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# Automation Not Domination:
## AI and the Workforce

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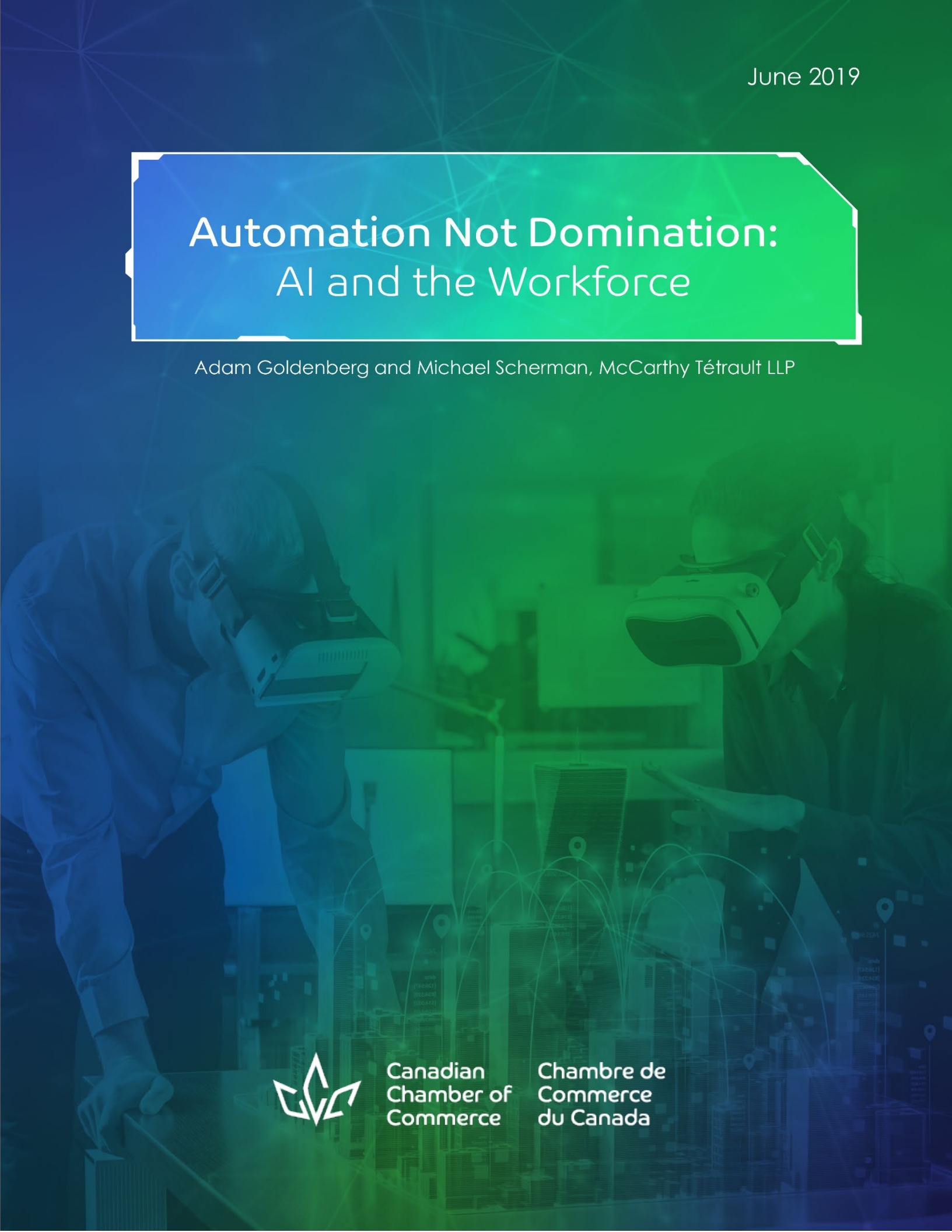
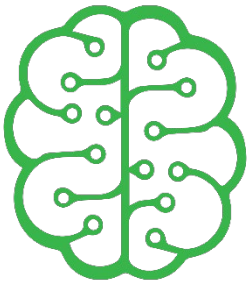


Canadian Chamber of Commerce
Chambre de Commerce du Canada



# Background

AI systems are increasingly prominent across the commercial landscape. They are changing and supporting employees' roles in the workplace. Autonomous vehicle technology in transportation, "chatbots" in retail sales, quantitative investment systems in finance and "digital twin" technology in manufacturing each herald an evolution in the way we work. That evolution will continue — and so it should.

It can only do so, however, by harnessing the talent and resilience of the Canadian workforce. As we continue through a "Fourth Industrial Revolution" — one spurred by the advent of cyber-physical systems, including AI[1] — the OECD estimates that 14% of jobs in OECD countries are already highly automatable, while another 32% will be radically transformed by technological progress.[2] Ensuring Canadian workers have the skills and knowledge necessary to succeed and prosper amid such widespread innovation is a crucial public policy priority.

Much has been written about how technology as a whole has revolutionized, is revolutionizing and will continue to revolutionize the workforce. AI systems raise particular challenges. Many AI systems benefit from human input and cooperation in training and in checking output or shift more complex decision making to human workers. For example, software that deploys algorithms to design products may shift the work of iteration to an AI system, requiring a human designer to establish and then narrow the parameters within which the system will iterate, ultimately selecting a final design.[3] Emerging roles increasingly demand advanced cognitive and socio-behavioral skills, as well as skills combinations associated with greater adaptability, as opposed to routine job-specific skills.[4] Due in no small part to this shift, it is expected that, by 2022, approximately 54% of employees will require "significant re- and upskilling".[5] Statistics Canada predicts that some 394,000 workers will move up the skills ladder between 2017 and 2026.[6]

This disruption will not be easy. Still, it seems increasingly likely that its effect on Canada's labour market — which will evolve and adapt — will be net positive overall. Labour productivity improvements will drive GDP gains as firms use AI to augment their employees' productivity and to automate certain tasks and roles. [7] Indeed, labour productivity improvements are expected to account for over 55% of all GDP gains from AI over the period 2017-2030.[8] Given that impacts on the workforce are evolving in tandem with technology, concrete policy solutions grounded in research are still a work in progress. Proposed solutions for the workforce range from incorporating digital literacy into the education curriculum from the earliest years, having industry and education work more closely at the post-secondary level, re-training displaced and disrupted workers and developing policies that facilitate the gig economy.

[1] World Economic Forum, "What is the Fourth Industrial Revolution" (19 January 2016).
[2] Organization for Economic Co-operation and Development, "OECD Employment Outlook 2019: The Future of Work" (2019).
[3] See P. R. Daugherty & H. J. Wilson, *Human + Machine: Reimagining Work in the Age of AI* (2018), at p. 141.
[4] World Bank Group, "World Development Report 2019: The Changing Nature of Work" (2019).
[5] World Economic Forum, Centre for the New Economy and Society, "Future of Jobs Report 2018" (2018).
[6] Government of Canada, "Job Seekers (2017-2026)" (October 2017).
[7] PwC, "Global Artificial Intelligence Study: Exploiting the AI Revolution" (17 July 2018) at 4.
[8] *Ibid* at 5.

To foster AI research and industry development, the Government of Canada has begun to implement a number of AI-focused strategies.

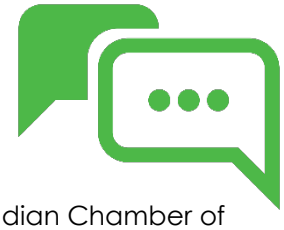
The government released its *Pan-Canadian Artificial Intelligence Strategy* (the "**Strategy**") in March 2017.[9] The Strategy funds three centres of excellence in AI research and innovation: Edmonton's Amii, Montréal's MILA and Toronto's Vector Institute. It also supports research chairs in machine learning to help retain and recruit top academic talent. The government also launched a $950-million "supercluster" initiative, one of whose five superclusters is focused on AI.[10]

Governments worldwide are implementing programs to foster innovation, attract AI talent and facilitate their workforces' implementation of AI. Australia offers a useful point of comparison with Canada. The two countries' populations are similar, and each has assembled an admirable number of AI experts given its relatively small population. Yet, Australia boasts two-and-a-half times the number of AI experts as Canada on a *per capita* basis.[11] Further, proportionally more researchers are joining the machine learning field in Australia than elsewhere, fewer are leaving the country than the global average, and Australia leads the world in terms of the percentage of its AI researchers doing high-impact work.[12]

While a detailed analysis of Australia's efforts in promoting AI is beyond the scope of this report, some illustrative examples may be helpful. AI was featured in the Australian government's recently released digital economy strategy, *Australia's Tech Future*, in which the government identified "ensuring skills remain relevant and up-to-date" and "supporting workers impacted by automation" as areas of focus.[13] Policies implemented in Australia include allocating government investments to support AI development. In 2016, Australia established Data61 within the national science research agency to help connect data-driven research and technology capability.[14] The Australian government also introduced Cooperative Research Centre grants, which provide industry-led collaborations, comprising at least one SME and at least one Australian research organization, with up to three years of matched funding of up to $3 million to develop important new technologies, products and services. The grants program is in its seventh round as of 2019.[15]

[9] CIFAR, "CIFAR Pan-Canadian Artificial Intelligence Strategy" (2019).
[10] Innovation, Science and Economic Development Canada, "Innovation Superclusters Initiative" (4 September 2018) *Government of Canada*.
[11] *Ibid*.
[12] *Ibid*.
[13] Department of Industry, Innovation and Science, "Australia's Tech Future" (December 2018) *Australian Government.*
[14] Data61, "Who We Are" *Commonwealth Scientific and Industrial Research Organisation*.
[15] Department of Industry, Innovation and Science, "Cooperative Research Centres Projects (CRC-P) Grants" (April 2019) *Australian Government*.

# What We Heard…



On April 16, 2019, at a roundtable discussion hosted by MILA in Montreal, the Canadian Chamber of Commerce and McCarthy Tétrault LLP brought together experts and business leaders from across multiple industries and academia to discuss issues and opportunities in relation to AI and the workforce. This roundtable was part of a series to gather insight from experts and business leaders across industries and academia on the future of AI in Canada. The discussion spanned a broad range of challenges that will bear on Canada's ability to realize AI's full potential across our entire economy and geography.

The following is an overview of the discussion as we heard it. These findings were subsequently discussed and further developed at a roundtable discussion hosted by McCarthy Tétrault LLP in Vancouver on May 22, 2019.

## I. Cultivate Canada's talent pool

***We Asked:*** **How can Canada continue to cultivate its AI talent pool?**
***We Heard:*** **Canada should bet on policies and programs that support talent and showcase Canada's competitive advantage.**

The greater the concentration of AI skills and knowledge in the Canadian workforce, the more resilient our workforce as a whole will be in tackling the opportunities that AI will offer. This means that cultivating and retaining AI talent in Canada must be a priority. Here, government has a crucial role to play.

Strong industry ecosystems and communities are critical. The launch of the AI supercluster in Montreal, along with support for hubs in Edmonton and the Toronto-Waterloo corridor, are promising steps toward strengthening local ecosystems and communities. The continuation of technology-centric policies will increase the density of industry players in Canadian urban centres. This is critical to retaining and attracting talent.

Canada should showcase the many areas in which it has competitive advantages relative to other technology hubs, such as Silicon Valley. For example, Canadian technology workers generally demand lower salaries and face lower real estate costs — particularly outside of Toronto and Vancouver — than do their counterparts in the Valley and the Bay Area. Governments can (and do) play an important supporting role by promoting Canadian urban centres as attractive places to work and to employ Canadian workers. In addition, governments can help to attract and retain AI talent by encouraging the development of deep and durable relationships between AI workers and Canadian communities.

To this end, roundtable participants encouraged deliberate government support for Canada's entrepreneurs. Smaller companies in the earlier stages of development not only serve as incubators for homegrown talent that can attract inbound investment but they also perform an essential seeding function in developing vibrant AI ecosystems in Canadian centres. Programs to help Canadian AI start-ups grow and stay in Canada would be beneficial because the most promising of these companies are particularly vulnerable to competition from larger international urban centres and multinational companies that may acquire them and move them out of Canada.

# II. Build a resilient workforce

***We Asked:*** **How can Canada ensure our workforce is resilient to disruption from AI?**
***We Heard:*** **Companies and governments should encourage workforce resiliency by encouraging career-long skills development.**

While AI will be disruptive in some areas, it will also present new opportunities for workers who "up-skill" and "re-skill." Employers should manage AI evolution not only by communicating the limits and possibilities of AI-based solutions but also by planning how to re-deploy and re-train their employees. Roundtable participants endorsed their own experiences in re-assessing their workforce according to competencies rather than by reference to their existing positions.

Governments and the post-secondary community can also be key partners in supporting employers in providing training and financial assistance to better retrain and redeploy workers. For example, post-secondary and in-house short course programs that provide work placements and professional skills development have been particularly useful. Online and open access modules can also help to reach workers in all parts of the country and to overcome mobility barriers to skills development.

While the private sector will have an essential role in ensuring access to career-long learning for Canadian workers, governments must also recognize the limits of industry's capacity privately to provide the necessary education and training. To the extent that college and university-level competencies will be required for jobs that we want to remain in Canada, leadership from government will be indispensable. Roundtable participants suggested that such support could take a number of forms, including using tax credits to encourage companies to fund post-secondary programs at Canadian colleges and universities — whether to make those programs tuition free for students or to facilitate mid-career enrolment, or both.

# III. Encourage AI "interfacers"

***We Asked:*** **How can Canadian companies better deploy AI solutions in the workplace?**
***We Heard:*** **Players in the AI ecosystem should encourage the proliferation of AI "interfacers."**

Roundtable participants noted that the "interfacer" function is critical to the successful development and use of AI technologies by a business. Management and employees alike may receive AI solutions with resistance or suspicion. Those solutions may also be deployed without a clear match to business needs thus ensuring future resistance and suspicion — a vicious cycle that can slow down AI integration at the expense of competitiveness and growth.

"Interfacers" have the skills necessary to avoid this negative feedback loop. An "interfacer" is the person or group within an organization who identifies the need for an AI solution, explores alternatives, acts as an interface between developers, senior management and other stakeholders and facilitates the implementation process. An "interfacer" can also be someone who works with the AI solutions provider to translate the AI technology into solutions for businesses.

There is no specific skillset or role that a person needs to succeed in this area. Certain AI solution providers have set up in-house consultancy groups to assist with the "interface" function. Businesses have seen success when they have deployed AI solutions after someone in the organization has clearly identified business needs and sought out solutions in the context of an overall technology vision. Roundtable participants suggested that consultants who have AI-industry acumen could be new players that facilitate the overall growth of the industry.

# Recommendations

The Government of Canada should:

- **Support training initiatives that help to upgrade and transfer existing skills**. Canadian workers are already being asked to respond to changes in their workplaces that result from the deployment of AI solutions. To ensure they can do so successfully, enhanced resiliency will be essential. The government should encourage and fund initiatives that "up-skill" and "re-skill" workers in partnership with post-secondary institutions and/or technology firms. The government should also directly encourage employers to retrain and redeploy their existing employees by facilitating partnerships with post-secondary institutions and AI start-ups.

- **Encourage AI "interfacers."** Canada's workforce needs to have people capable of playing the role of an "interfacer" between AI technologists and business leaders. These "interfacers" may themselves be AI technologists who have business acumen. They may also be business people with technical knowledge. The government should ensure there is an adequate supply of Canadians with these skillsets. It can do so by supporting secondment opportunities and similar at-work training programs for those who currently work in business and AI sectors.

- **Recognize the role of large tech companies in fostering the AI workforce.** The government should encourage initiatives that involve large technology companies, or incentivize their participation, in local education and training programs such as co-op placements and part time work programs. These companies' government-supported community contributions could also take the form of partnerships with local colleges and universities in research and recruitment — including by funding research and teaching positions at post-secondary institutions on a talent-sharing basis — as well as supporting local entrepreneurs through acquisitions and joint ventures.

- **Continue to foster technology-centric urban hubs**. The government should continue to invest in attracting and keeping key technology companies in Canada's urban centres. For example, Canada should convene different orders of government to implement policies that help companies obtain the real estate and workforce they need to establish or expand their presence in Canada and hire Canadian workers.

- **Focus on supporting local entrepreneurship**. The government should support more training and skills development programs with a focus on business skills for entrepreneurship. The programs could be offered free of charge, online and on a flexible schedule to aspiring entrepreneurs.

- **Provide financial support to aspiring entrepreneurs**. The government should provide more support to aspiring entrepreneurs, especially those in emerging and strategic industries such as AI. To do this, the government should consider allowing entrepreneurs to access part of their Employment Insurance benefits during the very early stages of their projects.
- **Implement measures that promote living in Canada**. The urban centres associated with the technology hubs should be promoted to AI workers as attractive work destinations. The government should partner with other orders of government to support the development of local infrastructure, promote accessibility to housing and fund cultural programs that make the hubs attractive to the global tech workforce. For example, well-developed public transit and a low cost of living will encourage workers to come and stay to work in Canada. The government should focus in particular on funding programs such as networking circles that provide opportunities to skilled technology workers to develop local connections. It should also continue to facilitate immigration pathways through initiatives such as the Global Talent Stream.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