Where the Gap Lies:

Iran and Canada in Artificial Intelligence Development

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Abstract

This article asks where, among the capacities a government can act on, the gap between Iran and Canada in artificial intelligence (AI) development is widest, and which parts of the Canadian path Iran could adapt. It compares national strategy documents, a programme evaluation, a government readiness index, World Bank indicators and original bibliometric counts from OpenAlex. On the Oxford Insights index, the widest difference lies in the Government pillar (58.94 points), well ahead of the Technology Sector (22.87) and Data and Infrastructure (21.06). Bibliometric counts add a second finding: Canada's AI articles rose from 876 in 2015 to 1,644 in 2024, while Iran's rose from 800 to 895, and articles without an international co-author fell in Iran from 666 to 546. The evidence does not show that Canada's strategy caused its lead, and Canada's own evaluation reports coordination gaps and slow commercialisation. The article concludes that Iran's first priority is institutional: to turn its 2024 national document into a funded, measurable and publicly evaluated programme. It offers five recommendations and names the study that would test them.

Keywords: artificial intelligence policy; national AI strategy; comparative policy analysis; Iran; Canada; research capacity

1. Introduction

Canada was the first country to implement a national AI strategy (Attard-Frost et al., 2024). Iran approved its National Artificial Intelligence Document in June 2024 (Regulations.ai, 2026), seven years later. The two countries also differ in income, in research spending and in access to private capital. A comparison between them is therefore easy to reduce to a single statement that Canada is ahead. That statement is true on most measures and tells a policymaker little.

The more useful question is where the difference in capacity is largest, because that determines what Iran should do first. It is tempting to assume the answer is technology: too little computing power, too few models, too few firms. This article tests that assumption against the available evidence. It asks two questions. Where is the gap between Iran and Canada widest? Which elements of the Canadian path can Iran adapt, and which should it avoid?

The argument is that the widest gap in capacity is institutional. On the readiness index that scores both countries on a common scale, the Government pillar separates them by more than the technology and infrastructure pillars combined. Market outcomes differ by more still, but they are results of many causes, and policy cannot set them directly. The research base is closer than the income gap would suggest, though its recent direction is a concern. Canada's lead does not rest on a seamless, integrated strategy, since its own evaluation reports coordination problems. What Canada does have, and Iran has yet to build, is a named delivery structure with multi-year funding and a public evaluation that records missed targets.

2. Materials and approach

This is a comparative document and indicator analysis, not a systematic review. Five kinds of material were used. For Canada: the federal evaluation of the Pan-Canadian Artificial Intelligence Strategy (Innovation, Science and Economic Development Canada, 2025), a programme-side impact assessment (CIFAR & Accenture, 2020) and a peer-reviewed review of 84 governance initiatives (Attard-Frost et al., 2024). For Iran: a secondary summary of the 2024 national document (Regulations.ai, 2026) and two interview-based academic studies (Anbarzadeh & Aliyari, 2026; Masoumi Godarzi & Poyanrad, 2027). For both: the Government AI Readiness Index 2024 (Oxford Insights, 2024), World Development Indicators (World Bank, 2026) and the AI Index 2025 (Stanford Institute for Human-Centered AI, 2025).

Bibliometric counts were retrieved from OpenAlex on 4 November 2026. They cover works typed as articles whose primary topic is the Artificial Intelligence subfield, with at least one author at an institution in the country. An article with authors in both countries counts once for each. Domestic-only figures in this article are calculated by subtracting internationally co-authored articles from the total.

Trade and financial restrictions on Iran are outside the scope of this article, although any full account of its access to hardware would need to address them. Table 1 summarises the main figures.

Table 1. Iran and Canada: selected indicators

Indicator	Canada	Iran	Source
AI readiness, overall (2024)	78.18	43.88	Oxford Insights
Government pillar	85.48	26.54	Oxford Insights
Technology Sector pillar	61.69	38.82	Oxford Insights
Data and Infrastructure pillar	87.35	66.29	Oxford Insights
R&D spending, % of GDP	1.79 (2024)	0.73 (2021)	World Bank
Researchers per million people	5,624 (2022)	2,240 (2021)	World Bank
Gross tertiary enrolment, %	76.3 (2023)	58.7 (2022)	World Bank
Internet users, % of population (2024)	94.4	85.3	World Bank
High-technology exports, % of manufactured exports	16.1 (2024)	0.8 (2022)	World Bank
GDP per capita, constant PPP dollars (2025)	57,990	16,834	World Bank
AI articles, 2015	876	800	OpenAlex
AI articles, 2024	1,644	895	OpenAlex
Internationally co-authored share, 2015	60%	17%	OpenAlex
Internationally co-authored share, 2024	63%	39%	OpenAlex
Top 10% by citations, 2024	171 (10%)	116 (13%)	OpenAlex

3. Government: strategy, institutions and coordination

The index gives Canada 78.18 overall and sixth place worldwide; Iran scores 43.88, below the global average of 47.59 (Oxford Insights, 2024). The composition of that difference is the striking result. The Government pillar accounts for a gap of 58.94 points, against 22.87 on the Technology Sector and 21.06 on Data and Infrastructure. Iran's strongest pillar, Data and Infrastructure at 66.29, is higher than Canada's weakest, the Technology Sector at 61.69. Iran's Government score of 26.54 is its lowest.

The documents help explain what that score may reflect. Iran's national document, approved by the Supreme Council of the Cultural Revolution, sets 14 policies and 11 major goals, assigns responsibilities across agencies, and mandates a National AI Organization and a Steering Council. It creates no penalties or liability rules and instructs ministries to draft implementing regulations (Regulations.ai, 2026). A theory-based evaluation drawing on 12 expert interviews finds an important normative foundation and an implementation architecture that remains insufficiently specified. The weaknesses it lists include institutional authority, sustainable financing, access to computational resources, measurable indicators and mechanisms for periodic revision (Masoumi Godarzi & Poyanrad, 2027).

Canada's structure is more specific. Innovation, Science and Economic Development Canada leads the strategy, CIFAR administers its talent and research initiatives, and funding was committed in two phases: $125 million for 2017 to 2022, and $443.8 million for 2021 to 2031 (Innovation, Science and Economic Development Canada, 2025). These figures are in Canadian dollars.

That structure should not be mistaken for integration. The same evaluation reports gaps in coordination across federal initiatives and AI institutions, and its first recommendation calls for better cooperation and synchronisation across programme components. A review of 84 Canadian initiatives finds a concentration on industry, innovation, research and public administration, with little attention to ethics statements or standards, workforce development, AI education and training, or digital infrastructure (Attard-Frost et al., 2024). The same authors identify outcome evaluation, public trust and national unification as open challenges.

What separates the two countries here is therefore less the quality of the design than the existence of delivery machinery and a feedback loop. Canada published an evaluation stating that its target of second place on the Stanford Global AI Vibrancy ranking was not met, and attributing the decline to slower industry adoption and commercialisation (Innovation, Science and Economic Development Canada, 2025). The available evidence on Iran suggests that such a loop has not yet been specified.

4. Talent and research capacity

The research gap is real, and proportionally smaller than the income gap. Canada's R&D intensity and researcher density are each about 2.5 times Iran's, while its income per person is about 3.4 times Iran's (World Bank, 2026). The years differ, so these ratios are indicative. On AI articles, the two countries were close in 2015, at 876 for Canada and 800 for Iran.

They have since diverged. By 2024 Canada had reached 1,644 articles, an 88 percent increase, while Iran reached 895, an increase of 12 percent (OpenAlex, 2026). The composition of Iran's growth is more revealing than the total. Internationally co-authored articles rose from 134 to 349, and domestic-only articles fell from 666 to 546. All of Iran's net growth in this measure came from international collaboration. Canada's domestic-only articles rose from 350 to 613 over the same period.

This pattern can be read in two ways, and the counts cannot decide between them. Iran's rise in international co-authorship from 17 to 39 percent is a gain in connection to global science. The fall in domestic-only output may indicate a thinning base at home, or it may reflect changes in database coverage and in how articles are classified.

The citation figures need the same care. In 2024, 13 percent of Iran's articles and 10 percent of Canada's fell in the top 10 percent by citations. These are recent works, the shares depend on database coverage, and fields of application are not separated, so the figures do not show that Iran's research quality exceeds Canada's. They do show that the Iranian base is not weak on this measure.

On talent flows, Canadian evidence is stronger than Iranian evidence. The federal evaluation reports that the Canada CIFAR AI Chairs programme attracted global talent and retained researchers, although survey respondents still named a lack of skilled workers among their largest challenges. A programme-side report places Canada fourth on a 2019 AI skills migration measure, up 20 places since 2015 (CIFAR & Accenture, 2020). For Iran, about 660 students were enrolled as international computer science doctoral students at United States universities in 2022, among the leading origin countries (Stanford Institute for Human-Centered AI, 2025). That figure shows demand and ability. It does not measure how many return, and no source consulted here does.

5. Commercialisation, capital and infrastructure

The gap widens as one moves from inputs towards markets. Researcher density differs by about 2.5 times, while the share of high-technology goods in manufactured exports differs by about 20 times, at 16.1 percent in Canada and 0.8 percent in Iran (World Bank, 2026). That measure covers all high-technology goods, not AI alone, and it is the largest ratio in Table 1. Such outcomes reflect a country's whole industrial history, so they are better read as a result to be explained than as a starting point for policy. Private AI investment in Canada was US$2.89 billion in 2024 and US$15.31 billion across 2013 to 2024. Iran does not appear in the same report's chart of selected areas (Stanford Institute for Human-Centered AI, 2025). Absence from a chart is not evidence of zero investment; it means that no comparable figure is available.

The scale of these figures bears on what Canada's strategy can be credited with. Public funding of C$568.8 million across both phases is small beside the private total, even allowing for the different currencies and periods. A programme of that size may have helped to anchor talent and attract firms, as evaluation interviewees say. It cannot by itself explain the capital. Canada also has a large neighbouring market and much higher income, and neither can be copied.

Commercialisation is Canada's own weak point. The evaluation finds that challenges in scaling AI solutions, coordinating programming and building infrastructure on time limit the return on Canada's investment. Funding for the compute project PAICE met delays of one to two years, stakeholders viewed it as a temporary stop-gap, and reliance on foreign cloud platforms is described as a problem for data sovereignty and intellectual property (Innovation, Science and Economic Development Canada, 2025). Rising demand for compute preceded the Budget 2024 pledge of C$2.4 billion for AI infrastructure and related measures (Stanford Institute for Human-Centered AI, 2025).

Iran's bottleneck appears in the same place, at a different scale. An interview study of 20 stakeholders finds that resource mobilisation is the critical constraint, particularly hardware and human capital (Anbarzadeh & Aliyari, 2026). The index gives Iran its highest score on Data and Infrastructure, yet that pillar is broad and includes data availability and representativeness alongside infrastructure, so the score should not be read as evidence of adequate AI computing capacity.

6. The case for the state as provider

The strongest objection to this argument is that Iran's state-led path is working as far as it can, and that importing a facilitator model would be premature. Anbarzadeh and Aliyari (2026) describe an evolution from a laissez-faire approach towards a developmental state between 2015 and 2025. They report that effective policymaking and regulation have fostered maturity in knowledge development and legitimation. They also report that the system relies heavily on state service provision to compensate for market failures and international sanctions, which reveals the fragility of the private sector. If private capital is scarce, the state may be the only actor able to provide the basics.

The objection has force. Canada's experience does not refute it, because the two countries' capital conditions differ so widely. Yet the same authors reach a different conclusion. They argue that governance must shift from direct provider to financial facilitator for the system to be sustainable, and they propose regulatory sandboxes and regulated data markets to stimulate private demand. The reasonable reading is one of sequence rather than opposition: the state remains the main source of resources for now, while building the rules and demand that allow others to take part. Iran's interview evidence, it should be said, reflects the views of participants and does not measure outcomes.

7. Limits of the evidence

Four limits bear directly on the conclusions. First, the index is a measure of government readiness, and its Government pillar includes a single Vision indicator scored 0, 50 or 100, along with general measures such as government effectiveness (Oxford Insights, 2024). The report warns that the Vision score polarises results. The published table gives pillars, not dimensions, for Iran, so the share of the 58.94-point gap due to strategy status alone cannot be separated. Both Canada and Iran are also among the 11 countries for which imputation of missing values was not always possible. The gap is large enough to survive some error, though its exact size should not be pressed.

Second, the Iranian documentary record used here is thin. The official text of the national document was not consulted; a secondary summary was used instead. The two Iranian studies rest on 12 and 20 interviews. Third, some Canadian figures come from interested parties: the 2020 impact assessment was produced by the programme administrator with a consulting firm. Fourth, this design is descriptive. It cannot show that a strategy, or any part of one, caused a country's position.

A stronger study would pair the official Iranian text with budget records and implementing regulations, and would match Iranian and Canadian AI researchers over time to observe return and retention. It would also rerun the bibliometric counts with a second database and with a manual sample of classified articles, to test whether the decline in Iran's domestic-only articles is real.

8. Discussion and recommendations

The answer to the first question is that, on a common scale, the widest gap in capacity lies in government rather than in the technology sector or infrastructure. The answer to the second

is that Iran should adapt Canada's delivery and evaluation practices rather than its overall model, and should avoid repeating its weak link between research and commercialisation. Five recommendations follow.

Give one body authority and a budget. The national document mandates a National AI Organization, and the evaluation literature identifies a legally empowered and agile coordinating institution as a condition of success (Masoumi Godarzi & Poyanrad, 2027). Its mandate, budget line and relation to the Steering Council should be set in law. Canada's coordination gaps show that a named lead is necessary and not sufficient, so the same law should define how ministries report to it.

Publish a funded programme with measurable targets and an independent evaluation. Canada's practice of funding in phases and publishing missed targets is cheap to copy and addresses the weaknesses already identified in Iran: financing, indicators and periodic revision. A first public evaluation could be scheduled within three years of the programme's start.

Treat research as an asset to protect. The strength of the Iranian citation share and the fall in domestic-only output together justify a retention programme modelled on the Canada CIFAR AI Chairs, with long-term appointments, access to computing and support for graduate students. It should be open to Iranian researchers abroad. International co-authorship should be kept and extended, since it accounts for all of the recent growth in Iranian AI articles.

Build shared computing with published rules. Hardware is the reported bottleneck in Iran, and Canada's PAICE delays show that compute programmes fail on process as much as on money. Iran should publish access rules, priorities and timelines from the start, and should name the body accountable for each stage.

Build demand before scale. Canada built research first and now struggles with adoption. Iran can start from the other end, in line with the proposals for regulated data markets and regulatory sandboxes (Anbarzadeh & Aliyari, 2026) and with university–industry collaboration (Masoumi Godarzi & Poyanrad, 2027). The state's move from provider to financier can begin with a few priority sectors, where public procurement and data access create paying demand for domestic firms.

The first two recommendations cost little and depend chiefly on decisions by government. For that reason they should come first.

9. Conclusion

Among the capacities measured on a common scale, Iran and Canada are furthest apart on government, and on research they are closer than their income levels would suggest. Their market outcomes differ most of all, and those depend on the capacities that come before them. Canada's record shows what a named structure, multi-year funding and public evaluation can sustain, and also that these do not secure commercialisation by themselves. Iran's national strategy supplies a normative foundation. Its value now depends on whether it becomes an explicit, funded and accountable programme, and whether Iran protects a research base whose domestic component may be weakening. Those are matters of institutional decision, which is why they are the place to begin.

References

Anbarzadeh, S. R., & Aliyari, S. (2026). Elucidating the role of governance in the development of the artificial intelligence technological innovation system in Iran. *Emerging Technologies and Governance*. https://doi.org/10.47176/etg.2026.1019

Attard-Frost, B., Brandusescu, A., & Lyons, K. (2024). The governance of artificial intelligence in Canada: Findings and opportunities from a review of 84 AI governance initiatives. *Government Information Quarterly, 41*(2), 101929. https://doi.org/10.1016/j.giq.2024.101929

CIFAR, & Accenture. (2020). *Pan-Canadian AI Strategy impact assessment report*. CIFAR. https://law.queensu.ca/sites/lawwww/files/files/Research/MachineMD/Pan-Canadian-AI-Strategy-Impact-Assessment-Report.pdf

Innovation, Science and Economic Development Canada. (2025). *Evaluation of the Pan-Canadian Artificial Intelligence Strategy 2.0*. Government of Canada. https://ised-isde.canada.ca/site/audits-evaluations/en/evaluation/evaluation-pan-canadian-artificial-intelligence-strategy-20-1

Masoumi Godarzi, M., & Poyanrad, A. (2027). Responsible AI governance in Iran: A program-theory evaluation of the National Artificial Intelligence Strategy. *Journal of Historical Research, Law and Policy*, 1–22. https://doi.org/10.61838/jhrlp.389

OpenAlex. (2026). *Articles in the Artificial Intelligence subfield by country* [Data set]. Retrieved November 4, 2026, from https://api.openalex.org/works?filter=primary_topic.subfield.id:1702

Oxford Insights. (2024). *Government AI Readiness Index 2024*. https://oxfordinsights.com/wp-content/uploads/2024/12/2024-Government-AI-Readiness-Index-2.pdf

Regulations.ai. (2026). *Iran: National Artificial Intelligence Document* [Secondary summary]. https://regulations.ai/regulations/RAI-IR-NA-NAIDIXX-2024

Stanford Institute for Human-Centered AI. (2025). *The AI Index 2025 annual report*. Stanford University. https://hai.stanford.edu/assets/files/hai_ai_index_report_2025.pdf

World Bank. (2026). *World Development Indicators* [Data set]. https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS