HOW AI WILL SHAPE UP GOVERNMENT OF ALBERTA AND THE BENEFITS IT CAN REAP AND BECOME MORE COMPETITIVE GLOBALLY BY THE STRATEGIC APPLICATION OF AI.

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ABSTRACT

The future of Artificial Intelligence (AI) remains dynamic and uncertain. Smaller startups and research institutions contribute innovative approaches, while ethical concerns surrounding AI bias and misuse are playing an increasingly important role in the industry. AI's ability to analyze vast amounts of data from diverse sources enables real-time decision-making that was previously impossible. By integrating data from suppliers, manufacturers, and logistics providers, AI creates a cohesive picture of the entire supply chain. This allows businesses to identify bottlenecks, predict demand fluctuations, and optimize inventory levels.

AI has become increasingly prevalent in governments worldwide, contributing to improved internal administrative processes and service delivery. Governments serve as the frontline for citizen interactions and are vital to economic development and sustainability, although they face resource limitations and struggle to manage the high risks associated with AI. Canada presents an interesting case study, as it is recognized as a leader in AI and has invested heavily in AI firms, while Canadian governments are generally considered risk averse. As AI technologies become more prominent in our everyday lives, they bring long-lasting political and socio-economic implications. The development and use of AI is supported both privately and publicly. Governments support AI because it promises economic growth, military advantage, and the streamlining of labor functions through automation.

KEYWORDS:AI, Government, Alberta,

INTRODUCTION

As an employee of the Government of Alberta, which is committed to a diverse and inclusive public service that reflects the population it serves, we strive to best meet the needs of Albertans. The Government of Alberta is responsible for leading the development of the provincial Capital Plan, which addresses the infrastructure needs of Alberta's population and supports key social programs, services, and economic development. As a procurement leader in the public sector, Government award an estimated $130–$200 billion annually for goods and services, professional services, and construction services. With the rapid advancement of technology, the explosion of big data, and significant progress in computing power, Artificial Intelligence (AI) has emerged as one of the most transformative innovations of the 21st century. From smart city initiatives to data-driven governance, AI is transforming how provincial governments operate and interact with their communities. AI possesses unique and powerful characteristics that distinguish it from traditional Information Technology (IT). One of its defining features is the ability to learn and adapt from data, a concept known as machine learning (Goodfellow, 2016; Fomin, 2020).

AI-powered predictive analytics have revolutionized demand forecasting accuracy. By analyzing historical data, market trends, and economic indicators, these systems help businesses align their production and distribution strategies proactively. AI-driven supply chain analytics also enhance risk management by identifying disruptions before they occur. These systems can simulate various scenarios and recommend alternative suppliers or routes, ensuring business continuity and minimal downtime. AI models excel at evaluating supplier performance by analyzing delivery times, defect rates, and communication effectiveness to provide performance scorecards. This allows businesses to make informed decisions about supplier relationships and negotiations. Supply chain transparency has been enhanced through AI-powered systems that provide real-time visibility into every stage of the supply chain. This transparency helps businesses maintain quality standards, ensure timely deliveries, and build stakeholder trust. AI-driven insights are transforming strategic decision-making, providing the intelligence needed to make data-backed decisions. The use of AI in supply chains will continue to grow, with increasing attention to issues like diverse data protection laws, industry standards, and international trade regulations.

ARTIFICIAL INTELLIGENCE PUBLIC POLICY AND FUNDING

AI policy is designed to support technological innovation that benefits long-term scientific advancements and the economy. One of the key priorities is human capital, specifically "cultivating and attracting highly skilled AI talent." This is evident from the large number of corporations listed in the AI ecosystem dataset. Much of the work on AI policy can be found at the federal level. AI promises to enhance service delivery, making it more efficient and personalized for citizens (Misuraca et al., 2020; de Sousa et al., 2019). AI can optimize operations, automate administrative tasks, and improve resource allocation, leading to streamlined processes and cost savings (Valle-Cruz et al., 2019; Zuiderwijk et al., 2021). Its analytical capabilities enable data-driven decision-making, providing insights and patterns that can guide policy formulation (McEvoy, 2019; Misuraca&Noordt, 2020). AI also promises to strengthen democratic governance by promoting citizen engagement and participation, allowing residents to play a more active role in decision-making processes (Darmon, 2019; Karanasiou, 2019). However, AI is prone to bias, influenced by biases in data, algorithm design, and learning processes, which can lead to unjust decisions and potential discrimination (Mittelstadt et al., 2016). Within provincial governments, regulating AI can be challenging, as it involves multiple components, such as data, training algorithms, and auxiliary algorithms (Ip et al., 2022). The current regulatory landscape at both federal and provincial levels is inadequate, resulting in an accountability gap (Katyal, 2019). Implementing AI requires substantial resources in terms of AI personnel, funding, and infrastructure (Vogl, 2021; Yigitcanlar et al., 2022). Additionally, AI raises ethical concerns, such as inequity and privacy (Mittelstadt et al., 2016). Notably, significant investments in AI have been made by governments at all levels (Brandusescu, 2021). Provincial governments play a critical role as the frontline of interactions with citizens, responsible for promoting economic development and sustainability within their jurisdictions (Streib & Willoughby, 2005). Compared to national governments, provincial governments often face resource constraints, and AI can be resource-intensive (e.g., hiring data scientists and investing in AI infrastructure) (Vogl, 2021; Yigitcanlar et al., 2022). Managing the risks associated with AI is also crucial for provincial governments, as AI sometimes promises more than it can deliver. Provincial governments must ensure that they make well-informed decisions, especially when taxpayers expect their money to be spent wisely. They must also allocate funds to maintain underfunded physical infrastructure, such as bridges and roads, which directly impact citizens' daily lives. As a result, finding the right balance between investing in AI and addressing essential infrastructure needs becomes a complex undertaking for provincial governments.

THE PROMISE OF THE SMART CITY: HYPE MEETS

AI is often considered part of a suite of smart city technologies, which include smart interfaces (e.g., city dashboards), smart control systems (e.g., traffic control systems), and the Internet of Things (e.g., smart lamp posts) (Al-Hader et al., 2019; Allam and Dhunny, 2019). Like other smart city rhetoric, visions of AI are often idealized. In these visions, AI systems and other smart technologies are frequently viewed as a "magic solution" to many urban issues (Allam and Dhunny, 2019). As a result of adoption, a city is seen as becoming smarter, more efficient, citizen-oriented, and sustainable, solving problems across multiple disciplines (e.g., Dirks & Keeling, 2009).

Provincial governments, in need of becoming "smarter," face pressure to adopt new technologies like AI systems (Dirks & Keeling, 2009) to enhance their internal operations and service delivery (e.g., Bullock, 2019; Misuraca et al., 2020; Ojo et al., 2019; de Sousa et al., 2019; Toll et al., 2019). This is part of the competition among smart cities to demonstrate which one is the smartest and can attract top tech talent (e.g., Kitchin, 2014; Monfaredzadeh& Berardi, 2015).

One motivation for provincial governments is the hope that AI will enhance efficiency (Bullock, 2019; Ojo et al., 2019; Valle-Cruz et al., 2019). Efficiency is often expected to result from the automation of existing tasks (Toll et al., 2019; Valle-Cruz et al., 2019; Zuiderwijk et al., 2021). Another motivation is the potential of AI to improve policy decisions. McEvoy (2019) argues that AI systems enable governments to make more reliable decisions by providing a wider range of policy options.

THE AI ARMSRACE: A BATTLE FOR TECHNOLOGY SUPREMACY

"The competition is fierce, with companies vying to outdo each other on various fronts. For example, model capabilities have become a battleground, as organizations strive to develop AI that can perform tasks more accurately, efficiently, and creatively than their competitors.

Scalability remains crucial, as organizations work to ensure their AI models can handle increasingly large workloads and datasets while maintaining performance. Accessibility has also become a major focus, with companies aiming to create user-friendly interfaces and seamless integration capabilities. Moreover, provincial governments have competing priorities, and AI adoption may not always be at the forefront."

BENEFITS AND CHALLENGES OF AI ADOPTION IN CANADIAN GOVERNMENTS

Public investments in AI technologies primarily benefit the private sector, as government funding for AI is directed mainly towards industries and academic institutions adjacent to industry. There has been considerable rhetoric regarding the potential of artificial intelligence (AI) in city operations. However, individuals involved in AI within Canadian provincial governments come from diverse backgrounds, possess varying levels of expertise, and adopt different approaches to AI development.

There are positive perceptions of the potential benefits of AI, including new insights, automation capabilities, efficiencies, problem-solving abilities, and community advantages in management and service delivery. Nevertheless, provincial governments face numerous challenges in adopting AI. Concerns revolve around labor cost reduction, lack of internal capacity, and decision-making difficulties.

Balancing these potential benefits against the challenges, results highlight significant organizational and technical obstacles provincial governments encounter in AI adoption, such as insufficient staff training and awareness, as well as funding constraints. Technical challenges include a lack of in-house expertise, difficulties with outsourced AI systems, data availability and access issues, and the integration of computing infrastructure and software utilization. As an indication of a desire to foster innovation and global competitiveness, the Canadian federal government launched the Smart City Challenge grant competition (2017-2018), pledging millions of dollars to develop technologically advanced cities in Canada. Canada has also made substantial investments in the AI sector, totaling billions of dollars as of 2020 (Brandusescu, 2021). With limited budgets and uncertainty regarding return on investment, provincial governments face the risk of financial loss if their AI initiatives are unsuccessful (Yigitcanlar et al., 2022). To address this deficiency, provincial governments would need to leverage funds to hire a range of costly AI personnel, including consultants, AI analysts, business intelligence specialists, and domain specialists (Jöhnk et al., 2021; Vogl, 2021; Wirtz et al., 2019).

Since AI is a new area for most provincial governments and is often considered non-mission critical, elected officials and senior management must be willing to allocate time and resources to support AI adoption. Bright et al. (2019) emphasized that a significant challenge to AI adoption in provincial government is convincing senior management of AI's potential so that they are willing to fund risky AI projects. Similarly, Campion et al. (2020) found that AI initiatives were often driven by policy at a higher level, which led to proactive internal efforts to encourage AI adoption. Desouza et al. (2018) suggested that external collaborations, particularly with academia, are essential for the public sector to initiate AI projects, as the public sector often lacks the capacity to manage large IT projects.

AI has gained popularity as a "smart" technology in cities due to its perceived benefits of automation, efficiency, objectivity, fairness, and improved service delivery (Bullock, 2019; Misuraca& van Noordt, 2020; Misuraca et al., 2020; Ojo et al., 2019; de Sousa et al., 2019; Toll et al., 2019; Valle-Cruz et al., 2019; Yigitcanlar et al., 2020; Zuiderwijk et al., 2021). Governments promote AI because it offers real-time analysis of large volumes of data (Allam &Dhunny, 2019; Kitchin, 2014; Rjab&Mellouli, 2019), enabling cities to collect and analyze big data by prioritizing, classifying, associating, and filtering information (Goodfellow, 2016). AI is believed to provide solutions to various urban issues concerning the environment, society, and health (Allam and Dhunny, 2019; Dirks & Keeling, 2009; Yigitcanlar et al., 2020).

EXAMPLES OF AI PROJECTS WITHIN CANADIAN PROVINCIAL GOVERNMENTS

- Building risk assessment: AI is used to analyze building data, predict the risks of buildingtypes and determine whether a city could drop certain inspections.
- Citizen service: AI technologies are implemented to improve citizen services, such as chatbots for customersupport.
- Community safety: AI is employed to enhance community safety by finding patterns to identify potential crime hotspots, predict crime trends, and optimize service and resource allocation.

- Detection of road: AI algorithms are employed to analyze road conditions, detect deficienciespotholes or other road deficiencies and prioritize maintenance andrepair efforts.
- Environmental and weather AI is employed to analyze environmental data such as rainfall data to analysissupport environmental monitoring and planning.
- Internal document analysis AI is utilized to process large volumes of internal documents, automate information retrieval, or extract relevant insights to support decision-making and knowledge management.
- Labour trends: AI is used to analyze labour market trends, predict job demand, identify skills gaps, or facilitate workforce planning and development initiatives.
- Retirement prediction: AI is used in predict the number of employees retiring to plan recruitment.

*Smart home: AI is integrated into smart home systems to provide another channelof accessibility to city services.

*Traffic monitoring: AI is utilized to monitor and analyze traffic patterns.

- Wildlife detection: AI is applied to detect wildlife in images and identify species at urban-rural fringe.

*Water billing analysis: AI is applied to analyze water usage patterns, detect anomalies or leaks, optimize billing processes, or identify areas for water conservation.

AI SOLUTIONS FOR SUPPLY CHAIN MANAGEMENT ISSUES

The impact of AI on supply chainManagement has increased efficiency no doubt

- Demand forecasting inaccuracies: AI predicts demand accurately using historical data and external factors like market trends and weather.
- Inventory management inefficiencies: AI tracks and manages inventory levels in real-time, reducing overstock and stockouts.
- Lack of visibility: AI integrates with IoT devices to provide end-to-end visibility in the supply chain.
- Delayed decision-making: AI offers real-time alerts and suggestions for disruptions, speeding up response times.
- Supplier coordination difficulties: AI-powered platforms enable seamless communication and collaboration with suppliers

CONCLUSION

Canada is positioning itself as an innovator and leader on the global stage by promoting AI as a key driver to support the innovation economy. Canadian governments are making substantial investments in AI technology, focusing first on industry and second on research institutions that support the design, deployment, and implementation of AI products. The reality is that both the government and, by extension, the public are financing a significant unknown. We have observed foundational policy inputs that are fostering transparency in AI, along with publicly available funding streams derived from open government-led proactive disclosure grants, contributions, and contracts. If we want AI to serve the public interest, it is essential to ensure access, alongside public scrutiny and independent oversight of the mechanisms and practices surrounding public investments and their relationships. There is a need for public accountability from both government entities and companies when building, procuring, and utilizing AI technologies. Predicting future trends in AI and supply chain management is challenging, given the rapidly advancing capabilities, the emergence of autonomous supply chains, and the evolving influence of AI on global trade dynamics. The potential long-term impacts and what companies can do to prepare remain uncertain. However, the journey must begin now. Artificial Intelligence is revolutionizing supply chain management by addressing critical challenges such as data inefficiencies and targeting limitations. AI empowers businesses with tools for predictive analytics, real-time optimization, and automation. These advancements not only enhance decision-making but also drive efficiency and innovation across industries. The integration of AI into business operations is still in its early stages, and success will depend on embracing and implementing these technologies while balancing automation with human expertise. Organizations that effectively integrate these technologies will gain a competitive advantage. The incorporation of AI into supply chain analytics represents more than just the

adoption of new technology; it signifies a transformation towards a more efficient, resilient, and sustainable supply chain system. As noted by Harvard Business School professor Karim Lakhani, "AI won't replace humans, but humans with AI will replace humans without AI." Organizations, such as the Government of Alberta, must recognize this reality.

REFERENCES

Albino, V., Berardi, U., & Dangelico, R. M. (2015). Smart Cities: Definitions, Dimensions, Performance, and Initiatives. *Journal of Urban Technology*, *22*(1), 3–21.

Allam, Z., & Dhunny, Z. A. (2019). On big data, artificial intelligence and smart cities. *Cities*, *89*, 80–91. https://doi.org/10.1016/j.cities.2019.01.032

Al-Mushayt, O. S. (2019). Automating E-Government Services With Artificial Intelligence.

Androutsopoulou, A., Karacapilidis, N., Loukis, E., & Charalabidis, Y. (2019). Transforming the communication between citizens and government through AI-guided chatbots. *Government Information Quarterly*, *36*(2), 358–367. https://doi.org/10.1016/j.giq.2018.10.001

Brandusescu, A. (2021). *Artificial Intelligence Policy and Funding in Canada: Public Investments, Private Interests* (SSRN Scholarly Paper 4089932).

Campion, A., Gasco-Hernandez, M., Jankin Mikhaylov, S., & Esteve, M. (2022). Overcoming the Challenges of Collaboratively Adopting Artificial Intelligence in the Public Sector. *Social Science Computer Review*, *40*(2), 462–477. https://doi.org/10.1177/0894439320979953

Campion, A., Hernandez, M.-G., Jankin, S. M., & Esteve, M. (2020). Managing Artificial Intelligence Deployment in the Public Sector. *Computer*, *53*(10), 28–37. https://doi.org/10.1109/MC.2020.2995644

Desouza, K. C., Dawson, G. S., &Chenok, D. (2020). Designing, developing, and deploying artificial intelligence systems: Lessons from and for the public sector. *Business Horizons*, *63*(2), 205–213. https://doi.org/10.1016/j.bushor.2019.11.004

https://doi.org/10.2139/ssrn.4089932

IEEE Access, *7*, 146821–146829. https://doi.org/10.1109/ACCESS.2019.2946204

Misuraca, G., van Noordt, C., &Boukli, A. (2020). The use of AI in public services: Results from a preliminary mapping across the EU. *Proceedings of the 13th International Conference on Theory and Practice of Electronic Governance*, 90–99. https://doi.org/10.1145/3428502.3428513.

Montréal International. (2022). *Artificial intelligence | Montreal, a global hub for AI*. Montréal International. https://www.montrealinternational.com/en/keysectors/artificial-intelligence/

Pica-Alfano, L. (n.d.). *Edmonton leveraging AI to make safety code inspections more efficient—Govlaunch Stories*. https://govlaunch.com/stories/edmonton-leveraging-ai-to-make-safety-code-inspections-moreefficient.

Policy Perspective. *Proceedings of the 20th Annual International Conference on Digital Government Research*, 91–99. https://doi.org/10.1145/3325112.3325242

Valle-Cruz, D., Alejandro Ruvalcaba-Gomez, E., Sandoval-Almazan, R., & Ignacio Criado, J. (2019). A Review of Artificial Intelligence in Government and its Potential from a Public

Yigitcanlar, T., Li, R. Y. M., Beeramoole, P. B., & Paz, A. (2023). Artificial intelligence in local government services: Public perceptions from Australia and Hong Kong. Government Information Quarterly, 40(3), 101833. https://doi.org/10.1016/j.giq.2023.101833

Zuiderwijk, A., Chen, Y.-C., & Salem, F. (2021). Implications of the use of artificial intelligence in public

governance: A systematic literature review and a research agenda. *Government Information Quarterly*, 101577. https://doi.org/10.1016/j.giq.2021.101577