Canadian Democracy and Economy in the Algorithmic Age

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Issue

The absence of clear global governance policies regulating the use of algorithmic-based technologies presents vulnerabilities for states utilizing them. Therefore, Canada must leverage its position in the rules-based international system and its experience governing algorithms domestically to mitigate risks and optimize economic opportunities in the algorithmic age.

Background

Understanding the Algorithmic Age

The algorithmic age is an era characterized by the ubiquity of underlying algorithmic technology being implemented in nearly every aspect of daily human life. An average consumer smart-phone grants nearly every human on earth unfettered access to a global repository of data. Underlying this pocket-sized technology is a massive collection of algorithms that can enhance a user's cyber-security, assist them in instantly finding relevant information, and facilitate human interaction on an unprecedented scale. Although algorithms are simply a set of computerized mathematical processes, they are critical components in rapidly emerging technologies such as artificial intelligence (AI) and encryption applications. Algorithms are not limited to online media or personal communications. They are also present in modern vehicles, manufacturing equipment, and most other things critical to the ongoing functioning of society. AI and other algorithmic-driven technologies show great economic potential due to their ability to enhance efficiencies in production processes. Early AI investments will position Canada to be a leader within the realm of emerging technologies while addressing responsible application and the role emerging technologies play in shaping our democratic and economic values.

The Global Environment

Despite the increasing prevalence of algorithms in our daily lives, responses from global governance institutions such as the United Nations have lacked the necessary coherence to address the new age adequately. There has nevertheless been significant progress in some global fora. The Organisation for Economic Co-operation and Development (OECD) and G20 have begun adopting principles to mitigate democratic, economic and human rights concerns related specifically to AI. The OECD Principles on Artificial Intelligence were adopted by member countries in May 2019; they were reinforced by the G20 when it adopted its "human-centred AI Principles" in June 2019 (OECD n.d.). Working toward further collaboration, Canada and France spearheaded an ongoing effort by the G7 to create the Global Partnership on AI, a collaborative body working to "support and guide the responsible adoption of AI that is human-centric" (Prime Minister of Canada 2018). These international efforts represent encouraging steps toward a coherent global framework to govern the algorithmic age. In addition, Canada can protect and advance its liberal democratic values and economic opportunities by collaborating with like-minded states on various initiatives related to governance in the algorithmic age.

National Efforts Across Jurisdictions

According to a repository of national AI policies developed by the OECD, hundreds of AI-specific initiatives have been developed across 60 countries, territories and the European Union (OECD Artificial Intelligence Policy Observatory n.d.). Among the array of policy instruments used, the vast majority can be grouped under the governance of AI, which includes approaches such as national AI strategies and oversight bodies. Otherwise, AI-focused policy instruments can be found in the following groupings: "direct financial support" (e.g., business grants), "indirect financial support" (e.g., risk- sharing schemes), "collaborative infrastructures" (e.g., networking platforms) and "guidance, regulation and incentives" (e.g., technology regulation). Research and student training are also frequent targets for many national AI policy approaches. Overall, the diverse range of policy instruments being employed to address AI is reflective of the complexity of the burgeoning algorithmic age.

A recent report by Oxford Insights — as commissioned by Canada's International Development Research Centre — attempted to develop criteria to assess the "current capacity [readiness] of governments to exploit the innovative potential of AI" (Oxford Insights 2019, 5). In the study, four clusters were used to evaluate the AI readiness of governments: governance; infrastructure and data; skills and education; and government and public services. Based on the criteria, Canada was tied with Sweden for sixth in the worldwide rankings. The top five countries were Singapore, the United Kingdom, Germany, the United States and Finland. Canada was applauded for its impressive talent attraction, but a lack of domestic success in the private sector was noted as a point of weakness. Bearing that in mind, if private sector growth in the United States continues to outpace Canada, it could become increasingly difficult for Canada to retain the skilled labour it has been attracting through various programs (e.g., favourable immigration policy). While perhaps not definitive, the AI readiness rankings illustrate Canada's relative advantage and the need for continued progress. Understanding Canada's relative position in the global ecosystem of algorithmic technology governance can assist us in determining what sort of international influence the country may be able to exert. Moreover, it could also highlight which countries may serve as like-minded partners for the development of governance systems and policies concerning algorithmic technologies.

National Efforts in Canada

The Government of Canada has adopted digital systems into its operations and has begun establishing policies and positions to govern their use domestically. The work of the Department of Digital Government demonstrates Canada's desire to adopt innovation in its operations and interactions across private and public spheres. A central element is Canada's commitment to the responsible use of AI technologies. The government has developed the Algorithmic Impact Assessment tool, which is a questionnaire designed to help users assess and mitigate the risks associated with deploying an automated decision system (Government of Canada 2019). As a middle power that is active across multiple international fora, Canada could leverage its domestic experience with responsible use to play a role in shaping how these systems adapt in the evolving algorithmic age.

In 2017, Canada was the first country to release a Pan-Canadian AI Strategy. Through the $125 million funding allocation for this strategy, Canada exhibits its commitment to build upon its existing AI ecosystem (Canadian Institute for Advanced Research n.d.). Canada continues to invest in this innovation and research through partnerships across academia and industry. Canadian researchers have made significant advancements in the field of AI. For instance, some of the most significant innovations in machine-learning research have stemmed from Canadian universities (Reflection AI n.d.). Importantly, Canada has established research clusters in multiple provinces that have positioned the country as a global leader. Canada differentiates itself from other countries with AI readiness through its openness and commitment to attracting and cultivating AI talent. Canada's approach to attracting talent from abroad has addressed skill gaps that exist within the local labour force. As a result, Canada has developed a diverse talent pool of highly skilled workers contributing to its AI research. Despite Canada's work in this sector, there continues to be a gap within the expanding AI ecosystem and labour retention. While Canada has been referred to as a platform country for its success in attracting workers from abroad, the United States continues to be a competitor in the AI field, which positions it as a global talent magnet. Therefore, to leverage its position as a growing leader in AI, Canada must improve its labour retention rate across the technology sector.

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Opportunities and Risks

Globally, as reported by Deloitte, recent estimates predict AI spending could translate to US$3.9 trillion in business value across the world by 2022 (Omnia AI 2019). Presently, however, the adoption of AI solutions into Canadian businesses is lagging, which limits its economic potential. It was determined that "only 16 percent of all businesses reported using AI technologies over the past year" (ibid.). Notably, that number remained unchanged from 2014 to 2018, which may indicate that Canada can improve the deployment of algorithmic technologies in its private sector. If Canada can achieve greater integration of algorithmic technologies into the value chain/business line, Canadian businesses may become more competitive globally through improved productivity, efficiency and the development of novel business operations and models fit for an algorithmic age. Furthermore, the potential benefits to be derived from algorithmic technologies and AI are not limited to economic gain. From a social perspective, the adoption of these new technologies can address different issues throughout our society. For instance, leveraging algorithmic technology could help aid in the mitigation of risks associated with the current COVID-19 crisis, such as contact tracing, and prevent or limit future crises through predictive analysis. Other examples of beneficial algorithms include blockchain for improvements to the agri-food chain toward limiting food insecurity and combatting climate change through the verification of carbon-offset projects.

There are two prominent forms of risk in the algorithmic age. First, risks arise from irresponsible use of emerging technologies. Some examples include: using invasive recommender systems to push political perspectives that undermine Canada's liberal democratic policies; using facial recognition or biometric-based systems for intrusive citizen tracking; and built-in algorithmic biases that result in selective exclusion from government services or that may even be used for nefarious purposes. Second, social risks arise from not keeping pace with the technological investments that underpin many aspects of society. For example, many of the algorithms used in encryption protocols, such as SHA-256, may be threatened by emerging technologies such as quantum computing (National Institute of Standards and Technology 2017). Failure to continually evolve with the rapidly changing technological environment opens states, businesses, and individuals to massive structural risk.

Recommendations

1. **Canada should encourage the adoption of responsible AI principles globally through international institutions and strengthen these principles domestically.** The foundations of responsible use principles have begun to take form through their adoption in international fora, such as the G20. As a member of many international institutions, Canada should advocate for the continued adoption of responsible use policies to ensure alignment across global interactions in various democratic and economic practices. Additionally, as Canada learns from its domestic lessons regarding the governance of AI, such lessons can be transferred to the international setting.

2. **Canada should leverage Canadian research clusters and its impressive talent pool to support the Global Partnership on AI and increase collaboration with the G7, G20 and OECD.** Considering Canada's value proposition as a beacon for talent cultivation and technological research, taking a leading role in a research-focused body is fitting. Canadian strengths and capacity to lead the Global Partnership on AI must be emphasized through diplomatic efforts within the G7. Examples of such leadership could include the leveraging of existing research clusters to serve as a "test-friendly environment" for future research and innovation conducted within the partnership. By exploiting our strengths (e.g., research clusters) to exhibit leadership in the partnership, the country can increase its influence over future policies and frameworks that will govern the algorithmic age. Such leadership will not only improve Canada's position within the G7 — the sponsoring body of the Global Partnership on AI — but also across the OECD and G20, given the collaborative relationship that has been fostered between the bodies on this issue. With greater influence over the global conversation surrounding the algorithmic age, Canada can promote its democratic values, revitalize the rules-based international order and safeguard its economic opportunities.

3. **Canada should invest in Canadian businesses by supporting an economy-wide transition to AI- and algorithmic-based technologies while implementing targeted work programs to improve labour retention in the country**. Canada should

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collaborate with relevant stakeholders to develop a program targeting small and medium enterprises to support them through a technological transition. The program should encompass policy options such as grants and tax rebates for the implementation of certain algorithmic technologies, increased access to skilled labour and consultative support concerning the transition. Relevant partners to accomplish such a program could include the Canadian Federation of Independent Business, the Canadian Chamber of Commerce, the Canadian Commercial Corporation and Export Development Canada. The adoption of algorithmic technologies and AI in the private sector will create a more prosperous economy — with competitive exports globally — and lead to a more robust and diverse talent pool, thus strengthening Canada's position as a leader on an international scale.

4. **Canada should continue to invest in global public-private partnerships.** Canada should develop a public-private partnership committee that will promote economic development through algorithmic-based technologies by building strong ties with leading companies in the sector. By interfacing with foreign actors, the committee would provide a platform to advocate for risk mitigation and pursue partnerships that advance Canada's values pertaining to emerging technology.

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