
Governments and Companies at the AI Crossroads



About the StrategyCorp Institute

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Executive Summary

Artificial intelligence (AI) is top of mind for public and private sector decision-makers as they ask themselves a crucial question: what does AI mean for my organization and the people I serve (be it clients or citizens)?

As governments and companies around the world face the inevitable AI crossroads, the StrategyCorp Institute explored the topic of artificial intelligence during the latest season of its podcast. This three-part series welcomed experts from different sectors to examine AI through an international, national and local lens.

In the [first episode](#), Daniel Castro, Director of the Center for Data Innovation, highlighted that countries are taking different approaches to regulating AI. Many international institutions are working on AI but no common global standards to govern AI have been established. As a result, companies must navigate a fragmented regulatory landscape in which requirements and stringency are uneven across jurisdictions.

The [second episode](#) looked at AI in the Canadian context with Christelle Tessono and Viet Vu from The Dais at Toronto Metropolitan University. Canada's approach to AI is characterized by a mix of support and regulation. Canada was the first country to launch a national AI strategy in 2017. Over the years, the federal government made several investments to maintain and grow the AI ecosystem.

As the technology evolved and the European Union introduced its AI Act in 2021, discussions around the regulation of the technology emerged in Canada. In June 2022, a bill to regulate AI was introduced in the House of Commons. The proposed legislation faced several criticisms from civil society and industry. Some of its content was rapidly outpaced by technological progress like generative AI (GenAI). This led the government to propose amendments to the bill.

The podcast series also looked at how governments and companies are leveraging the potential of artificial intelligence in their operations. The [third episode](#) focused on AI in the municipal context with the Chief Information Officer of Burlington, Chad MacDonald. Similar to the private sector, AI adoption among local governments varies widely depending on size, risk appetite and resources.

Organizations must navigate both hype and concerns around the impacts of AI. The technology will disrupt the labour market by automating certain tasks. This will carry significant implications for white-collar workers and creative industries. It will change the nature of work for some positions, but it is unclear whether it will lead to job losses and/or the emergence of new roles. Training and upskilling will be an important piece of the puzzle.

Studies indicate that AI could increase the productivity of workers and firms. It is however too early to tell whether this will be visible at the macroeconomic level. The Solow Paradox serves as a warning to individuals eager to quickly see a productivity boost in the data.

As companies deploy AI-based solutions, they must be cognizant of potential business liabilities. They may be held liable for what their AI tools do. As large language models need a lot of training data, there are ongoing debates around what AI means for existing intellectually property regimes.

The AI crossroads is characterized by uncertainty around the trajectory of AI and its deployment in the economy. The speed at which AI is evolving challenges policymakers, business leaders, workers and civil society. One thing is certain: AI is here to stay and its rapid progress is forcing everyone to adapt.

Introduction

With artificial intelligence top of mind for governments, C-suite executives, workers and civil society, the StrategyCorp Institute released a podcast series on artificial intelligence (AI) during the 2024 winter/spring season of [Intended Consequences](#). This three-part series looked at AI through an international, national and local lens.

The [first episode](#) set the stage by looking at how jurisdictions in Asia, Europe and North America are working to regulate AI. The Institute welcomed the Director of the Center for Data Innovation Daniel Castro to provide this global perspective.

Christelle Tessono and Viet Vu from The Dais at Toronto Metropolitan University joined the [second episode](#) to discuss Canada's approach to artificial intelligence. Similar to other countries, Canada is attempting to introduce a regulatory framework while also supporting AI innovation and adoption.

Companies are not the only ones looking to leverage the potential of artificial intelligence, which is why the [final episode](#) of the series focused on AI in the municipal context. The Chief Information Officer of Burlington, Chad MacDonald, shared how his city is integrating AI-based solutions and what municipalities must keep top of mind in terms of opportunities and risks.

By exploring AI in different contexts, this podcast series generated thought-provoking conversations. A common theme emerged across all three episodes: governments and companies in Canada and abroad are at a crossroads when it comes to artificial intelligence. They all face the same challenge around determining what the rise of AI means for their operations, competitiveness, security and the people they serve (be it citizens or customers).

This paper builds on the AI podcast series by weaving in some key takeaways and insight from guests. The report examines this AI crossroads and what it means from a regulatory and innovation perspective. It also discusses the state of AI adoption in Canada and the impacts of the technology on businesses and the economy.



Section 1

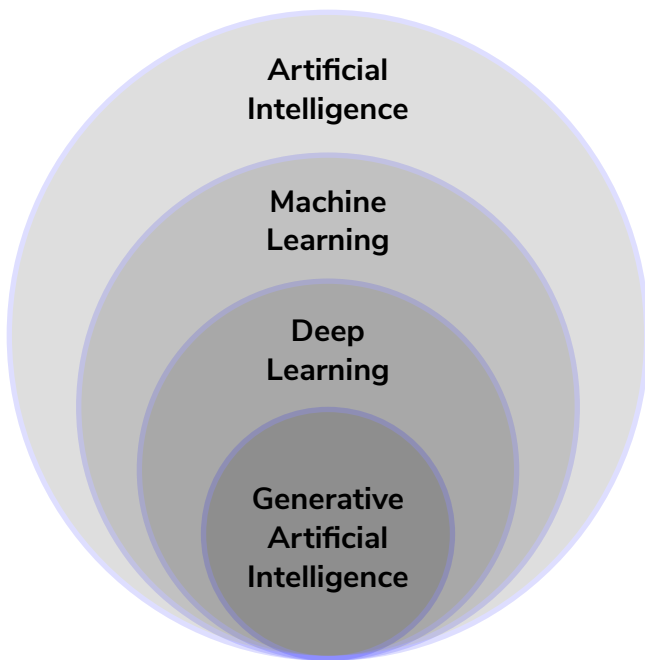
Defining AI

AI as a Catch-All Term

On November 30, 2022, OpenAI launched its generative AI (GenAI) tool known as ChatGPT. The impressive capabilities of this large language model immediately generated fascination and fear. For many people, artificial intelligence was at best a concept they did not think about often before the advent of ChatGPT.

Artificial intelligence did not start with generative AI. Developments in AI have built on top of one another to get to where we are today. GenAI is based on deep learning¹ (DL), which is itself a subset of machine learning² (ML).

Figure 1.
Relationship Between AI, ML, DL and GenAI



With the hype generated by ChatGPT, artificial intelligence has become a catch-all term that is sometimes misunderstood or misused. Defining AI can get very technical, but the OECD definition is the most-commonly used around the world:

An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment (OECD, 2024, p. 4).

By design, the OECD definition does not speak to the technical aspects of AI (e.g., ML, DL and GenAI) beyond the term “machine-based system”. The word “content” was recently added to the definition to account for the output of generative AI models like text and images.

With the technology progressing rapidly, adequately defining AI can be difficult. Conceptualizing how AI systems are used can also be complex and subject to debates. For governments looking to regulate artificial intelligence, these crucial issues are top of mind.

¹ IBM (2024a) defines deep learning as “a subset of machine learning that uses multi-layered neural networks, called deep neural networks, to simulate the complex decision-making power of the human brain”.

² IBM (2024b) also provides a helpful definition of machine learning: “a branch of artificial intelligence (AI) and computer science that focuses on the using data and algorithms to enable AI to imitate the way that humans learn, gradually improving its accuracy”.



Section 2

AI Regulation Around the World

Countries Are Working to Regulate AI, but Fragmentation Is Emerging

While several international institutions are working on AI, there is no formal global governance of artificial intelligence. As a result, jurisdictions around the world are developing their own AI regulatory regimes.

EUROPEAN UNION

The European Union (EU) was the first jurisdiction to introduce a dedicated legislation on artificial intelligence in April 2021. Simply titled the *AI Act*, this risk-based framework divides AI systems into four categories:

- Unacceptable risk (e.g., cognitive behavioural manipulation, social scoring and biometric identification)
- High risk (e.g., toys, cars as well as AI systems used in critical infrastructure, education, employment, law enforcement and justice)
- Limited risk (e.g., chatbots and deepfakes)
- Minimal or no risk (all other AI systems including AI-enabled video games and spam filters) (European Commission, 2024; European Parliament, 2023).

Under this framework, AI systems that pose an unacceptable risk will be banned. High-risk systems will be allowed but several requirements will apply, including passing a conformity assessment before they are made available. Transparency obligations will apply to limited risk systems. This includes disclosing the use of AI and if specific content is AI-generated. There will be no requirements applicable to minimal-risk AI (European Commission, 2024; European Parliament, 2023).

France, Germany and Italy initially opposed the *AI Act* over concerns about its impacts on local AI companies and startups, but an agreement was eventually reached. This cleared the way for its approval by the European Parliament in March 2024 and the Council of the European Union in May 2024.

At the time of writing, the *AI Act* is expected to come into force over the summer. New regulations still start applying progressively depending on the requirement over a two-year period (Council of the European Union, 2024; European Parliament, 2024). The implementation and enforcement of the *AI Act* will be supported by a newly established “EU AI Office”.

Similar to the General Data Protection Regulation (GDPR) on data protection, the *EU AI Act* carries implications for foreign organizations. This could give the European Union a first-mover advantage in terms of its influence on other countries’ AI frameworks and regulations.

UNITED STATES

Across the Atlantic Ocean, the United States is taking a different approach to AI. In October 2023, President Joe Biden signed the *Executive Order on Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence*. In the absence of significant legislative progress on AI in Congress, this Executive Order (EO) is the main AI regulatory framework in place in the United States at the time of writing.

Standards are an important part of the EO. The National Institute of Standards and Technology (NIST) will play a central role in leading the

³ The Computer Security Resource Center (2024) defines “red team” as “a group of people authorized and organized to emulate a potential adversary’s attack or exploitation capabilities against an enterprise’s security posture. The Red Team’s objective is to improve enterprise cybersecurity by demonstrating the impacts of successful attacks”.

development of standards, tools and tests, including as it pertains to red-team testing³ (The White House, 2023). However, as Daniel Castro pointed out, these standards are currently mostly voluntary for industry.

Foundation models deemed to present a serious risk to national security, national economic security or national public health and safety will face more stringent requirements. Under the *Defense Production Act*, foundational model developers will have to notify the federal government when training the models and share their safety test results (The White House, 2023).

The Executive Order also covers other dimensions related to AI such as how government uses the technology, the protection of equity and civil rights and American leadership in AI innovation. The latter is crucial to understand: while the United States is looking to regulate AI, it also seeks to stimulate AI innovation as it competes on the global stage with China.

UNITED KINGDOM

Beyond the European Union and the United States, other countries are developing their own ways to regulate artificial intelligence. The United Kingdom is openly taking a “pro-innovation” approach to AI. It sets out five principles existing regulators should apply within their respective sectors:

- Safety, security and robustness
- Appropriate transparency and explainability
- Fairness
- Accountability and governance
- Contestability and redress (Department for Science, Innovation & Technology, 2024, p. 4).

The United Kingdom’s approach focuses on building the AI capacity of regulators instead of setting up a separate governance and regulatory architecture. Given how fast the technology is evolving, this could potentially enable regulators to be nimbler and adapt to AI developments faster, in part because they know their respective fields best.

ASIA

Different approaches to AI can be found in Asia. China is aggressively working to be a global leader in artificial intelligence. Data shows that Chinese organizations applied for nearly 30,000 AI-related patents in 2022. China alone submitted 40 per cent of all patent applications related to AI, well ahead of any other country including the United States (Bloomberg News, 2023). Paradoxically, advanced AI systems like GenAI can pose a destabilizing threat to the Chinese regime given their ability to create content. To that effect, the government banned access to ChatGPT.

At the opposite end of the spectrum, Japan distinguishes itself by fully embracing generative AI. The country allows large language models to be trained on copyrighted data. The tension between training GenAI with potentially copyrighted data and protecting intellectual property is hotly debated in several jurisdictions.

As countries take different approaches to AI, regulatory fragmentation is emerging with requirements and stringency varying across jurisdictions. The introduction of regulatory regimes helps provide certainty to organizations developing and/or adopting AI. However, a multitude of fragmented sets of rules also increases the compliance burden of companies that operate in several countries.

While large multinational players will have the resources to navigate this complex regulatory landscape, smaller companies will face greater challenges. As a result, they could either restrict where they offer their products (thus limiting their growth) or find themselves inadvertently offside of the rules in place in a jurisdiction. Global fragmentation could also lead to the relocation of AI development and deployment to countries with less burdensome regulatory regimes.

In this environment where complete harmonization is unlikely, Daniel Castro noted the importance of interoperability between regulatory regimes. This could for instance mean that countries agree on what an AI risk assessment or red teaming requirements should look like.



Section 3

Canada's Approach to AI

Canada's Approach to AI Is a Mix of Support and Regulation

Canada is traditionally perceived as a leader in artificial intelligence. It is home to world-renowned AI scientists. Canada had the third highest number of AI researchers and investments into new AI firms in 2023 (Turi, 2024). The Canadian AI ecosystem is anchored by three national AI Institutes: the Vector Institute, the Montreal Institute for Learning Algorithms (Mila) and the Alberta Machine Intelligence Institute (Amii).

In 2017, Canada became the first country in the world to establish a national AI strategy. In 2021-2022, the Government of Canada earmarked nearly \$444 million to launch the second phase of the *Pan-Canadian Artificial Intelligence Strategy*. In its current form, the strategy has three pillars: commercialization, standards, talent and research (Government of Canada, 2022).

Collaboration is at the heart of this strategy with the three AI Institutes, the superclusters, the Standards Council of Canada, the Digital Research Alliance of Canada and the Canadian Institute for Advanced Research (CIFAR) all playing a role in supporting the pillars (Government of Canada, 2022).

The 2024 federal budget proposed to invest \$2.4 billion to bolster Canada's leadership in AI and address some challenges faced by researchers and industry. Of this amount, \$2 billion is intended to increase computing capabilities and technological infrastructure available to Canadian researchers, start-ups, and scale-ups (Government of Canada, 2024a, p. 168). The issue of bottleneck to access computing capacity in Canada was noted by Viet Vu in the StrategyCorp Institute podcast.

The budget also included funding to support AI commercialization and adoption by small- and medium-sized enterprises (SMEs). Amid rising concerns around the impacts of AI on jobs, some

money was earmarked to support workforce adaptation and training. The budget also proposes to create an AI Safety Institute to ensure the safe and responsible development and use of the technology (Government of Canada, 2024a, pp. 168-169).

THE ARTIFICIAL INTELLIGENCE AND DATA ACT

While the Government of Canada has actively sought to maintain and strengthen the country's leadership in artificial intelligence over the years, it acknowledges that the technology needs to be regulated. In June 2022, the government introduced bill C-27, which contains the *Artificial Intelligence and Data Act* (AIDA). Attached to the proposed legislation to update Canada's data privacy regime, AIDA took several stakeholders by surprise who decried a lack of consultation and overall details.

If passed, AIDA would regulate certain AI systems by imposing requirements related to their design, development and use. The focus is on "high-impact artificial intelligence systems". What constitutes a high-impact artificial AI system was initially supposed to be defined in regulations later, which created confusion and concerns. The government clarified its thinking in the fall of 2023 by indicating that an AI system would be considered high impact if it is used in one of the following classes:

- Employment
- Health care and emergency services
- Law enforcement
- Decision of a court or administrative body
- Determination whether to provide service to an individual
- Processing of biometric information
- Moderation of content that is found on an online communication platform (Champagne, 2023).

AIDA would “prohibit certain conduct in relation to artificial intelligence systems that may result in serious harm to individuals or harm to their interests” (Bill C-27, 2024). Christelle Tessono noted this relatively narrow scope excludes harms toward population groups or communities and does not take into consideration collective harms an AI system could produce. She gave the example of predictive policing tools that would lead to systemic forms of discrimination and racial profiling.

In terms of the governance of AIDA, the bill provides for the establishment of an Artificial Intelligence and Data Commissioner. This person would be responsible for administering and enforcing the legislation (AIDA includes monetary and even imprisonment penalties in case of violations). Christelle Tessono highlighted that this Commissioner would report to the Minister of Industry, whose department would be responsible for both stimulating AI innovation and regulating the technology. The dual mandate of Innovation, Science and Economic Development Canada (ISED) on AI could put the Artificial Intelligence and Data Commissioner in a difficult situation.

Moreover, Christelle Tessono noted that government institutions will, for the most part, fall outside the scope of AIDA. This comes at a time where several federal departments and agencies are testing and integrating AI-powered solutions. According to data reported by the CBC, the government “has used artificial intelligence in nearly 300 projects and initiatives, new research has found — including to help predict the outcome of tax cases, sort temporary visa applications and promote diversity in hiring” (Karadeglija, 2024). Instead of a formally legislated framework, the Government of Canada’s use of AI is informed by a patchwork of “guiding principles” and documents such as the *Directive on Automated Decision-Making* and the *Guide on the Use of Generative AI* (Government of Canada, 2024b).

The pace of technological progress in AI has been much faster than the progression of bill C-27 in Parliament. For instance, AIDA was introduced before the launch of ChatGPT. This forced the federal government to adapt. It released a *Voluntary Code of Conduct on the Responsible Development and Management of Advanced Generative AI Systems* in September 2023 to attempt to address and mitigate the risks of the technology. At the time of writing, 30 organizations had signed on to this non-mandatory code.

In the fall of 2023, the ISED Minister wrote a letter to the House of Commons Standing Committee on Industry and Technology to suggest amendments to bill C-27. In addition to clarifying what a high-impact system is, the letter targeted obligations related to the AI value chain (for developers and system managers for instance) and distinct requirements for general purpose systems like GenAI. The Minister also provided clarifications on the role of the Artificial Intelligence and Data Commissioner (Champagne, 2023).

The influence of the EU AI Act was reflected in the Minister’s letter. He sought amendments to align some definitions with the EU and the OECD. Moreover, the high-impact classes the federal government eventually identified are quite similar to the categories of high-risk systems identified in the EU AI Act. Lastly, the Minister suggested changes that would help Canadians identify content created by artificial intelligence. This is in line with the requirements for limited risk AI systems in the European Union. Transparency obligations could in theory help prevent AI from being used for malicious purposes such as cyber attacks and mis/disinformation. In practice, however, enforcement will prove difficult as bad actors will look to circumvent the laws in place.



Section 4

AI Adoption in Canada

AI Adoption Varies Across Canada

ChatGPT brought artificial intelligence to the mainstream. Suddenly, one did not need to be a software developer to use AI. As a result, organizations and institutions around the world started asking themselves what the risks and opportunities could be. Educational institutions like universities were among the first to deal with these questions as students could simply use ChatGPT to write papers and take-home exams.

The adoption of AI tools by organizations, workers and the public is evolving rapidly. While it holds promises, the risks and potential harm of AI is one of the main drivers leading countries to regulate the technology.

On the business side, Viet Vu pointed out that AI adoption in Canada is higher among large companies compared to small firms that often do not see any use for AI. The Survey of Innovation and Business Strategy (SIBS) conducted by Statistics Canada found that 6.3 per cent of all surveyed businesses used AI in 2022, only slightly up from 5.9 per cent in 2019. The proportion of companies with 20 to 99 employees that was using AI in 2022 was lower at 5.3 per cent. It was notably higher for businesses with 250 employees or more (16.5 per cent) (Statistics Canada, 2024).

Interestingly, more recent surveys conducted by industry report higher AI adoption rates than SIBS across all firm sizes. According to research commissioned by IBM (2024c), 37 per cent of large organizations in Canada (more than 1,000 employees) had deployed AI as of November 2023. This was up from 34 per cent in April of the same year. Another 48 per cent was exploring the potential deployment of AI in their business operations. AI adoption by large Canadian organizations was however below the global level (42 per cent) (IBM, 2024c).

Looking at Canadian SMEs (one to 250 employees), a study by Microsoft found that 78 per cent were looking to adopt artificial intelligence as of January 2024 (Microsoft New Centre Canada, 2024).

GENERATIVE AI ADOPTION

The rise of GenAI has the potential to democratize access to AI. Tools like ChatGPT are relatively affordable and easy to use. This could incentivize smaller companies to explore opportunities to integrate AI.

The extent to which Canadian organizations use GenAI varies extensively across studies. Research from the Canadian Chamber of Commerce Business Data Lab found that nine per cent of firms of all sizes in Canada used GenAI in 2024. Another five per cent planned to use it soon. The significant majority of businesses (73 per cent) had not considered integrating GenAI into their operations (Business Data Lab, 2024).

Focusing on medium and large Canadian organizations across economic sectors, recent IDC Canada survey data paints a different picture. IDC found that 29.2 per cent of respondents were already investing significantly in GenAI as of April 2024. These organizations had spending plans in place for training and/or acquiring Gen AI solutions (IDC Canada, 2024).

The results also highlighted that another 48.2 per cent of respondents were either starting to test models or identifying potential use cases. Only 21.9 per cent of medium and large surveyed enterprises indicated that they were not doing anything related to GenAI as of April 2024 (IDC Canada, 2024).

Looking at its own transaction data, Float, a fintech business finance platform, found that 32.4 per cent of Canadian SMEs that use its services had

purchased a ChatGPT subscription in the first quarter of 2024 (Q1, 2024). This was up from 14.2 in the first quarter of last year. When excluding companies in the tech sector, 26.4 per cent of SMEs had spent money to use ChatGPT in Q1, 2024 (Dale & Cheung, 2024). This data does not obviously capture any free use of ChatGPT 3.5 by a firm or its employees.

AI ADOPTION IN MUNICIPALITIES

Municipalities are also trying to determine how to leverage artificial intelligence. From building permit approvals to smart infrastructures to providing information to residents, there are multiple potential use cases in the municipal context.

Chad MacDonald noted that it is crucial for municipal officials to determine their risk appetite and priorities to decide where they want to experiment (i.e., back office versus front office). Integrating AI also requires involving City Council members early to raise awareness and get their buy-in. A parallel with the private sector can be drawn here: given the potentially transformative and disruptive nature of the technology, involving C-suite and board members in AI discussions is essential.

While the overall adoption of AI in Canadian municipalities is relatively low, some are starting to experiment with pilot projects. Cities like Burlington and Edmonton are emerging as early adopters in several areas. For instance, both are using AI in the housing space. Chad MacDonald noted that Burlington has an AI tool to assess proposed building plans against the City's by-laws. It can provide immediate feedback to applicants before they formally submit plans. This AI tool gives applicants the opportunity to make changes upfront and ultimately save time.

Edmonton relies on an AI software “to predict whether builders will pass low-risk inspection types while enabling the City to automatically pass inspections for builders with a good track record. This reduces red tape by the City, frees personnel to inspect higher-risk projects and shortens timelines for builders” (Edmonton, 2024).

Developing a comprehensive list of AI uses in the municipal sector in Canada is beyond the scope of this report, but the examples of Burlington and Edmonton highlight the concrete potential of the technology. As some municipalities pioneer AI solutions, others across the country will benefit from their experience. Looking to the future, informal alliances between municipalities may emerge to enable the sharing of best practices and lessons learned related to AI. They could even potentially pool their resources together to explore AI use cases in the municipal context.

The StrategyCorp Institute has been examining AI's municipal implications since before the advent of GenAI. As AI adoption slowly rises in Canadian municipalities, a question a StrategyCorp Institute report asked in 2021 remains highly relevant: “whether AI will transform municipalities into more integrated, community-responsive, effective and efficient organizations” (Fenn, 2021, p. 5). The report noted that the technology presents an opportunity to break silos and integrate policies and service delivery across the structure of a municipality (Fenn, 2021).



Section 5

How AI Impacts Businesses and the Economy

Between Hype and Concerns: Uncertainty Around the Economic and Business Impacts of AI

Predictions on the path and the impacts of artificial technology range from AI solving Canada's declining productivity to posing an existential risk. When it comes to assessing the potential economic and business impacts of AI, there is currently significant uncertainty.

EMPLOYMENT

Generative AI is fueling concerns around the future of work. Unlike previous waves of automation that mostly disrupted blue-collar workers, the GenAI revolution carries significant implications for white-collar occupations and creative industries.

The strikes in Hollywood were highly visible examples of the fear around the technology reducing the need for certain types of workers. Closer to home, public sector unions also expressed concerns. The president of the Public Service Alliance of Canada (PSAC), Chris Aylward, argued that "any automation or use of artificial intelligence should enhance workers' jobs and working conditions and not replace them" (Thompson, 2023). Aylward indicated that the federal government should engage with unions and workers before using AI-based solutions.

In the municipal context, Chad MacDonald mentioned that some city civil servants were concerned AI would replace them. It is crucial for leaders looking to integrate AI to explain that new tools are meant to assist staff and enable them to focus on other tasks.

Predictions around technology causing job losses can be misleading. They assume adoption will be comprehensive and that every dimension of some positions can be automated. This disregards important nuances. In many ways, it is more accurate at this stage to talk about the impacts of AI on the specific tasks of workers.

There is no doubt artificial intelligence will reduce the need for certain tasks like translating written or audio material, notetaking during meetings and summarizing large documents (just to give three examples). It will alter the type of skills required in some jobs as individuals learn how to use AI-based tools. As machines perform more tasks, soft skills like communication, adaptability and attention to detail will be highly valuable. Attention to detail will be particularly crucial as many white-collar jobs will require an ability to proofread and edit content generated by AI.

Just like AI will create the need for new skills like "prompting", the technology may also lead to the emergence of new jobs and even industries. While it is still early stages, we are already seeing new job postings related to GenAI appear such as for "prompt engineer" roles.

Ultimately, as AI frees up workers from certain tasks, the great unknown remains whether it will enable them to focus on more productive tasks. Part of this answer will depend on whether employers give workers the opportunity to do so. In other words, whether employers see AI as an investment to boost workers' capacity or as an investment to simply cut costs. It will also depend on whether the right resources are in place in organizations and, more broadly, in society to support workforce adaptation, re-skilling and training.

In addition to helping mitigate the impacts of AI on the digital divide, training and re-skilling will play a crucial role in supporting the adoption of the technology. As with other digital technologies that predated AI, the data shows that challenges associated with talent and skills are currently a major barrier faced by organization looking to integrate AI (Business Data Lab, 2024; IBM, 2024c; Microsoft New Centre Canada, 2024).

PRODUCTIVITY

The potential for artificial intelligence to stimulate productivity is a hot topic of conversation in policy and economic circles, especially in a country like Canada which faces major productivity challenges.

At the worker level, recent research appears to find that AI has a positive impact on individual productivity. The latest AI Index Report produced by the Stanford Institute for Human-Centered Artificial Intelligence noted that “in 2023, several studies assessed AI’s impact on labor, suggesting that AI enables workers to complete tasks more quickly and to improve the quality of their output” (Masjel, Fattorini, Perrault, et al., 2024, p. 217). Interestingly, the Index nuanced this finding by highlighting that “other studies caution that using AI without proper oversight can lead to diminished performance” (Masjel, Fattorini, Perrault, et al., 2024, p. 217).

Focusing on GenAI, a 2023 McKinsey paper argued that the technology could fuel labour productivity growth in the range of 0.1 to 0.6 per cent annually through 2040 (McKinsey & Company, 2023).

In theory, at the firm level, more productive workers can help increase business output. Anecdotal evidence and survey data point in this direction. The Microsoft study referenced earlier noted that 76 per cent of SME that already use AI believe it has a positive impact on the firm’s productivity. The SMEs surveyed “report an average increase of 31 per cent in productivity” (Microsoft New Centre Canada, 2024).

We usually calculate productivity as total economic output divided by total input (labour and capital). This ties back to the impacts of AI on the labour market. Maintaining or growing overall economic activity with less input could mathematically lead to higher productivity. However, if AI stimulates the economy to a point where it requires more workers and/or capital, the effects on productivity might not be as clear.

Economist Robert Solow famously said that computers were everywhere except in productivity statistics. This came to be known as the Solow Paradox. This provides a cautionary tale for governments and people who are eager to see the impacts of AI on productivity in macroeconomic data.

In the grand scheme of things, it bears keeping in mind that we are still at the early stages of AI adoption. In the current experimentation phase, Viet Vu pointed out that organizations will explore a wide array of AI uses before they decide where it ultimately makes sense to integrate the technology.

BUSINESS LIABILITY

As companies consider AI, they must account for the liability risks the technology poses in some cases. Due diligence and the establishment of protocols and guardrails must go hand in hand with AI adoption.

If not trained and programmed properly, AI-powered solutions that directly impact customers and the public can present serious liabilities. With GenAI increasingly powering chatbots, organizations must ensure these online tools provide the right information. If not, there can be real consequences. In a case that attracted the attention of international media, the British Columbia Civil Resolution Tribunal found Air Canada liable for the inaccurate information its online chatbot gave a customer. The airline was forced to pay financial damages to the customer after the chatbot misled him regarding the availability of a discounted fare (Yagoda, 2024).

The use of AI can also lead to discrimination against equity-deserving groups. In addition to the predictive policing tools Christelle Tessono identified, any process that relies on AI to make decisions regarding individuals poses a severe risk if it is not trained on quality data that is inclusive and representative. Regulators in Europe and Canada are attempting to prevent this type of outcome by categorizing many AI systems that make decisions about people as “high risk” (in the areas of employment, health care, law enforcement and the judicial system for instance).

The current uncertainty around the interaction between AI and intellectual property (IP) laws is another dimension organizations must be aware of. Large language models get trained on a variety of data sources, including sometimes copyrighted content. In many cases, AI developers do not pay to use every single piece of copyrighted material. This led to several legal battles between AI companies and content creators. For instance, *The New York Times* launched last year a lawsuit against OpenAI and Microsoft alleging copyright infringement and unauthorized use of its published content (Grynbaum & Mac, 2023).

Rana Foroohar, a global business columnist and associate editor at the *Financial Times*, aptly predicts that “as AI works its way into proprietary corporate data sets, opportunities for litigation over copyright will increase” (Foroohar, 2024). This will certainly be the case given the lack of regulatory clarity in most jurisdictions.

Another important question persists around the IP status of material generated by an artificial intelligence. This carries significant implications for organizations using GenAI to produce content. In the United States, a judge ruled in August 2023 that “artwork created by artificial intelligence isn’t eligible for copyright protection because it lacks human authorship” (Setty & Poritz, 2023).

The plaintiff lost a similar case in the United Kingdom in December 2023. The court determined that an AI cannot be granted a patent for an invention because an inventor must be a natural person under the current patent regime (Reuters, 2023). There has not been a similar case in Canada yet, but case law points towards a similar definition of what/who is an inventor (Di Piano, 2024).

Lastly, as countries continue to work to regulate artificial intelligence, organizations must start assessing which requirements would apply to them and where. Complying with different regimes and rules will likely prove challenging and burdensome for many companies. While some countries like Canada might try to align their AI regimes with the European Union to an extent, others like the United States and Asian nations are on course to adopt different rules.



Conclusion

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Given the rapid innovation in artificial intelligence and the watershed moment of ChatGPT, governments and companies find themselves at the AI crossroads. AI adoption is rising. Large firms currently have the edge, but Canadian SMEs and municipalities are starting to integrate the technology.

Against this backdrop, countries are working to regulate the technology, with the European Union introducing the first major AI legislation back in 2021. Since then, other jurisdictions have developed divergent regulatory approaches to AI based on their own national realities.

Canada is attempting to strike a balance between regulation and innovation. Over the years, the federal government has made large investments to support the AI industry. To address the risks of high-impact AI systems, the government introduced the *Artificial Intelligence and Data Act*. Similar to the EU AI Act, AIDA was outpaced by technological progress like GenAI. This forced the government to propose a voluntary code of conduct as well as amendments to AIDA.

There is significant uncertainty around the impacts of AI on businesses and the economy more broadly. The technology has the potential to disrupt the labour market and stimulate productivity, but it is too early for the impacts to be visible in the macroeconomic data. While growing, the adoption of AI remains at early stages in the grand scheme of things.

The technology brings significant liability risks organizations must account for, including the risks of discrimination and biases against equity-deserving groups. Significant questions also remain around the treatment of AI under our existing intellectual property laws and whether IP regimes will have to adapt to account for this new reality.

Much is still unknown in terms of the trajectory of AI and its deployment in the economy. It can be seen as either a threat or an opportunity depending on one's vantage point. However, one thing is for certain: AI is here to stay and will impact almost every sector, from education to critical infrastructure to health care. In this regard, all organizations must figure out what the technology means for them and the people they serve.

A large, thick blue circular graphic that is partially cut off on the right side, framing the central text.

Bibliography

Bibliography

Bill C-27: An Act to enact the Consumer Privacy Protection Act, the Personal Information and Data Protection Tribunal Act and the Artificial Intelligence and Data Act and to make consequential and related amendments to other Acts. (2022). 1st Reading June 16, 2022. 44th Parliament, 1st session. Retrieved from the Parliament of Canada website: <https://www.parl.ca/DocumentViewer/en/44-1/bill/C-27/first-reading>

Bloomberg News. (2023, October 24). China Widens Lead Over US in AI Patents After Beijing Tech Drive. BNN Bloomberg. <https://www.bnnbloomberg.ca/china-widens-lead-over-us-in-ai-patents-after-beijing-tech-drive-1.1988619>

Business Data Lab. (2024, May). Prompting Productivity: Generation AI Adoption by Canadian Businesses. Canadian Chamber of Commerce. https://bdl-lde.ca/wp-content/uploads/2024/05/Prompting_Productivity_Report_May_2024.pdf

Champagne, F.-P. (2023, October 3). Correspondence from the Honourable François-Philippe Champagne, Minister of Innovation, Science and Industry [Letter]. Standing Committee on Industry and Technology. <https://www.ourcommons.ca/content/Committee/441/INDU/WebDoc/WD12600809/12600809/MinisterOfInnovationScienceAndIndustry-2023-10-03-e.pdf>

Computer Security Resource Center. (2024). Red Team. Retrieved April 29 from https://csrc.nist.gov/glossary/term/red_team#

Council of the European Union. (2024, May 21). Artificial intelligence (AI) act: Council gives final green light to the first worldwide rules on AI [Press release]. <https://www.consilium.europa.eu/en/press/press-releases/2024/05/21/artificial-intelligence-ai-act-council-gives-final-green-light-to-the-first-worldwide-rules-on-ai/>

Dale, A., & Cheung, M. (2024). Canadian Business Spending Trends Q1 2024. Float. Retrieved April 22 from <https://floatcard.com/canadian-business-spending-trends/q1-2024/>

Department for Science, Innovation & Technology. (February 2024). Implementing the UK's AI Regulator Principles: Initial Guidance for Regulators. https://assets.publishing.service.gov.uk/media/65c0b6bd63a23d0013c821a0/implementing_the_uk_ai_regulatory_principles_guidance_for_regulators.pdf

Di Piano, N. (2024, March 15). Ghost in the machine: AI and patent protection. Smart & Biggar. <https://www.smartbiggar.ca/insights/publication/ghost-in-the-machine--ai-and-patent-protection>

Edmonton. (2024). Edmonton: Smart City. Retrieved April 23 from https://www.edmonton.ca/city-government/initiatives_innovation/smart-cities

European Commission. (2024, March 6). AI Act. <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai>

European Parliament. (2023, December 19). EU AI Act: first regulation on artificial intelligence. <https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence>

European Parliament. (2024, March 13). Artificial Intelligence Act: MEPs adopt landmark law [Press release]. <https://www.europarl.europa.eu/news/en/press-room/20240308IPR19015/artificial-intelligence-act-meps-adopt-landmark-law>

Fenn, M. (2021, June). Another victim of COVID-19: The municipal status quo? StrategyCorp Institute of Public Policy and Economy. https://strategycorp.com/wp-content/uploads/2023/04/SCI-Municipal-AI_White-Paper_V6.pdf

Foroohar, R. (2024, March 25). Beware AI Euphoria. *Financial Times*. <https://www.ft.com/content/599a5c5b-dc59-4724-8248-2d4132ffdb7f>

Government of Canada. (2022, July 20). Pan-Canadian Artificial Intelligence Strategy. <https://ised-isde.canada.ca/site/ai-strategy/en>

Government of Canada. (2024a). Budget 2024: Fairness For Every Generation.

Government of Canada. (2024b). Responsible use of artificial intelligence (AI). <https://www.canada.ca/en/government/system/digital-government/digital-government-innovations/responsible-use-ai.html>

Grynbaum, M.M., & Mac, R. (2023, December 27). The Times Sues OpenAI and Microsoft Over A.I. Use of Copyrighted Work. *The New York Times*. <https://www.nytimes.com/2023/12/27/business/media/new-york-times-open-ai-microsoft-lawsuit.html>

IBM. (2024a). What is deep learning? <https://www.ibm.com/topics/deep-learning>

IBM. (2024b). What is machine learning (ML)? <https://www.ibm.com/topics/machine-learning>

IBM. (2024c). IBM Global AI Adoption Index 2023. <https://canada.newsroom.ibm.com/2024-01-10-Canadian-businesses-saw-uptick-in-AI-Adoption-in-2023-vs-global-peers>

IDC Canada (2024, April). IDC Canada IT Advisory Panel.

Karadeglija, A. (2024, April 11). Federal government use of AI in hundreds of initiatives revealed by new research database. *CBC News*. <https://www.cbc.ca/news/politics/federal-government-used-ai-1.7170307>

Labrecque, S. (Executive Producer). (2024, February 21). Artificial Intelligence Regulation Around the World (No. 79) [Audio podcast episode]. In *Intended Consequences*. StrategyCorp Institute. <https://strategycorp.com/podcast/artificial-intelligence-regulation-around-the-world/>

Labrecque, S. (Executive Producer). (2024, March 22). Artificial Intelligence Regulation and Innovation in Canada (No. 81) [Audio podcast episode]. In *Intended Consequences*. StrategyCorp Institute. <https://strategycorp.com/podcast/artificial-intelligence-regulation-and-innovation-in-canada/>

Labrecque, S. (Executive Producer). (2024, April 11). Artificial Intelligence in the Municipal Context (No. 82) [Audio podcast episode]. In *Intended Consequences*. StrategyCorp Institute. <https://strategycorp.com/podcast/artificial-intelligence-in-the-municipal-context/>

Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J. C., Shoham, Y., Wald, R., & Clark, J. (2024). *The AI Index 2024 Annual Report*. Standard University Institute for Human-Centered AI. https://aiindex.stanford.edu/wp-content/uploads/2024/04/HAI_2024_AI-Index-Report.pdf

McKinsey & Company. *The economic potential of generative AI: The next productivity frontier*. <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#introduction>

Microsoft News Centre Canada. (2024, March 25). *New Study Reveals Canada's SMBs are turning AI Curiosity into AI Action* [Press release]. <https://news.microsoft.com/en-ca/2024/03/25/new-study-reveals-canadas-sbms-are-turning-ai-curiosity-into-ai-action/>

OECD. (March 2024). *Explanatory Memorandum on the Updated OECD Definition of an AI System*. OECD Artificial Intelligence Papers, No. 8. <https://www.oecd-ilibrary.org/docserver/623da898-en.pdf?expires=1713470840&id=id&accname=guest&checksum=470332539A4FBA30D0294FBF1A18E189>

Reuters. (2023, December 20). *AI cannot be patent 'inventor', UK Supreme Court rules in landmark case*. Reuters. <https://www.reuters.com/technology/ai-cannot-be-patent-inventor-uk-supreme-court-rules-landmark-case-2023-12-20/>

Setty, R., & Poritz, I. (2023, August 18). *AI-Generated Art Lacks Copyright Protection, D.C. Court Says (1)*. Bloomberg Law. <https://news.bloomberglaw.com/ip-law/ai-generated-art-lacks-copyright-protection-d-c-court-rules>

Statistics Canada. (2024). *Table 27-10-0367-01 Use of advanced or emerging technologies, by industry and enterprise size*. Retrieved April 30 from <https://www150.statcan.gc.ca/t1/tbl1/en/cv!recreate.action?pid=2710036701&selectedNodeIds=4D13&checkedLevels=0D1,1D1,2D1,2D2&refPeriods=20170101,20220101&dimensionLayouts=layout2,layout3,layout3,layout2,layout2&vectorDisplay=false>

The White House. (2023, October 30). *FACT SHEET: President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence*. <https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/30/fact-sheet-president-biden-issues-executive-order-on-safe-secure-and-trustworthy-artificial-intelligence/>

Thompson, E. (2023, September 11). *Federal government issues new rules for public servants using AI*. CBC News. <https://www.cbc.ca/news/politics/generative-ai-chatgpt-government-1.6961323>

Turi, T. (2024, January 11). *Canada: A Global Leader in AI Technology*. Let's talk science. <https://letstalkscience.ca/educational-resources/backgrounders/canada-a-global-leader-in-ai-technology>

Yagoda, M. (2024, February 23). *Airline held liable for its chatbot giving passenger bad advice - what this means for travellers*. BBC. <https://www.bbc.com/travel/article/20240222-air-canada-chatbot-misinformation-what-travellers-should-know>

