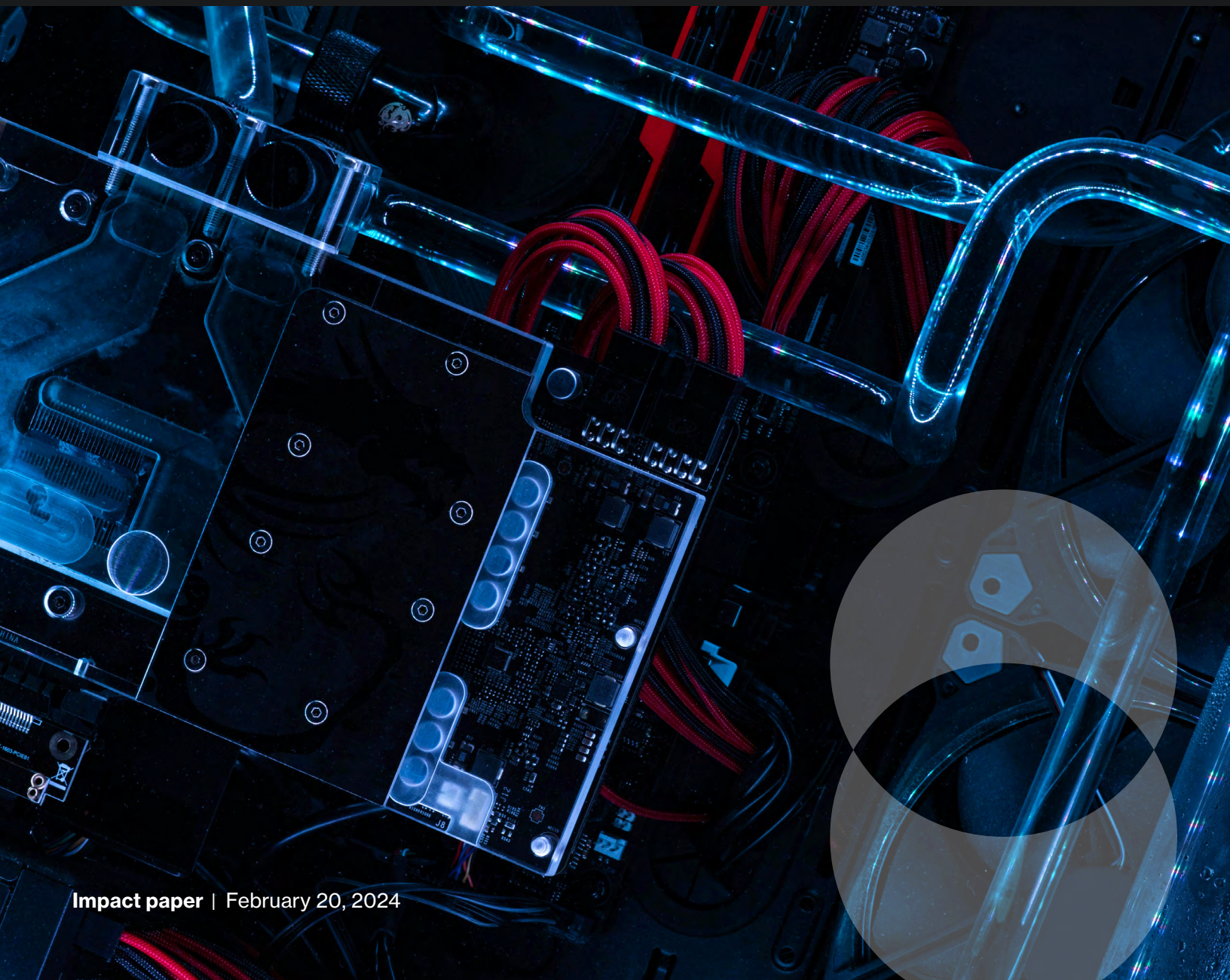**The Conference Board of Canada**

Real Talk

How Generative AI Could Close Canada's Productivity Gap and Reshape the Workplace—Lessons From the Innovation Economy

Impact paper | February 20, 2024

Canadian Centre for the Innovation Economy

Canada has an innovation problem. We have a highly educated workforce and strong research capability, but consistently lack commercial success and innovation-based economic growth. This problem is known as Canada's innovation paradox, and it's the problem the Canadian Centre for the Innovation Economy is here to address.

The Canadian Centre for the Innovation Economy (CCIE) will drive national innovation performance by using data-driven insights to unpack the significant pain points to improve innovation in Canada.

CCIE aims to be the destination of choice for trusted, timely insights and policy recommendations on the innovation economy.

Our research reveals the ways Canada can enhance its productivity and global competitiveness through innovation. We focus on how we can accelerate technology adoption and the scaling up of Canadian businesses. Additionally, we analyze the implications of technological advancements on the future of work.

Our Research Centre is funded by multiple members—united in their mission for progress—who help support and inform the Centre's research agenda. We appreciate the support from our Funding Members. Their passion and understanding of the urgent need for progress helps propel us forward and allows us to conduct research that matters.

We welcome you to join us.

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A uniquely Canadian opportunity

Generative artificial intelligence (AI) is upending work as we know it. Though these tools are still in their infancy, they can already summarize documents, analyze reams of data, forecast trends, and support code development.

Deployed correctly, generative AI will be transformative for parts of the Canadian economy and help reverse our decades-long decline in productivity. But Canadian businesses have been slower than their counterparts in the United States to adopt it.[1] To better understand the potential of this technology, we conducted a survey of 221 start-ups across Canada and 17 in-depth interviews with company founders and experts.

Canada is a leader in the discovery and creation of artificial intelligence. But the country is lagging in adopting the technology at the organizational level. Our findings suggest that governments, businesses, and machine-learning experts will need to work together to overcome barriers to adoption in the workplace and unlock the potential of generative AI for better economic performance.

Canada has the expertise. Now it needs to act. As Martin Bufi, a former senior technical advisor at MaRS, puts it, "It is definitely Canada's race to lose."

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1   KPMG, "Canadian Businesses Experimenting With ChatGPT."

The kick-start Canada needs?

After decades of development, 2023 was the breakout year for generative AI. In a matter of weeks, the technology burst out of the research lab and into the hands of anyone with an Internet connection. Suddenly, ChatGPT was writing emails, summarizing reports, and helping countless undergraduates formulate essays. Other tech companies raced to release their own versions, such as Google's Bard and Anthropic's Claude. Meanwhile, image generators such as DALL·E started turning out logos and other designs in minutes. When Microsoft made its AI assistant, Copilot, available to 150 million users of its enterprise Office suite worldwide, generative AI truly entered the mainstream.[2]

The rapid proliferation of these tools has huge implications for worker productivity. In a study of 453 college-educated professionals, MIT researchers found that those with access to ChatGPT completed a series of exercises—writing cover letters, composing emails, devising business plans—40 per cent faster than those who had no help from AI.[3] Several other studies have come to similar conclusions.

Mark Daley, Western University's chief AI officer—the first position of its kind in Canada—says that generative AI will fundamentally reshape how workers interact with computers. "Probably the most underappreciated, and kind of scary, opportunity is creativity," he says. "Five years ago, no one would have said a computer was creative." But generative AI can analyze data, form ideas based on it, and act as a sounding board for human users, a role once filled by human colleagues. "The best way to think about large language models"—the technology underpinning chatbots like GPT—"is that they are really enthusiastic but naive interns," he says. "Anything you can imagine getting an intern to do, now you have a machine that can do that—short of making coffee." (In fact, Daley says that he plans to staff his new office with "mostly robots and not human personnel.")

The productivity gap

Google estimates that generative AI will save the average Canadian worker 100 hours per year.[4] These gains will be welcome in Canada, which has a long-standing productivity problem. In 1981, Canada's GDP per capita was about C$3,000 above the average of 19 similar OECD countries (adjusted for purchasing power parity).[5] Today, it has fallen to C$5,000 below the average. Presenting Budget 2022, finance minister Chrystia Freeland called this lack of productivity "the Achilles heel of the Canadian economy."[6] This manifests as low business expenditures in R&D, lagging tech adoption, and a lack of high-tech exports.[7]

The reasons for this gap are myriad. According to the OECD,[8] regional differences in regulations hinder interprovincial trade, and government subsidies interfere with the natural life cycles of businesses, keeping unproductive companies alive instead of letting talent and resources flow to more successful firms. Robert Gagné, the director of the Centre for Productivity and Prosperity, argues that lack of competition also contributes to Canada's below-par performance. Many of Canada's largest companies—banks, telecoms, and airlines—enjoy stable oligopolies, so they don't need to invest in research and development or adopt new technologies to maintain market dominance. Small firms can do well without ever expanding beyond their home city. As a result, only a minority of large firms that face competition from abroad are forced to innovate and increase productivity to survive.

If Canada's productivity continues to be outpaced, the country will be C$18,000 behind the OECD average by 2060, resulting in a significantly lower quality of life. "It will become more difficult for government to finance public services: hospitals, schools, roads, and public transit," says Gagné. "We will become, relatively speaking, a poor country."

2   Mehdi, "Announcing Microsoft Copilot."

3   Noy and Zhang, "Experimental Evidence."

4   Public First, "Google's Economic Impact in Canada."

5   Deslauriers and Gagné, "The Low Productivity of Canadian Companies."

6   Department of Finance Canada, *Budget 2022.*

7   Conference Board of Canada, The, "Innovation Report Card 2024."

8   Organisation for Economic Co-operation and Development, *Economic Policy Reforms 2023.*

Hesitation nation

Canada is home to several of the world's most influential machine-learning researchers and outperforms many of its OECD peers when it comes to developing AI. According to Deloitte, Canada's pool of AI talent is growing faster than that of any other G7 country, and we rank fourth globally in the number of generative AI companies per capita.[9]

According to statistics compiled by The Conference Board of Canada, generative AI could add 1.97 per cent to the national GDP (see Chart 1). If the potential for generative AI to create entirely new categories of products and services is taken into consideration, the effect could be even bigger. In this case, the non-profit Forum IA Québec predicts that a significant increase in AI adoption could boost Quebec's GDP by 7 per cent to 15 per cent by 2035.[10]

In other words, if any nation needs to reap the benefits of generative AI, it's Canada. Yet, Canadian businesses have so far taken a timid approach to generative AI. Only 6 per cent of 16,000 businesses polled by Statistics Canada reported that they were planning to adopt it over the following 12 months.[11] By April, when generative AI had entered the mainstream, KPMG found that 37 per cent of Canadian companies were exploring ways to use ChatGPT, but in the United States, that figure was 65 per cent.[12]

For evidence of Canada's sluggishness, consider the clientele of Cohere, a Toronto company that helps businesses implement large language models like GPT. Ronak Shah, the firm's privacy and regulatory affairs counsel, says that only 1 per cent or 2 per cent of Cohere's customers are from Canada.

Chart 1

Productivity impact of generative AI as a share of regional GDP
(potential productivity impact of generative AI for selected metro regions, percentage of 2022 regional GDP)
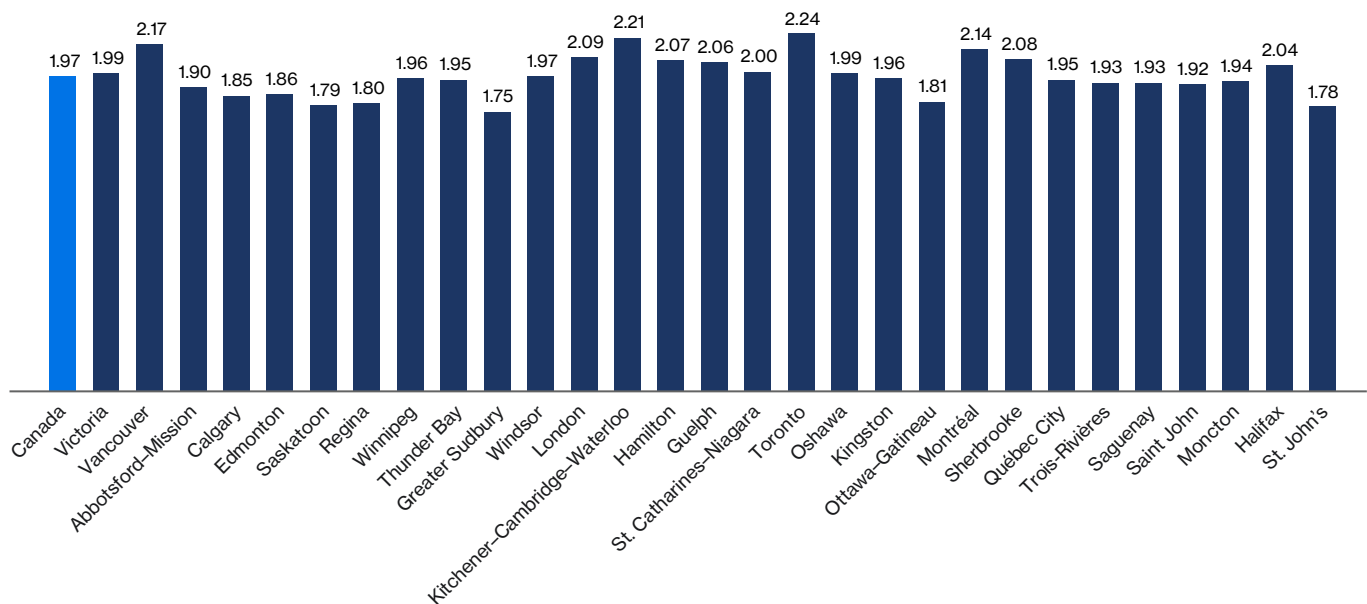
Sources: The Conference Board of Canada; McKinsey & Company.

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9   Deloitte, *Impact and Opportunities.*
10 PricewaterhouseCoopers LLP and Forum IA Québec, *Analyse économique.*
11 Statistics Canada, "Canadian Survey on Business Conditions."
12 KPMG, "Canadian Businesses Experimenting With ChatGPT."

Putting the I in AI:
How three tech pioneers are boosting their personal productivity

The coding collaborator
When Western University's chief AI officer Mark Daley does programming, he uses Github Copilot, an AI-powered tool that can autocomplete code. "If I'm on a flight and I don't have access to it, I feel like a part of my brain is missing. It's a massive productivity enhancement."

The custom-built summarizer
Martin Bufi, a former senior technical advisor at MaRS, custom-built himself a generative AI tool that can summarize 50-page documents and respond to queries about what it just learned. "This saves huge amounts of time, since it allows me to ask questions about the documents and go more in-depth if needed."

The personal office manager
In November 2023, Ronak Shah, Cohere's privacy and regulatory affairs counsel, travelled to the U.K. to attend the AI Safety Summit. [...]

This may indicate that few Canadian companies are adopting generative AI, or even if they are, they seek out services of international AI firms rather than local businesses, hindering the growth of potentially successful GDP-boosting start-ups.

To get a more robust, up-to-date view of how Canadian companies are adopting generative AI, we conducted an online survey. The survey was distributed to approximately 1,300 ventures by 10 accelerators/innovation hubs. A total of 221 start-ups participated in the survey, headquartered in eight provinces and operating in 19 sectors (see Appendix A). We asked a range of questions to determine how extensively these ventures are using generative AI, what they expect its productivity impact to be, and what, if anything, is holding them back from integrating it further. In addition, we conducted 17 interviews with start-up founders, AI specialists, and productivity experts.

We chose to poll start-ups because they tend to adopt new technologies more readily, provide informative case studies, and often indicate where the business community at large is headed. The experiences of these early adopters could inform executives and leaders in other parts of the economy as they consider how to use generative AI in their businesses.

If the responses from the start-up community are any indication, Canada is making inroads—but there is still a long way to go.
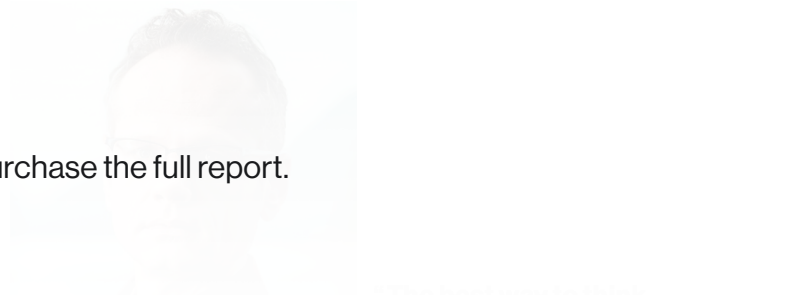
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