

CANADIAN ROBOTICS COUNCIL
CONSEIL CANADIEN DE LA ROBOTIQUE



WHAT WE HEARD REPORT 2024

Canadian Robotics Council Symposium

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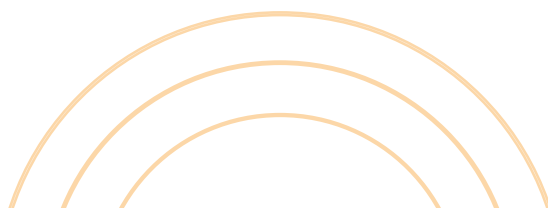


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We bring the ecosystem together

INDUSTRY

360+ members
from Denmark and abroad

PUBLIC SECTOR

Danish Board of
Business Development

Co-funded by
the European Union

Odense Robotics is co-funded by the Danish Board of
Business Development, the Danish Agency for Higher
Education and Science, and the European Union, as well
as a broad range of projects and partnerships.



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Productivity crisis? Robots can help with that

Robots are excellent at solving productivity problems. In fact, most are designed to do just that! This is why Canada's low rate of robot adoption deserves the attention of those who care about preserving Canadian global competitiveness jobs, and quality of life. If Canada wants to steer clear of a productivity emergency and future labour shortages, we urgently need to evolve our innovation policies, practices and training programs to **prioritize robotics upskilling and incentivize robot adoption** across sectors.

This was the overarching consensus at the sold-out 2024 Canadian Robotics Council Symposium. Held in downtown Toronto this past June, CRC's third annual symposium brought together a record number of senior decision-makers and diversity of perspectives to propose solutions to the underlying challenges that are limiting robot adoption and innovation in this country.

Those who were able to attend the symposium in person will recall the palpable energy in the room – not even a false fire alarm was able to derail our many insightful discussions!

Highlights from this year's event included:

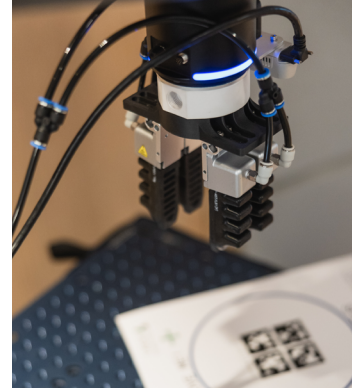
- A keynote from the CEO of Denmark's 500-firm strong robotics cluster – Odense Robotics – and a follow-on roundtable to

explore partnerships between Canadian and Danish economic development agencies, companies and training institutions.

- New networking opportunities for robotics startups and investors, including roundtables that explored how the investor and IP community can better support scale-ups and commercialization.
- A landmark panel and follow-on roundtable that went past the robots-vs-jobs debate to find common ground between Canada's robotics industry and trade unions, which received national news coverage in The Globe and Mail.

Each of these conversations demonstrates the unique opportunities that arise when diverse viewpoints come together to tackle a problem. Indeed, this 2024 "What We Heard Report" synthesizes the perspectives from industry leaders, investors, policy makers, economists, regional economic development agencies, researchers, training providers, trade union representatives and international partners on these issues and many more.

As such, it provides readers a 360-degree record of what symposium participants agree will be needed to unlock robot-enhanced productivity and innovation here in Canada.



We heard that **the most urgent need is to incentivize robot adoption among SMEs** – the thousands of small businesses that form the backbone of the Canadian economy. And we heard that longer term strategic thinking is needed to attract, retain and develop robotics talent and IP if we are to steer Canadian industries through labour shortages, climate challenges and global competition.

Most importantly, we heard that there are reasons to be hopeful about the future of Canadian prosperity, because our current state of low robot adoption and declining productivity – while a problem of crisis proportions in the eyes of central bankers – actually represents a significant opportunity for the next generation of innovators who are willing to tap into and grow Canada's domestic robotics market. Canadian robotics companies that have built a successful export business are eager to help transfer that success and expertise in their local regions.

We also heard that hope alone isn't enough, and that swift action is needed. Robotics offers a game-changing opportunity to transform our economy, but to keep pace with our global competitors and international partners who are already investing in robotics at scale, Canada needs a bold national robotics strategy – one that ties our AI strategy with the physical industries that drive our economy. And to level the playing field for robotics innovators, it also needs patient and dedicated robotics funding programs that recognize the unique challenges of developing hardware solutions and expertise for a global marketplace.

Robotics can and should be part of a comprehensive industrial strategy that builds on Canada's international reputation for AI and robotics excellence, preserves and adds value to our abundance of natural resources, and reinforces our core values as a diverse, multicultural and sovereign trading nation.

The Canadian Robotics Council is uniquely positioned to be the forum where Canada's national robotics strategy takes shape. This starts with mapping the issues, capabilities and people that comprise our ecosystem. If you have not already done so, we invite you to participate in this collaborative effort by registering with the Council. <https://www.roboticscouncil.ca/how-to-join>

The CRC is grateful to our sponsors, chapter authors and committee chairs, and the many contributors who joined us at the symposium and advised on what issues and solutions such a national robotics strategy might encompass. You will see them acknowledged throughout this document.

We are particularly grateful to our funding partner, NGen, and to Christy Michalak for taking on the role of program co-chair for this year's symposium. Her guidance in shaping the program and her introductions to several key speakers and sponsors were invaluable.

Sincerely,
Hallie Siegel & Ryan Gariepy,
CRC Executive Co-Chairs

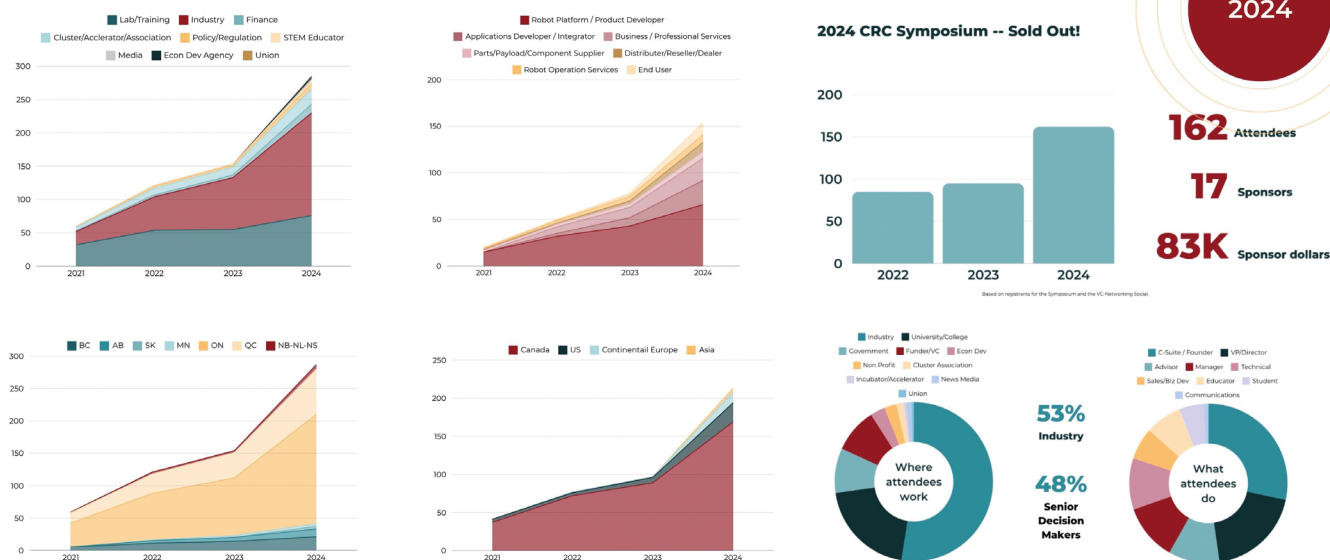
2024 CRC EXECUTIVE UPDATE

The Canadian Robotics Council (CRC) was launched with a mission to build a robust and self-sustaining ecosystem network that integrates robotics expertise and develops robotics talent across industry verticals from coast to coast, while serving as the collective national voice and international point of contact for Canadian robotics.

Since establishing as a non-profit association in 2023, and thanks in part to funding and network support from NGen, our database of registered members has grown significantly. We are seeing a greater diversity and more representative balance of registered organizations, an expansion of our geographic reach (both domestically and internationally) and a greater number of influential decision-makers engaging in our events and activities than when we first started.

Using 2020 benchmark data from an Innovation, Science and Economic Development Canada (ISED) commissioned report, we estimate that we have engaged about half of Canada's robotics companies (154/310) and academic research labs (66/105) since launching as a registered non-profit organization. Recent growth in our reach and in our diversity are in large part due to a sold-out 2024 symposium that was co-organized with CRC, NGen and the University of Toronto Robotics Institute.

Engaging senior decision-makers from organizations across the robotics value chain, in Canada and internationally



While our database is not yet representative of the entire Canadian robotics ecosystem, it remains the **most comprehensive database of the Canadian robotics ecosystem** presently available. This means that we are well positioned to begin to track the overall impact of the sector in terms of job creation and other key metrics.

Priorities for the 2025 season include:

- Supporting ISED and NGen on the [Canadian trade mission to Hannover Messe](#)
- Organizing the 2025 Symposium
- Refining our annual membership model
- Launching a case study library
- Continuing to develop our sectoral mapping and tracking capabilities as a long-term strategic objective, since this information will be valuable to all Canadian robotics stakeholders as they develop their own strategic plans and roadmaps



Partner Statement: Next Generation Manufacturing Canada (NGen)



Jayson Myers
CEO, NGen

At Next Generation Manufacturing Canada (NGen), our mission is to strengthen the competitiveness and growth potential of Canada's critical advanced manufacturing sector to deliver step-change improvements in areas such as greenhouse gas (GHG) emission reductions, environmental sustainability, health and safety, food and water security, and supply chain resilience for Canadians and the world. Canada's robotics sector will play a pivotal role in achieving these goals.

The sector has strong research and workforce capabilities right across the country. We have brilliant technologies, strong start-up ecosystems, and world-leading manufacturing companies and other end-users of robotic technologies. It's crucial that we raise awareness about our capabilities and connect the ecosystem together to form partnerships that can enhance business opportunities and create technology solutions to resolve business challenges.

But it's not only about the technology.

It's about empowering the workforce to make companies agile and responsive to market conditions, customer demand, and technology in a proactive, immediate and value-adding way. It's about creating opportunities for Canada's youth to join the sector and creating well-paying jobs that will be there for them on graduation and protect Canadians' way of life for years to come. It's about connecting complementary ecosystems with expertise in areas such as

artificial intelligence, photonics and automation, and new and novel materials to enable these partnerships. It's also about strengthening international connections to create opportunities for Canadians.

For all these reasons, we partnered with the Canadian Robotics Council (CRC) this year to bring together its members and other leading voices from Canada's robotics, workforce and advanced manufacturing ecosystems. The Symposium allowed for a deeper understanding of the challenges and opportunities facing Canada's robotics companies, and to hear where industry itself sees its innovation investment priorities.

We're excited about future collaborations with the CRC, as NGen's Cluster Accelerator Network expands to connect more than 30 industry clusters from across the country, including the CRC. We will also travel together to Hannover Messe 2025 – with Canada featured as this year's partner country – as the CRC brings its member companies to network and exhibit new technologies at the largest industrial technology fair in the world.

The successful collaboration between our two organizations, combined with participants' valuable insights, culminated in a highly impactful symposium and the creation of this comprehensive report that will inform the growth and competitiveness of Canada's robotics industry. Thank you to everyone who contributed!

"We're excited about future collaborations with the Canadian Robotics Council, as NGen's Cluster Accelerator Network expands to connect more than 30 industry clusters from across the country, including the CRC."

Spotlight: 2024 CRC Symposium Keynote

How Denmark built a world-class robotics ecosystem

In his keynote address, **Søren Elmer Kristensen**, CEO of **Odense Robotics**, revealed how collaboration between academia, industry, a trade union and local government was critical to the success of Denmark's robotics cluster.

Located in Odense, this world-leading **cluster** has grown over two decades to include over 500 firms that employ over 12,000 people.



**WATCH THE FULL KEYNOTE ADDRESS
ON YOUTUBE**



ROUNDTABLE REPORT

Forging international robotics and AI partnerships: The Denmark-Canada context

Sponsored by:



International partnerships between robotics clusters present significant opportunities for advancing technology and addressing supply chain challenges while aligning with national priorities. This roundtable brought together leaders from Denmark and Canada to explore cooperation strategies. This report summarizes key insights, actions and challenges identified during discussions.

Cultural Compatibility

A crucial theme emerged around the importance of shared values and complementary strengths between Canada and Denmark. While cultural differences exist, participants noted that Denmark's business environment aligns more closely with Canada's than with that of the U.S., emphasizing innovation and a healthy work-life balance. Danish participants expressed a strong respect for Toronto, signaling a foundation for a successful partnership.

Partnership Framework

Effective partnerships evolve through several stages: initiating contact, fostering regular engagement, creating programs for knowledge exchange, and establishing formal agreements for ongoing collaboration. Discussions focused on developing a structured Canada-Denmark partnership across three key areas: Education, Industry Partnerships & Technology Development, and Investments & Policy.

Key Dimensions

EDUCATION

- Existing programs in Denmark, Canada, and beyond that could host exchanges and collaboration opportunities include:
 - An elite robot summer school hosts international students who can visit Danish companies and meet Danish students
 - Mitacs projects that enable Danish and Canadian students to conduct R&D projects at Canadian universities or companies, but there is no specific call for robotics

ACTIONS:

- Document a comprehensive list of exchange programs that already exist
- Canadian Robotics Council (CRC) to make a recommendation to **Mitacs to enable a robotics-specific exchange**
- Closely monitor cross-pollination opportunities in robotics topics, e.g. defense, food/biome, construction, manufacturing, and energy

INDUSTRY PARTNERSHIPS & TECHNOLOGY DEVELOPMENT

- Existing programs in Denmark, Canada, and beyond that could lead to the creation, development, and market access of robotics innovations and technologies in key areas:
 - Industrial robotics:** The Eureka program enables industry-led international R&D projects between 45 global economies
 - Drones:** Odense is hosting an international drone show in 2025, which could be a good engagement event for Canadian and Danish robotics academics and companies to meet
 - Medical robotics:** Toronto is emerging as a robotics and AI hub, supported by strong academic institutions and a vibrant startup ecosystem and hospital networks, while Odense, Denmark, is recognized for its focus on healthcare and industrial robotics within a collaborative environment
 - Industrial-Academic Collaboration:** **National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP)** provides advice, connections and funding to help Canadian startups take their ideas to an international market

ACTIONS:

- Identify a comprehensive list of **technology trade shows** (e.g., Hannover Messe, Automatica, IQRA, IRAS) to participate in and develop programming for Canadian and Danish stakeholders to meet. This could include a virtual event before trade shows to establish initial connections
- Establish an industry committee to identify which academics and startups are interested in Danish-Canadian partnerships
- To leverage the **funding available through the Eureka program**, find the right institutional cluster counterpart in Denmark as a start

Investments & Policy

- Existing funding programs and policies in Denmark and Canada to enable collaborations
 - A Danish sovereign fund invests to support the expansion of Danish companies into international markets and the expansion of international companies into Denmark
 - The Business Development Bank of Canada (BDC) **has recently launched a deep tech fund to help Canadian startups** develop their markets and commercialize their technologies in Canada and abroad
 - There are Danish industry organizations who influence policy, but none in the robotics sector
 - Canadians are allowed to immigrate to Denmark and there are a growing number who are taking advantage of this opportunity

ACTIONS:

- Invite the Danish sovereign fund to explore Canadian robotics clusters as partners to enable the expansion of Danish startups into Canada
- Establish a bilateral agreement between Canada and Denmark to support Eureka projects
- Identify unique infrastructure available in each country to support the development and growth of robotics innovations

Summary

This report underscores the strengths of Denmark and Canada's robotics ecosystems, highlighting their innovation, collaboration, and commitment to ethical practices. As a result of the connections made during the symposium, efforts are already underway to establish bilateral funding calls between Canada and Denmark under the Eureka framework. Several bilateral scouting and partnering missions are also being planned in 2025 to facilitate knowledge exchange and drive industrial collaboration.

The partnership between these countries exemplifies how international cooperation can enhance knowledge sharing and drive technological advancements. Key action points include:

- **Enhancing Knowledge Sharing:** Identify and build on existing exchange programs in Canada and Denmark to drive knowledge exchange
- **Establishing International Networks:** Facilitate connections between Canadian robotics stakeholders and global clusters by identifying regular meeting opportunities
- **Strengthening Government Support:** Advocate for policies and funding that support international partnerships and funding for collaborative robotics initiatives

Furthermore, the CRC can play a proactive leadership role in establishing and nurturing relationships with other global robotics clusters. There is a significant opportunity for the Canadian robotics ecosystem including industry, training partners, governments and trade commissioners and economic development agencies to collaborate to attract foreign investment and support the growth and expansion of international companies into Canada. The CRC should continue to invite international delegates to its events to enable this type of activity. By facilitating dialogue and collaboration with established international hubs, the Council can position Canada as a leader in the robotics sector, driving innovation and creating opportunities for growth. Through strategic alliances and joint initiatives, Canada can harness global expertise, ultimately contributing to a more dynamic and interconnected robotics landscape.

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Realising automation potential – in Canada and Denmark



Søren Elmer Kristensen
CEO, Odense Robotics

Our world faces significant challenges, from green transition and labor shortages to inflation and geopolitics, and automation is part of the solution. Increasing automation requires investment in innovation and tech transfer – and, I believe, strategic alliances globally.

While geographically far apart, Denmark and Canada share many challenges and opportunities in this regard. My visit to Canada earlier this year underscored the exciting opportunities to realise automation potential by tapping into synergies between Denmark's and Canada's robotics ecosystems.

DENMARK – A ROBOTICS NATION WITH INCREASING ADOPTION

In recent years, Denmark has become a global automation leader, particularly within collaborative and mobile robots. We have an innovative robotics, automation, and drone industry providing world-class solutions. We have strong academic institutions and testing facilities. Denmark has a strong ecosystem united by a well-established national cluster. And we have strong partnerships with trade unions, municipalities and national policymakers to encourage the adoption of new technologies in existing and new domains.

Robot adoption in Denmark is moving in the right direction but is far from realizing its full potential. According to the IFR World Robotics Report 2023 that charts installed industrial robots globally, Denmark moved up to 7th place in 2023 in terms of robots per employee.

But there's no room for complacency. While large manufacturing companies have embraced automation, there remains a significant untapped potential for automation amongst Danish SMEs. Automation remains a daunting task for small and medium-sized enterprises.

That's why Odense Robotics is working together with players from across the ecosystem in order to

drive innovation and increase adoption. Denmark must provide end users with the right support to start automating. We must increase awareness of the benefits of automation. We must showcase solutions and attract talent. And we must support innovation – bringing together researchers and companies to find future solutions.

SYNERGIES BETWEEN DENMARK AND CANADA

Denmark and Canada share many challenges and opportunities, which was clear to me on my visit to Waterloo and Toronto earlier this year. I was impressed by the country's growing robotics ecosystem. Like in Denmark, I could sense a strong sense of urgency in Canada to realise the country's automation potential.

I was privileged to be invited to participate in the Canadian Robotics Council Symposium, where key players from the Canadian ecosystem discussed the future of robotics technology.

As a keynote speaker, I had the honour of sharing insights on how Denmark has succeeded in establishing a strong robotics ecosystem and efforts to support robotics adoption.

Later in the day, I joined an exciting roundtable discussion exploring cooperation strategies that could benefit both nations. It was an incredibly fruitful day filled with interactions with many passionate players from the Canadian robotics and automation ecosystem.

I'm eager to continue the meaningful conversations I had on my visit to Canada and explore the opportunities ahead. We can go further together by building on each other's expertise in strategic collaborations. The world is waiting for new, robotics solutions to solve our many global challenges – and together we can make them a reality for the benefit of producers and end users on both sides of the Atlantic.



INTERNATIONAL DRONE SHOW 2025

Join us at one of Europe's biggest drone events

Want to be part of one of Northern Europe's biggest drone events? Secure your ticket now for International Drone Show 2025 in Denmark.

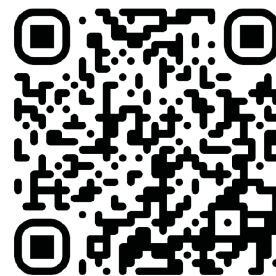
See new drone technologies in action, network, and hear experts from Europe's drone industry share new industry insights and research knowledge— all at the International Drone Show on **18-19 June 2025** at HCA Airport in Odense, Denmark.

The annual conference and expo event is a unique meeting place for the drone industry, researchers and end users – from the commercial and public sector, including defence – to discuss the latest drone innovations, explore new application potential and learn about Denmark's drone ecosystem.

Conference themes: Defence, security & the Arctic, Industry use cases & new technologies, Advanced air mobility and Integrated airspace.

The event features:

- ✂ Talks and panelist discussions covering industry themes
- ✂ Live flight demonstrations
- ✂ Expo area showcasing the latest drone solutions and research
- ✂ B2B matchmaking event – book 1:1 meetings in advance
- ✂ After-show networking dinner
- ✂ Several pre-events for international companies on 17 June

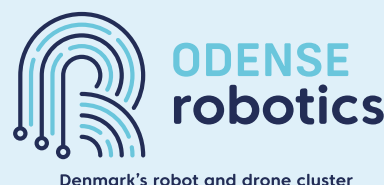


Go here to buy tickets, expo spaces,
networking dinner & pre-events

Let's collaborate!

Denmark is home to one of the world's leading robotics, automation and drone ecosystems. As the national cluster organisation, Odense Robotics brings people, companies and organisations in Denmark and worldwide together to tap into new collaboration opportunities. We help companies innovate, grow and find new partners. If you are interested in hearing more about Denmark's robotics ecosystem and how we can collaborate, reach out to us to discuss.

www.odenserobotics.com



A photograph of two men seated on a stage for a panel discussion. The man on the left is bald, wearing a light blue polo shirt and dark trousers, with his hands clasped. The man on the right has short grey hair, is wearing a dark suit jacket over a light blue shirt and tie, and is gesturing with his right hand while speaking. Both men have name tags. The background is a bright, modern interior with large windows. A red semi-transparent banner is overlaid across the bottom half of the image.

Spotlight: 2024 CRC Symposium Panel



Signs of hope? A robotics perspective on Canada's productivity crisis, innovation capacity and global competitiveness

MODERATOR

Rita Trichur, Senior Business Writer and Columnist, *The Globe and Mail*

PANELISTS

John Belton, Director, Human Resources and Industrial Relations, *Bombardier*

Charles Deguire, CEO and Founder, *Kinova*

Jayson Myers, CEO, *NGen*

Panelists discussed the role of automation in boosting national productivity and solutions to increase widespread adoption. Key themes included training and retaining robotics talent, developing automation road maps, and creating awareness for the potential of automation.



WATCH THE FULL PANEL DISCUSSION ON YOUTUBE

ROUNDTABLE
REPORT

Keeping up with the Jetsons: Why Canadian adoption of robotics and automation is more critical than ever

Sponsored by:



Canadian productivity stagnated between 2019 and 2023,¹ but robotics and automation hold great promises when it comes to improving small business performance: according to a BDC study, 39% of the most productive businesses invested in automation compared to 18% of other companies.²

This report summarizes the challenges, opportunities, and recommendations discussed at the roundtable “Keeping up with the Jetsons: Why Canadian adoption of robotics and automation is more critical than ever.” Held in June at the 2024 Canadian Robotics Council (CRC) Symposium, the event brought together a variety of stakeholders, from banks and government representatives to innovative manufacturers.

Challenges

THE KNOWLEDGE GAP

Small businesses don’t always have the knowledge and skills to prioritize and undertake automation projects by themselves—especially if they have never implemented such a project before. Lacking the technical expertise and resources to evaluate, implement, and maintain robots, business owners tend to see automation projects as daunting and risky.

THE BIG NEED TO SUPPORT SMALLER PROJECTS

Government support for automation is available at the federal and provincial levels. But too often, funding is made available only for big, state-of-the-art projects, and carries with it measurable administrative overheads. Small and medium businesses need support for smaller initiatives driving incremental improvements. More funding is also needed, as program coffers often run dry quickly.

THE REAL ESTATE HURDLE

Some Canadian entrepreneurs have not felt the need to invest in technology, as real estate has been a safe and reliable capital investment. In comparison, improving operations by adopting robotics appeared to be a risky endeavour, especially for older entrepreneurs who will soon be looking to sell their company.

THE LACK OF DATA

Small businesses don’t always collect and organize production and customer data. This gap often makes it hard for them to identify promising areas for improvement and to assess the impact of their automation project.

Opportunities

IMPROVING COMPETITIVENESS THROUGH PRODUCTIVITY

For too long, Canada has been lagging behind in productivity. One key solution to closing the productivity gap is a seismic shift toward automation and robotics—both of which are now considered essential to boosting Canada’s flatlining economy and improving our standard of living.

DEALING WITH THE LABOUR SHORTAGE

Automation and robotics can help small businesses overcome the labour shortage by taking over difficult, repetitive, and physically demanding tasks. According to a study cited in BDC’s report on industrial automation, **44% of manufacturers have automated or robotized certain processes to deal with a labour shortage.**

IMPROVING QUALITY WHILE BOOSTING CAPACITY

Robots don’t fear the grind: they can perform repetitive tasks with high precision and consistency, all day and all night, reducing errors and improving product quality while increasing your overall output. Fully 42% of businesses adopting technologies have improved the overall quality of their products (reduced or eliminated customer returns, etc.), according to a BDC report on automation.

Recommendations

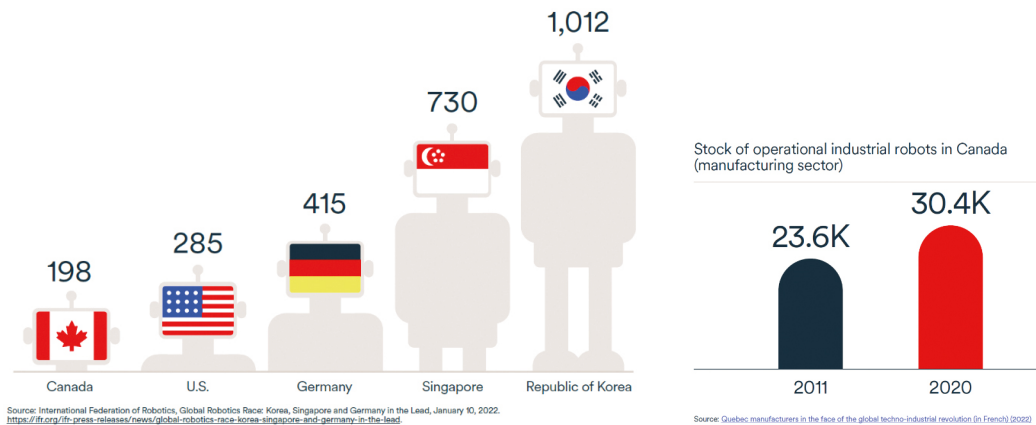
INCREASE AND IMPROVE GOVERNMENT FUNDING

Advocating for government agencies to adjust their funding strategies is essential to address the needs of Canadian small businesses. Programs not only need to be better funded, but they need to better take into account and prioritize the needs of those

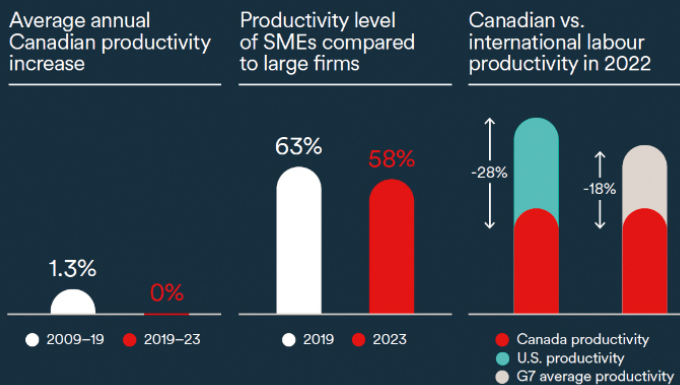
¹Canada’s Productivity Puzzle: Solutions for Entrepreneurs, BDC, June 2024.

²Harnessing the Power of Industrial Automation and Robotics, BDC.

Robots per 10,000 employees in the manufacturing sector, Canada and selected countries, 2022



Canada's productivity gaps have widened since the pandemic.



taking their first steps towards automation. Many programs, for instance, would benefit from more flexible criteria that would enable wider participation.

CREATE OPPORTUNITIES TO SHARE BEST PRACTICES

Business owners are busy, and many small companies are working hard simply to keep the lights on. They have little time to identify priority applications of robotics within their businesses, to research practical automation solutions, or to make a deep dive into the potential integration challenges stemming from the adoption of these solutions. For this reason, the innovation and automation ecosystem needs to come together in order to help small companies share their

knowledge and best practices. Experts need to be available to support SMEs in their automation journey.

DE-RISK THE ADOPTION PROCESS

Adopting a new technology can be risky, but it need not be. The robotics and innovation ecosystem needs to come together to develop initiatives reducing the risk for business owners. Facilities showcasing new technologies, for instance, could be established. Suppliers could also offer low restocking fees. This would greatly de-risk the innovation process for many entrepreneurs, providing them with confidence and practical insights on how new technologies can be integrated into their operations effectively.

RESOURCES

[Harnessing the Power of Industrial Automation and Robotics—A guide for entrepreneurs](#)

[Canada's Productivity Puzzle: Solutions for Entrepreneurs](#)

[Robotics and automation in wood products and furniture manufacturing: How to get started](#)

[Robotics and automation in plastic and rubber products manufacturing: How to get started](#)

[Robotics and automation in metal fabrication and automotive manufacturing: How to get started](#)

[Robotics and automation for the food and beverage industry: How to get started](#)



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Case study

Gourma greenhouses: Why invest in automation?

Based in Saint-Norbert, Quebec, the company is specialized in growing fresh herbs, which it distributes across the province. After being acquired in 2013, the company now boasts over 20,000 square metres of greenhouses and 60 employees.

The issue

The company wanted to optimize its processes as part of an expansion project

When the province of Quebec was caught up in the whirlwind of the pandemic in 2020, the importance of food autonomy became clear. Provincial decision-makers asked businesses to pitch in.

Gourma answered the call and launched a project to double its production area. However, once it had developed its plans, the company realized that it needed to make an important decision.

Charles Verdy, President of Gourma, explained: "Since we were taking on a major project, we had a choice. We could either stick with our current production methods or we could automate some of them. We took a gamble on automation to optimize our production."

The project

Automating basil production


Gourma grows 34 different varieties of herbs. Each plant has its own unique characteristics, such as size and growth time, so it was unrealistic for the company to automate the production of all of its plants as part of this project. It therefore opted to limit automation to the production of basil, its most popular product. Since the seeding stage was already automated, Gourma focused on the handling and harvesting stages.

Prior to that, employees had to do everything manually after the seeding stage: seedlings had to be placed on a tray and then moved to the different sections of the greenhouses at every subsequent stage. At harvest time, employees had to go into the greenhouses to pick the plants, package them one by one and transport them to a workstation, where another employee would pack them in cases.

With this project, Gourma was able to automate these operations using conveyor belts and robots.

"For our entire plant production system, our automation project yielded an increase in productivity of at least 15%."

Charles Verdy, President



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Robotics ROI Case Study Library: Pre-Call for Submissions

The Canadian Robotics Council (CRC) is creating a public library of case studies to showcase how robotics solutions drive return on investment (ROI) for Canadian businesses. This initiative aims to help tackle Canada's productivity challenges by inspiring more companies to adopt robotics technologies.

Why Contribute?

Demonstrate Real Impact: Share how robotics has reduced injuries, improved uptime, saved costs and delivered measurable results.

Amplify Your Reach: Gain exposure through CRC's extensive networks, maximizing your marketing efforts.

Support Robotics Adoption: Help create a trusted resource that educates businesses and de-risks robotics investments.

The Need for Action

Canada lags behind peer nations in robotics adoption, limiting productivity and global competitiveness. A 2023 survey by the Canadian Manufacturers' and Exporters' Association shows that 36% of manufacturers cite unclear ROI as a top obstacle to adopting advanced technologies.

The CRC library will fill this gap by providing credible, data-driven success stories that highlight the tangible benefits of robotics adoption. These case studies will guide businesses and lenders in understanding the ROI of robotics solutions, ultimately supporting more informed investment decisions.

GET INVOLVED

PLEDGE YOUR CASE STUDY

Fill out our [Case Study Library Pledge Form](#) or email info@roboticscouncil.ca for more details.

SPONSOR OR JOIN CRC

Secure 2025 benefits at 2024 rates, gain exclusive discounts and expand your visibility in Canada's robotics ecosystem. Email us at info@roboticscouncil.ca for more information.

A woman with long grey hair, wearing a black blazer over a white lace top, is seated and speaking. She is gesturing with her right hand. In front of her is an open book. The background is a bright, out-of-focus indoor space with large windows. Three concentric orange circles are overlaid on the image, centered around the woman. A solid red horizontal band covers the bottom half of the image, containing the text.

Spotlight: 2024 CRC Symposium Panel



Towards union: Investing in a robot-enabled labour force

MODERATOR

Rita Trichur, Senior Business Writer and Columnist, *The Globe and Mail*

PANELISTS

Todd Deaville, VP, Advanced Manufacturing Innovation, *Magna International*

AJung Moon, Founder and Advisor, *Open Roboethics Institute*

Kaylie Tiessen, Research Department, *Unifor*

In this landmark conversation, panelists discussed the impact of technological change in unionized environments and how all players can work together to identify shared concerns and objectives.



[WATCH THE FULL PANEL DISCUSSION ON YOUTUBE](#)

Read more about the discussion in Rita Trichur's opinion piece for The Globe and Mail, [Companies and unions must strive for consensus on robotics and automation at work](#)

ROUNDTABLE
REPORTExploring technology deployment strategies
for Canadian organizations that actively
engage workers

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Incorporating worker voices and collaboration between employees, companies, and governments is critical to advancing successful robotics adoption. That was the conclusion of a roundtable held during the 2024 Canadian Robotics Council (CRC) Symposium titled "Towards union: Partnerships for a robot-enabled labour force," which brought together firms of different sizes, industry organizations, and union representatives to share experiences and develop recommendations.

The roundtable's goal was to encourage participants to adopt a strategic framework for adopting robotics in industry and integrating expertise from every part of a company, including workers whose positions may one day be augmented by robots. Participants in the discussion shared examples of the benefits of involving workers in understanding robotics technology, contributing their expertise to system development, and providing training to help them retain jobs, advance their careers, and promote greater diversity in the workforce.

As one participant underlined, successful integration of robots in the workplace often augments existing processes and aspects of employees' current work. In most cases, the conversation is about determining an appropriate level of augmenting human labour with robots rather than full automation and worker replacement.

Still, the scale of technology adoption and training required to adapt is vast. Government investments in training and skill development can accelerate the transition and support gains in productivity, which is an important goal for Canada's economic prosperity. Participants included representatives from Unifor, the Canadian Manufacturers & Exporters, Advanced Manufacturing Innovation, Open Roboethics Institute, and Ontario and B.C. manufacturers and robotics startups.

In the discussion, participants emphasized the following key challenges and opportunities:

Challenges

1. **Training and Readiness:** As established manufacturing industries adopt new technologies, they face the challenge of reskilling their workforce. For example, the auto industry's transition to electric vehicles will require new education and skills.
2. **Stakeholder Collaboration:** Successfully integrating robotics into the workplace requires cooperation between the government, labour unions, and companies. Ensuring these diverse groups work together can be complex, as their priorities (e.g., profit, job security, technological advancement) are often pitted against each other.⁴
3. **Worker Engagement:** In many cases, workers are merely informed of robotics adoption after decisions are made. Without active participation in the process of designing and integrating the robotics solution into the workplace, there is a risk workers may resist changes or miss opportunities to gain new skills. This can lead to workplace friction and ultimately the rejection of new technology, including robots, at work.³

Opportunities

1. **Safety Improvements:** Robotics can significantly improve worker safety by automating dangerous tasks, which reduces the risk of injury in physically demanding jobs.
2. **Job Creation and Diversity:** Robotics can reduce the physical demands of certain jobs, making them more accessible to a diverse workforce, including people from underrepresented groups. This could open up opportunities for these jobs to become more inclusive, breaking down barriers that often prevent individuals from entering the sector, and allowing new talent to join the workforce.
3. **Skill Development:** Training can equip workers with skills that enhance their career prospects. Done right, robotics can augment worker capabilities, allowing progression to advanced roles and ensuring long-term employability in a tech-driven workforce.

4. **Productivity Gains:** Companies that adopt robotics can achieve increased productivity. Automation streamlines processes, allowing businesses to operate more efficiently.⁵

The discussion emphasized that any successful robotics adoption strategy should begin with a comprehensive environmental scan of all stakeholders and their roles at the firm-, regional-, and national-level. The scan should include how integrating robotics into the workplace will impact different stakeholders. Below are **specific recommendations** for each group of stakeholders involved:

Recommendations

GOVERNMENTS:

- **Ambitious Goals and Comprehensive Policies:** Provincial and federal governments should set clear, ambitious goals to encourage widespread robotics adoption. Emphasis should be placed on designing a robust, government-led training system to help workers transition and create stability during times of change.
- **Wrap-Around Supports:** Policy packages should include financial support for purchasing new equipment and worker training. This approach would equip employers to provide on-the-job training for new equipment while ensuring workers gain the necessary skills to adapt to evolving technological demands. A strong sense of career ownership is an important strategy for helping workers to manage change. Rather than wait for robotics adoption to require new skills, workers can be equipped with information about emerging skills profiles and trained to prepare for the jobs of the future.
- **Portable Credentials:** Governments should work to ensure that training programs and certifications for robotics and related skills are recognized across provinces, facilitating a cohesive national workforce development strategy.
- **Active Stakeholder Engagement:** Planning for automation should be an active process where governments encourage the formation of regional industry councils that actively involve workers, companies, and governments in decisions.

COMPANIES:

1. **Early Worker Engagement:** To ensure a successful robotics integration, companies should involve workers early in the design and adoption process. This can be achieved by designating “champions” within the organization—

an individual who advocates not only for the technology but, crucially, for the needs and concerns of the workforce. The role of these “champions” is to foster open communication, engaging all relevant stakeholders who may be directly or indirectly affected by the deployment of robotics. Rather than imposing the technology onto employees, the champion’s responsibility is to understand their perspectives, ensuring their insights are heard and represented in discussions with technology providers. This approach builds trust, encourages collaboration, and helps tailor robotics solutions to better fit the work environment and workforce needs, ultimately facilitating smoother adoption and integration.

2. **Educating Change Leaders and Managers:** Given the complex nature of the champion’s role, companies should ensure that the individual selected is not only equipped to manage the practical, managerial, and technical aspects of robot deployment, but is also well versed in the wide range of ethical, social, legal, regulatory, and public perception issues that may impact successful integration of the system into the workplace.
3. **Collaboration with Vendors:** Companies should set clear expectations with robotics vendors to develop training programs that equip workers with the skills needed to work with robots, ensuring a smooth and stable transition.
4. **Job Creation and Inclusion:** A common challenge in automation adoption is the fear that jobs will be eliminated. However, in practice, jobs usually shift rather than disappear, with new skills required for existing roles. With proper training, robotics can create jobs¹. Participants shared examples of robots reducing physical job demands while increasing technical skills, opening opportunities for new workers, including those in, for example, male-dominated industries and people with physical disabilities. Existing workers also gain skills that extend their careers and reduce exposure to harsh conditions.

INDUSTRY ORGANIZATIONS:

1. **Information Sharing and Collaboration:** Industry groups, such as the Canadian Vehicle Manufacturers Association, can play a pivotal role in facilitating the exchange of information between companies by creating platforms that enable the sharing of best practices, success stories, failures, and lessons learned from various organizations’



journeys in adopting robotics. In addition, industry groups can collaborate with governments to promote proven strategies for re- and up-skilling workers while integrating new technologies. For example, they can co-develop training curricula tailored to emerging industry needs, establish industry-wide standards for skills certification, and advocate for policies that support workforce development.

2. **Forecasting Workforce Needs:** These organizations can collaborate with government agencies, educational institutions, and labour unions to forecast future workforce demands and promote long-term planning, which is critical for managing the impact of robotics adoption.
3. **Frameworks for Retraining:** By providing frameworks for introducing robotics and retraining workers, industry organizations can help ensure a smooth, stable transition to increased usage of advanced technologies.

LABOUR ORGANIZATIONS:

1. **Facilitate Worker Consultation:** Labour unions are important resources of information and training for workers and companies. They can facilitate consultation between firms and their employees, ensuring that worker voices are heard during the design and deployment of innovative technologies.²
2. **Promoting Stable Communities:** Unions can continue to build stable communities by educating stakeholders and advocating for transition programs that stabilize worker employment, job retention, and skill development through times of technological change.
3. **Skill Development and Career Ownership:** Workers should be provided with information on emerging skills and offered subsidized training opportunities that help them adapt to new technologies. A sense of career ownership is an important strategy for workers to manage change. Rather than waiting for robotics adoption to happen, workers can become equipped with information about emerging skills and connected to training opportunities for the jobs of the future.

Next Steps

One of the recurring themes in the roundtable was an emphasis on **the importance of continuous reskilling and upskilling to help workers at all levels of a company adapt to new technologies**. This ensures they acquire the necessary skills to retain and advance in their evolving roles. Effective workforce development was highlighted as requiring collaboration between companies, governments, labour unions, and industry organizations to design training programs that address the challenges of today and tomorrow. Additionally, participants emphasized the need

for workers to take proactive ownership of their careers by staying informed about emerging skills and accessing training opportunities, enabling them to remain competitive in a tech-driven labour market.

In addition to the focus on education and training, **all the participants spoke about the utility of coming together to have a conversation to share their experiences and needs**. The roundtable was a unique opportunity for different actors — government, unions, technology providers, and others — to discuss ways to promote robotics adoption, strategies that have worked so far and how to scale successful initiatives. Promoting stakeholder dialogue on this topic should be an ongoing goal for the CRC.

The **immediate next steps** to ensure continued collaboration and dialogue will be:

1. **Planning and preliminary development of the “Ethical Integration of Robotics and Workforce Impact” Course:** To support the challenges and opportunities identified, the Open Roboethics Institute (ORI), in consultation with key experts and with continuous engagement from stakeholders represented in this roundtable, will lead the development of a course focused on understanding the implications of integrating robotics into the workforce. This course will address the ethical challenges of robotics integration while highlighting its specific impact on labour. By offering tools for systematically examining the pros and cons of robotics integration, the course will ensure that stakeholders at all levels are prepared and have a clear, practical strategy to manage this transition, enabling workers across various roles to adapt effectively to the evolving technological landscape.
2. **Hosting another roundtable at the upcoming CRC symposium** will provide an important opportunity to continue fostering open communication between the CRC, labour organizations, robotics companies, governmental organizations, and other key stakeholders. While this roundtable is not intended to be a formal working group, it will offer a valuable platform for ongoing dialogue and collaboration.

During this discussion, participants can explore the idea of establishing a Working Group on Future Workforce and Robotics Adoption. This working group could bring together representatives from various sectors to develop an action plan focused on worker engagement, robust training programs, and ethical technology integration. Additionally, we will consider drafting a Memorandum of Understanding (MOU) to formalize commitments between key stakeholders. This MOU would reinforce a collective commitment to ethical robotics integration and workforce engagement.

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¹Dixon, J. (2020). **The Effect of Robots on Firm Performance and Employment**. Statistics Canada.

²2018 Unifor technology paper: **The Future of Work is Ours: Confronting the Risks and Seizing the Opportunities of Technological Change**

³2021 IAM Canada Report: **Charting Change: Workers’ Voices in an Automated World**

⁴2018 Brookfield Institute whitepaper: **Better, Faster, Stronger: Maximising the Benefits of Automation for Ontario’s Firms and People**

⁶2024 Canadian Manufacturers & Exporters **Manufacturing Workforce Report: Roadmap for Ontario Regional Industry Councils**



Worker voice required: Getting the best and avoiding the worst outcomes of technological change for workers and technology adopters



Kaylie Tiessen
Unifor Research Department

Technological change of any kind, robotics implementation included, presents substantial uncertainty for workers. Ushering a technological change process cannot ignore this fact but must instead provide information, consider worker expertise, ask for worker input and build stability for impacted employees.

The fact that workers are fearful and resistant to technological change should not be a surprise or a frustration for that matter. Headlines shared on social media and commentary from technological adopters often focuses on promoting the potential for technology to displace and replace workers. If the news is not about job destruction it may be about how new tech is used as a tool to pervasively surveil and unfairly punish workers. This is often done with automated and rigid interpretation of limited data and little to no gray area in the decision-making process.

Why would a worker in this environment feel confident that new technology proposed by an employer will make their working life better? The short answer is: they won't.

Workers aren't necessarily opposed to technological advancement, but they are opposed to having their livelihoods threatened and their contributions diminished. They are opposed to being treated like cogs in a wheel instead of active, knowledgeable and dignified participants in the workplace and the economy.

Furthermore, successful technological change requires worker input and expertise in the physical (or digital) design and implementation but also in the impact mitigation plan.

Unifor's analysis of hundreds of instances of technological change at work in all sectors of the economy reveals two important themes. First, the results of technological change in environments that bypass worker input is often destructive, unsuccessful and frustrating for all stakeholders. Second, the impacts of technological change on workers generally fall into 6 broad categories. They include health and safety improvements and

degradations, changes in income and potential wage bifurcation, surveillance and bias, job loss, productivity enhancement vs. workload increase and more. New technologies must be carefully analysed by workers, unions, tech designers and adopters in order to amplify the positive impacts and mitigate the negative.

Commentary on tech change often comes across as surprised or even appalled that workers would oppose a new technology – especially one that is set to increase productivity, improve profit, make work safer or deliver economic benefits to the public. What's missing from the underlying analysis in the commentary is two-fold. First, new technology is inherently destabilizing for workers. Without a plan to mitigate the negative outcomes and deliver stability in the face of change workers will get left behind. Second, workers are the stakeholders who will be operating the new technology on a daily basis and have intimate knowledge of the best way to improve the processes that get their job done. When their expertise is ignored, unnecessary friction is often introduced in the production process – whether that process produces a good or a service.

Unions have decades of experience negotiating and ushering technological change in a way that mitigates risks to both workers and employers. The collective bargaining process can set the rules for work ownership and expectations for re-training that begin to build that sense of stability that workers need. The benefits of unionization and advance co-planning cannot be understated.

Integrating worker voice is currently the most consequential missed opportunity in the technological change process. Worker voice can improve technology design, enhance the implementation process and mitigate instability that might otherwise go unscrutinized.

Getting the best and avoiding the worst of technological change for workers and society means moving beyond the tendency to treat jobs as a byproduct of innovation and instead build innovation around improving people's working lives. Workers need to be put at the centre of that process.

ROUNDTABLE
REPORT**Building demo and testing facilities that spur robot adoption and develop talent**

Sponsored by:

Avidbots

This roundtable brought together industry leaders to discuss strategies for boosting robotics adoption in Canada, focusing on the lack of accessible robotics demonstration, training, and testing facilities here. Participants reviewed successful test centres in other countries, explored their potential benefits for Canada, and addressed barriers, funding solutions, and next steps for innovation. Fueled by recent government funding announcements^{1, 2, 3} targeting facilities and programs to support small or medium-sized enterprise (SME) technology adoption in southern Ontario, ongoing discussions have centered on how a robotics test centre might accelerate adoption among SMEs in the region, and what partnerships are needed to make it a reality.

Challenges

1. **Canadian SMEs lack a basic understanding of robotics technology, including its benefits, practical applications, and expected return on investment.** This is especially true outside the automotive sector, where robot adoption is particularly low.⁴ There is considerable opportunity to bring robotics to other industries in the region, but with few opportunities to see robots in action or test deployments locally, businesses are cautious about adoption. Left unaddressed, this knowledge gap will push Canadian companies further behind global competitors in adopting productivity-boosting technologies.
2. **Canadian robotics scale-ups need a level playing field to compete in global markets.** While there are plenty of incubators and support systems for Canadian startups, robotics scale-ups have less support and face multiple challenges. First, Canada's low adoption rates and small market economy force our homegrown robotics companies to validate and market-test their products abroad, while many of their foreign competitors can do this domestically. Second, most foreign competitors are supported by dedicated government funding designed to accelerate robotics development in their regions (see point 3), which only exacerbates the home market challenge. Third, Canadian robotics scale-ups seeking investment to enter global markets must compete for access to capital with Canadian software-centric scale-ups, who tend to have much faster and straightforward paths to exit. A more level playing field is needed if promising Canadian robotics companies are to scale and have ecosystem-wide impact at the rates seen in foreign countries.

3. **While foreign governments are funding robotics test and demonstration centres to rapidly accelerate SME robotics adoption and development in their regions, Canada's approach to funding such initiatives is patchwork at best.** Dedicated and coordinated funding for robotics adoption and commercialization is becoming standard in other countries, and has resulted in a proliferation of robotics test facilities and commercialization zones around the world. For example, China already has at least 10 dedicated robotics industrial parks across the country.⁵ The Republic of Korea has begun construction on a KRW 200 billion (~\$200 million CAD) 167,000 square meter National Robot Test Field site, to open in 2027.⁶ Germany has many test centres for robotics and just opened the largest RIG (Robotics in Germany) centre with a budget of 20M Euros.⁷ In addition, China and Denmark have dedicated venture funds designed specifically to support robotics companies.^{9,10} Facilities and initiatives such as these give foreign governments and businesses a significant competitive advantage. Meanwhile, though Canadian federal and provincial programs have funded a myriad of AI and digital adoption schemes, the lack of coordinated and dedicated funding for robotics here makes it challenging to assemble the partnerships and match funding required to get robotics demonstration and SME test facilities off the ground. Ultimately, this puts both our historic competitive edge in robotics excellence and our nation's productivity at risk.

Opportunities

The key to overcoming these challenges is for Canada to invest in robotics initiatives that boost our nation's productivity while better capitalizing on our strengths in robotics R&D. Investing in regional robotics test centres offers multiple mutually-reinforcing benefits to a wide range of stakeholders:

OPPORTUNITIES FOR KEY STAKEHOLDERS

1. **Hands-on robotics learning hub and automation consultation service for SMEs:** A robotics test centre can offer Canadian SMEs a hands-on platform to

explore the latest robotics advancements in simulated industrial settings. Without having to travel to international industrial trade shows, SMEs will be able to see the specific ways that commercially available robotics solutions can yield a return on investment. SMEs can learn how to navigate common challenges such as how to prepare their workforce and business processes for automation. SMEs that are ready for next steps can be referred to automation consultants for further customized support on their automation journey.

2. **Demonstration zone for robotics original equipment manufacturers (OEM)s and product developers:** Test centre facilities can provide dedicated space for Canadian robotics OEMs and product developers to showcase their technology to regional customers in realistic industrial settings, helping them achieve product-market fit faster, secure early-stage revenue, and investment. This will allow established robotics companies to expand their domestic market. It will also give robotics scale-ups a chance to refine and test their products locally, making it easier for them to attract investment for global expansion. Including select international OEMs will expose Canadian businesses to best-in-class robotics technologies, foster international partnerships and better prepare them to enter global markets.
3. **Talent engine for regional governments seeking to support critical and high-growth sectors:** Regional robotics test centres can both train and supply in-demand robotics talent for SME clients in emerging and high-growth sectors like advanced manufacturing, logistics, and construction, where significant workforce shortages are projected.

Partnership and funding opportunities

1. **~\$750K CAD in in-kind donations have already been pledged by CRC industry partners.** Industry leaders such as Kinova, Avidbots, OTTO Motors, Taiga Robotics, Maple Robotics, Rogers, Ericsson are keen to support domestic robotics growth and have already



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pledged equipment and expertise. The CRC is currently well positioned to partner with regional partners seeking to open a robotics test centre in their community, to identify match industry supports for grant applications, support or deliver SME and executive training programs, advise on test centre programs and partnerships, and promote centre programs and client success stories. In the near future, the CRC hopes to be well positioned to lead the creation of such centres in targeted communities and vertical applications.

2. **Strong alignment with provincial and federal funding priorities:** The concepts described above are well-aligned with the principles of Ontario's Critical Technologies Initiative and Skills Development Fund Capital Stream, and with FedDev's Regional Artificial Intelligence Initiative. Complementary initiatives (NGen's Advanced Manufacturing Strategy, Canada's Mines to Mobility Strategy, Ontario's Electric Vehicle Strategy and its Advanced Manufacturing Strategy) can also be leveraged to promote robotics test centres, develop application area expertise, and provide adoption incentives directly to SME clients. In the near future, the CRC will be well positioned to be a lead partner on such programs, as we seek patient funding and dedicated facilities that support the unique challenges of developing hardware solutions and expertise for a global marketplace.

Recommendations

FOR PROSPECTIVE TEST CENTRE PARTNERS

- **Prioritize robot adoption, commercialization and SME training:** Test centre objectives should focus on boosting SME productivity and commercialization, with training as a key part of achieving these goals. This will help partners access current government funding programs that are designed to support these needs.
- **Leverage the CRC to secure match contributions from industry:** Government funding programs require industry to match funds, either in cash or through in-kind contributions like equipment and expertise. CRC industry members are committed to supporting Canadian SMEs on their automation journey while growing our domestic robotics market and capacity to innovate on the global stage.

- **Engage economic development agencies, training institutions, and downstream industry associations:** Test centres need support from local stakeholders to succeed, and proposals that include contributions from or that are led by regional stakeholders can be viewed more favorably. Regional economic development agencies, colleges, and universities can play an essential role by contributing facilities, training, staff, talent, business development, and accreditation. Likewise, downstream trade unions and industry associations can help identify test centre clients, and advise on and advertise training programs.

FOR GOVERNMENT

- **Create incentives for SMEs to automate:** Other regions, like Michigan with its \$300K Industry 4.0 Grant,⁸ offer direct cash incentives for SMEs to automate. Canada needs similar initiatives to create demand, grow the domestic robotics market, and speed up the adoption of proven robotics technologies that will boost national productivity and ensure our industries remain globally competitive.
- **Create more agile funding mechanisms that support the unique realities of launching demonstration and test centres designed to spur robot adoption and commercialization in Canada:** Faster and more responsive funding programs specifically tailored to emerging hardware ecosystems – which might include, for example, longer application windows or rolling deadlines, clear eligibility requirements, more flexible partnership arrangements, longer spend timelines and lower industry match ratios – would level the playing field for robotics test centre initiatives. This would enable growing communities to benefit from enhanced education, increased adoption, and accelerated technology development, which would in turn strengthen the test centre's impact.
- **Align federal, provincial and regional funding priorities to support robot adoption as a critical component of a comprehensive industrial strategy:** Alignment will make it easier for SMEs to navigate funding opportunities. It will also signal to domestic suppliers and international partners that Canada is committed to preserving and capitalizing on its robotics R&D excellence, creating a more stable environment for both domestic and foreign direct investment in our AI innovation ecosystem.

Next Steps

The CRC will continue to play a substantial role championing and supporting regional robotics test centre initiatives as opportunities arise.

If you represent any of the following groups, we encourage you to contact us at industrial-committee@roboticscouncil.ca:

- **A robotics company or service provider** that is interested in pledging match contributions to a robotics test centre in your region

- **A training institution, learning partner, or regional economic development agency** that is interested in starting or joining a robotics test centre in their region

- **An SME** that would benefit from a robotics learning hub or automation consultation program

We look forward to hearing from you.

RESOURCES

¹ Ontario Critical Technology Initiative

² FedDev Ontario Regional Artificial Intelligence Initiative

³ Ontario Skills Development: Capital Stream

⁴ Canada's Low Adoption of Robotics Outside the Automotive Sector

⁵ 10 Robot Industry Parks in China

⁶ National Robot Test Field to begin pilot operation in 2027, with Daegu and MOTIE signing MOU

⁷ Robotics Institute Germany (RIG) is established

⁸ Michigan Robotics and Advanced Automation Incentives

⁹ Beijing to Create \$1.4BN fund to promote robotics development

¹⁰ Denmark Odense Robotics Startup fund

CASE STUDY:

RIT - Avidbots' Kas deployment

Rochester Institute of Technology (RIT) partnered with Avidbots, adding (4) Kas autonomous cleaning robots to their fleet, enhancing cleaning efficiency. With each robot covering up to 10,000 sqft/hr, the fleet supports RIT's team by automating high-traffic area cleaning and enabling staff to focus on detailed tasks. Expected to achieve ROI in less than a year, Kas' AI-driven flexibility has seamlessly integrated into campus life, earning support from students and staff while promoting RIT's commitment to innovative campus operation.

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ROUNDTABLE
REPORTAccelerating robotics-related
IP commercialization in Canada

Sponsored by:



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Introduction

Entrepreneurship is more than just a choice—it's a skill.¹ It involves making difficult decisions under uncertainty, constrained by time and capital. Most academics in Canada are not trained to be entrepreneurs.

During the roundtable discussion at the Canadian Robotics Council (CRC) on the topic of "Lab-to-Market IP Transfer: How to spin out more and better robotics tech in Canada", a number of reasons for low rates of successful academic commercialization were discussed. They included a lack of entrepreneurship education for academics, complex and differentiated intellectual property (IP) policies between institutions, a lack of risk capital in Canada for seed early-stage ventures, an absence of incentives for academics to leave their tenured positions, and too few seasoned business leaders to help take unproven technology to market. Suggestions for how to improve the base rate of commercialization ranged from (1) engaging academics who have created successful commercial entities to guide policy and support entrepreneurs, (2) challenging faculty and departments to regard their contribution to society not by publications but by the creation of jobs in their domain of expertise through commercial entities, and (3) providing curated and structured opportunities for academics to learn entrepreneurship from successful entrepreneurs.

The most promising near-term opportunity to address many of the above elements was to provide more experiential learning opportunities for academics nationwide to learn about commercialization from individuals with a history of entrepreneurial success.

Opportunities

Experiential learning opportunities for academics at scale should target early-career individuals (i.e., graduate students and postdocs) over tenured faculty. Tenured faculty often have deep roots in academia, and while their labs may develop the IP with the greatest commercial potential, the leap required for a tenured faculty to leave their tenured position and pursue

entrepreneurship is substantial. In contrast, graduate students and postdocs have the fewest existing commitments restricting an attempt at entrepreneurship.

A 2019 report titled *Degrees of Success* found that while the number of graduating PhDs in Canada continues to rise, the number of available faculty positions remains relatively static.³ Most new academic trainees in Canada will not end up as tenured professors. These early-career academics represent an ideal community to target with experiential learning opportunities in entrepreneurship as they decide which career path is right for them.

Challenges

Entrepreneurship requires a significantly different mindset and skillset compared to academic research.² We cannot expect academics to choose entrepreneurship or succeed at it without opportunities to develop entrepreneurial skills. For example, academics are trained to make reasonably measured claims on large datasets, while entrepreneurs often need to make significant and definitive business decisions on limited information. Academics are trained to be slow and methodical, while entrepreneurship requires speed and efficiency. Academics are trained to write grants, educate students, and publish and critique journal articles, while academic entrepreneurs need to convert technology into products, identify and engage customers, and raise capital on an investable story. Collectively, these entrepreneurial skills are not developed as part of the current academic curriculum; academics are trained to be academics, not business owners. Our roundtable agreed that while barriers to academic commercialization exist, providing Canadian academics opportunities to learn entrepreneurship skills from successful entrepreneurs will improve the propensity to choose entrepreneurship and the overall rate of IP commercialization in Canada.

The absence of opportunities for academics to develop entrepreneurial skills is a contributing factor to low rates of commercialization in Canada.⁴ While Canada is actively addressing this with a recent NSERC grant to build nationwide academic entrepreneurship training



networks,⁵ large multi-province networks to train academic entrepreneurs are not built overnight, and talented entrepreneurs with a history of success commercializing innovation are not easy to concentrate. Canada only produces around 100 spin-outs per year,⁶ yet over 10,000 new PhD students launch their academic journey every year in Canada.⁷ This imbalance between the number of successful academic spinouts in Canada and the number of aspiring academics nationwide who might benefit from experiential entrepreneurship education is significant. Importantly, startups need technical support too, and while researchers would benefit from some entrepreneurial training to ensure the greatest opportunity for career success, the volume of trained researchers also represents a significant opportunity to bring technical talent to Canada's robotics startups. A two-sided marketplace connecting academic talent with entrepreneurs may further advance commercialization productivity/success, providing Canadian startups with technical talent while providing academics the business experience. This presents a clear opportunity for a singular coordinated body to concentrate successful entrepreneurs nationwide to facilitate their engagements with academics while providing entrepreneurial learning opportunities for Canadian academics in the robotics sector at scale.

Recommendations

We recommend consolidating support for robotics innovation around existing Pan-Canadian

experience-based entrepreneurship training networks for academics where successful entrepreneurs are already concentrated and experiential learning opportunities are already abundant.

Some of the leading nationwide programs in Canada already accomplishing some elements of this larger recommendation are Mitacs, National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP), Lab2Market, and the Creative Destruction Lab. Mitacs funds Canadian graduate students and postdocs to take internship positions at businesses in need of their technical support, NRC-IRAP funds established Canadian researchers to work with SMEs on larger technology-centric co-development projects, Lab2Market provides structured entrepreneurship education and programming to academics, and the Creative Destruction Lab provides early-stage STEM-based startups access to successful entrepreneurs for mentorship and support to commercialize through a startup. Collectively, for Canada to commercialize more innovation outside of academia, there needs to be a coordinated investment in the opportunities for our academics in robotics and adjacent areas to explore entrepreneurship, connect and work with industry, and learn from successful entrepreneurs how to achieve commercial success. The time to scale experiential learning opportunities for academics is now.

RESOURCES

¹ [Prioritizing successful entrepreneurial skills: An emphasis on the perspectives of entrepreneurs versus aspiring entrepreneurs](#)

² [Shifting Your Mindset: Academics who want to be entrepreneurial need to think in new ways, writes Kerry Ann Rockquemore.](#)

³ [Degrees of Success: The Expert Panel on the Labour Market Transition of PhD Graduates](#)

⁴ [Canada's Low-Innovation Equilibrium: Why It Has Been Sustained and How It Will Be Disrupted](#)

⁵ [Lab to Market grants: New initiative to support entrepreneurial training](#)

⁶ [AUTM 2022 Licensing Survey](#) (Canadian Data)

⁷ [Persistence and graduation of doctoral degree students, within the STEM/BHASE \(non-STEM\) grouping and province or territory of first enrolment, by student characteristics](#)

**ROUNDTABLE
REPORT**

Creating industry-ready robotics graduates and innovation-ready companies: What are the necessary supports?

Sponsored by:



On-the-job skills training provides students with the essential skills and network needed to enter and succeed in a robotics career. It also provides companies with a low-risk opportunity to trial prospective employees, strengthen their recruitment pipelines through connections with Canadian universities and colleges, and advance their innovation agenda. Nonetheless, Canadian robotics graduates must often leave the country to find work in their chosen field, companies fail to tap into leveraged funding opportunities, and faculty find that companies' innovation ambitions and R&D dollars are not aligned with the best-in-class research they are known for. Furthermore, would-be users of robotics technologies often cite the lack of trained personnel needed to operate these technologies as a barrier to adoption¹.

Work-integrated learning opportunities of all types—such as internships, co-ops, and other collaborative research and innovation projects can provide the framework, support, and financial incentives to make on-the-job training accessible to students and companies alike. In addition to helping companies build their talent pipeline, these programs can provide the framework for companies to engage in meaningful R&D activities. However, there are questions about whether existing programs are sufficient to ensure that Canadian robotics students find a job here within Canada in the industry upon graduation. There are also concerns about whether these programs meet the needs of the companies that are most in need of funding support required to maximize the use of R&D dollars.

This roundtable on creating industry-ready graduates to support growth and innovation assembled stakeholders from universities, industry, and innovation ecosystem players such as Mitacs to identify the programmatic, funding, and partnership gaps needed to accelerate robotics R&D among Canadian businesses

Opportunities

The panel discussed the benefits of collaboration between industry and academic partners on research and innovation projects. Industry partners still view their academic counterparts as a valuable source of talent, and a source of potential innovations that can transform their sectors in 5-10 years. Post-secondary institutions look to industry for ideal use-cases for the ideas and technologies they have in development. Many research-heavy post-secondary institutions are leveraging relationships with industry contacts to engage in applied research projects.

The Canadian innovation ecosystem— which includes the Tri-Council research agencies, independent not-for-profits, and regional and academic incubators— has programs and funding support at the national and provincial levels to support projects and ventures in the robotics sector. The most notable of these programs are the NSERC-Alliance grant and the Mitacs Accelerate and Business Strategy Internship (BSI) programs. The NSERC-Alliance grant can be paired with Mitacs Accelerate programs to allow companies to leverage non-dilutive grants to build impactful R&D projects at a fraction of the cost. The BSI program allows students, post-docs, and recent graduates to gain the business acumen required to help companies optimize their prototypes or do the market research and engagement required to tailor their solutions to their end users. Other ecosystem players, such as Innovative Solutions Canada and the Ontario Centre for Innovation (OCI), serve as federal and provincial funding supports that allow businesses to engage in late stage R&D to pilot their solutions with clients. Organizations such as OCI also provide funding support to retrain existing employees to adapt to automation of various processes.

Lastly, post-secondary institutions are developing programs and strategic initiatives to allow for more interdisciplinary research collaborations within their institutions and with other industry partners. For example, the University of Toronto has a series of Institutional Strategic Initiatives (ISIs), that rally researchers from different faculties around a certain topic to drive cutting-edge research. One of these ISIs is in robotics. Other institutions, such as Université de Sherbrooke, have interdisciplinary research institutes dedicated to recruiting graduate students to pursue research projects with direct industry-related applications.

Challenges

Despite the continued interest in collaboration and the availability of programs to facilitate these projects, there are many obstacles that prevent these partnerships from taking off. The first of these barriers to engaging in talent-building, collaborative R&D projects with post-secondary institutions is navigating the IP policies of the post-secondary institutions. These policies vary between academic partners, and may be too restrictive to facilitate meaningful collaborations if companies cannot retain

ownership of their inventions or have to pay large royalties to the institutions upon commercialization. Small medium-sized enterprises (SMEs) and start-ups often require greater support around developing different forms of intellectual property (IP) to enter these delicate conversations about ownership in a way that opens up the possibility for collaboration, while protecting their home grown IP.

However, it is important for universities and colleges to get credit for contributions to innovation that were supported by their resources and knowledge-base. Related to the challenges around IP, post-secondary institutions and industry may have competing objectives for pursuing collaborative projects. While companies may want to keep abreast of developments in research to identify innovations worth commercializing, post-secondary institutions and their faculty rely on publications and conference presentations to showcase their contributions to a body of knowledge in a given field. In these instances, it may be helpful for partners to tap into the network of organizations like Mitacs to find the optimal match with a university or college with IP policies suitable for the proposed collaboration.

Another key challenge is the lack of capital that many companies have to undertake extensive R&D activities. Some of these companies may have a prototype or solution that needs to be implemented in real-world settings before making the decision to invest in further research activities to optimize their technology. This limitation can serve as a barrier to entry to tap into some of the existing federal and regional funding mechanisms meant to allow companies to make suitable investments in their technologies so they can improve and scale. While there are programs with a lower barrier to entry, there is inadequate guidance to help smaller, and early-stage companies to achieve the milestones they need to tap into these other programs (see Figure 1 on page 34).

Lastly, developing robotics hardware is significantly more time-consuming and costly compared to software-driven sectors. This impacts the type of talent support companies require. Robotics firms need employees skilled not only in engineering and software development but also in areas such as hardware prototyping, system integration, testing, and long-term project



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management. These companies must balance the technical expertise required for hardware with knowledge of market dynamics and user requirements to ensure the adoption of their innovations.

Recommendations

Given the opportunities for collaboration and the challenges that may prevent fruitful collaborations from taking place, creating more avenues for interaction between relevant stakeholders in the robotics ecosystem is required to help graduates transition into industry. Industry, post-secondary institutions, government funders, and non-government funders are positioned to play clear roles in strengthening the robotics ecosystem in Canada. This will allow enterprises in the robotics sector to maximize the use of existing programs and resources to build the talent pipeline required for R&D and to promote adoption of their technologies for their prospective clients.

FOR INDUSTRY

First, it is important for companies of all sizes and personnel in the sector to create industry associations and other networks that can support companies in advocating for their interests. Through these communities, newcomers and old players in the ecosystem can develop resources for training talent, teach others how to protect their IP, and provide support on what it takes to thrive and survive as an enterprise. In terms of network creation, both existing clusters and new associations can be leveraged. The Canadian Robotics Council can help build these networks by collaborating with established research hubs at Queen's, Waterloo, and McGill, and organizing industry-academia collaborations. The Council could serve as a catalyst for companies to access not just talent, but also funding programs and knowledge-sharing platforms that accelerate the integration of robotics into industries like manufacturing.

The next critical piece for industry is to do a lot more stakeholder engagement with the end-users of their technologies. To solve the adoption challenges, it might be helpful to train future employees that understand both the technical challenges being solved while having an understanding of the change management practices required to successfully automate certain workflows. Without a proper survey of these components, it will be hard to deploy talent in a way that helps companies grow and scale.

By working together, Mitacs and the Canadian Robotics Council can help remove barriers to robotics adoption by focusing on training specialized talent, fostering collaboration, and providing companies with the financial and strategic support needed to navigate the complex process of technology implementation.

FOR POST-SECONDARY INSTITUTIONS

Colleges and universities have a critical role to play as the source of talent needed to build and maintain a robust robotics industry in Canada. While there has been meaningful progress in terms of developing strategic initiatives and collaborative programs in the robotics sector, these programs can use refinement. Universities should continue to outline strategic research areas and create key centres of excellence that can attract investment for interdisciplinary forms of research that can transform the sector. The focus in a lot of these conversations centres on universities due to their research contributions, but colleges can play a critical role in training the professionals that may be more directly responsible for supporting automation processes or operating the technology used by SMEs, especially in critical areas such as construction and manufacturing. Both colleges and universities should work to develop curriculums that allow their students to gain both the hard and soft skills required to make a meaningful transition into industry in a way that allows them to support innovation rather than just to fill the requirements of existing roles.

Tapping into the resources of organizations such as Mitacs, NSERC, or OCI can be useful for securing the industry partnerships required to build these practical experiences that can enrich the curriculum at post-secondary institutions. For example, Mitacs programs like Accelerate and Business Strategy Internship (BSI) can help address these challenges by providing industry access to students and post-graduates with interdisciplinary training. For example, BSI offers students a unique combination of technical expertise and business acumen, which can help companies optimize their robotics prototypes and align them with real-world market demands. This dual exposure can help companies overcome the high-cost barriers and long lead times associated with robotics hardware by equipping them with talent that understands both the technology and the business strategy required to bring it to market.

FOR THE INNOVATION ECOSYSTEM

While the innovation ecosystem has many players that can support various stages of R&D as well as talent development, the distinction between these offerings is not always clear or accessible for SMEs looking to meaningfully engage with these programs. It is important for these organizations to articulate their offerings effectively and know enough about the other support available to make the appropriate recommendations to SMEs looking for talent. For example, the Student Worker Placement Program (SWPP) is useful for hiring interns to support standard operations, but not suitable for R&D projects. Programs like Mitacs, on the other hand, are more suitable for project-specific and research-driven work-integrated learning

on a small scale with short-term projects and larger, strategic projects. Hiring talent for both purposes may be critical to the development of a sustainable recruitment pipeline.

The ecosystem stakeholders can facilitate better adoption of robotics in advanced manufacturing by establishing clear pathways for collaboration between academia, industry, and key robotics research hubs like Queen's, Waterloo, and McGill. For instance, through Mitacs' research internships and innovation-focused programs, robotics companies can engage with highly skilled interns who are trained in the specific demands of hardware development and industrial applications. This not only helps companies access talent but also supports the development of new solutions tailored for sectors like advanced manufacturing, which can benefit significantly from automation.

The Canadian Robotics Council can play a pivotal role in this by acting as a central body to create industry-specific networks and support systems. It can bring together companies, research institutions, and government bodies to drive policy discussions, advocate for sector-specific funding, and promote

the integration of robotics in critical industries like manufacturing.

FOR GOVERNMENT

Finally, the government has a critical role beyond articulating economic priorities when it comes to supporting the robotics ecosystem. Compared to some other member countries of the Organisation for Economic Co-operation and Development (OECD), Canada provides quite a few tax incentives to businesses. However, this has not translated to increases in meaningful R&D spending for companies.² Therefore, it is important for the government to keep investing in research spending through the tri-council agencies and other entities that can support these efforts, such as Mitacs. Additionally, there might be a need to meaningfully engage with SMEs on how existing tax incentives and credits can be utilized to de-risk their growth operations. However, it might also be useful for the government to explore adoption of some of these technologies where relevant for some of their existing capabilities, to lead by example in promoting adoption of automation for Canadian enterprise.²

RESOURCES

¹ [Robotics Technologies Adoption: Insights from the Survey of Advanced Technology](#) (statcan.gc.ca)

² [Where Are The Robots?](#) (centreforfuturework.ca)



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Robotics and regional talent central to Ontario's manufacturing strategy



Vincent Caron

*Director, Policy & Ontario Government Relations
Canadian Manufacturers & Exporters*

Ontario's manufacturing sector is the heart of Canada's economy. With its key trade links to the U.S., and strategic supply chain leaders in several industries, its success is linked to our country's ability to compete globally. But the sector's workforce (800,000 strong as of 2023) has declined over the last two decades, as Ontario lost ground versus key competitors in the U.S., Mexico and Asia.

Despite this, momentum has been regained following the COVID-19 pandemic. Driven by a low-carbon transition, provincial action to cut red tape, reduce costs and Ontario's remarkable position in North America, our manufacturing workforce is now poised to grow again.

For the first time in its history, Ontario is building an Advanced Manufacturing Strategy, building on sectoral strategies in automotive and life sciences. In its final report published in October 2024, Ontario's Advanced Manufacturing Council called for the province to increase manufacturing's contribution to Ontario's economy (real GDP) by 20% by 2035, and close the productivity gap with the U.S. over that period, increasing by more than 25% over ten years.

A member of the Council, Canadian Manufacturers & Exporters is a national trade association representing manufacturers large and small, across sub-sectors and regions of Canada. With support from Ontario's Skills

OBSTACLES PREVENTING ONTARIO MANUFACTURERS TO INVEST MORE IN ADVANCED TECHNOLOGIES

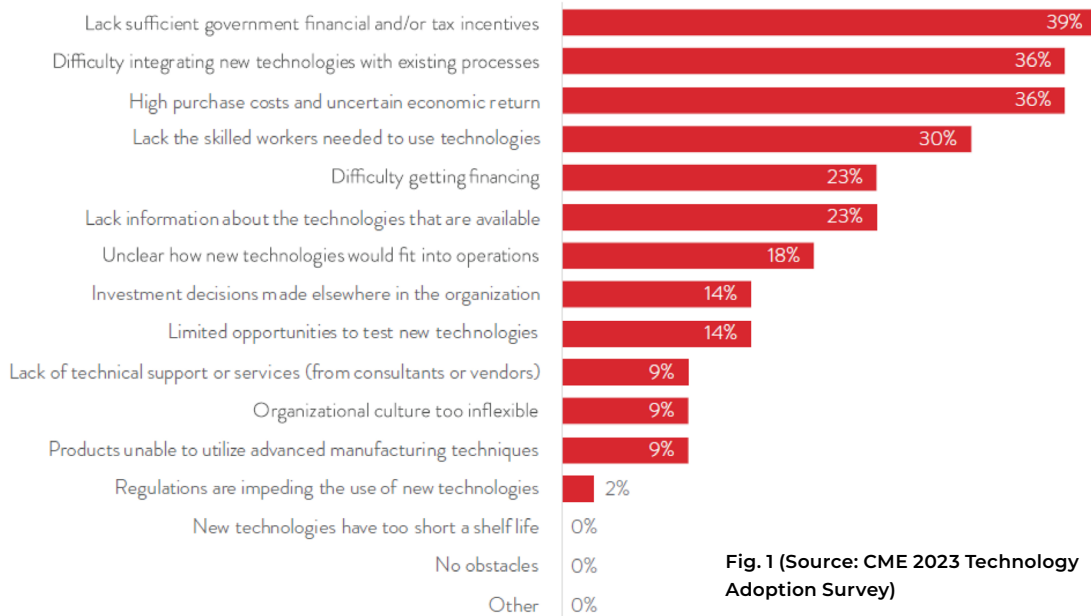


Fig. 1 (Source: CME 2023 Technology Adoption Survey)

Development Fund (Phase 3) delivered by the Ontario Ministry of Labour, Immigration and Skills Development, the association has begun convening Regional Industry Councils in Fall 2023, with involvement from manufacturers, high schools, colleges, and universities. A first **Manufacturing Workforce Report** was published in May 2024, and the initiative is currently in its second year, with roundtables held in Southwestern, Eastern and Northern Ontario.

Its key objective is to connect a provincial advanced manufacturing strategy with regional talent plans fitting the needs of Ontario's regions. By tailoring training and educational programs to specific regional demands, workforce development can be aligned with the unique strengths and challenges of each area. Furthermore, fostering partnerships between educational institutions, industry, and community organizations will help cultivate a more agile and responsive talent pool, ultimately positioning Ontario as a leader in manufacturing innovation and competitiveness.

Toward a Technologically Agile Workforce

A key area of focus to date relates to technological adoption, and the associated workforce needs. In CME's 2023 Technology Adoption Survey, a third of participating manufacturers identified the lack of skilled workers as a key obstacle to implementing solutions (see Figure 1).

This is especially true for robotics, which is a common technology solution relevant to manufacturers across manufacturing subsectors, from automotive, aerospace to food, metal fabrication or forestry. From a workforce training perspective, core fundamental robotics, data management and programming skills are transferable, making the workforce more versatile, and therefore more agile/resilient in times of change and uncertainty. Regional Industry Council participants emphasized the need for schools to foster problem-solving skills in both general labour and skilled trades workers to adapt to future changes. Manufacturing open door tours and mentoring of students through initiatives like FIRST Robotics were highlighted as especially important.

Universities called for a renewed focus on connecting Ontario manufacturers with the extensive cooperative student programs available at Ontario's post-secondary institutions. Some institutions noted a decline in recent years from the manufacturing industry in offering placements, which happened concurrently with increased labour needs.

Other participants called for a better promotion of manufacturing to technology professionals (software, robotics engineers or data scientists) who may have in the past gravitated to other sectors. On-the-job training was generally viewed as the best way for manufacturers to provide workers with the operational knowledge they need to succeed in their role.

Solutions to these problems include:

- Mandate Skilled Trades Ontario to conduct a timely review of curriculum for a short-list of in-demand trades to consider the integration of more content on basic engineering and industry 4.0
- Promote the connection of manufacturers to FIRST Robotics and other problem-based, competitive learning opportunities to develop the skills of elementary and high school students.
- Ontario should establish a governance table under the leadership of the Minister of Labour, Immigration, Training and Skills Development to convene at least yearly and align action on recommendations from ongoing Regional Industry Councils.

If you are a manufacturer with workforce development issues / ideas, or a learning institutions wishing to develop deeper partnerships with the manufacturing sector, please feel free to contact CME Ontario to learn more about this initiative.

ROUNDTABLE
REPORT**Building tomorrow's innovators today:
The critical imperative for strengthening
Canada's robotics talent pipeline**

Sponsored by:

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Building a strong and diverse talent pipeline in robotics requires strategic partnerships and a long-term vision. In the province of Ontario, we witness "unprecedented advancements in advanced robotics, artificial intelligence (AI), and predictive analytics," which provide manufacturers with opportunities to revolutionize production lines and increase productivity through tools like preventative maintenance, as highlighted in the 2024 Advanced Manufacturing Council Final Report.¹ However, these advancements demand "a workforce with the skills needed to be competitive, including the programmers, skilled trades workers, and engineers to install, operate and maintain new technologies on the production line."

It's essential to inspire young people and their parents about STEM subjects, making them aware of the viable careers in robotics and the steps to achieve them. Robotics captivates younger students naturally due to its technological allure, making it an excellent gateway into STEM education. Effective outreach can inclusively attract students to robotics programs, providing graduate students with valuable leadership opportunities. The Canadian robotics community has a significant role to play in encouraging youth interest in robotics. This can be part of their immediate corporate social responsibility initiatives, medium-term recruitment strategies, and long-term

efforts to enhance public perception and diversity in the field.

These insights were discussed at the roundtable "Filling the gap in the Canadian robotics talent pipeline through service leadership and outreach" during the Canadian Robotics Council 2024 symposium, where stakeholders from organizations, companies, academia, and youth gathered to explore challenges, opportunities, and recommendations.

Challenges**SUSTAINABILITY OF OUTREACH PROGRAMS**

One of the significant challenges discussed was the sustainability of outreach programs. Ensuring complementary motivation and vision across multiple partners, consistent funding, resources, and volunteer engagement is critical for long-term success.

MEASURING IMPACT

Another challenge is the lack of metrics to assess the effectiveness of outreach programs. Developing standardized measures specific to the domain that can evaluate the impact on student interest and career choices is essential.

INCLUSIVITY

Ensuring that outreach programs are inclusive and accessible to all

students, regardless of their background, socioeconomic status and/or other factors, remains a challenge.

Opportunities

IMPROVING PUBLIC PERCEPTION AND DIVERSITY

Outreach initiatives that highlight the diverse applications of robotics in sectors such as agriculture, food, medicine, and automation can enhance public perception of robotics. It is essential to present robotics as a tool that augments human capabilities rather than replaces them. Early engagement with robotics fosters familiarity, benefiting not only those pursuing STEM education but also individuals interacting with robotics across various levels, from management to skilled labor. This strategy is crucial to promoting widespread adoption of robotics within Canadian industries and making the field more appealing to a diverse group of students. Such efforts can effectively address the existing lack of diversity in the robotics industry.

ENHANCING RECRUITMENT EFFORTS

To effectively address Canada's rapidly evolving economy and technological landscape, especially with the transition to a net-zero economy and the rise of AI, the robotics industry must enhance its recruitment efforts. Engaging with students early can create a robust pipeline of skilled individuals poised to enter this high-growth sector. Such a strategy is crucial for breaking the cycle of exclusion faced by equity-seeking groups in emerging job markets. By implementing focused education and recruitment initiatives, the industry can lower barriers to opportunity and ensure a diverse workforce ready to meet future demands. Stakeholders should continuously evaluate and adapt these efforts to align with the dynamic economic environment, ensuring inclusive access to employment in the robotics field.

LEADERSHIP DEVELOPMENT

Outreach programs are instrumental in providing graduate students with the platform to cultivate and enhance their leadership skills, which are not only essential in academic circles but also highly valued across various professional industries. These programs often offer unique speaking opportunities that increase visibility for participants, allowing them to engage with leaders and experts from a range of sectors. By interacting with diverse stakeholders, graduate students can practice and refine their leadership abilities, preparing them for future roles that require visionary thinking and decisive action. This not only benefits the students themselves, but also contributes to

the academic institutions and organizations they represent, as these emerging leaders bring fresh perspectives and innovative solutions to the table.

Recommendations

ENHANCING TEACHER SUPPORT

Teachers play a crucial role in shaping students' career interests—from kindergarten to high school. Providing them with the necessary resources, training, and support to integrate robotics and coding into their curriculum is vital. Recent changes adding coding to the math curriculum are a step in the right direction. Integration of robotics into existing teaching plans can provide a more hands-on and engaging student experience when satisfying programming/coding requirements in the curriculum. Offering workshops, regular presentations, and access to robotics kits designed to align with curriculum expectations are also recommended.

EXPANDING EXISTING PROGRAMS

Building on successful initiatives like FIRST Robotics competitions and university-led outreach programs can help reach a broader audience. Collaborating with organizations like Ontario Council of Technology Education (OCTE), Science Teachers' Association of Ontario (STAO), and the Ontario Association of Mathematics Education (OAME), can further extend the reach and impact of these programs.

INDUSTRY INVOLVEMENT

Industry involvement is a crucial driver for enhancing the reach and effectiveness of outreach programs. Encouraging more companies to participate in sponsorship, mentorship, and employee engagement through volunteerism not only benefits the community but also provides companies with significant advantages. By engaging current employees in meaningful outreach activities, companies can address their skills shortage and build a future workforce that aligns with their needs. This collaborative approach, exemplified by the province of Ontario, demonstrates that "by working together, industry and government, as well as labor and academia, can secure Ontario's place as a manufacturing leader, all while creating good-paying jobs and enshrining a new age of prosperity for all people of Ontario now and into the future."¹

DEVELOPING YOUTH AMBASSADOR GROUPS

Creating youth ambassador groups for students in grades 6 to 12, including workshops, competitions, and mentorship programs, can foster long-term interest in robotics. Youth ambassadors can serve as



relatable role models, inspiring younger students to pursue STEM careers.

TRACKING PROGRESS

Implementing a system to track the progress and career paths of students involved in outreach programs can provide valuable insights. This data can help refine and improve outreach strategies over time.

Next Steps

- Encourage CRC to include kids and youth within research initiatives for a more encompassing ecosystem evaluation. By facilitating their participation in industry meetings and events, we not only empower young individuals to contribute valuable insights and fresh ideas but also ensure that diverse perspectives are considered in the decision-making process. Encouraging young participants to share their thoughts can lead to innovative solutions and a more robust understanding of the challenges and opportunities within the ecosystem. Engaging with youth in this manner not only strengthens the knowledge base but also fosters

a sense of ownership and responsibility towards ecosystem sustainability among the next generation of stakeholders.

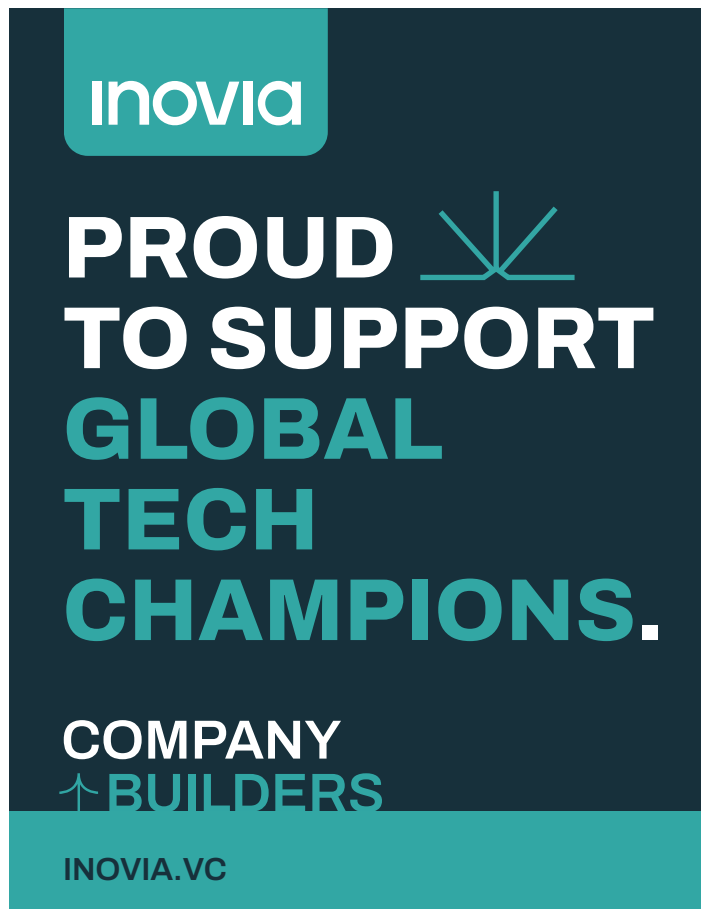
- Establish comprehensive metrics that will be visualized through a dedicated dashboard including the mapping of robotics and STEM programs across Canada, specifically targeting kindergarten through high school. By doing so, stakeholders can easily monitor and evaluate the reach and effectiveness of these programs. The dashboard will provide detailed insights into program locations, participation rates, and educational outcomes, allowing for data-driven decisions to enhance STEM education for young learners nationwide.
- Brainstorm Communication strategy for engagement
- Continue compiling success stories and best practices from global ecosystem-building initiatives
- CRC can provide a forum for academic-industry collaboration on outreach.
- Encourage the CRC to include youth-focused organizations like FIRST Robotics Canada in their ecosystem recommendations and future workforce strategies, which develop and inspire the youth and build the talent pipeline.

RESOURCES

¹ **2024 Advanced Manufacturing Council Final Report (Ontario Ministry of Economic Development, Job Creation and Trade)**
Next Generation Skills: How Robots Create New Jobs and Help to Fight Labor Shortage (International Federation of Robotics)

Building a Nation of Innovators (Innovation, Science, and Economic Development Canada)

Invest in Odense: Odense is a world-leading robotics city with an exceptional ecosystem



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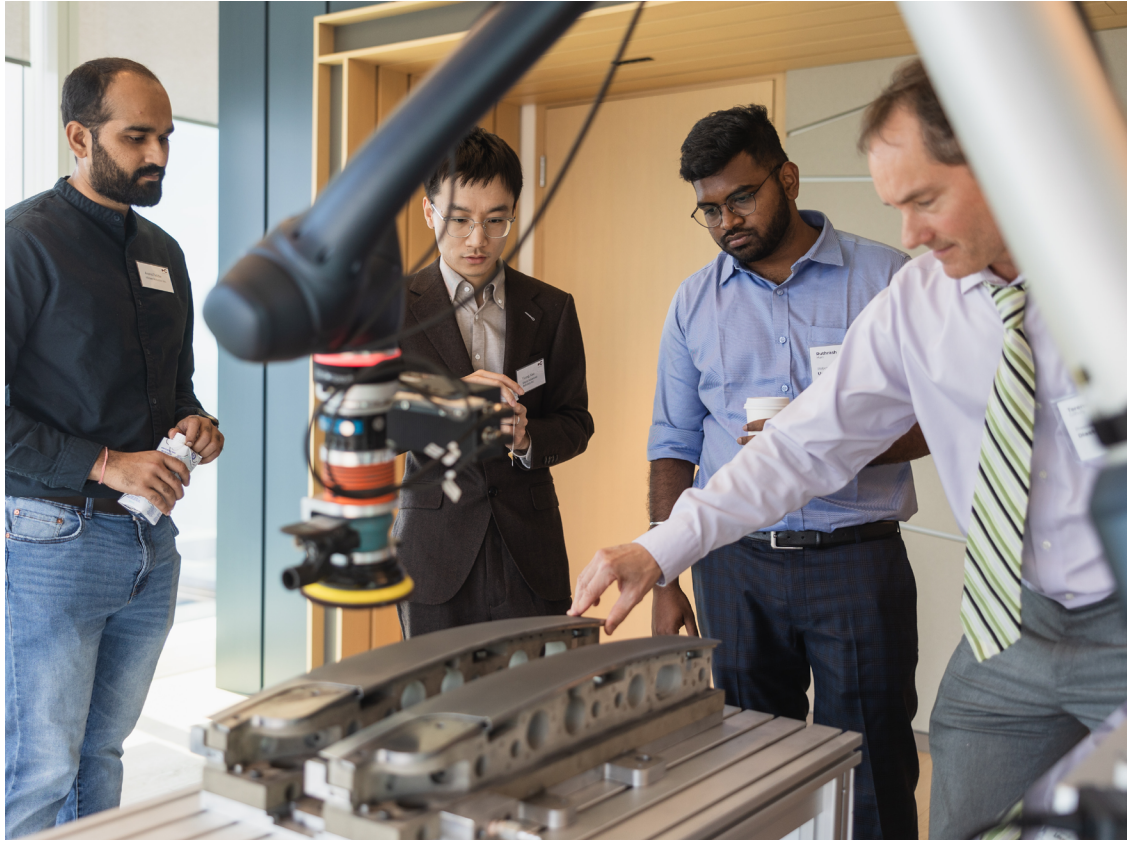
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Committee Updates

Industry Committee

Research and Training Committee

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2024 CRC INDUSTRY COMMITTEE UPDATE



PABLO MOLINA

Industry Committee
Co-Chair

CTO, VP of Product,
Chairman, **Avidbots**



ANDREW ALLEN

Industry Committee
Co-Chair

Director of Technology
Strategy, **MDA Space**

Committee Vision and Mission

VISION

Our vision is to unite Canada's robotics companies into a collaborative force that drives innovation, excellence, and economic growth. We aspire to position Canada as a global leader in robotics.

MISSION

Our mission is to inspire the next generation of Canadian robotics companies and SMEs to embrace robotic technologies. We will achieve this by educating Canadian SMEs on the value and application of robotics, developing strategies that incubate the growth of our domestic robotics market, and helping Canadian robotics companies gain access to international markets and investment.

Past Successes and Current Projects

- **Robotics Test Centre Initiative:** We secured approximately \$750K CAD in in-kind donations of equipment and expertise towards the creation of a robotics test centre focused on promoting robot adoption among SMEs. We also applied to OCI's Critical Technology Initiative for test centre funding; unfortunately OCI changed its match funding requirements, rendering our application invalid. To keep the momentum going despite this setback, we hosted a roundtable at the 2024 CRC Symposium. For a summary of our learnings, see the Test Centre Roundtable Report in this document.
- **Automate Conference:** The industry team attended Automate 2023 where we made great connections with Automate Canada and Export Development Canada.



2023-24 Committee Members

Jonathan Lussier, Business
Development Director, **Kinova**

Eric Jackson, President, **Cellula Robotics**

Andrew Allen, Director of Technology
Strategy, **MDA**

Christy Michalak, Director,
Manufacturing Development Programs,
NGen Canada

Jessica Yip, COO and Director,
A&K Robotics

Pablo Molina, CTO, VP of Product,
Cofounder, **Avidbots Corp**

Ilija Jovanovic, COO, Cofounder, **Taiga
Robotics**

Richard Lee, Principal Engineer, General
Dynamics, **Land Systems**

James Lee, Director, Innovation Solutions
Group, **Jones Healthcare Group**

Pascal Larochelle, VP of Operations,
Western Canada, **ASI Group**

Philip Reece, CEO, Founder,
Indro Robotics

Warren Ali, Director, Industry
Development, **Vector Institute**

Simon Metivier, Product Manager,
Vention

Dan Mashatan, Sr. Manager, Autonomy
and AI Software, **Teledyne FLIR**

Lawrence Lee, Automation Manager,
Armo Tool

- **Recruitment:** The industrial committee has grown from 8 members to over 14 members, adding end-users as well as support groups like NGEN and Vector Institute to the group. There is such a strong interest in joining that the group is considering splitting into two groups - the precise details of the split is being discussed. We also created and ratified a detailed recruitment process to ensure future inclusions to the industrial committee are done in a pragmatic fashion.

- **CRC Symposium support:** The industrial committee assisted in both symposiums by helping organize VC events of 2024 Symposium as well as supporting many aspects like roundtables (Test Centre Round Table 2024 & BDC Productivity Round Table 2024) and fireside chats (Symposium 2023) and helping to secure sponsorship for the events.

- **Basic Use Case bank:** The team created a list of 15 basic use cases for robotics - these simple use cases will be used later in 2025 to expand to a larger Use Case Bank effort.

Future Plans

DRIVING ADOPTION OF ROBOTICS IN CANADA

- **Creating a Use Case Bank:** Our goal is to create a searchable and informative back of use cases for robotics in Canada. A top priority is to raise funding to support this effort.

- **Advancing the Robotics Test Centre Initiative:**

In the coming year we will continue our work refining the value proposition and plans for the centre, generating additional match funding, and exploring new grant opportunities with a variety of regional partners and industry associations.

- **Recruiting more end-users for the committee and the CRC overall:**

It is important to gather perspectives on why robotics is not more widely used in industry.

ECOSYSTEM / COMMUNITY BUILDING

- **Connecting with existing test centres in underwater robotics:**

The goal is to connect with existing test centres for underwater testing in Canada (in British Columbia and Newfoundland/Labrador) to drive synergies between the CRC and the existing test centres.

- **Running quarterly informal meetups:**

Create quarterly meetups at different companies in different localities to allow for informal meetings between different members of the community.

- **Attending conferences outside of key robotics conferences:**

It is important to spread the word about robotics and their applications to manufacturing and other verticals.



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at Queen's University

2024 RESEARCH AND TRAINING COMMITTEE



AJUNG MOON

Co-Chair, Research and Training Committee
Assistant Professor,
McGill University



FRANÇOIS POMERLEAU

Co-Chair, Research and Training Committee
Associate Professor,
Laval University

Committee Vision and Mission

By 2030, Canadian advancements in robotics have an increased impact globally and serve as key elements in addressing worldwide societal challenges important to Canadians, and the average Canadian has a functional level of robotic literacy and demand more practical innovations in robotics to sustainably maintain and increase their quality of life.

Past Successes and Current Projects

Three working groups (WG) have been formed:

- WG1 leads a landscape analysis of robotics research labs across Canada. It is currently in the final stages of data collection.
- WG2 focuses on examining the quality of robotics training programs offered at universities across Canada and investigating whether the current offerings meet Canada's needs. The first priority was on courses offered at universities across the country. This has been completed and currently undergoing analysis. Subsequent focus will include college-level courses and other training opportunities.
- WG3 leads the CRC's visibility. It led social networking activities at various international conferences, including International Conference on Intelligent Robots and Systems (IROS) and IEEE International Conference on Robotics and Automation (ICRA).

Future Plans

WG1 aims to complete the analysis of research labs, combined with data of robotics related funded projects available from Canada's major granting agencies (e.g., NSERC). WG2 plans to complete the current analysis toward a publication of the results in early 2025. WG3 hosted the Canadian Robotics Council IROS 2024 meet-up.



2023-24 Committee Members

Clément Gosselin, Full Professor, *Laval University*

Angelica Lim, Assistant Professor of Professional Practice, *Simon Fraser University*

Brandon DeHart, Adjunct Assistant Professor and RoboHub Manager, *University of Waterloo*

James Servos, Director, Robotics Software, *Locus Robotics*

Hallie Siegel, Managing Director, Strategy & Partnerships, *University of Toronto Robotics Institute*

Ramzi Asfour, Director, Administration, Ingenuity Labs, *Queen's University*

Sabrina Jocelyn, Professional Researcher, *Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST)*

Marie Charbonneau, Assistant Professor, *University of Calgary*

Amir Hajzargarbashi, Research Officer, *National Research Council Canada*

Jonathan Kelly, Associate Professor, *University of Toronto Robotics Institute*

André Gallant, Assistant Professor, *Université de Moncton*

Modupe Olufemi, Advisor, Business Development, *Mitacs*

Sylvain Langlois, Manager, Manufacturing, Communications and Technologies, *Natural Science and Engineering Research Council Canada*

Hyelim Juliana Kim, *Mitacs*

2024 GOVERNMENTAL COORDINATION COMMITTEE UPDATE



BRUNO MONSARRAT

Co-chair, Governmental Coordination Committee

Team Leader, *Automation, Robotics & Intelligent Manufacturing*

National Research Council Canada



2023-24 Committee Members

Martin Picard, Manager, Lunar Exploration Robotics Systems, *Canadian Space Agency*

Ola Dele, R&D Director, *National Research Council Canada*

Étienne Gendron, Head of Robotics and Automation, *Centre Technologique en Aérospatiale*

Ben Willoughby, Manager, Aerospace and Advanced Manufacturing Unit, *Ontario Ministry of Economic Development*

Samantha Owsianski, Industry Liaison Manager, Technology Access *Centre for Aerospace & Manufacturing*

Arthur Kong, Director, Project Development, *NGen Canada*

Jack Collier, Robotics Researcher, *Defence Research and Development Canada*

Committee Vision and Mission

The vision of the CRC's Governmental Coordination Committee is to federate a critical mass of provincial and federal governmental stakeholders in coordination with industry and academia to catalyze the advancement and operationalization of robotic solutions in support of national priorities in the terrestrial, aerial and space domains. The advancement of these robotic platforms will improve the economic welfare of Canadians, the quality of their environment and will provide state-of-the-art digital platforms for their safety and national security.

Past Successes and Current Projects

After an expansion period that took place over the past two years, the Committee now gathers 12 active members representing nine provincial and federal government agencies. With the collaboration of the Intelligence & Analytics team of the National Research Council of Canada (NRC), the Committee has already completed a thorough mapping of governmental organizational units supporting the deployment of robotic solutions in Canada. This exercise has recently allowed the mapping of 168 organizational units involved in either the operationalization of robotic solutions, research, innovation and regulatory development in the field of robotics or robotics-adjacent technologies, as well as the management of funding programs relevant to the Canadian robotics ecosystem.

Thanks to this mapping effort, the Committee has documented, for each identified organizational unit, its responsible manager, mandate, sector of activity, location, competencies, and the types of robotic platforms used to advance the mission of their parent governmental agency. The geographic distribution of these organization units on the Canadian territory, as well as their high-level classification by their mandate, are illustrated in *Fig. 1. (page 48)*. Among all the identified sectors of activity, five sectors – Defence, Fisheries & Oceans, Health, Agriculture and Agri-Food and Public safety – gather more than 40% of the identified organizational units. Also, the provinces of Ontario (67) and Quebec (37) gather together close to 60% of the identified governmental entities.

It is also noteworthy that all identified organizational units involved in either the operationalization of robotic solutions, the research and innovation or the regulatory development in the field of robotics, operate within specific verticals. This further emphasizes the importance of the Committee mandate to contribute towards a greater coordination between agencies.

Ongoing activities of the Governmental Committee also include a review of pluriannual policies and strategies of provincial and federal agencies in Canada to identify strategic orientations that are relevant for the advancement of the Canadian robotics ecosystem.



**168 GOVERNMENT
UNITS SUPPORTING
THE DEPLOYMENT OF
ROBOTIC SOLUTIONS
IN CANADA**

Mapping of governmental organizational units supporting the deployment of robotic solutions in Canada*

* Including aerial robotics & robotic perception expertise, excluding org. units focusing on AI

Governmental Coordination Committee
Comité de coordination gouvernementale

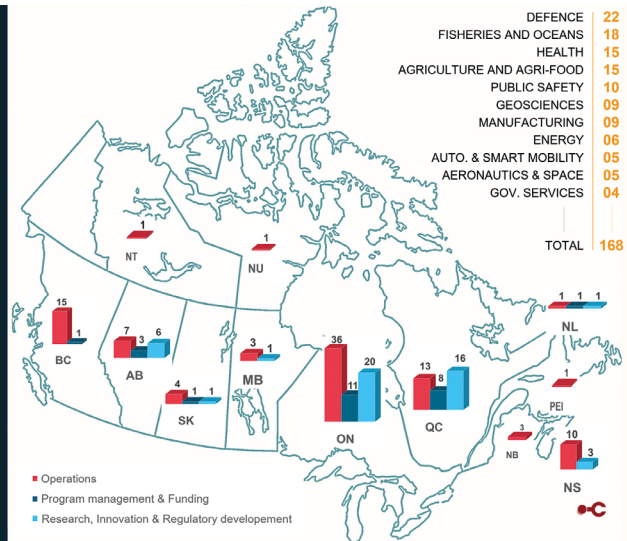


Fig. 1

Future Plans

Over the next 12 months, the Committee will expand its mapping efforts to study how governmental capacities have been orchestrated, funded and networked in countries where robotics adoption is the strongest internationally. In a first stage, an emphasis will be given to the study of the governmental ecosystem relevant to robotics in Germany. In parallel, the Committee will work on the organization of a first intra-governmental workshop to foster exchange and collaboration between provincial and federal governmental stakeholders with interest in the advancement of robotics in Canada.

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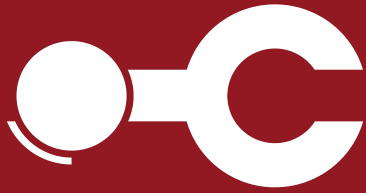


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