Rebooting Regulation:
Exploring the Future of AI Policy in Canada

CIFAR

brookfield institute
for innovation + entrepreneurship

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ACKNOWLEDGEMENTS

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ABOUT CIFAR

CIFAR is a Canadian-based, global charitable organization that convenes extraordinary minds to address science and humanity's most important questions. By supporting long-term interdisciplinary collaboration, CIFAR provides researchers with an unparalleled environment of trust, transparency and knowledge sharing. Our time-tested model inspires new directions of inquiry, accelerates discovery and yields breakthroughs across borders and academic disciplines. Through knowledge mobilization, we are catalysts for change in industry, government, and society. CIFAR's community of fellows includes 19 Nobel laureates and 400 researchers from 22 countries. In 2017, the Government of Canada appointed CIFAR to develop and lead the Pan-Canadian Artificial Intelligence (AI) Strategy.

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ABOUT BII+E

The Brookfield Institute for Innovation + Entrepreneurship (BII+E) is an independent and nonpartisan policy institute, proudly housed within Ryerson University. We are dedicated to building a prosperous Canada where everyone has the opportunity to thrive due to an inclusive and resilient economy. BII+E generates far-sighted insights and stimulates new thinking to advance actionable innovation policy in Canada.

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TABLE OF CONTENTS

ABSTRACT

In 2018, CIFAR and the Brookfield Institute for Innovation + Entrepreneurship (BII+E) launched a series of five workshops to engage policy innovators in conversations about the public policy implications of artificial intelligence (AI). This series brought together over 125 policymakers from across Canada to learn about existing and potential AI capabilities and applications, explore the policy implications of AI, and develop policy responses.

In each of the workshops, participants developed a variety of policy recommendations to respond to a specific case study. Across all of the workshops, recommendations clustered in the following areas:

+ Addressing the future of work
+ AI anti-trust mechanisms
+ Consumer protection
+ Data governance
+ Public education and consultation
+ Encouraging responsible innovation
+ AI regulation and legislation

Throughout the series, CIFAR and BII+E continually improved the facilitation methods and materials, which will be launched in an open source format in fall 2019. Additional opportunities include furthering technical and policy capacity building in the policy sector, and encouraging organizations and groups within the AI community to engage across sectors and include diverse perspectives.

SERIES OVERVIEW

Artificial intelligence (AI) refers to the increasing ability of machines to complete tasks which were previously completed by human intelligence. Rapid advances in AI — especially in the fields of deep learning and reinforcement learning — have the potential to offer a wide range of benefits, but also pose a number of challenges. Many policymakers lack awareness of current AI capabilities and applications and their associated policy implications. For this reason, there is an increasing need to build capacity for thinking about emerging technologies among policymakers across all sectors to ensure AI is developed, implemented and governed in ways that will align with public interest objectives.

Together, the Brookfield Institute for Innovation + Entrepreneurship (BII+E) and CIFAR designed and delivered a series of five AI Futures Policy Labs in Toronto, Edmonton, Vancouver, Ottawa, and Montreal. This series brought together over 125 policymakers from the public, private, academic, and not-for-profit sectors across Canada with the aim of increasing their understanding of existing and potential AI capabilities and applications, build capacity to understand the policy implications of AI, and facilitate early thinking about appropriate policy responses.

Figure 1:

Policy Lab locations

Vancouver Lab
October 18, 2018

Edmonton Lab
September 20, 2018

Montréal Lab
February 5, 2019

Ottawa Lab
November 26, 2018

Toronto Lab
June 25, 2018

Recognizing that AI policy will require collaboration among different sectors rather than being developed by one sector in isolation, we used an expansive definition of policymaking which allowed us to include representatives from public, private, academic, and not-for-profit sectors. For more detailed summaries of the design processes, lab content, and recommendations, please see the location specific summaries.[1]

Each Lab consisted of approximately 25 participants from a variety of organizations. Each workshop opened with an AI 101 presentation with an AI expert to bridge knowledge gaps before the participants split up into groups of five or six to work on a case study. Each group was assigned a unique case study focusing on an AI application in a specific public policy area, which they examined through worksheets (canvases) under the guidance of a facilitator. In the afternoon, there was an AI Policy 101 presentation to inform participants about existing AI policy initiatives and mechanisms from around the world. At the end of the day, each group would share the insights from their discussions with the rest of the participants. Case studies centred on topics in health care, law, immigration, housing, human resources, and education.[2]

[1] http://bit.ly/AIpolicylabseries
[2] To read about the structure of the workshops in more detail, including the different case studies, please refer to the AI Future Policy Lab summary reports.

Figure 2:
Participants by Sector

Other
3.8%

Private
14.4%

Academic
14.4%

Non-profit
15.9%

Public
51.5%
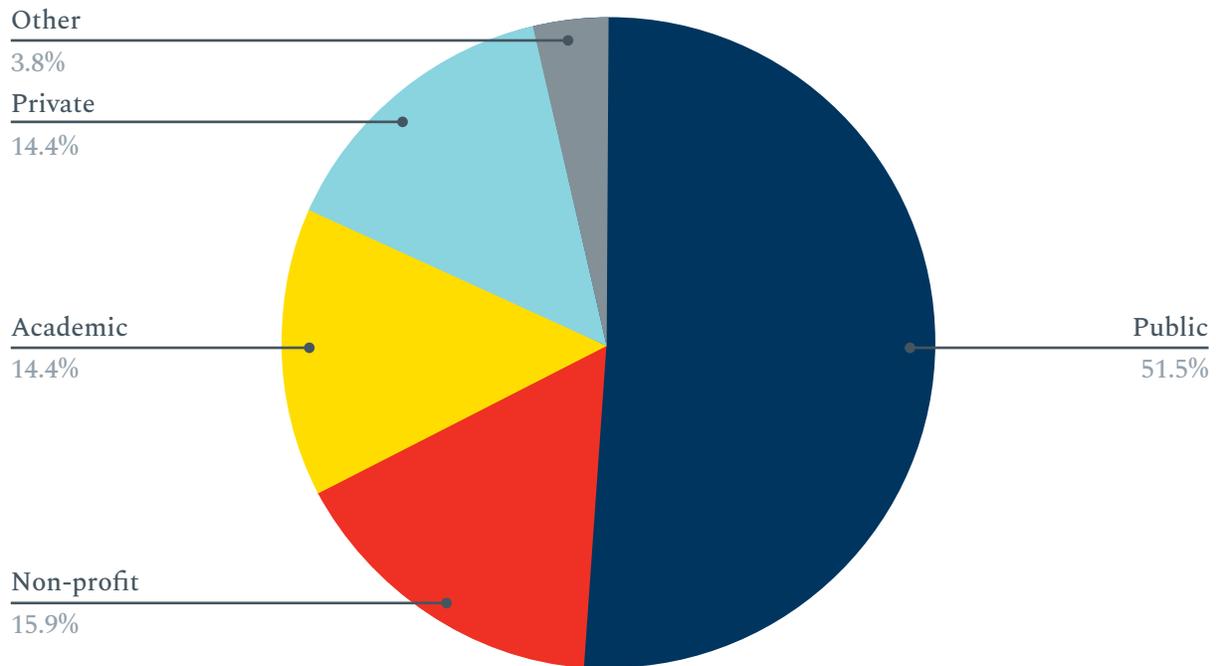
RESULTS

Based on participant feedback, the AI Futures Policy Lab series was successful in increasing participant awareness and understanding of existing and potential AI capabilities and applications. This was due to the combination of invited talks and facilitated sessions focusing on real-life case studies. Participant-generated policy recommendations demonstrated an increased understanding of the benefits and challenges associated with AI applications, and a variety of perspectives on how to increase the beneficial development and use of AI while limiting the potential risks. Side discussions during and after the Labs indicated that participants had a keen interest in the content we had created and felt it was of significant value to their work. One former participant reached out to us to tell us that she had taken our materials and facilitated her own session with her colleagues at the Government of Alberta.

AI POLICY 101: INNOVATE BC AI JUSTICE CHALLENGE

Launched in 2018, the AI Justice Challenge is a partnership between Innovate BC and British Columbia's Ministries of Citizens' Services and of the Attorney General to actively engage the innovator community to help solve business challenges in the justice sector using AI technology. These solutions would provide the public with better access to the justice system, allowing citizens to navigate the system more quickly, easily, and affordably. The AI Justice Challenge provides an opportunity for the provincial government to collaborate with the innovation community to address challenges affecting millions of British Columbians.

POLICY RECOMMENDATION TRENDS

Throughout the series, participants were tasked with developing policy recommendations based on their discussions at each Lab. These were meant to encourage the realization of benefits and mitigate the risks associated with the use of current AI applications. The case studies for each group provided a real-world jumping-off point for both approaches to AI policy as well as specific interventions. Broader discussions tended to focus on considerations such as:

+ Whether policy should be directed at a specific technology or at technology-neutral outcomes
+ The level of policy intervention appropriate for a rapidly developing technology field
+ The ability of governments to govern the use of code and algorithms that often operate inside a "black box"

More specific proposals that were developed can be clustered into seven distinct categories.[3]

FUTURE OF WORK

Current AI applications are already affecting a variety of professions by automating specific tasks and assisting with decision making. A number of participant recommendations recognized the need to account for the changing nature of work across sectors. These included:

+ Curriculum reform in professions that are experiencing disruption
+ Reforming professional standards and codes of conduct to accommodate changes brought about by AI
+ Make reskilling options available for those at risk of being disrupted

AI ANTI-TRUST

By collecting and aggregating user data to improve their AI-driven services, large firms and early adopters generally have an advantage over their smaller competitors. Their use of AI provides them with increased overall market power and market share that allows them to outpace their competition. Participant recommendations acknowledged the need for anti-trust regulation to moderate markets and foster a more level playing field to mitigate monopolies and adverse social effects.

+ Governments should develop and implement an offsetting mechanism when an AI application threatens to reduce market accessibility
+ Governments should provide public access to AI-driven products and services, perhaps through public libraries, particularly in cases where limited access to such products threatens social equity and fairness
+ Governments should develop policies that would encourage competition and minimize the existence of monopolies and money spent on foreign software
+ Develop and enforce relevant anti-trust regulation

CONSUMER PROTECTION

Companies that deliver AI-powered services require large amounts of consumer data, which may threaten the rights and privacy of consumers and users. Participants highlighted the need for stronger measures to uphold current consumer protection standards, increase trust, and mitigate the variety of risks involved with consumer-facing AI applications.

+ Organizations should be required to disclose the use of AI tools
+ AI-powered services should be opt-in
+ Create a public complaint and reporting structure for the use of non-evidence-based algorithms, with an option for a formal response from the subject of the complaint
+ Require the anonymization of individual data when shared publicly to protect privacy
+ Develop a robust appeal process for those who feel they have been wrongly assessed

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[3] These categories are not organized in a particular order and represent the views of the participants, not CIFAR and BII+E.

DATA GOVERNANCE

Given the exceptional value of large data collections, there are concerns about how these data collections can be governed to protect the interests of individuals, as well as guarantee oversight over their use. Participant recommendations proposed the creation of new forms of data governance to protect and direct value towards socially beneficial goals.

+ Pilot new data governance models based on third-party stewardship
+ Create civic data trusts to inform and govern access to data sets for training models

PUBLIC EDUCATION

The impacts of AI are already being felt across sectors, borders, classes, and cultures. However, the kind of impact that this technology will have is likely to differ depending on a variety of socio-economic and contextual factors. Moreover, those who are unfamiliar with the use of AI-driven technology will not receive the same benefits as those who have adopted these tools. For this reason, participants stressed the need for increased AI and digital literacy.

+ Promote awareness of data protection rights and regulations among the general public
+ Increase the digital literacy of the public, particularly among traditionally marginalized and vulnerable populations

PUBLIC CONSULTATION

Dialogue between governments, corporations, and civil society are required to ensure that harms are identified and addressed, and that policy adequately reflects public interest objectives and addresses concerns from specific groups.

+ Hackathons to identify and mitigate bias in AI applications
+ Enable affected individuals to participate in the development of regulation
+ Create a space for dialogue between affected users and policymakers

+ Hold public consultations about AI and data to address concerns about privacy and security
+ Increase engagement with stakeholders when developing policy frameworks

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AI POLICY 101: INTERNATIONAL OBSERVATORY ON THE SOCIETAL IMPACTS OF ARTIFICIAL INTELLIGENCE AND DIGITAL TECHNOLOGIES

Jointly funded by the Fonds de recherche du Québec and the Ministère de l'Économie et de l'Innovation, the Observatory will assemble 20 universities and colleges, as well as 90 research centres, to explore the societal impacts of AI. This initiative will bring together government, civil society, academia, and the private sector to conduct research, training, and consultations, as well as develop recommendations on policy and law to support the development of responsible AI.

ENCOURAGING RESPONSIBLE INNOVATION

Continued research and innovation are necessary for advancing technology and maximizing social and economic benefits, though it is important to ensure responsible innovation to protect social values. Participants highlighted multiple ways policymakers can incentivize and guide responsible development and use of AI. These range from financial incentives to governance frameworks.

+ Provide government funding to incentivize companies to incorporate transparency into the design of their applications
+ Encourage open source algorithms to mitigate inequality
+ Promote the use of sandboxes to pilot AI-driven systems in simulated environments to evaluate their risk level
+ Develop AI principles to guide thoughtful implementation of new AI-driven tools

AI REGULATION AND LEGISLATION

Participants stressed the need for government to play a stronger role in ensuring AI is developed, implemented, and used responsibly in all sectors. Recommendations included developing new regulations and legislation, adopting existing regulations implemented by other governments, amending current legislation, and developing new government departments to oversee the development of these technologies.

+ Establish a Department of Digital Policy and an Office of the Chief Algorithmic Intelligence Auditor to manage government responses to AI
+ Develop regulations that establish transparency and accountability standards for decisions made by automated systems
+ Ensure AI is designed and aligned with human rights regulations
+ Government should modernize and strengthen privacy and discrimination laws to protect users when sensitive information is required by AI systems
+ Government should prescribe limits to manage how, and to what extent, automated systems should influence legal decisions
+ Ensure a wide adoption of the Treasury Board of Canada Secretariat Directive on Automated Decision Making

AI POLICY 101: GOVERNMENT OF CANADA ALGORITHMIC IMPACT ASSESSMENT

Supporting the Treasury Board Directive on Automated Decision Making, the Algorithmic Impact Assessment (AIA) is a questionnaire developed to assess and mitigate the potential risks associated with adopting an automated decision system. Using a risk score to assess systems, the AIA is a mechanism that determines the potential direct and indirect impacts of AI technologies on users and stakeholders. Though developed for internal government systems, it has the potential to be adopted by external organizations.
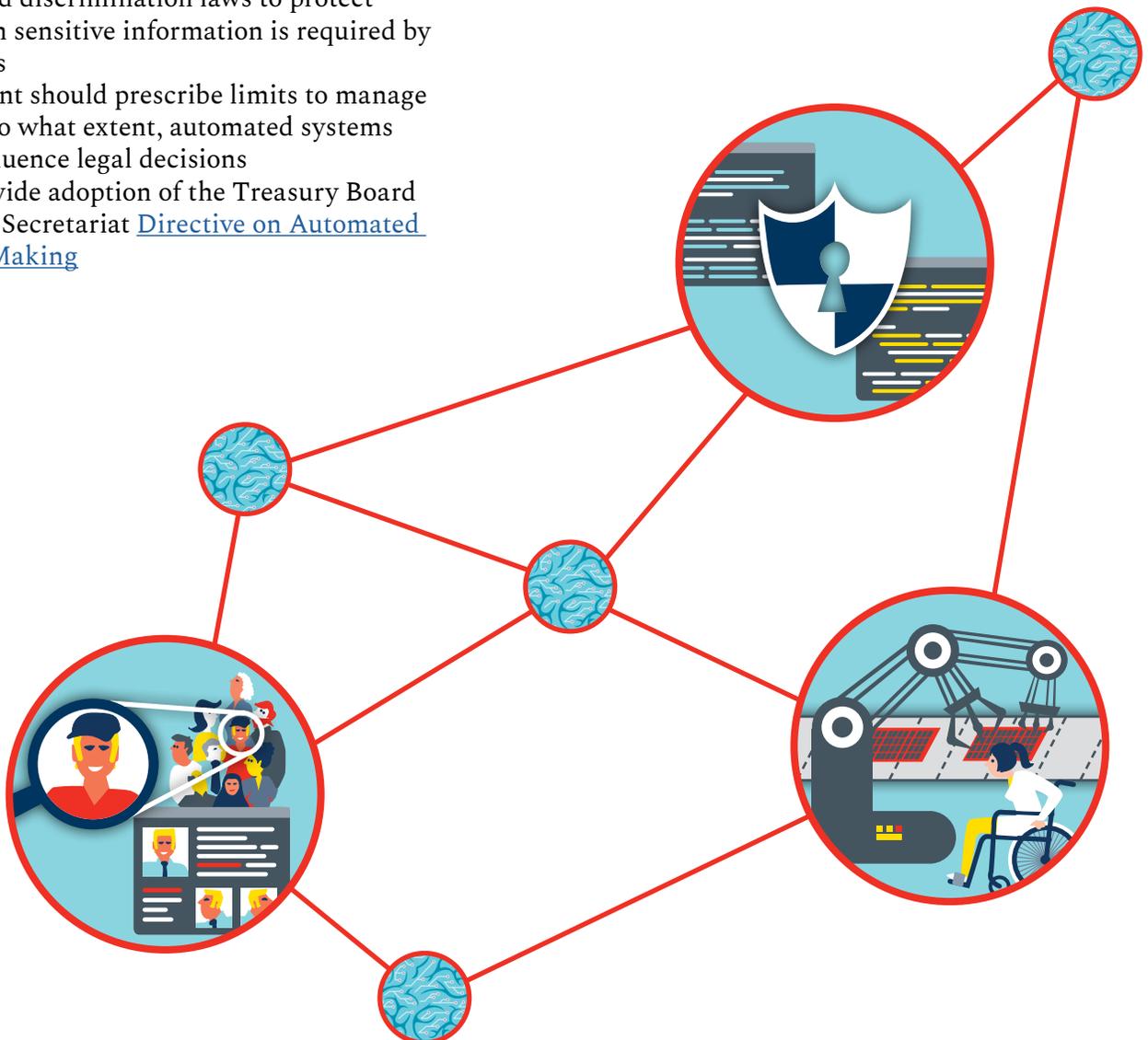
LESSONS LEARNED

THE VALUE OF REAL-WORLD CASE STUDIES

AI, when discussed on its own, is an abstract concept open to a range of interpretations. In order to facilitate thoughtful conversations, participant discussions were centred on real-world case studies of current AI applications.[4] These included:

+ Naborly, a tenant screening app that generates risk scores, enabling landlords to make smarter rental decisions
+ Ideal, a talent intelligence app for high-volume recruitment processes that sources, screens, and analyzes candidates in real-time
+ Nestor, an AI class assistant that uses machine learning algorithms and advanced facial recognition to analyze the attention of students while they listen to online lectures
+ InnerEye, a research initiative led by Microsoft, applies state-of-the-art computer vision and machine learning algorithms to automatically analyze three-dimensional medical CT and MRI scans to identify tumours and organs at risk
+ ROSS Intelligence, an artificially intelligent legal research tool that applies cutting-edge natural language processing to increase a lawyer's ability to sort through and find information relevant to their cases
+ Efforts by Immigration, Refugees, and Citizenship Canada to develop a predictive analytics system to automate activities currently conducted by immigration officials and to support the evaluation of immigrant and visitor applications

This case study approach helped to ground conversations by providing participants with direct insights into how AI can be deployed in everyday life and its impact on individuals.

USING FEEDBACK TO IMPROVE CONTENT AND DELIVERY

Continuous reiteration of the workshop structure was critical for providing value to participants. This enabled us to refine the content and delivery model of each Lab to better serve participant knowledge gaps and interests. After each Lab, participants had the opportunity to provide feedback related to what worked and what did not work, as well as any other comments or suggestions they had to offer. This feedback was immediately assessed and applied to the design of the following Lab. This resulted in changes to canvas design, content, and facilitation methods. For example, to give participants more opportunities to interact with different people, we changed the final session of the day from a group report-back to sharing in small groups that were comprised of one member from each case study. We also entirely redesigned the canvases to be much simpler and more user-friendly based on feedback we had received.

RANGE OF KNOWLEDGE AND COMFORT LEVELS

Participants were not expected to have any familiarity with AI technology prior to the workshop; as a result, there was a noticeable range of understanding among participants. Additionally, there was a range of comfort levels among participants in relation to this topic, leading some participants to hesitate to contribute to group discussions. Anticipating this, we made sure the Labs were designed to offer a safe space for critical thinking, encourage open discussion, and facilitate thoughtful collaboration in order to ensure everyone had an opportunity to contribute and add value. Our efforts to create a safe space for discussions are reflected in our choice to split participants up into small groups, typically made up of about five individuals and an active facilitator, to work through a particular case study. This helped to eliminate the stress of working in a large group.

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[4] See our Montreal summary for a detailed exploration of the case studies: http://bit.ly/MTLaipolicylab

MEETING DEMAND

Although we tried our best to accommodate everyone who expressed interest, budgetary and staff restrictions limited the number of attendees we could host at each Lab. It was also important to maintain an open, collaborative environment, which benefits from a small group setting. Interest in the series grew as it went on, and as a result we were not able to accommodate all participants that wished to be a part of the Labs. A number of people from the cities where we delivered Labs have enquired about future Labs, explaining they had only become aware of them after the fact. This indicated the limitations of holding one workshop per city on a specific date, and also that there is demand beyond the policy innovators that we engaged directly.

There may be other ways to deliver this content to better accommodate the demand, such as holding multiple engagements in one location, increasing resources (budget and staff) to accommodate more attendees, or offering toolkits for organizations to run their own Labs. However, the strengths and weaknesses of each delivery model must be taken into account. On-demand delivery through a mechanism like online education, where users can access materials on their own time, can reach a larger audience but may not generate the same level of collaboration or convene individuals from different backgrounds in the same physical space. On the other hand, in-person events lend themselves better to facilitating deeply collaborative discussions between participants who may hold various perspectives, but this mode of delivery is restricted by physical limitations.

RECOMMENDATIONS

PROGRAMMING OPPORTUNITIES

The Policy Lab series highlighted the demand among policy innovators for more engagements connecting civil servants with technical experts on emerging technologies. Participants found that the introduction to AI concepts through an AI 101 session provided important grounding for discussions of policy opportunities. There is an opportunity to expand AI literacy programs for

public servants and the broader policy community to prepare for the wide range of challenges and opportunities that will arise in the short and long terms.

Similarly, another opportunity is for continued discussions about international AI policy responses. There was a great deal of interest from participants about Canadian and international efforts to address issues related to the ethics, regulation, and oversight of AI applications; though, in many cases, even major policy initiatives such as the European Union's General Data Protection Regulation were unfamiliar. As a new and rapidly evolving policy area, documentation and open sharing of current efforts, best practices, and lessons learned by other jurisdictions and organizations can enable other policymakers to learn from and build upon a shared body of knowledge. Making existing tools and resources available to public servants and innovators working in this space can encourage greater innovation and progress towards more proactive and informed policy responses.

MULTI-SECTORAL ENGAGEMENT

The success of this initial workshop series, as well as feedback from participants, indicates the value of policy discussions that incorporate a range of perspectives that can also engage technical communities. There is an opportunity to further support activities that bridge academic, civil service, non-profit, and private sector perspectives. Diversity of perspectives should also extend beyond sectors to include different ethnic and religious backgrounds, personal lived experiences, and career stages. For example, the participants in the Policy Lab series crossed a range of career stages and were able to collaborate effectively, bringing together different and valuable ideas. Many discussions about AI tend to take place in siloed or non-inclusive environments and do not accommodate the broad range of perspectives and subject-matter experts that are necessary to holistically address the challenges and opportunities that AI presents. It is important that all groups and organizations in the AI community work to bridge gaps in engagement and understanding.

NEXT STEPS

In fall 2019, we will be open sourcing our facilitation materials for public access and use. It is our hope that by making these resources accessible to a wider audience, policy innovators will be empowered and equipped to explore these conversations about AI policy within their own communities, building capacity within their networks for thinking about future AI technologies, their impacts, and the ways in which policymakers can respond to them.

Our team is currently exploring options for expanding the AI Futures Policy Lab series both within Canada and internationally, as well as developing a "deep dive" workshop model that will focus on specific policy areas, such as health care, national security, or law.

We are looking for organizations to partner with us on future projects. If you are interested in our work and would like to get involved, please get in touch.

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