risks.

Leverage new data with consumers

Smart manufacturing gives processors the opportunity to make substantiated and evidence-based claims about the sustainability of their products. The use of robots as well as the automation and digitization of operations will generate new data, which processors can then leverage to help them differentiate their products from others. This is particularly important given that recent amendments to the *Competition Act* have elevated the standards for making environmental and sustainability claims, including claims on labels.

23 Food Processing Skills Canada, "Canadian Meat and Poultry LMI – Executive Summary."

Appendix A

Methodology

We developed two approaches to identify key sustainability issues facing companies in the meat value chain—a relevance analysis and an integrated materiality matrix. These two approaches were adopted because the quality of disclosures differ between companies and industries. For instance, not all companies include a materiality matrix as part of their sustainability disclosures.

Company data and eligibility requirements

Fifty companies in the downstream segment of the meat value chain were selected to establish the highest priority sustainability issues. (See Table 1.) This included meat manufacturers, grocery retailers, and food service retailers. These companies were sourced from online databases for their respective industries. The selection criteria for the companies in each value chain segment were:

- publicly available disclosures on sustainability performance and priority issues
- company operations in the beef industry in North America or Europe
- annual company revenues over $1 billion

The breakdown of companies analyzed is as follows: 17 meat manufacturers; 17 grocery retailers, and 16 food service retailers.

Relevance analysis

Twenty-one of the 50 companies selected for this analysis did not have materiality matrices. To ensure inclusivity, we conducted a relevance analysis for every company. A relevance analysis establishes the highest priority sustainability themes based on how frequently they appear in the company's sustainability disclosures and reports. Data for the relevance analysis was obtained from the companies' ESG, sustainability, and annual reports.

A total of 1,535 sustainability issues were recorded from the reports, and the issues were condensed into 24 unique themes. These themes included sustainability opportunities and challenges, such as animal health and welfare, sustainable agriculture, and climate change. The data was classified into the appropriate themes using keywords and adjacent concepts. For instance, issues related to food waste reduction and circular economy were assigned to the waste reduction strategy theme, whereas issues such as reducing scope 1, 2, and 3 emissions and achieving net zero were assigned to the emissions and climate change theme.

We then determined a total for the frequency of occurrence for all the themes across each value chain segment, followed by the top five themes with the highest total for frequency of occurrence. We used these themes to establish the highest priority issues for companies that do not have a materiality matrix.

Integrated materiality matrix

Twenty-nine of the 50 companies for this analysis had a materiality matrix included in their sustainability disclosures. These matrices were used to develop the integrated materiality matrix in this study.

The methodology we used is outlined in the following two key steps.

First, the 10 highest ranking sustainability issues from each company's materiality matrix were determined using their relative positions. A total of 290 issues were captured across meat processing, grocery retail, and food service retail sectors. We then categorized these issues under 23 unique themes (for instance, product safety, quality and responsibility, and food safety issues were categorized under the product quality and safety theme).

Second, each theme was assigned an X and Y coordinate to mark its relative position to other sustainability themes. The average X and Y coordinates for each issue contained within a theme was used to assign this relative position. We used these coordinates to develop the integrated materiality matrix (IMM). A total of 23 themes were produced in the IMM. To make our prioritization method more robust, we also accounted for the frequency of occurrence of the sustainability themes across the 29 materiality matrices.

The median frequency of occurrence for all the sustainability themes across the 29 materiality matrices was then determined. Only the sustainability themes at or above the median frequency were included in the IMM. This resulted in the 13 sustainability themes reflected in the IMM.

Table 1
Meat value chain firms

Value chain segment	Companies	Operational region	Headquarters
Meat processors	Bigard	Europe	Quimperlé, France
	Cargill	North America and Europe	Minnesota, U.S.
	Danish Crown	North America and Europe	Randers, Denmark
	Dawn Meats Group	Europe	Waterford, Ireland
	HyLife	North America	Manitoba, Canada
	Inalca	North America and Europe	Castelvetro Modena, Italy
	JBS Meats	North America and Europe	São Paulo, Brazil
	Maple Leaf Canada	North America	Mississauga, Canada
	Marfrig	North America and Europe	São Paulo, Brazil
	Moy Park	North America and Europe	Craigavon, Northern Ireland
	OlyMel	North America	Quebec, Canada
	OSI Group	North America and Europe	Illinois, U.S.
	Perdue Farms	North America	Maryland, U.S.
	Premium Brands	North America	British Columbia, Canada
	Sofina food	North America and Europe	Ontario, Canada
	Tyson Foods	North America and Europe	Arkansas, U.S.
	Vion Food Group	Europe	Boxtel, Netherlands

(continued ...)

Value chain segment	Companies	Operational region	Headquarters
Grocery retailers	Aldi	North America and Europe	Essen, Germany
	Asda	Europe	Leeds, England
	Costco	North America and Europe	Washington, U.S.
	Empire Company	North America	Nova Scotia, Canada
	Federated Co-operatives	North America	Saskachewan, Canada
	Hello Fresh	North America and Europe	Berlin, Germany
	Kroger	North America	Ohio, U.S.
	Loblaws	North America	Ontario, Canada
	Longos	North America	Ontario, Canada
	Metro	North America	Quebec, Canada
	Sainsburys	Europe	London, England
	Save on Foods	North America	British Columbia, Canada
	Schwarz Group	North America and Europe	Baden-Württemberg, Germany
	Target	North America	Minnesota, U.S.
	The Co-operative Group	Europe	Manchester, England
	Walmart	North America	Arkansas, U.S.
	Whole foods	North America and Europe	Texas, U.S.

(continued ...)

Value chain segment	Companies	Operational region	Headquarters
Food service retailers	Aramark	North America and Europe	Pennsylvania, U.S.
	Campbells Soup Company	North America and Europe	New Jersey, U.S.
	Chipotle Mexican Grill	North America and Europe	California, U.S.
	Compass Group	North America and Europe	Chertsey, England
	Dominos	North America and Europe	Michigan, U.S.
	Kraft Heinz	North America and Europe	Illinois, U.S.
	McDonald's	North America and Europe	Illinois, U.S.
	Nestle	North America and Europe	Vevey, Switzerland
	Red Robin	North America	Colorado, U.S.
	Restaurant Brand International	North America and Europe	Ontario, Canada
	Sodexo	North America and Europe	Issy-les-Moulineaux, France
	Starbucks	North America and Europe	Washington, U.S.
	Subway	North America and Europe	Connecticut, U.S.
	Sysco	North America and Europe	Texas, U.S.
	Wendy's	North America and Europe	Ohio, U.S.
	Yum! Brands	North America and Europe	Kentucky, U.S.

Source: The Conference Board of Canada.

Appendix B

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