Artificial Intelligence Series
Part I: AI and the Workforce

Context:
Canada has emerged as a leader in the global race to develop artificial intelligence (AI).\(^1\) Given the rapid growth in computational power, experts predict the next five years will bring more advancement than the past 30 years combined. The global market potential was estimated at $2.4 billion in 2017, and trillions of dollars are expected to be invested in the coming years.

As part of its ongoing policy development process, the Canadian Chamber of Commerce produces reports and undertakes activities that generate an improved and detailed understanding of specific subject areas with the goal of improving the public policy framework in that area. Through a series of roundtables in 2019, the Chamber will identify positive outcomes in AI, exploring the range of policy options for investment, innovation, integration and workforce sustainability.

What we did:
During the first two weeks of December 2018, the Canadian Chamber of Commerce undertook a series of interview discussions on AI and the workforce with key thought leaders and influencers.\(^2\) Our intent was to begin investigating the impact of integrating AI systems into business processes as an interface with the general workforce.

This interview exercise sets the stage for the Chamber’s work on AI and skills throughout 2019.

This is what we heard:

A Common Language for AI
- In order to better define and ascertain AI workforce needs and impacts, we would benefit from a common language describing what AI is, how segments of the workforce are involved and affected, and what the changing needs of business and the workforce are.
- AI is often conflated with terms such as automation and digitization. Although it is an integral part of the evolving economy, it is an industry unto itself and warrants a specific focus.

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\(^1\) For example, see 2018 articles from DMZ-Ryerson, Forbes, Fortune, Global Affairs Canada, Globe and Mail and University Affairs.

\(^2\) The Canadian Chamber of Commerce is grateful to colleagues at ABB, Amazon Canada, Bell Canada, Blackberry, Durham College (AI Hub), Google Canada, IBM Canada, Microsoft Canada, MILA, Seagate and the University of Waterloo for their time and input.
AI is already influencing the workforce in a number of unique ways. The rapid rate of change is unprecedented in size, scope and ambition. AI is now being integrated across all industries and has impacts across all levels and classifications of the labour market.

**AI and the Workforce**

Discussion on AI and the workforce is welcomed and important, yet we must acknowledge that the technology is still nascent and much is unknown. Disruption is inevitable, and it was acknowledged that conversations speculating about massive job loss persist in the media and the marketplace; however, a more prevalent sentiment among interviewees was the expectation that while there will be some impacts on jobs, the labour market as a whole will evolve and adapt.

With respect to AI and the workforce, there was agreement among those interviewed on broad segments of focus:

- Senior leadership and management, who must be transparent, demonstrate commitment and drive the AI culture shift in their respective businesses. This senior leadership can also be using AI in interesting and innovative ways in their own work;

- AI specialists, who are researching, developing and testing AI, alongside what some posited is an important role of ‘ethicist’ (a function which will be examined across the Chambers roundtables);

- AI implementers, who are bringing AI into industry (e.g., strategists) and providing oversight (e.g., cybersecurity experts); and

- AI interfacers, who represent the more general workforce, and will be affected to various degrees and need to adapt/pivot accordingly.

Immigration plays a critical role, particularly for the AI specialist category, where Canada has significant talent shortages. We need to be attracting the ‘best and the brightest’ to work alongside our domestic expertise in further cultivating Canadian capacity. Many interviewees applauded federal government’s Global Talent Stream program, expressing that it should be further promoted and expanded.

**Skills, Education and Training**

Discussions on the AI skill sets needed throughout workforce were echoed by interviewees on what we have heard in the larger discourse on AI in the workplace to date about effectiveness in operating in Industry 4.0:

- Educational institutions need to focus on math and computer literacy without sacrificing human skills such as critical thinking, problem solving, communication and entrepreneurship.

- Character traits required - which are more admittedly more difficult to teach/learn - include agility, adaptability and resiliency.

- We need to start with youth incorporating digital literacy into the primary curriculum, and we need to instill a culture of lifelong, flexible learnings.
For AI-focused careers and expertise, there is a feeling among business that the postsecondary education sector has been slow to react. Acknowledging this, AI specific (and even more niche) degrees, diplomas and certificates will be rolling out over the next three years at a number of universities and colleges.

In the interim, many currently entering the AI industry have advanced degrees, although some businesses have now started hiring undergraduates and are providing learning opportunities.

The private sector has effectively invested to provide both the tools and time for their employees across workforce segments to learn and remain current. There are a plethora of education platforms, AI learning tools, academies, curriculum, courses, badges and certificates. In a number of instances, and often at no cost, they have opened these up for public consumption. This is filling an important need for re-skilling and up-skilling and will be further investigated to be fully appreciated.

**Collaboration and Inclusivity**

- The vast majority of those interviewed felt that collaboration within the AI industry is unprecedented with businesses supporting academia, incubators, employees and local communities. There is a recognition by those within the AI industry that there is room – and a need - for all players, and that this cooperation must continue to ensure Canada is successful. This will be of particular interest vis-à-vis the evaluation of the government’s superclusters initiatives, and could serve as an example of how cooperation can lead to success.
- With this collaborative framework, there is a general sense of opportunity and potential, and that no one will be left behind.
- However, several of those interviewed expressed concerns that certain populations (e.g., women) are being relegated as AI has a STEM-heavy focus, and that others are likely to be (e.g., lower skilled and/or older employee currently in the workforce) to be relegated. There is also recognition that even if there is a net/net benefit to the country as a whole, individual and groups of employees might be disproportionally affected.
- Concern for the rural/urban divide also surfaced repeatedly, and although many understand the initial focus on Edmonton-Waterloo-Toronto-Montreal, in order to be truly successful as nation, it was felt this concentration needs to be dispersed.
- The theme of unconscious bias – the tendency to impose one’s own expectation of outcome on the development, implementation and impact of AI – came up repeatedly, and is an important consideration in the overarching AI discussion.

**Policy framework considerations**

- Vis-à-vis the role of the federal government, it was felt that one of the most significant influences Ottawa could have overall is cultivating and supporting a Canadian identity of innovation, tech savvy-ness and resilience.
Although most of the conversations on policy frameworks did not focus on the workforce specifically, some felt the role that the federal government could have is to support the creation of competency frameworks for each workforce categories, alongside skills development. Provincial and territorial governments also have an important role in the development of K-12 curriculum.

Where many gave governments (federal and provincial) credit for investments in R&D, the focus now needs to shift to supporting commercialization.

Regarding regulation of and standards within the industry writ-large:
  o There was consensus that the government needs to be involved immediately, though there were no clarity on precise roles.
  o There was agreement that areas of focus should be in data collection, underpinning of the development of the technology and deployment of AI tools.
  o The federal government needs to be unified domestically, and playing a leadership role on the international stage in regulatory frameworks and standards development.
  o Most importantly, there needs to be flexibility: “The country that is going to dominate AI is going to have the most agile regulations and dynamic regulatory framework”.

These are our next steps:
  o The Chamber will continue to liaise with its members and other key stakeholders to distill the main themes from these interview discussions and other research: (i) AI and the workforce; (ii) AI and inclusivity; and (iii) AI and policy framework development. We will be looking at each using a business lens and addressing the challenges of common language as it pertains to each theme.
  o To support this work, the Chamber will be holding a series of roundtables next year, the first focused on AI and the workforce (date and location TBC), with a view to driving towards common language and developing recommendations to government to ensure Canada has the investments, regulatory framework and workforce that will allow us to stay globally competitive.
What We Heard…
Canadian Chamber of Commerce AI Round Table
University of Waterloo
March 19, 2019

On March 19, 2019, the Canadian Chamber of Commerce brought together experts from across multiple industries and academia to discuss how the deployment of artificial intelligence (AI) raises many public policy questions about how to respond to the technology from a legal/regulatory perspective. Starting with the premise that AI will generate regulatory activity to address privacy, security and safety, we attempted to address the challenges of:

• Separating the myths from the reality of the state of the technology and what we might see on a five-year time horizon.
• Identifying barriers to adoption (technology, network, data gaps, regulatory hurdles) and explore policy options to overcome the barriers.
• Exploring the state of the industry and where government can (and should) play a role in enabling adoption and growth, such as incentives, tax measures, trade agreements, services or policies.

To follow is a summary of the discussion as we heard it:

I. Regulatory “Lag”

We asked: Is regulatory “lag” good for AI innovation and uptake?

We heard: Yes, it is — and the more lag, the better.

Experience shows that legislation introduced with the right intentions can have unintended consequences on technology uptake, and thus on economic growth. In British Columbia, for example, the data custody provisions of provincial privacy legislation effectively prevent the public sector from using cloud computing applications. If the federal government moves too quickly to regulate too much, it risks undermining Canada’s burgeoning AI ecosystem.

Society has seen economic revolutions before. AI could spur such a revolution. But it will not do so all at once. Any attempts at “forward thinking” or “real time” regulation could quickly be overtaken by advances in AI technology. Canada’s priority, at this juncture, should be to encourage those advances, not to seek to limit them prospectively through regulation.

1 Freedom of Information and Protection of Privacy Act, R.S.B.C. 1996, c. 165, s. 30.1.
Canada should, instead, tell the world that our jurisdiction will be a friendly one for AI innovation. We should rely on existing legislation and regulation, create an accessible inventory of those frameworks, provide guidance on how they apply to AI technology — perhaps through a “single window” approach — and seek to limit redundancies and to close gaps. But we should give businesses based in Canada a wide berth to develop AI technologies, and to create the jobs and foster the economic growth that will come with it.

A number of specific potential regulatory approaches were discussed:

- Roundtable participants were generally not supportive of a “sandbox” model. The concern is that the bureaucratic processes associated with operating such a “safe” environment could be sufficiently cumbersome to push AI innovation to other jurisdictions.

- It was suggested that algorithms could be vetted for “safety” by a regulator, subject to confidentiality protections and similarly to pharmaceuticals. Some roundtable participants saw this approach as bound to be limited by the government’s technical capacity, and also as an unnecessary step that could serve as a brake on economic growth.

- It was also suggested that the government support a standards-based approach, including binding professional standards for technologists similar to those imposed on members of other regulated professions. This proposal was generally well received, though implementing it (in the absence of effective self-regulation) would likely require provincial, rather than federal, action.

II. Consumer Attitudes

We asked: What do Canadians want?

We heard: The public expects principled guidance to prevent harm to individuals, and an ambitious agenda for global leadership.

“AI” is not one thing. Government has a role in educating Canadians about what different AI technologies are, what they can do, and how they will affect our society. A workable definition of AI is a necessary starting point for official guidance on how different AI systems may be developed and deployed.

Canadians do not expect a complex regulatory framework. We do, however, wish to advance our collective desire to encourage the responsible and ethical development of AI in Canada. The federal government can do so developing clear guidance to businesses on how their existing legal obligations apply to AI innovation.

Guidance should be oriented around the principle of avoiding harm. Like “AI”, the term “harm” will require precise definition. That definition may largely be derived from existing legislative and regulatory
frameworks, such as those that guard against discrimination. In this way, the guidance need not be legally binding in itself in order to build Canadians’ trust that AI innovation will not harm them.

We want Canada to be a global leader in AI. We want companies based in Canada to be at the forefront of innovation in this space. But we also want the application of AI in business processes not to undermine our legal rights and interests. Effective, principled guidance can provide a bridge between these two desires, to ensure that they do not operate in conflict with one another.

III. **Competitiveness and Growth**

**We asked:** What do Canadian businesses need?

**We heard:** Canadian businesses need to be able to compete globally.

One participant highlighted how China is using its citizens’ health information to create a massive data set to train algorithms. This illustrates the global competitiveness of AI innovation. Businesses based in Canada have to compete in this environment. Governments must bear this in mind as they approach AI regulation.

Canada needs the ability safely to generate and maintain data sets that will allow AI algorithms to learn. Our legal and regulatory frameworks must allow these data sets to be generated and accessed. Existing and proposed limitations on AI development and deployment should be assessed against this policy objective.

We also need governments to work in partnership with the private sector, and with one another. Private sector organizations should be allowed space to develop self-regulatory approaches within the ambit of principled guidance from government. Those self-regulatory approaches should inform future government action. And, because AI regulation crosses jurisdictional boundaries between orders of government, the federal government’s collaboration must extend to the provinces.

Working together, Canada’s governments and businesses are well positioned to decide, in partnership, how existing legal and regulatory frameworks apply to AI innovation. The goal should be to provide effective guidance that bridges the divide between AI development and AI deployment — and to create an environment that encourages economic growth.