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ORIGINAL ARTICLE

The Transformative Potential of Artificial Intelligence for Public Sector Reform

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Abstract

This article examines the experience with and potential application of artificial intelligence (AI) within the Canadian public service. Assessed are the ways in which AI is being applied to internal administration and operations, the bilingual requirements of Canada's federal government, public service delivery, policy analysis and advising, application adjudication, and monitoring and regulatory compliance. The response to date from the federal government on how to guide the use of AI in the public service is assessed, and options and prospects for the future are offered in conclusion.

Sommaire

Dans cet article, nous étudions les essais et l'application potentielle de l'intelligence artificielle (IA) au sein de la fonction publique canadienne. Nous évaluons les façons dont l'IA est appliquée aux opérations et à l'administration internes, aux exigences en matière de bilinguisme du gouvernement fédéral du Canada, à la prestation des services publics, à l'analyse et aux conseils en matière de politiques, aux procédures de demande et de règlement, ainsi qu'à la surveillance et à la conformité réglementaire. Nous évaluons la réponse du gouvernement fédéral à ce jour sur la manière d'orienter l'utilisation de l'IA dans la fonction publique, et proposons en conclusion des choix et des perspectives d'avenir.

INTRODUCTION

The Canadian public service, along with many government institutions worldwide, stands at a critical juncture. Amid a stream of criticisms and calls for reform, one potentially transformative force has emerged as an opportunity: artificial intelligence (AI). As AI technologies advance and spread rapidly, they offer potential solutions to longstanding issues of efficiency, effectiveness, and responsiveness in public administration. From streamlining administrative processes to enhancing policy analysis and improving regulatory enforcement, AI offers a wide array of potential benefits.

However, AI also introduces new complexities and concerns that must be carefully navigated, particularly in areas of transparency, accountability, privacy, the preservation of human judgment in crucial decision-making processes, and public perceptions about the acceptability of AI-supported public administration functions. From the perspective of public servants, the potential job displacement that may arise from increased automation in the public sector, the disruption to traditional work patterns, and the demand to upskill will be top-of-mind.

This article examines the evolving landscape of AI within the Government of Canada, focusing on its impact on internal administration and operations (including facilitating Canada's bilingual federal system), public service delivery, application adjudication, policy analysis and advising, and regulatory enforcement.

BACKGROUND: THE RAPID ADVANCE OF AI TECHNOLOGIES

AI is intelligence represented by computers that mimic or perform tasks similar to human learning, problem solving, and decision making (Russell & Norvig, 2016). Recent AI advances over the past decade are largely based on machine learning (ML), a technique where machines learn by being shown many examples of correct outcomes and—through pattern recognition and inference—identify a new outcome. ML approaches acknowledge that it is hard (or impossible) for humans to explain every step in a process (a challenge in trying to automate a task), but that machines are diligent, tireless learners. The result has been significant progress in research areas such as computer vision and audio interpretation, predictive modelling, and natural language processing (NLP).

Noteworthy advances in this current era of AI are in perception and cognition, where facial recognition technology (FRT) is now a feature on your phone and voice recognition is commonplace. In cognition and problem solving, AI has bested world champions in complex board and card games, and has excelled in optimising operations, detecting malware and fraud, automating claims processes, buying and selling stocks, predicting an appropriate text response, and making credit decisions. Where perception and cognition meet, devices such as autonomous vehicles and robotics can now perform tasks once exclusively the domain of humans.

Generative AI (GenAI) captivated a widespread audience in late 2022, focused on creating new content from text and images to computer code, music, and spoken words. Tools like Open AI's GPT-3 showed that AI could not only process natural language but generate human-like text across a wide range of topics and styles (Safaei & Longo, 2023). A pivotal moment came with the public release of ChatGPT, a web-browser version of GPT-3 which brought generative

AI capabilities within the capacity of any contemporary computer user, sparking widespread discussions about AI's potential impact on knowledge work, learning, and creativity.

APPLYING AI IN THE PUBLIC SERVICE

This section surveys application areas where AI is beginning to lubricate the machinery of government. Examples and cases include internal administrative processes and operational management, delivering public services, supporting application adjudication, supporting the policy analysis and advising function, and monitoring and enforcement of regulatory requirements.

Internal Administration and Operations

AI deployment in the public sector primarily focuses on optimizing internal governmental operations (OECD & UNESCO, 2024). Through automation of routine administrative tasks, AI systems can enable significant operational efficiencies and cost reductions while allowing public servants to focus on strategic initiatives. What follows provides examples of how AI technologies can and are being deployed across internal administrative functions. Examples of emerging AI applications include in human resource management, managing FOI requests, and French/English machine translation.

Human Resource Management: AI technologies are also transforming human resource management in the public sector. AI can assist in screening resumes, identifying potential candidates, and even conducting initial interviews, potentially reducing bias and improving efficiency in the hiring process. Consider the example of automated systems to assess job applicants, where video recorded interviews are evaluated by AI to determine a candidate's characteristics and predict their future job performance.

Cases: The Department of National Defence (DND) recently tested the use of two commercial AI hiring tools that promise unbiased behavioural assessments and measurements of the personalities and cognitive abilities of applicants, as part of an effort to improve diversity in the workplace as part of the DND *Artificial Intelligence Strategy* (DND, 2024) aimed at integrating AI into various operational and corporate areas.[1]

Freedom of information: AI can improve FOI process management to improve response times, lower costs, and ensure consistency. AI-powered systems can triage incoming requests to categorize and prioritize them, rapidly search through vast repositories of government records, suggest relevant document repositories based on requested content, and identify duplicate or similar requests to avoid redundant work. AI models can assist in the redaction process by identifying potentially sensitive information for review, suggesting appropriate redactions based on exemption categories, and improving consistency in applying redaction rules across documents. From the requester perspective, AI-powered chatbots and interfaces can guide requesters in formulating more specific and targeted requests, provide instant access to already publicly available information, and suggest narrowing the scope of overly broad requests.

Cases: No examples of the use of AI in the FOI process at the federal level were found; however, there is some activity in the Government of British Columbia where the *FOI Modernization Project* involves the use of analytics resulting in improved business processes and quicker response times (Narayanan, 2024).

Official Languages and Translation: AI has made significant gains in automating language translation (Mohamed et al., 2024). Machine translation (MT) has evolved significantly, from statistical approaches to more advanced AI-driven methods. In Canada's officially bilingual government, MT presents opportunities to address translation needs, particularly for official language minority communities. Note that the Treasury Board "Guide on Use of Generative AI" (TBS, 2023) includes translation as a potential AI application. The Translation Bureau's separate guidelines from April 2024 recommend machine translation only for non-protected, non-specialized texts where translation errors will not impact Official Languages Act compliance or require distribution without editing (Translation Bureau, 2024b). While remote simultaneous interpretation poses challenges such as sound quality issues, AI tools can help mitigate these, supporting interpreters and enhancing communication efficiency (Translation Bureau, 2024a).

Cases: The CEO of the Government of Canada's Translation Bureau acknowledged in February 2024 that despite employing 100 translators for parliamentary work and outsourcing half their volume, the agency struggles to meet demand. As one response, the Translation Bureau has been leveraging AI to enhance productivity and improve their translation services and address significant translation backlogs that are affecting parliamentary work (DEDC Committee, 2024), a proposal that raised concerns from the Official Languages Commissioner about maintaining language equality (Théberge, 2024).

Public Service Delivery

The incorporation of AI into public service delivery can improve how governments interact with and serve their citizens. Intelligent virtual assistants using NLP capabilities can provide continuous public service support, operating as the first point of contact in government service delivery offering round-the-clock assistance through sophisticated chatbot interfaces. Their functionality extends beyond simple information dissemination to include guidance through complex application processes, real-time status updates on citizen requests, and multilingual support services that cater to diverse populations. Importantly, these systems are designed with the ability to recognize their limitations, escalating complex queries to appropriate human staff members when necessary.

Cases: Among chatbots providing direct support to citizens, Canada's Business Assistant Chatbot (part of the Canada Business App), is a mobile application to support small and medium business owners in navigating government programs and services, while providing tailored recommendations and personalised notifications on funding applications (ISED, 2024). Also, the Record of Employment Comments Classification (ROECC) is an AI model that streamlines the processing of Employment Insurance (EI) claims (ESDC, 2022). Using NLP, it automates the review of free-text comments received on records of employment. The system follows specific business rules and takes simple actions to reduce the manual workload of Service Canada officers and ensure timely payment of benefits.

Application Adjudication

The integration of AI into application-intensive government services can significantly affect bureaucratic processes, offering new possibilities for efficiency and fairness. Consider

immigration services, where AI tools are being applied to application management and adjudication processing. These systems can efficiently handle routine aspects of application processing, including initial document verification, completeness checks, and basic eligibility assessments. This automation can free up human officials to redirect their expertise toward more complex cases that require nuanced judgment, cultural understanding, and careful consideration of humanitarian factors.

Cases: In late 2018 it was revealed that Immigration, Refugees and Citizenship Canada (IRCC) had been using AI for at least four years to process immigration visa applications (Molnar & Gill, 2018). The federal government is now in the process of developing a system of predictive analytics to automate certain activities currently conducted by immigration officials and to evaluate some immigrant and visitor applications (Tomkinson, 2020). IRCC has launched an "Advanced Analytics" system to help triage Temporary Resident Visa (TRV) applications from India and China to make the process more efficient and potentially apply this system globally in the future (Heron Law, 2022). This shift has significantly boosted processing speeds: in 2022, IRCC made over five million strategic decisions on applications, doubling the previous year's numbers (CWR Immigration Consulting, 2023).

Policy Analysis and Advising

AI can potentially support the policy analysis and advising functions in three broad ways: through modelling of alternative options and their possible impacts; through analyzing the feedback received from citizen and stakeholder engagement initiatives; and through the synthesis of large amounts of material in the crafting of decision support documents such as briefing notes.

Scenario modeling: machine learning algorithms can simultaneously generate and evaluate multiple policy options, offering decision-makers deeper insights into potential outcomes and trade-offs. These models account for complex interactions between various policy elements, providing a more nuanced understanding of potential impacts and enabling exploration of a broader range of policy alternatives (Longo & McNutt, 2018).

Cases: The Public Health Agency of Canada (PHAC) Pandemic Forecasting utilized machine learning models to project COVID-19 case trajectories and assess policy impacts in real-time. By integrating mobility, health, and demographic data, they developed predictive tools to understand likely outbreak trends and healthcare requirements. These models helped PHAC make informed decisions on public health interventions, such as vaccination drives and lockdown measures, adapting strategies as the pandemic evolved (Ogden et al., 2020).

Analysing Engagement Feedback: The volume of feedback that is received through digital engagement efforts continues to pose challenges for governments, and AI tools may help in this regard. AI now provides tools for more nuanced assessment of constituents' meaning, and their capabilities at managing large volumes of feedback are advancing rapidly (Chen et al., 2020).

Cases: Transport Canada launched a project in 2019 aimed at collecting and analyzing data to understand Canadians' perspectives on driverless vehicles. The project, completed under contract with private sector public opinion firms, included sentiment analysis on large volumes of social media data (Transport Canada, 2019, 2021).

GenAI for Briefing Note Writing: The emergence of GenAI is where most policy analysts will directly experience the impact of AI on their work. Consider the writing of a briefing note. Recent advances in NLP have led to the development of GenAI tools such as ChatGPT that can undertake a similar task: given a brief prompt, an NLP tool can consult content databases and

synthesise the findings that can serve as a useful start (Armstrong et al., 2019). A recent experiment tested whether current NLP technology is capable of producing briefing notes that expert evaluators judge to be useful, finding that such tools can serve as a useful supplement to the work of human policy analysts (Safaei & Longo, 2023). And given the speed with which the capabilities of NLP tools are developing, the quality of GenAI briefings has improved significantly since then.

Cases: While use cases in the federal public service have not been found, GenAI is undoubtedly being used by public servants to assist with writing emails, drafting briefing notes, and outlining presentations (Reddit, 2023)—all uses envisioned and permitted by guidance in documents such as the *Guide on Generative AI*.[2]

Regulatory Enforcement

AI can be used in support of regulatory compliance and enforcement responsibilities across various domains of public administration, offering enhanced capabilities for detection, assessment, and strategic intervention. Machine learning algorithms can support anomaly detection in regulatory contexts, enabling the analysis of vast datasets to identify potential non-compliance patterns that might escape traditional monitoring methods. This capability would allow regulatory agencies to implement more targeted and efficient enforcement strategies, focusing resources where they are most needed. Predictive compliance represents another potential advance, where AI systems analyze historical non-compliance patterns to anticipate potential future violations (Meijer & Wessels, 2019).

Cases: The Canada Revenue Agency (CRA) has been using AI since at least 2018 to detect tax fraud and monitor compliance, enhance collections and compliance programs, improve collection strategies and risk-scoring systems for tax debts, and analyze web-based information without obtaining consent (Scott, 2024). The CRA also uses tools to support the detection and management of fraud and unauthorized efforts to access its systems. This includes using business intelligence and detection models to identify questionable user activities (CRA, 2023).

An Evolving Framework for AI in the Public Service

Paralleling a range of policies, regulations, legislation, and initiatives focusing mainly on industry, innovation, and technology development[3] (Attard-Frost et al., 2024), the government has also developed several internal policies and guidelines to govern the ethical and effective use of AI by public servants. The *Directive on Automated Decision-Making* (first issued in 2019 but updated in 2023 as AI systems became more widely available to non-experts) applies when AI systems are used to make or inform administrative decisions, requiring departments to a complete an Algorithmic Impact Assessment (TBS, 2019a) and meet transparency, quality assurance, and procedural fairness requirements. The *Guide on the Use of Generative Artificial Intelligence* (TBS, 2023) is for federal institutions and public servants. It provides an overview of GenAI and identifies challenges related to its use, puts forward principles for using AI responsibly, and offers policy considerations and best practices. The guide also requires agencies to evaluate and address ethical, legal, and operational risks before deploying AI tools, with particular emphasis on preventing bias and ensuring compliance with human rights, accessibility, and fairness standards. Foremost, public servants are prohibited from inputting

personal information into publicly available online AI tools, as this would constitute unlawful disclosure. Concise best practices and "*dos and don'ts*" for the use of GenAI by public servants are provided in the secondary document *Generative AI in your daily work* (TBS, 2024a).

The government continues to develop its internal AI governance framework (as do several provincial governments). As of late 2024 the federal government was working on Canada's first AI strategy for the public service, with plans to release it in spring 2025 (TBS, 2024b). The Treasury Board Secretariat (TBS) has launched public consultations to gather insights on AI use within the federal public service, aiming to ensure responsible and inclusive deployment. The upcoming strategy envisions an empowered workforce developed through continuous enhancement of AI literacy, access to advanced tools, and upskilling programs, all aimed at fostering a culture of innovation and adaptability (OECD & UNESCO, 2024). The plan is to include retraining for public servants and hiring tech talent, emphasizing responsible AI use while preserving jobs (Karadeglija, 2024).

Summarizing the Experience to Date

The integration of AI into public service operations has begun to take shape across multiple domains, with applications ranging from internal administration to service delivery and regulatory enforcement. Early deployments demonstrate both the potential and limitations of AI in government settings. Within internal operations, AI is being tested in human resources management, FOI processing, and translation services with varying degrees of success and adoption. In citizen-facing services, AI powers chatbots and application processing systems have been deployed. Policy analysis has seen AI applications in scenario modeling, engagement feedback analysis, and document preparation, while regulatory enforcement benefits from AI-powered anomaly detection and compliance monitoring. The government has responded to this evolving landscape with a framework of policies and guidelines while working toward a comprehensive AI strategy for the public service expected in 2025.

The experience to date with AI integration in the public sector (indeed with the long history of e-government incrementalism and occasional debacles) raises important questions about appropriate expectations and the necessary conditions for success. While early applications demonstrate promise, they also reveal the need for careful consideration of where and how AI should be deployed in government operations. This suggests that the next phase of AI adoption requires a nuanced understanding of the conditions under which AI can effectively support public service functions while maintaining accountability, fairness, and public trust. Key considerations, highlighted in the concluding section, include identifying which functions are most suitable for AI augmentation, what safeguards need to be in place, and how to ensure AI deployment aligns with public service values and objectives.

INTEGRATING AI IN THE PUBLIC SERVICE: APPROPRIATE EXPECTATIONS AND CONDITIONS

The adoption of AI into government operations requires the same careful considerations that should accompany all digital transformation initiatives. While technology offers significant potential for improving internal administrative functions, enhancing public service delivery, or improving policy formulation, fundamental principles should guide its implementation.

To move forward will require developing better expectations about AI as a solution and the conditions under which it can succeed. First, digital solutions should not be viewed as a panacea for organizational or systemic problems; rather, technology serves as an amplifier that can enhance already well-functioning processes but will also highlight the dysfunction in systems (Heeks, 2003). Second, the discourse around digital government must shift away from cost reduction as the primary justification; while efficiency gains may emerge over time, and cost reductions will be imperative, the primary focus should remain on service quality improvement and enhanced citizen engagement (Dunleavy et al., 2006; Fountain, 2004; Lips, 2020). Third, successful digital transformation hinges on two critical factors: public servant adoption and citizen acceptance. Front-line workers must not only understand but actively embrace new technologies for successful implementation (Ahn & Chen, 2022). Similarly, citizens must perceive digital services as accessible, reliable, and advantageous compared to traditional channels (Bélanger & Carter, 2008). Integrating AI into government operations will require an understanding of not just the technological capacities but also the point where public servant and citizen perspectives on the appropriateness and acceptability of AI technologies intersect (Wellstead, 2021).

Governments should adopt a measured, strategic approach to AI implementation, focusing on building trust and demonstrating value rather than pursuing rapid transformation. Starting with small, pilot projects to test and refine AI applications in a controlled setting before scaling up will avoid failures like the ArriveCan app (Malone, 2022). While the potential benefits of public services supported by AI are substantial, success requires careful consideration of organizational readiness, user needs, and implementation strategies. This cautious yet optimistic approach will allow governments to harness technology's benefits while minimizing the risks associated with all digital transformation projects. Yet courage to reimagine public services, corporate processes, and policy formation will be required. The challenge today is not whether AI can be useful across a range of government processes; instead, the "bottleneck now is in management, implementation, and business imagination" (Brynjolfsson & Mcafee, 2017, p. 5).

Training for public servants remains crucial. A recent iteration of the annual digital open government forum from the Canada School for Public Service on the topic of "Harnessing the Power of Artificial Intelligence" (CSPS, 2024) indicates the demand for straightforward guidance on how AI can be adopted by public sector innovators. A central challenge for most governments is going to be a deficiency in the public sector's ability to adopt AI hampered by inadequate skills, insufficient technologies, inadequate data, and a lack of awareness of the potential of AI and its appropriate areas of application. To successfully implement AI in today's government will take a combination of people skills, technology tools, and data. These skills are still rare, or expensive, and will require investments by governments and its partners in building those skills within the public service (Delisle & Lajoie, 2022; Longo et al., 2021). Coincidentally, AI tools will be instrumental in delivering this training by providing personalized learning experiences, automating basic training tasks, offering virtual mentoring, enabling practice scenarios through simulations, and helping to assess and track skill development across large numbers of public servants simultaneously (Boucher et al., 2024; Klitgaard, 2024; Levy & Pérez Albertos, 2024; Mollick & Mollick, 2023).

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ENDNOTES

[1] Note, however, that DND neglected to undertake a privacy impact assessment and algorithmic impact assessment (TBS, 2019a), claiming the Treasury Board "Directive on Automated Decision-Making" (TBS, 2019b) did not apply because its use of these tools did not make any final decisions (Cardoso & Curry, 2021).

[2] In the Treasury Board's *Guide on GenAI*, the response to the first FAQ "Can I use generative AI to draft emails or briefing notes?" is straightforward though cautious: "Yes. Depending on the context. If you use a generative AI tool to draft an email or briefing note, you are responsible for making sure that: the data you input into the tool doesn't include personal, protected, classified or other sensitive information, unless you have confirmed that the tool is appropriate for the security classification of the information; generated content is accurate, non-partisan, unbiased, and doesn't violate intellectual property laws; you inform management that you used a generative AI tool in the drafting process" (TBS, 2023, p. np).

[3] See, e.g., the *Pan-Canadian Artificial Intelligence Strategy* (ISED, 2022a) and the *Digital Charter Implementation Act*, 2022 which proposes *inter alia* the *Artificial Intelligence and Data Act* (AIDA) to regulate AI systems development (ISED, 2022b).

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