The State of Science, Technology, and Innovation in Canada 2025

Expert Panel Report

THE CHARGE

What is the state of science, technology, and innovation in Canada, and how does Canada compare internationally?

- Areas of strength
- Expenditures
- STI ecosystem
- Barriers and knowledge gaps

EXPERT PANEL

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(Chair)

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Jeffrey R. Taylor

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Expert panel members serve as individuals and do not represent the views of their organizations of affiliation or employment

EVIDENCE GATHERING

- Scholarly and grey literature
- Data from Statistics Canada, OECD, other sources
- Bibliometrics & technometrics
  - USPTO and EPO
  - Scopus and Overton, OpenAlex, Web of Science

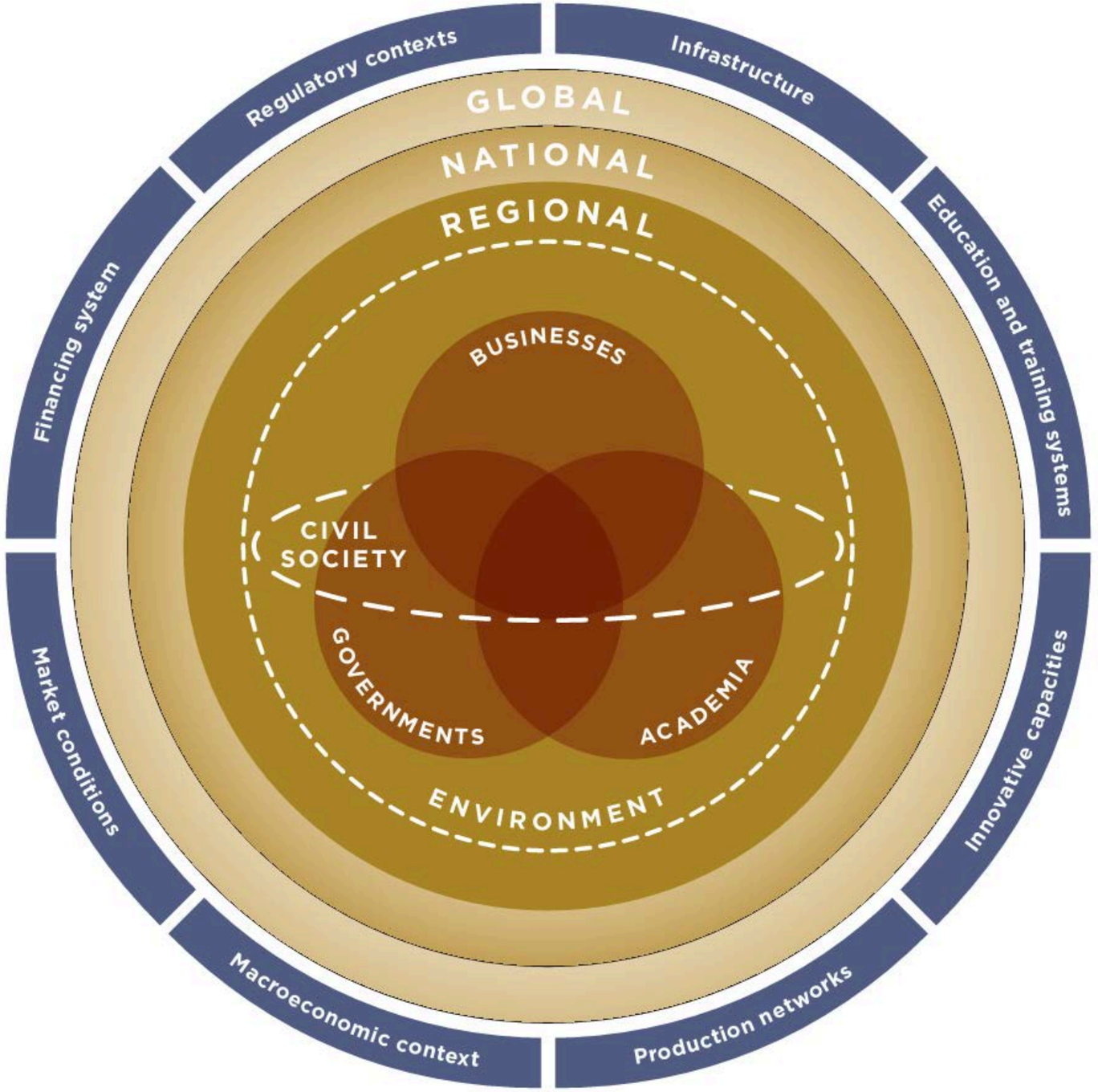
COMMISSIONED PAPERS

- Partnership with SSHRC to fund eight synthesis papers and a webinar
- Deep dives on key issues
- Novel measurement approaches using the Overton and OpenAlex databases
- Virtual event gave focus to the Indigenous dimensions of science, technology, and innovation in Canada

DATA CAVEATS

- International comparisons require careful interpretation
- Incentives influence data reporting
- Data not available for some key contemporary issues
- * denotes areas of uncertainty

THE STI ECOSYSTEM



KEY DRIVERS SHAPING STI

Canada’s productivity crisis

Canada–U.S. relations

Artificial intelligence

WHERE CANADA STANDS

- High and impactful research outputs
- High levels of higher education R&D
- Relatively high R&D among a segment of SMEs
- Strong talent base

- Low and declining business and government R&D
- Low and declining technology adoption
- Talent and IP leaving Canada
- Limited domestic financing

EDUCATION AND TALENT

Highly educated population*

63% with post-secondary qualification compared to OECD average of **41%**

Falling behind at graduate levels

12% with graduate degree compared to OECD average of **15%**

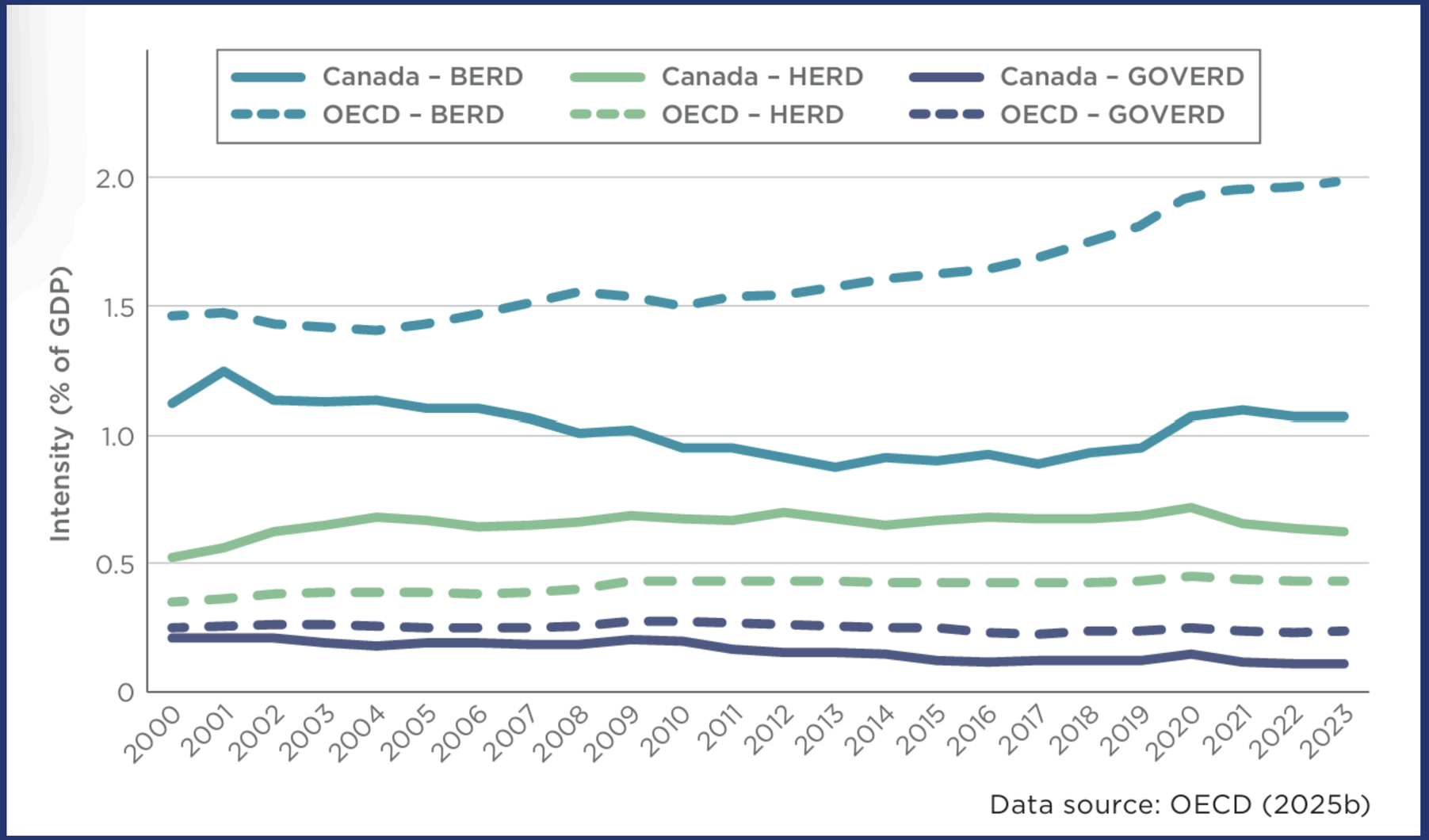
Strong concentration of researchers*

10.9 researchers per thousand compared to OECD average **of 9.5**

Fewer R&D technicians and support staff*

4.2 per thousand compared to OECD average of **4.7**

$ R&D EXPENDITURES



Data source: OECD (2025b)

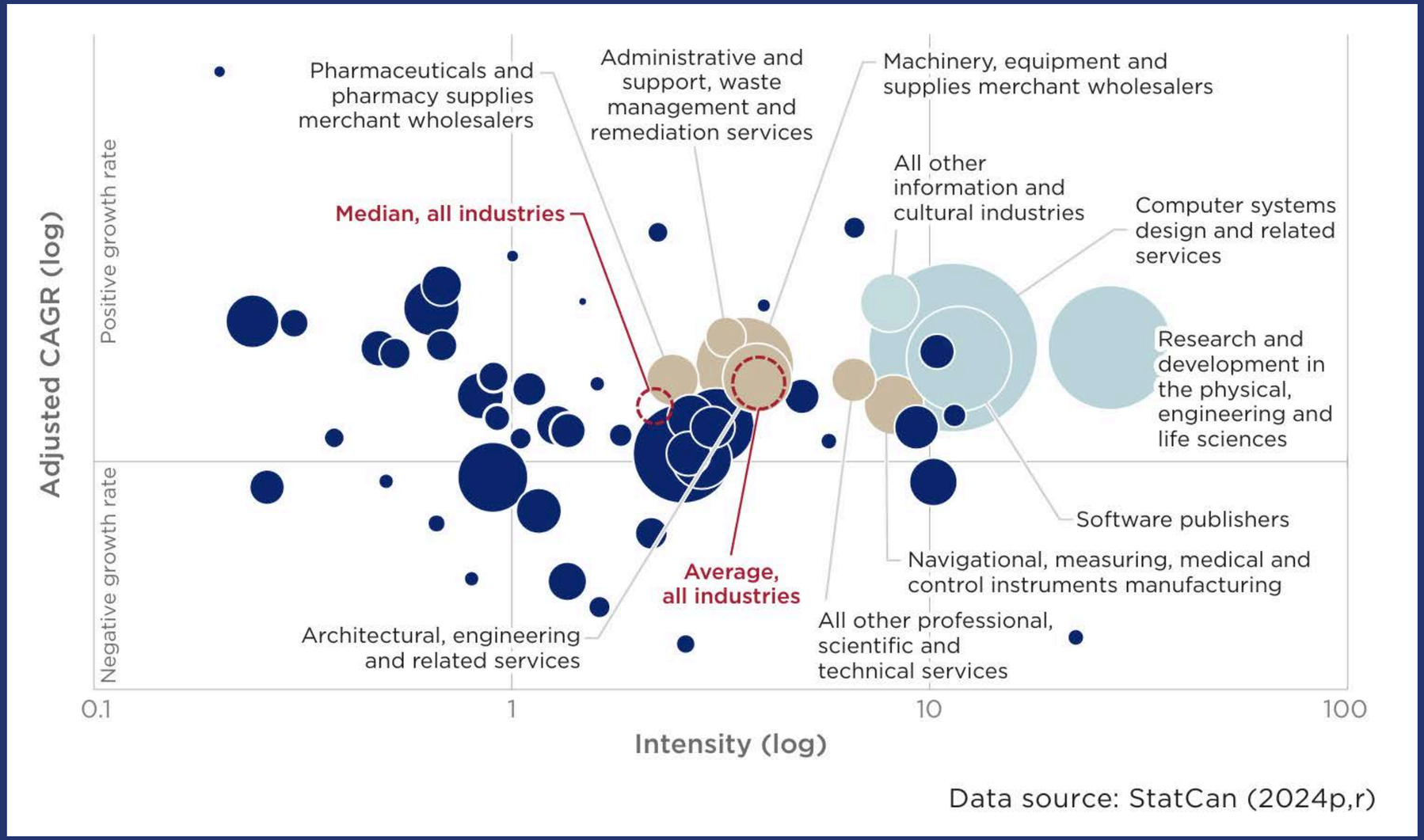
INDUSTRIAL R&D

- Compared to other OECD countries
  - Low share of R&D performed in **large enterprises**
  - High share performed in **SMEs**

- R&D expenditures in Canadian **SMEs** have markedly increased in recent years relative to larger firms

- **Foreign multinational firms** account for up to 44% of Canada's BERD and are increasing their R&D expenditures in Canada at a faster rate than domestic firms

INDUSTRIAL R&D STRENGTHS



Data source: StatCan (2024p,r)

FINANCING AND STARTUPS

- Canada’s startup ecosystem is **increasingly concentrated** around larger CMAs like Toronto, Vancouver, and Montréal
- **Constrained financing** for early-stage startups and those looking to scale rapidly results in firms seeking out foreign investors (mainly from the United States)
- Financing has **predominantly gone to ICT-based startups**, perhaps reflecting a lack of large, stable VC for more capital-intensive industries

PUBLICATIONS

Among the world's top contributors

3.6% of world's publications

9th in world

Growing but losing ground

Output grew **9%** from 2012-2017 to 2018-2023, **slower than the global average**

Highly impactful work

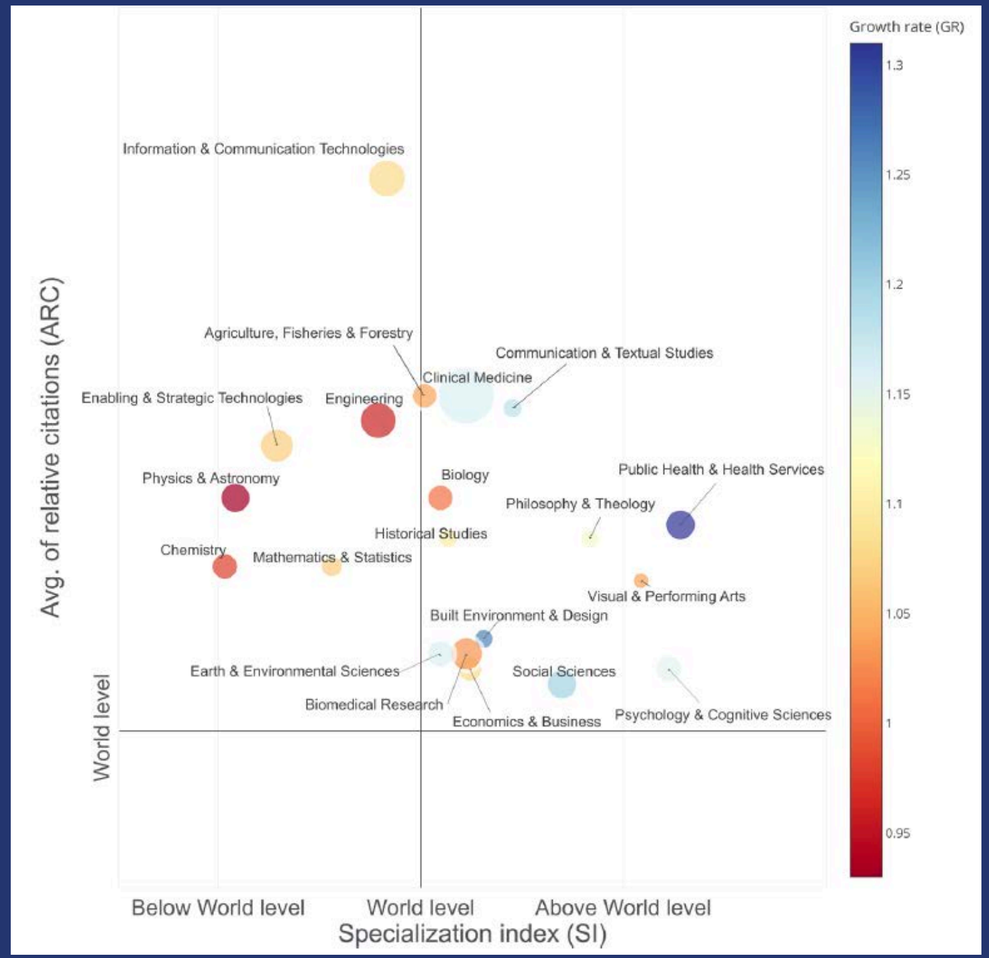
Ranked **6th** for publication impact

Strong international collaborator

Over 50% of publications include a foreign co-author

PUBLICATION STRENGTHS

- Public health and health services
- Clinical medicine
- Information and communication technologies



PATENTS

Modest contributor

1.6% of world's USPTO patents

8th in world

Growing but losing ground

Output grew **5%** from 2012-2017 to 2018-2023, **slower than the global average**

Moderate impact

Patent citations rank **4th**, on par with world average

Dramatic outflow

Causes may include poor domestic absorptive capacity, dominance of foreign firms performing R&D

PATENT STRENGTHS

- Electrical engineering is strong but declining
- Mechanical engineering is strong and growing
- Patenting in instruments has shown some of the highest growth

INNOVATION PERFORMANCE

- **Innovation** by Canadian businesses has **decreased** noticeably in recent years
    - Despite **increased expenditures** on innovation activities

- The acquisition, development, and use of **advanced technologies** have **substantially decreased** in recent years, particularly among SMEs

OBSTACLES TO INNOVATION

- Most significant and persistent obstacles to innovation reported by firms are **uncertainty and risk, and lack of skills**

- Obtaining or enforcing IP is generally not considered to be a significant obstacle

*"The most commonly cited reason for not using advanced technologies—by a wide margin—is that they are **not viewed as applicable or necessary for the business**."*

ECOSYSTEM BARRIERS

Low rates of technology adoption

AI adoption across industries

Limited access to domestic financing

Enhanced role for pensions, other risk capital

Lack of large firms in innovative sectors

Lack of focus in STI policies and programs

Cultivating regional strengths
Tailored interventions

KNOWLEDGE GAPS

- Need for more robust analytical capacity to understand the system and potential interventions
  - Relevant, real-time data and analysis
  - Foresight
  - Deep dives on emergent issues and rapidly changing conditions
- Effectiveness of government’s full STI policy and program suite
- Broader frameworks for understanding the STI ecosystem

REFLECTIONS

Severity

- Productivity crisis
- Many indicators trending in wrong direction

Canada is not translating upstream strengths in research and talent into downstream economic benefits

Urgency

- Ability to maintain standard of living in Canada in jeopardy
- Shifting economic relationships

The set of societal challenges Canada faces today surely provides the burning platform needed to drive bold changes

Opportunity

- Talent and research strengths
- R&D-intensive SMEs growing domestically

Aggressive AI adoption could transform Canada's STI ecosystem

QUESTIONS?

CCA | CAC