

The Conference
Board of Canada

2024 Innovation Report Card

Benchmarking Canada's Innovation Performance





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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Key findings

- Canada has lost its way regarding innovation. Our nation scores a C on The Conference Board of Canada's Innovation Report Card, ranking 15th among 20 countries. Of the 21 innovation indicators, Canada scores below average on 14 of the indicators.
- Canada's Innovation Paradox is greater than ever. The country does relatively well at building its innovation *capacity* but fails to keep up with peers in innovation *activity* or see innovation-based economic *results*.
- Compared with its peers, Canada is marked by a strong foundation in higher education and a vibrant spirit of entrepreneurialism.
- The country has a dire need for change across multiple facets of the economy—cultural, governmental, industrial, and technological—to reverse its lagging performance.
- Canada's innovation journey is marked by a slipping performance relative to peer nations. Canada heavily underperforms in technology adoption that includes robotic deployment, high-tech exports, and mobile app development.
- Canada is a risk-averse innovation culture. Overcoming our country's pervasive fear of failure and low levels of business, research and development (R&D) will allow us to tap into the nation's thriving entrepreneurial spirit. This is evidenced by a remarkable tendency for early-stage entrepreneurship and vigorous belief in Canada's entrepreneurial capabilities.



Recommendations

We've identified seven pivotal areas of opportunity to improve Canada's innovation performance:

1. Improve productivity by adopting new technologies.
2. Make intellectual property (IP) and research and development (R&D) the key drivers of commercial success by improving funding and programs.
3. Expand the venture capital (VC) landscape to provide the financial backbone for startups and innovative projects.
4. Support advanced manufacturing in Canada to rejuvenate our manufacturing sector.
5. Inject a competitive spirit within the business ecosystem.
6. Encourage new businesses by lowering risk and providing deep support for innovators.
7. Reinforce our strengths in higher education and research by fostering entrepreneurial opportunities.



Introduction

Innovation is one of the most important drivers of economic growth in advanced economies. History tells us that a high standard of living is unsustainable in the long-term when a country has a low-innovation rate.



Firms and other organizations that innovate successfully enhance their competitiveness and position themselves for growth. Communities, regions, and countries also benefit from innovation. Areas with strong innovation see improvements in productivity, economic growth, and job creation. They have more resources available to spend on education, healthcare and the environment.

Canada’s poor innovation performance is at an all-time low, and the world is taking notice. The Organisation for Economic Co-operation and Development (OECD) predicts Canada will be the worst performing (advanced) member country over the next four decades as measured by real GDP per capita.¹

The alarm bells are ringing

Canada’s inability to speed up innovation-based economic growth isn’t just a business risk. It’s also a prelude to reduced international leadership potential, less availability of quality jobs, and a subsequent decline in its citizens’ living standards. Failing to reverse this trend will put what we hold dear as Canadians at risk.

Our healthcare system, our infrastructure, our competitiveness, our education, our position in the world all hinge on taking action—in some cases drastic action—to reverse our slide to the bottom.

Each policy that doesn’t address the dire need for innovation is a step toward a future where Canada lags, while other nations leap forward. It’s imperative to design policies that are not just reactive but visionary—fostering a culture of innovation that can avert the looming economic downturn, and secure a prosperous, stable future for every Canadian.

1 OECD, “The Long Game.”

This report card is a wake-up call for policy-makers and business leaders. It paints a picture of a country that has lost its way on innovation. If we don't change our path, all Canadians will suffer.

By providing an in-depth assessment of Canada's innovation performance, we can identify our country's strengths, weaknesses, and the actions necessary to change its future.

Building on the Innovation Report Cards of 2019 and 2021, The Conference Board of Canada's 2024 Innovation Report Card (IRC) is even more comprehensive in its ability to provide direction to decision-makers. This year's IRC provides an evidence-based assessment of our nation's performance across 21 indicators of innovation performance compared with 19 of our peer nations.

The results are sobering.

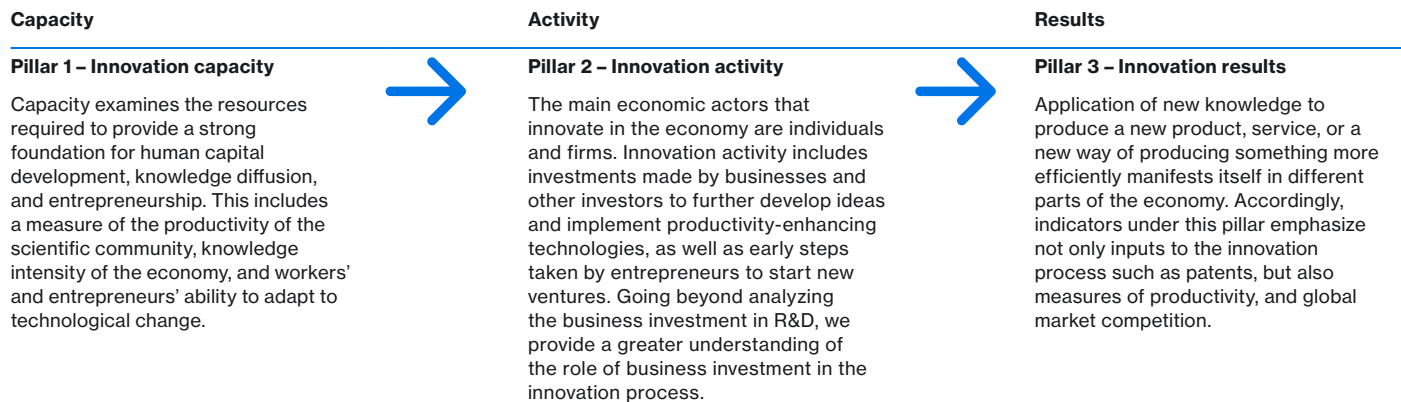
This version of the report card finds us in a position similar to in previous years. While Canada is continuing downward trends in some areas, it is continuing upward trends in other areas.

Each of the 21 innovation indicators offers an opportunity for action. Although we recognize that innovation does not necessarily interact in linear ways, there is a logical order to analyze indicators: innovation capacity, activity, and results. (See Exhibit 1.)

As a nation, as business leaders, as educators, as researchers, and as citizens, it is critical that the decline is reversed. We are not without hope. But we may be running out of time as our competitors surge ahead.

Exhibit 1

The three pillars of innovation—A continuum from capacity to activity to results



Sources: Innovation, Science and Economic Development Canada; The Conference Board of Canada.

Overall ranking

We find that Canada earns a score of C and ranks 15th among 20 peer countries

Canada ranks below average in 14 out of the 21 indicators we examined. For a detailed explanation of data sources and the approach to developing the rankings see Appendix A. To explore how countries scored across indicators see Appendix B.

First, we explore where Canada’s innovation performance is the weakest and in need of transformative intervention. Understanding where and by how far we have declined in key indicators provides a sobering wake-up call for the path we must forge to change our direction.

Then, we focus on areas of average performance that present specific opportunities to reverse our performance and gain ground.

Finally, we turn to our strengths. These indicators demonstrate that strong leadership and continued investment can shine a path ahead where Canada can lead globally.

Each indicator tells a unique story about an aspect of our innovation system. Each indicator invites discussion of which policy measures are needed to address gaps or spur action.

Table 1

Canada receives a C in overall innovation ranking

| Ranking countries | Capacity | Activity | Results | Overall ranking |
|-------------------|----------|----------|-----------|-----------------|
| 1 Korea | A+ | A+ | B | A+ |
| 2 Switzerland | A | C | A+ | A |
| 3 Singapore | B | B | A- | B |
| 4 Sweden | A+ | C | C | B |
| 5 Germany | B+ | C+ | C | B |
| 6 Israel | C | A- | B- | B- |
| 7 United States | B | B+ | C- | B- |
| 8 Finland | A- | C- | D+ | B- |
| 9 Netherlands | B | C+ | C- | B- |
| 10 Denmark | A | D | C- | B- |
| 11 Ireland | C+ | C- | B- | C+ |
| 12 Austria | A- | D | D+ | C |
| 13 United Kingdom | B | C+ | D | C |
| 14 Norway | A | D- | D- | C |
| 15 Canada | B | C | D- | C |
| 16 Australia | B | C- | D- | C- |
| 17 France | B- | C- | D | C- |
| 18 Japan | D | C | C- | D+ |
| 19 China | D- | C- | C- | D |
| 20 Italy | D | D- | D- | D- |

Source: The Conference Board of Canada.



Innovation Capacity

Areas where transformative intervention is needed

Risk adverse innovation culture

A growing fear of failure is preventing us from achieving greatness

We have a culture of innovation problem: Canadians are afraid to fail, therefore they don't act on their bold ideas.

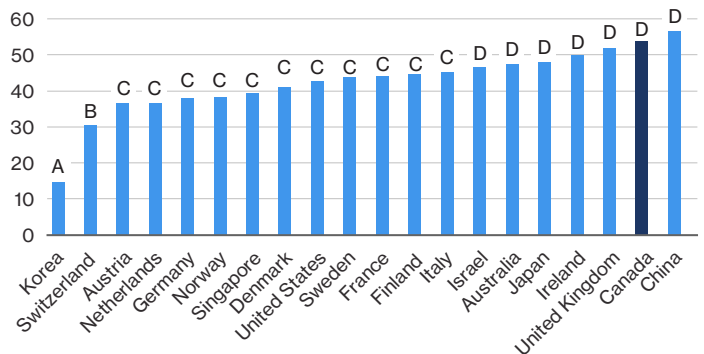
A high proportion of adults believe there are startup opportunities, and they have necessary entrepreneurial skills, but nearly half of these individuals are deterred from taking action by a fear of failure.

Canada is second only to China for the cultural fear of failure. In areas, such as entrepreneurial ambition and skills sets, we rank as high as the best countries in the world. However, the societal and personal costs of failure put us at the bottom. Canada is in an increasingly poor position compared with its peers, and the gap between us and the top performers is rapidly growing.

Level of fear is influenced by the perceived economic consequences of entrepreneurial failure. As the cost of housing and food continues to rapidly increase in Canada, this metric is not likely to improve in the near term.

Chart 1

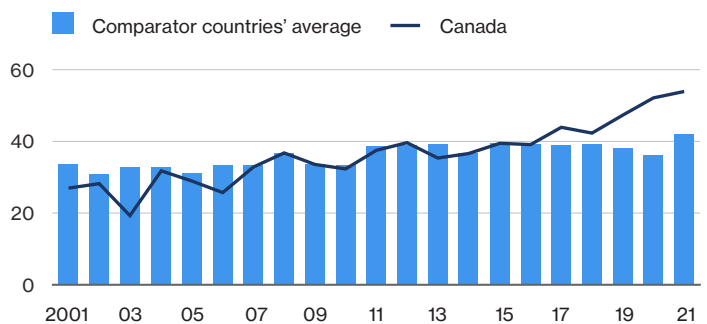
Canada receives a D in fear of failure rate (percentage of 18–64 population who see good opportunities but would not start a business for fear it might fail)



Note: This is a percentage of those seeing good opportunities, and not the total adult population. Sources: Global Entrepreneurship Monitor; The Conference Board of Canada.

Chart 2

Canada's fear of failure rate has increased in recent years (percentage of 18–64 population who see good opportunities but would not start a business for fear it might fail)



Note: This is a percentage of those seeing good opportunities, and not the total adult population. Sources: Global Entrepreneurship Monitor; The Conference Board of Canada.

Chronically declining levels of research and development

Government R&D is stagnating in the face of competing priorities

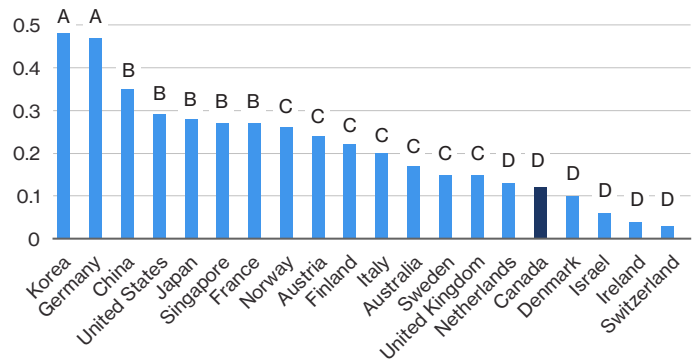
Canada is not investing as much in R&D as peer countries. While Canada’s investments were once near the average of its peers, they have precipitously dropped since the 1980s.

Government R&D is crucial to knowledge discovery and addressing large scale social, scientific, and environmental issues. It explores the areas into which businesses don’t tread. While there are many priorities competing for government funds, faltering public innovation will curtail our country’s ability to address its most pressing challenges.



Chart 3

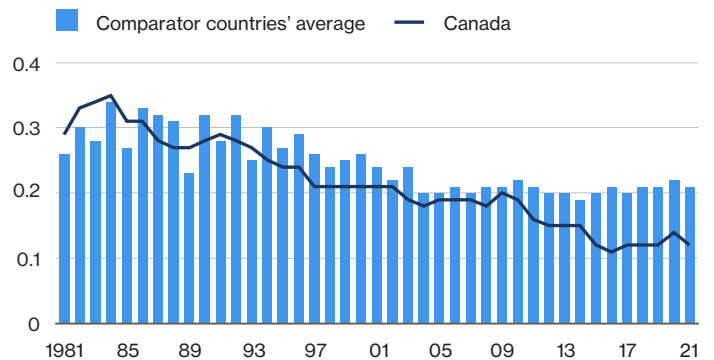
Canada receives the low grade of D in government expenditure on R&D (government expenditure on R&D as a percentage of GDP)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

Chart 4

Canada has decade-long decline in government R&D spending (government expenditure on R&D as a percentage of GDP)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

Innovation Activity

Business R&D is not filling the gap

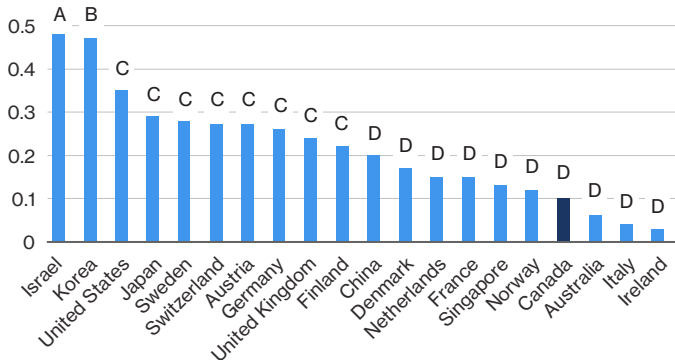
For most of Canada’s peer nations, as public R&D declines, business R&D increases to make up for the gap. However, this is not the case for Canada. Canadian business R&D has been declining for nearly 20 years, falling by a third over this period.

Canada has experienced a sharp decline in business R&D over the past 20 years. Neither the Canadian government nor businesses have been able to reverse this trend. This is likely due to multiple, interdependent factors such as lack of competition; industry composition; lack of investment capital; current mix of government programs; complacency; and risk aversion.

Businesses must invest in research and development to become more productive and competitive in a global economy. Government must work with business to reform its current approach and prioritize a national innovation agenda that tackles this issue at the firm level.

Chart 5

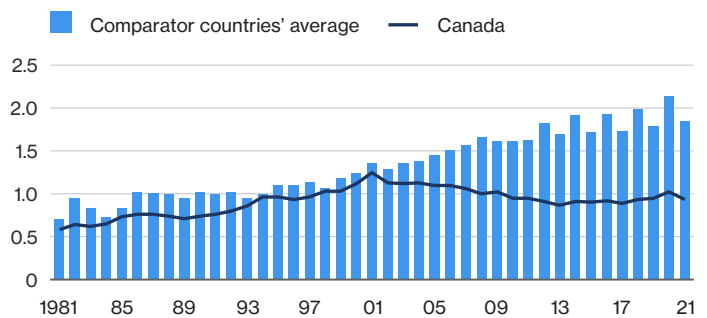
Canada receives a D in business enterprise expenditure on R&D (business enterprise expenditure on R&D as a percentage of GDP)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

Chart 6

Canada’s position has worsened in the last 20 years in business enterprise expenditure on R&D (business enterprise expenditure on R&D as a percentage of GDP)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

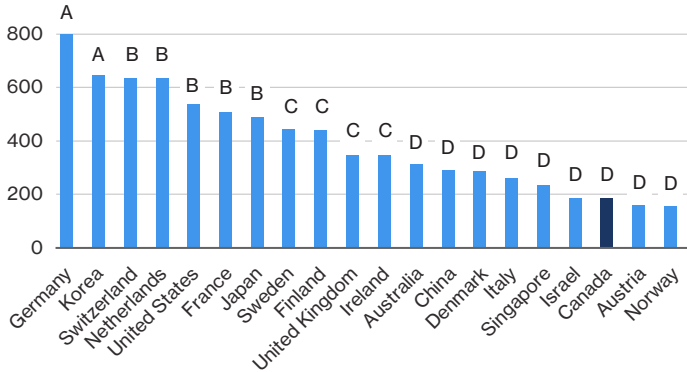
Canada’s largest companies underperform globally on R&D spending

Homing in on our country’s largest global companies does not make the situation look brighter. Canada is third-last among global corporate R&D investors. While Canada’s largest companies’ R&D spending has stagnated for the last decade, average spending for companies in peer nations is rising.

The lack of large Canadian anchor firms that rank in the top 2500 global companies hurts our innovation ecosystem. Large corporate R&D centres develop global technologies and Canadian intellectual property; create domestic supply chains; and attract skilled professionals, researchers, and innovators. Large anchor firms tend to be more globally competitive and could improve innovation-based economic growth.

Chart 7

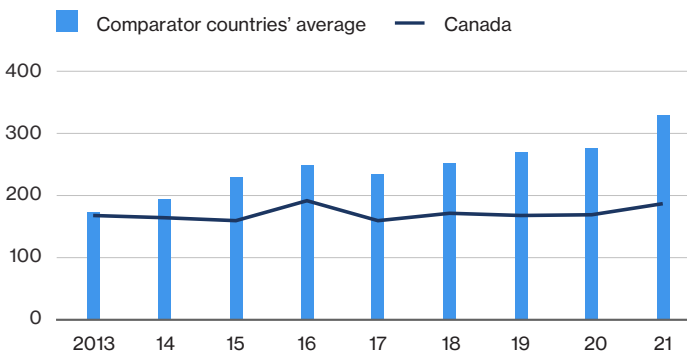
Canada receives a D in global corporate R&D investors (average R&D spending of domestic companies that ranked among the top 2,500 companies globally, in 2021 € millions)



Sources: European Commission; The Conference Board of Canada.

Chart 8

Canada usually ranks below average in global corporate R&D investors (average R&D spending of domestic companies that ranked among the top 2,500 companies globally, 2021 in €million)



Sources: European Commission; The Conference Board of Canada.



Punching below our weight in advanced manufacturing

Canada deploys robots less than almost every other peer nation

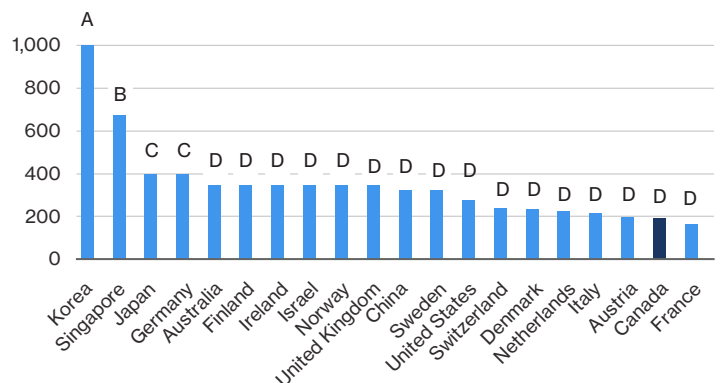
Canadian manufacturing companies are not adopting automation and advanced technologies at the same degree as their counterparts in peer nations.

With other countries prioritizing efficiency and cost reduction at a greater rate, our domestically manufactured products may struggle to compete globally.

When focusing in on artificial intelligence (AI) even though we are a leader in AI research and training, we are at the bottom among peer countries on AI/ML (machine learning) company adoption rates.²

Chart 9

Canada receives a D in robot density (number of robots installed per 10,000 employees in manufacturing industry)



Sources: International Federation of Robotics; The Conference Board of Canada.

² Scale AI, AI at Scale.

Innovation Results

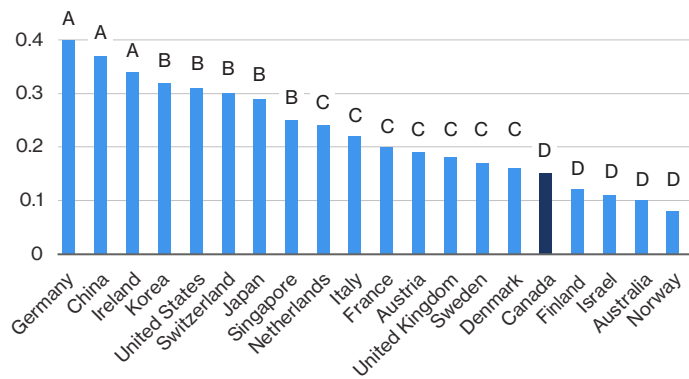
A declining manufacturing base has collapsed our competitive industrial performance

Canada's Competitive Industrial Performance (CIP) ranked above average in the 1990s and the 2000s, but our position has worsened for over 20 years straight. This is an indicator where Canada has fallen from a C to a D since the previous Report Card. CIP is an index of the ability to produce, and export, manufactured goods competitively. Technological capability, industrial diversity, and export sophistication can be inferred by this index.

The deep integration of Asian economies to the global market, and subsequent offshoring of Canadian manufacturing, reduced our competitiveness. Yet other countries like Germany and the United States were able to preserve their industrial export ability and thus their status as strong industrial performers.

Chart 10

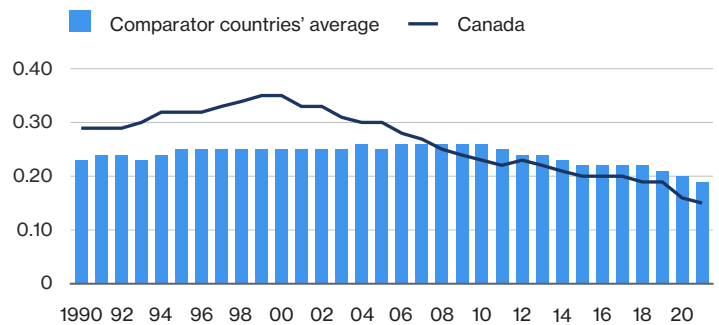
Canada receives a D in competitive industrial performance (CIP index)



Sources: United Nations Industrial Development Organization; The Conference Board of Canada.

Chart 11

Canada's position in competitive industrial performance has been worsening (CIP index)



Sources: United Nations Industrial Development Organization; The Conference Board of Canada.

High-tech exports have not yet fulfilled their potential

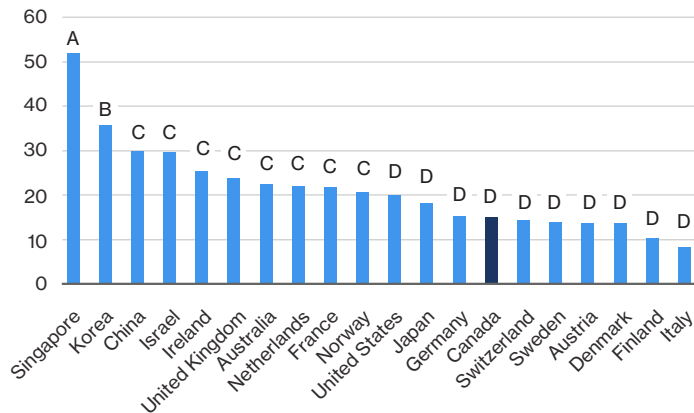
Historically, Canada is below average on exporting domestically manufactured high-tech goods. And, while the average of its peers has risen over time, the country has largely stagnated.

A stagnation of high-tech exports, relative to the size of Canada's manufactured exports, implies we are unable to produce or innovate in emerging technology domains as much as our peers.

Improving the performance of Canada's high-tech exports is an opportunity considering the growing move away from China as the world's manufacturer, and the trend toward nearshoring/friendshoring.

Chart 12

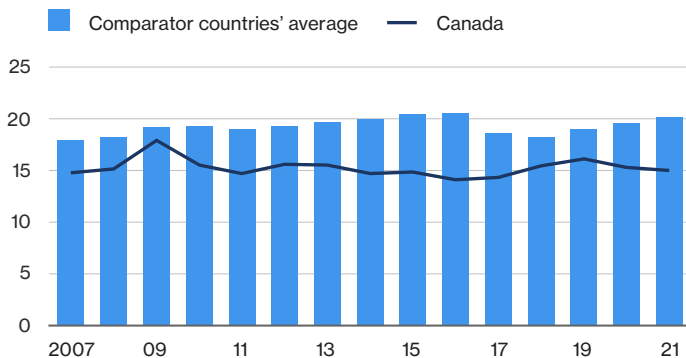
Canada receives a D in high-tech exports
(high-technology exports, percentage of manufactured exports)



Sources: World Bank; The Conference Board of Canada.

Chart 13

Canada has performed consistently below average in recent years in high-tech exports
(high-technology exports, percentage of manufactured exports)



Sources: World Bank; The Conference Board of Canada.



Low levels of mobile app development

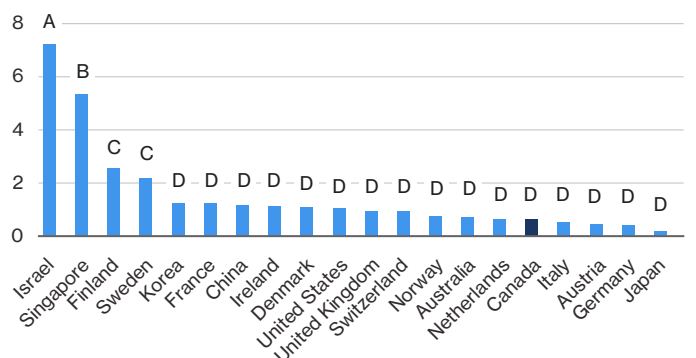
Developers wanted – Canada’s mobile app ecosystem needs to create more unicorns

Given the increased reliance of products and services on our phones, a thriving ecosystem for mobile app development indicates a conducive environment for startups and entrepreneurs.

However, here too, Canada performs below average and near the bottom of the pack. Israel and Singapore lead on mobile apps, followed by the Nordic countries of Finland and Sweden.

Chart 14

Canada receives a D in mobile app creation
(the number of global downloads of mobile apps, by origin of the headquarters of the developer/firm, scaled by PPP\$ GDP, billions)



Sources: World Intellectual Property Organization; The Conference Board of Canada.

Intellectual property – We can’t commercialize what we don’t own

Reversing our poor patent performance is imperative

Canada’s patent performance ranks near the very bottom, just above Italy and China. While the average performance of peer nations continuously increases, ours is worsening.

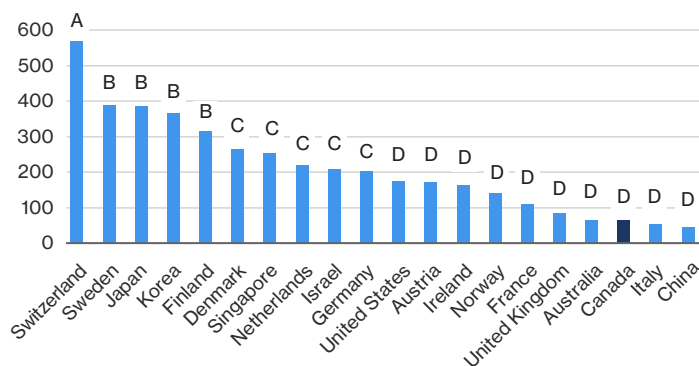
Paired with Canada’s low business R&D spending, we can see its struggle to conduct and commercialize innovative research. Improving Canada’s performance in patenting will start with improving business R&D and collaborations with post-secondary institutions to move research into innovative products and services.

Patenting is crucial for scaling Canadian firms into international competitors because intellectual property determines their ability to protect and “charge rents” for their ideas. IP also allows firms the “freedom to operate” in their field of use. An approach to develop competitive IP strategies is to identify where Canada has sectoral specialization and strength and support those areas.

Canada’s national IP strategy – along with several notable organizations such as the Innovation Asset Collective (IAC) and Ontario’s Intellectual Property Office (IPON) – supported by dedicated government IP programs is a promising start. More is needed for Canada to prevent IP leakage and actively participate and compete in the intangibles economy.

Chart 15

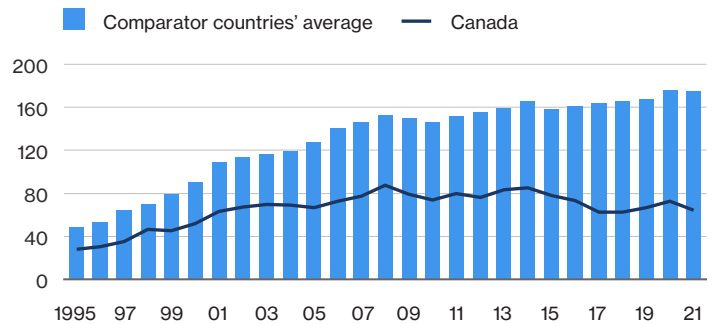
Canada receives a D in patents
(number of patent cooperation treaty publications per million population)



Sources: World Intellectual Property Organization; The Conference Board of Canada.

Chart 16

Canada consistently ranks below the average and its position has worsened in recent years
(number of patent cooperation treaty publications per million population)



Sources: World Intellectual Property Organization; The Conference Board of Canada.

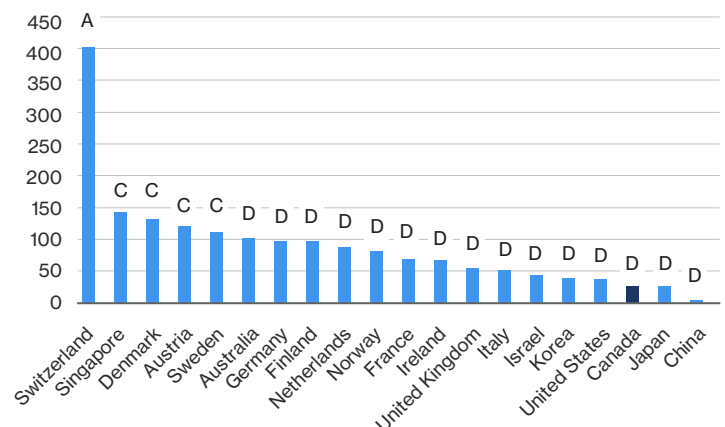
Trademark registrations are trending up, but have significant room to grow

Canada has seen some growth since 2019 despite being at the very bottom of this indicator for decades. However, Canada is still far-away from its peer average.

This is an important area for growth because when registrations reach a critical mass, they can indirectly influence investments in R&D. In turn, this yields new products and services that require trademarking.

Chart 17

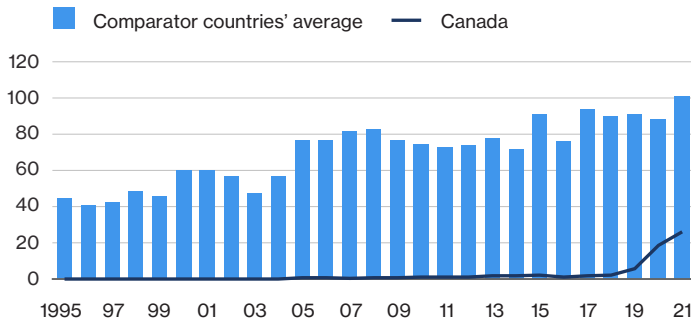
Canada receives a D in trademark registrations
(number of trademark registrations per million population)



Sources: World Intellectual Property Organization; The Conference Board of Canada.

Chart 18

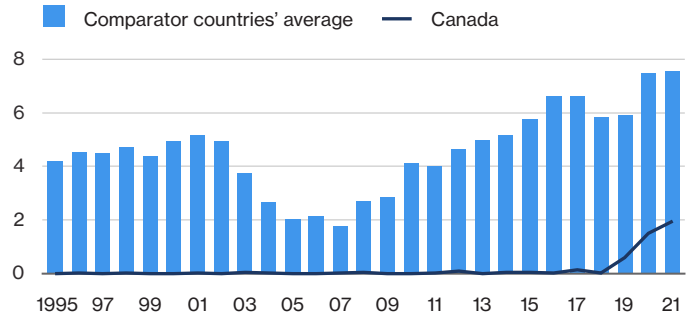
Canada consistently ranks below the average, but its position has improved in recent years (number of trademark registrations per million population)



Sources: World Intellectual Property Organization; The Conference Board of Canada.

Chart 20

Canada consistently ranks below the average, but its position has improved in recent years (number of industrial design registrations per million population)



Sources: World Intellectual Property Organization; The Conference Board of Canada.

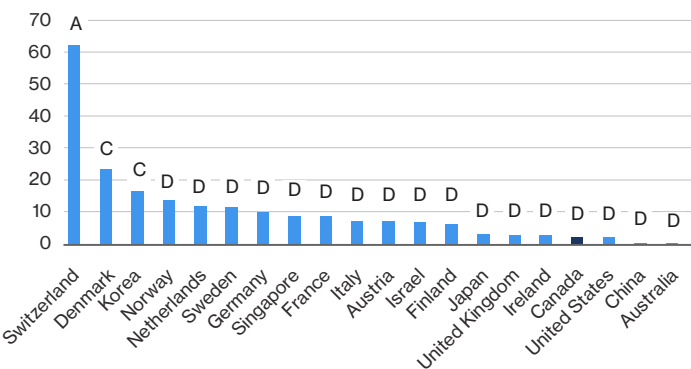
Growing industrial design registrations offer a new area for focus

Canada consistently ranks below average in industrial design registrations – the measure of firms’ and individuals’ ability to invent and seek protection for their R&D outputs. However, we have seen an increase in industrial design registrations at a similar time scale to trademark registrations.

Switzerland dominates on all three IP measures. It is a country to look toward as an example of a high-performing, knowledge-based economy.

Chart 19

Canada receives a D in industrial design registrations (number of industrial design registrations per million population)



Sources: World Intellectual Property Organization; The Conference Board of Canada.



Higher Canadian multifactor productivity (MFP) growth would mean increasing efficiency over time

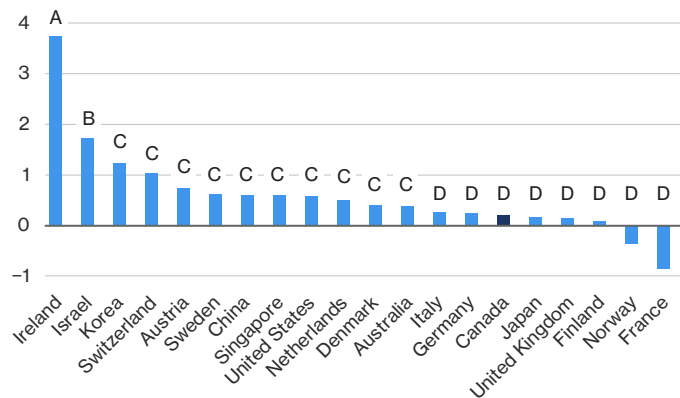
Canada is slightly below its peers on MFP growth

Canada's low labour productivity (GDP/hour worked) is well documented. The less reported metric of MFP measures the innovative ways and overall efficiency in which businesses combine labour and equipment in the production process.³ This measure of productivity is important because the more efficient our economy and society, the more we can raise living standards and reduce the environmental impacts of economic activity.

Increasing technology adoption and the introduction of process innovations will help Canada catch its peers.

Chart 21

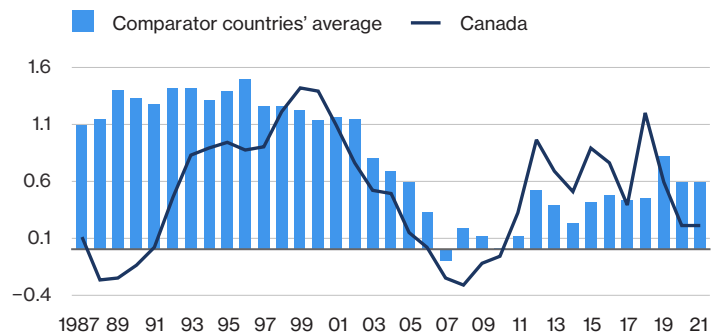
Canada receives a D in multifactor productivity growth rate (annual multifactor productivity growth rate, 5-year moving average)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

Chart 22

Canada usually ranks close to or below average in multifactor productivity growth rate (annual multifactor productivity growth rate, 5-year moving average)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.



³ Ireland has adopted special policies that enable innovative companies to contribute to measures of economic productivity.

Innovation Capacity

Achievement near peer country performance

Research ecosystem – Our capacity for generating new knowledge

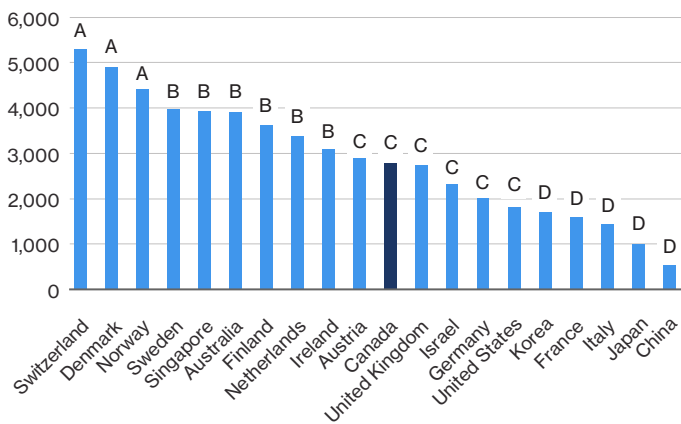
Scientific article output is near average but has waned over time

Scientific articles are important to innovation, as they indicate scientific knowledge creation. Canada was once above average in knowledge creation, but has fallen compared with its peers over the last decade.

However, given this indicator is normalized by the population size, Canada’s ranking is in part attributed to a higher population growth rate when compared with its peers.

Chart 23

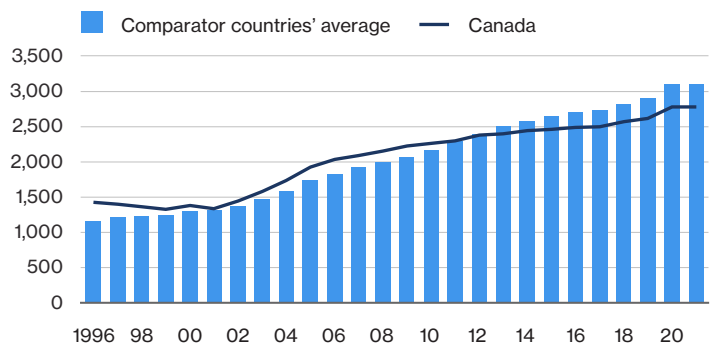
Canada receives an average grade of C in scientific articles (number of scientific articles per million population)



Sources: U.S. National Science Foundation; The Conference Board of Canada.

Chart 24

Canada’s historically above-average position has started to erode in recent years (number of scientific articles per million population)



Sources: U.S. National Science Foundation; The Conference Board of Canada.

We have a sufficient researcher base to build innovations

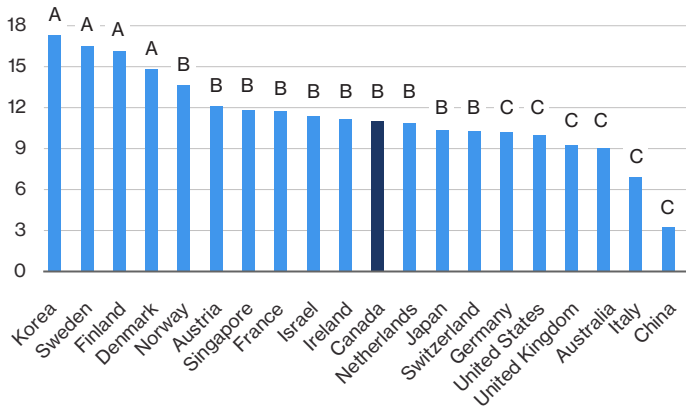
The number of research personnel across government, academia, and industry are about the average of our country’s peer nations. Canada has recovered on this metric after performing poorly for the last decade.

While this metric could be further improved, it shows that Canada has a sufficient base from which to create and improve knowledge, as well as form the talent base for R&D.

The rate of research professionals is highest in Korea and very strong in the Nordic countries, with Sweden, Finland, Denmark, and Norway all rounding out the top five.

Chart 25

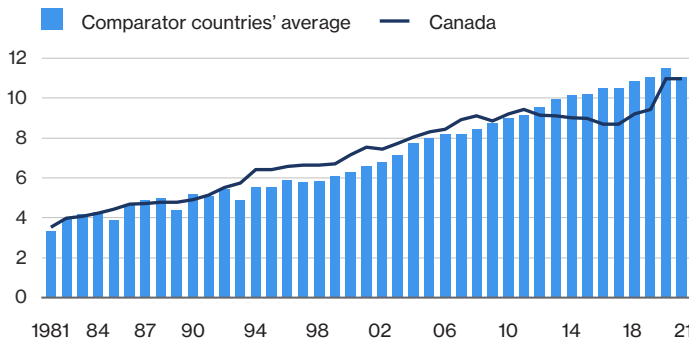
Canada receives a grade of B in researcher intensity (number of researchers (FTE) per 1,000 total employment)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

Chart 26

Canada's historically above-average position started to erode in recent years before bouncing back (number of researchers (FTE) per 1,000 total employment)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.



Internet use for Canadians is on par with peer nations

Over 90 per cent of all Canadians use the Internet

How extensively a population uses Internet services is an important determinant of the diffusion of information, ideas, people's ability to collaborate, and to be part of the digital economy.

While the share of people using the Internet is historically above the average for Canada, this indicator alone does not tell the full story. Other important performance factors that determine a country's ability to develop and leverage online platforms, good and services, include broadband coverage, access, speed, and cost.

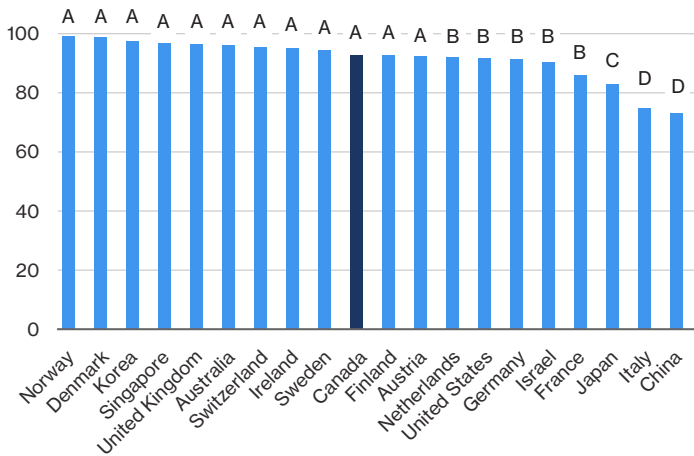
Importantly, high use rate in large metropolitan areas may conceal lower access and use rates in rural areas. Those who could most benefit from driving innovation and economic growth – largely remote communities and Indigenous populations – may be unable to realize their potential.

Important for both consumer and industrial innovation is the development and deployment of 5G. There are substantial productivity gains associated with the deployment of 5G-enabled next-generation telecom services in industries like digital healthcare, advanced manufacturing, and agricultural automation.

Despite our high levels of Internet use, we are one of the most expensive countries globally for Internet and mobile costs.⁴ There are alternative models to the geographic based competition of our current telecom regime. For example, an independent tower model would increase service-based competition, and thus, lower costs.⁵

Chart 27

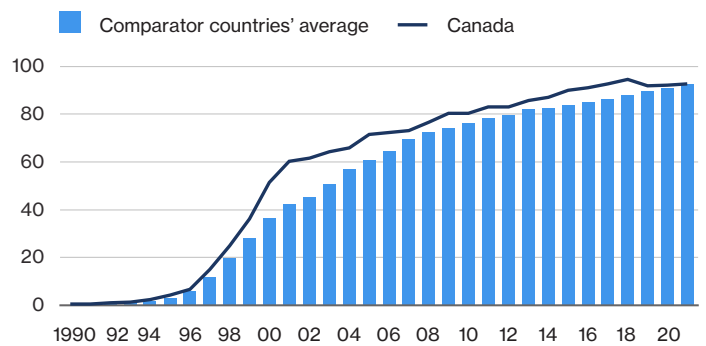
Canada ranks among the top countries in ICT use (percentage of individuals using the internet)



Sources: International Telecommunications Union; The Conference Board of Canada.

Chart 28

Canada always had above-average position in ICT use, but its position is slipping in recent years (percentage of individuals using the internet)



Sources: International Telecommunications Union; The Conference Board of Canada.

4 The Conference Board of Canada, *Improving Tower Sharing in Canada*.

5 Ibid.



Innovation Activity

Venture capital (VC): a fast-changing landscape

VC Investment looks strong in Canada, but has to compete with the United States

Venture capital, as a percentage of GDP, has experienced significant growth in recent years with 2021 being a bumper year. Accounting for the size of economies, Canada ranks third behind Israel and the United States which have 3.6 and 2.3 times more financing.

The steep increase in funding in 2021 is likely due to the pandemic-related stimulus packages and funding initiatives to support startups and small businesses that produced and encouraged VC investment. These increases have moved our ranking from a D in the previous report card to a C this year. It remains to be seen if the spike in 2021 is an anomaly or part of upward trend.

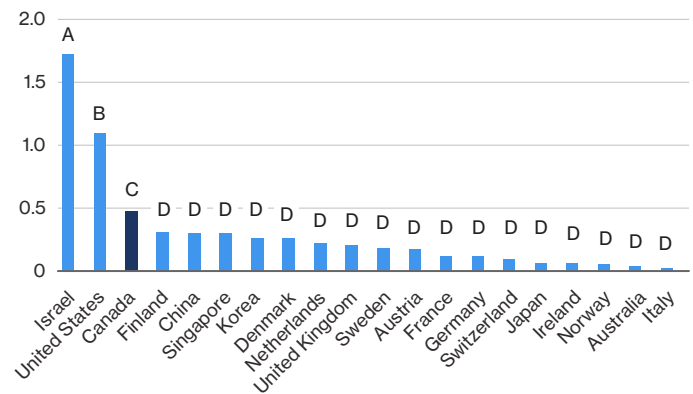
The combined impact of the Venture Capital Action Plan (VCAP) in 2013 and the Venture Capital Catalyst Initiative (VCCI) in 2017 are often cited as government programs designed to increase financing for innovative Canadian firms.

Although the venture capital levels are healthier in Canada than in Europe, Canadian firms face a relative disadvantage. This is due to their close proximity to competitors and greater access to capital in the United States, which can compel Canadian firms to move south of the border.

VC and firms need to continue to cultivate access to growth capital and leverage global interest and success stories to attract funding to create companies that are market leaders.

Chart 29

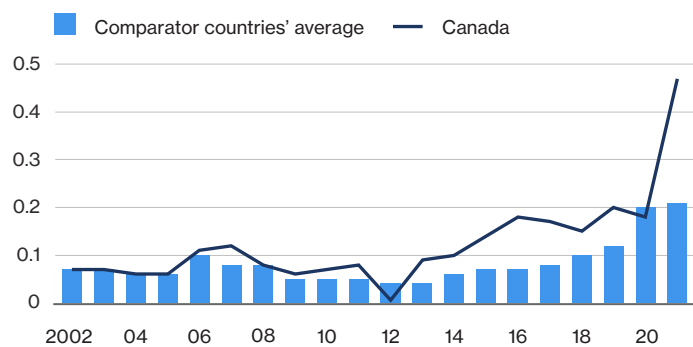
Canada receives a C in venture capital investment (venture capital investment as a percentage of GDP)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

Chart 30

Canada mostly ranks higher than average in venture capital investment (venture capital investment as a percentage of GDP)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

Innovation Capacity

Achievement exceeds peer country performance

High performers in education and talent

Canadian higher education R&D is consistently strong

While business and government R&D levels are troubling, our higher education R&D is at a stable, above average level compared with peers. Higher education institutions conduct research across an array of fields compared with the greater specificity of business R&D.⁶

This makes Canada’s innovation economy heavily reliant on the higher education sector for the generation of new ideas and early-stage technologies. The poor transfer of new ideas and talent into innovation-based growth is a known paradox in Canada.

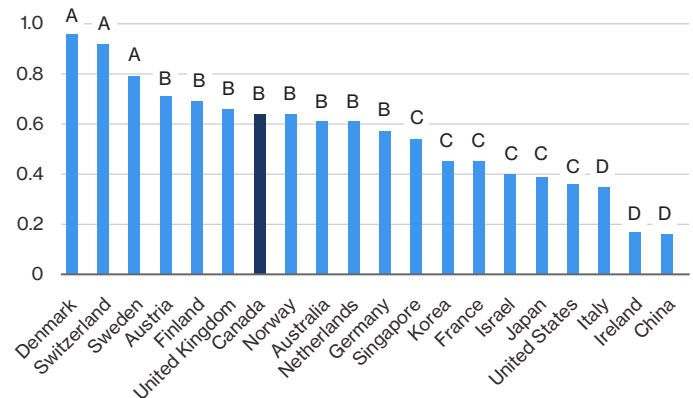


The enabling mechanisms and barriers for knowledge translation from post-secondary research include intellectual property rights, access to research facilities by industry, tech transfer, industry-academic collaboration, and funding programs.

Low business receptor capacity for higher education research means that Canadian ideas and talent will often go outside of Canada.

Chart 31

Canada receives above-average grade of B in higher education expenditure on R&D (higher education expenditure on R&D as a percentage of GDP)

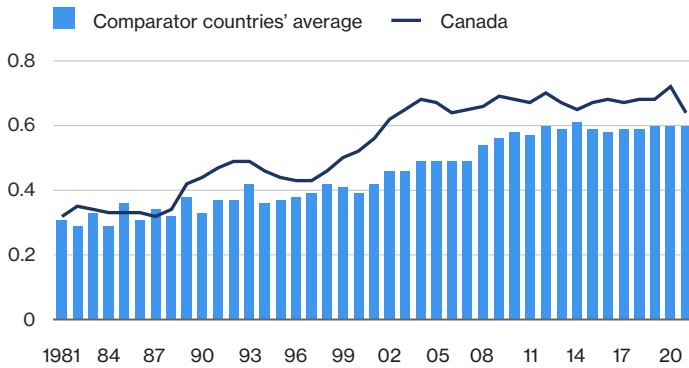


Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

⁶ Some studies focus on public R&D by combining government intramural expenditure on R&D (GOVERD) and higher education expenditure on R&D (HERD). But we chose to analyze them separately because they contribute to innovation in different ways (i.e., results from HERD are more open to the global public compared with results from GOVERD). GOVERD refers to the costs associated with government-led R&D projects, including salaries of government researchers, laboratory expenses, equipment, and other direct R&D-related costs incurred within the government agencies or departments. HERD represents the total expenditure on research and development performed within higher education institutions and research institutes.

Chart 32

Canada has consistently above-average spending on higher education expenditure on R&D (higher education expenditure on R&D as a percentage of GDP)



Sources: Organisation for Economic Co-operation and Development; The Conference Board of Canada.

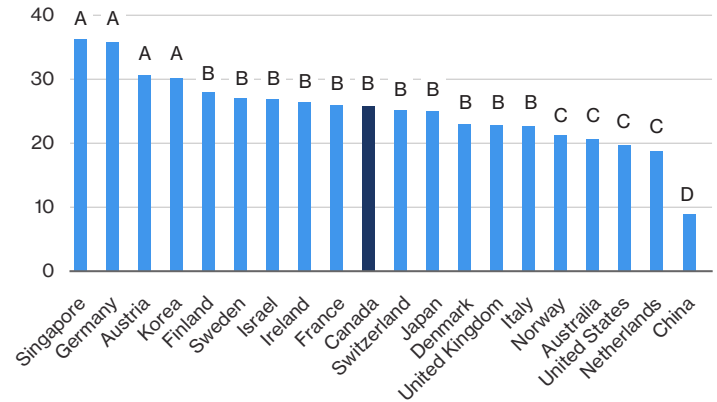
Canada sufficiently produces STEM graduates, but should keep an eye on retention

A talented future workforce is key to a successful innovation system. Canada ranks highly in educating its population, receiving a B in producing highly qualified personal. While Singapore and Germany lead peer nations on STEM (science, technology, engineering, and math) graduates, Canada ranks above Switzerland, Japan, and the United States.

Although we are relatively strong in this area, a concern is that these graduates do not remain in Canada, drawn by higher wages or greater opportunities outside of the country. Creating a thriving innovation ecosystem of companies for STEM graduates to stay in Canada, and attracting highly qualified personal from abroad, should be a priority to ensure this ranking translates into domestic innovation-based economic growth.

Chart 33

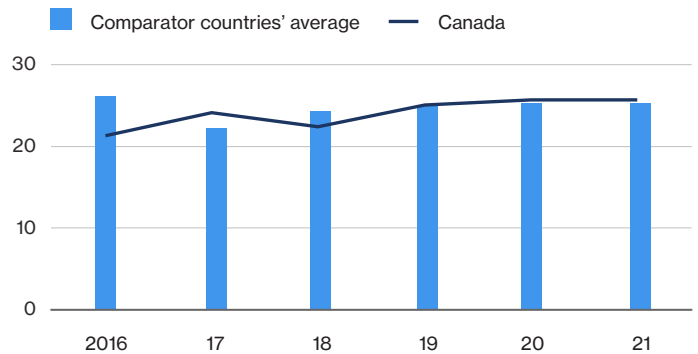
Canada receives an average grade of B in in STEM fields (percentage of graduates from science, technology, engineering, and mathematics programs in tertiary education)



Sources: United Nations Educational, Scientific and Cultural Organization; The Conference Board of Canada.

Chart 34

Canada's ranking has been stable over the last decade (percentage of graduates from science, technology, engineering, and mathematics programs in tertiary education)



Sources: United Nations Educational, Scientific and Cultural Organization; The Conference Board of Canada.



We are an entrepreneurial nation

Canadians believe there are many good entrepreneurial opportunities

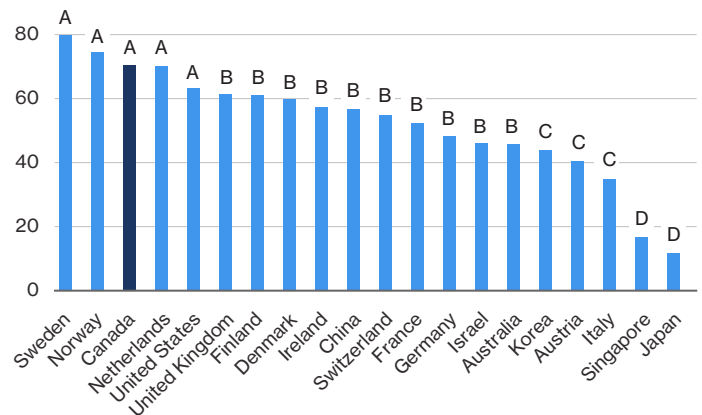
Entrepreneurialism is where Canada ranks strongest compared to its peers.

Many Canadians believe they can identify gaps, unmet needs, emerging trends, or areas for improvement in the market or society.

On this measure, only Swedes and Norwegians are above our ability to see business opportunities. This is a long-term trend over the past decade, and even during COVID, Canada ranked significantly higher than the average peer nations.

Chart 35

Canada receives an A in entrepreneurial opportunities (percentage of 18–64 population who see good opportunities to start a firm in the area where they live)

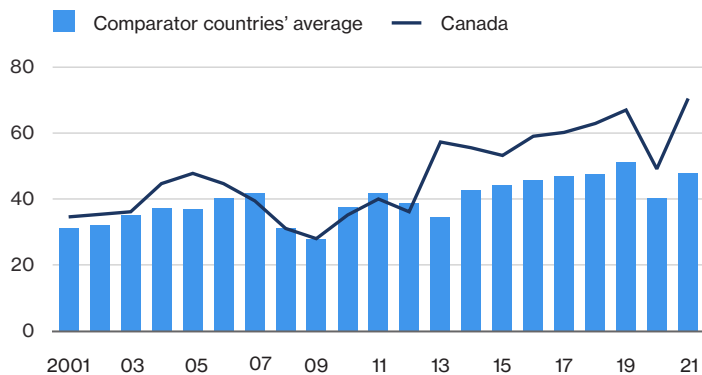


Sources: Global Entrepreneurship Monitor; The Conference Board of Canada.

Chart 36

Canada always ranks at or above the average in entrepreneurial opportunities

(percentage of 18–64 population who see good opportunities to start a firm in the area where they live)



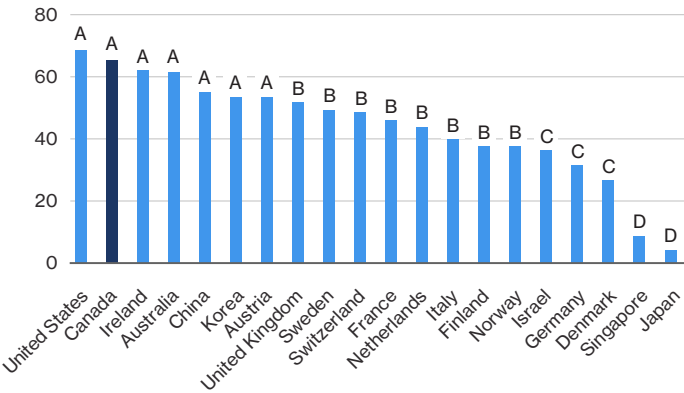
Sources: Global Entrepreneurship Monitor; The Conference Board of Canada.

Moreover, we strongly believe we have the skills to start a business

Canadians also believe in their ability to successfully undertake entrepreneurial endeavors. We have a strong culture of individual achievement and history of entrepreneurial migrants. Only Americans have more confidence than we do.

Chart 37

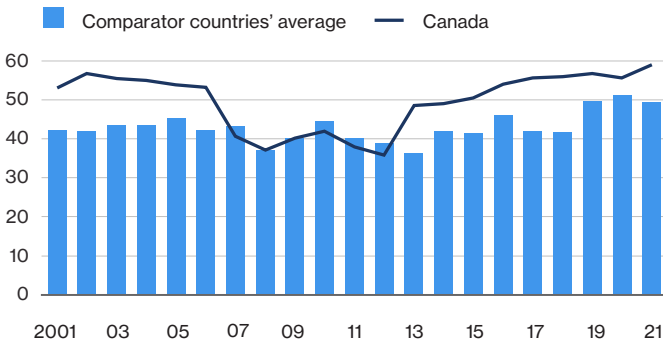
Canada receives an A in entrepreneurial capabilities (percentage of 18–64 population who believe they have the required skills and knowledge to start a business)



Sources: Global Entrepreneurship Monitor; The Conference Board of Canada.

Chart 38

Canada always ranks at or above the average in entrepreneurial capabilities (percentage of 18–64 population who believe they have the required skills and knowledge to start a business)



Sources: Global Entrepreneurship Monitor; The Conference Board of Canada.

In fact, we excel at early-stage entrepreneurship

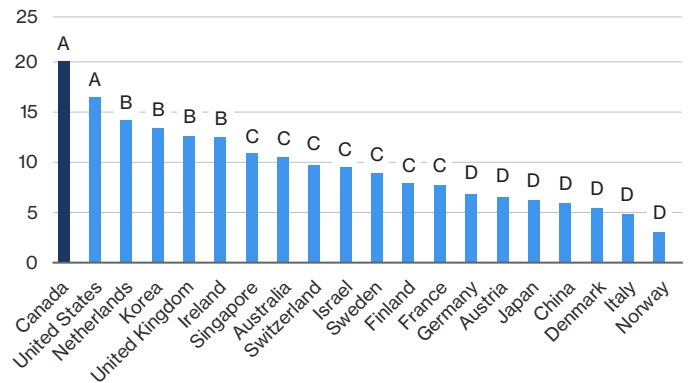
Canada has more individuals than any other peer nation who are either emerging entrepreneurs or owner-managers of new businesses. We have ranked well above average on this metric for the last decade.

However, this success does not translate into scaling-up our homegrown businesses. We must ensure that these individuals have the tools and resources to grow their business. We also need to support firms who have the potential to move from start-ups into scale-ups and export to compete globally.

Moreover, the allure of better-resourced innovation ecosystems, notably in the U.S., can divert entrepreneurial talent and ideas away from Canada.

Chart 39

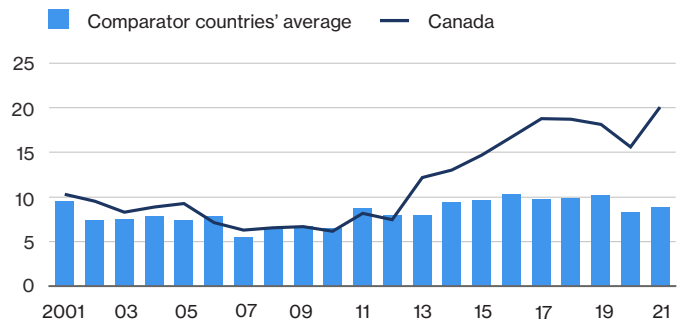
Canada receives an A in total early-stage entrepreneurial activity (TEA) (percentage of 18–64 population who are either a new entrepreneur or owner-manager of a new business)



Sources: Global Entrepreneurship Monitor; The Conference Board of Canada.

Chart 40

Canada mostly ranks above the average and its position has improved significantly in recent years (percentage of 18–64 population who are either a new entrepreneur or owner-manager of a new business)



Sources: Global Entrepreneurship Monitor; The Conference Board of Canada.



Conclusion

The challenge we face calls for bold leadership that not only champions a fresh cultural outlook and policy narrative around innovation in Canada but supports an ecosystem for innovators to thrive and take risks.

To create the conditions to turn the corner, there are at least seven pivotal areas of opportunity from the results of the Innovation Report Card:

- 1. Improve productivity:** Enhance innovation-driven growth by adopting new technologies to improve resource utilization, reduce costs, lower environmental footprints, and be more competitive.
- 2. Focus on intellectual property and R&D:** Make IP and R&D the focus of commercial success by improving current funding and programs. This will ensure adequate protection and freedom to commercialize Canada's most innovative ideas. Focus on collaborations with post-secondary institutions and the effective transfer of technology and IP to companies.
- 3. Foster venture capital investment:** Fortify the VC landscape to provide the much-needed financial backbone for startups and innovative ventures.
- 4. Support advanced manufacturing in Canada:** Leverage the export opportunities to refresh our manufacturing sector, adopt advanced technologies, and engage in global market supply chains.
- 5. Increase competition:** Adopt new competition legislation to inject a competitive spirit within the business ecosystem for new entrants and open up domestic markets to drive innovation.
- 6. Leverage entrepreneurial culture and risk-taking:** Encourage the creation of new businesses by lowering risk and providing deep support for innovators to introduce new and improved products and services. Amplify and celebrate innovation success stories to foster a culture of achievement and inspire promising innovators.
- 7. Lean into our innovation strengths:** Reinforce our strengths in higher education and research through increased funding, fostering entrepreneurial opportunities and our success in creating and retaining top-tier STEM grads.

Appendix A

Methodology grade assignment

The Conference Board’s methodology consists of four steps.

First, we selected comparator countries based on one of the following conditions. The first 13 countries (Switzerland, United States, Sweden, United Kingdom, Netherlands, Korea, Singapore, Germany, Finland, Denmark, China, France, Japan) rank above Canada in the latest edition of the Global Innovation Index (GII).¹ Because we need to improve Canada’s innovation performance, it is reasonable to look up to countries that outperformed us in the recent past. Austria, Ireland, and Israel are included in the list because their governance approach to innovation is considered exemplary by the Canadian Innovation and Investment Agency Round Table that established the Canadian Innovation Corporation (CIC). Norway and Australia are included in the list because, along with Canada, the World Intellectual Property Organization (WIPO) highlights them as significant natural resource producers and exporters that struggle to obtain a better balance between level of investment and innovation results.² Italy was included to ensure we are comparing Canada with all other G7 countries.

Second, we clean and organize data by countries. For each indicator, we collected data on the countries’ R&D spending, entrepreneurship performance, venture capital and intellectual property activity, high-tech manufacturing export etc. For details on our data sources, please download Individual Indicator Data Sources. The link can be found at the end of Appendix A.

Third, we apply the minimum–maximum scaling method to transform the data so that the best performing country receives a score of 100 and the worst performing country receives a score of 0. The reason for applying the minimum–maximum scaling method is to standardize data that are measured in different units. This allows for the addition of scores from different indicators to create a composite score for innovation performance categories (i.e., capacity, activity, results) as well as for an overall innovation performance score for countries. The formula for the minimum-maximum scaling is:

$$X_{scaled} = \frac{X - X_{min}}{X_{max} - X_{min}} \times 100$$

Fourth, we assign letter grades to countries based on their standardized score with an approach of 25-point increments. Table 1 below explains the upper and lower bounds for A, B, C, D grades.

Table 1
Letter grade definitions

| Letter grade | Upper bound | Lower bound |
|--------------|-------------|-------------|
| A | ≤100 | >75 |
| B | ≤75 | >50 |
| C | ≤50 | >25 |
| D | ≤25 | ≥0 |

Source: The Conference Board of Canada.

A country receives a report card rating of A on a given indicator if its score is in the top group (>75); a B if its score is in the upper middle group (equal or less than 75, but >50); a C if its score is in the lower middle group (equal or less than 50, but >25); and a D if its score is in the bottom group (equal or less than 25).

For example, on the indicator “Government expenditure on R&D as a % share of GDP,” the top performer (Korea) has a value of 0.48 in 2021, and the bottom performer (Switzerland) has a value of 0.03. France (with 0.27) and Finland (with 0.22) rank roughly in the middle of the distribution. Using our minimum–maximum scaling method, the standardized values and letter grades for those countries become the following:

Korea: 100 (A)

France: 53.3 (B)

Finland: 41.9 (C)

Switzerland: 0 (D)

1 WIPO, *Global Innovation Index 2022*.

2 Ibid.

Having calculated report card ratings for all 21 indicators, we then calculate an overall composite index for each country by averaging all the standardized indicator values. We do not attempt to give specific differential weights to indicators according to importance; we unconditionally give each indicator equal weight. This is the standard approach used by most organizations in the absence of any compelling reason to apply different weightings.

We average the standardized scores across indicators in respective innovation performance categories (i.e., capacity, activity, results) to assign letter grades for those categories. And we average the standardized scores across all 21 indicators for the overall innovation performance. We assigned more detailed letter grades for categories and the overall performance to allow for more refined comparisons among countries. Table 2 below explains the upper and lower bounds for the more detailed grades we used for the categories and the overall performance.

Table 2
Granular letter grades breakdown

| Letter grade | Upper bound | Lower bound |
|--------------|-------------|-------------|
| A+ | ≤100 | >91.7 |
| A | ≤91.7 | >83.3 |
| A- | ≤83.3 | >75 |
| B+ | ≤75 | >66.7 |
| B | ≤66.7 | >58.3 |
| B- | ≤58.3 | >50 |
| C+ | ≤50 | >41.7 |
| C | ≤41.7 | >33.3 |
| C- | ≤33.3 | >25 |
| D+ | ≤25 | ≥16.7 |
| D | ≤16.7 | ≥8.3 |
| D- | ≤8.3 | ≥0 |

Source: The Conference Board of Canada.

The indicators map to the Innovation Capacity, Activity, and Results model as noted below:

Innovation Capacity

- Fear of failure rate
- Government expenditure on R&D as a % of GDP
- Graduates in STEM fields as a % of all graduates
- Higher education expenditure on R&D as a % share of GDP
- Information and communication technologies (ICT) use
- Perceived entrepreneurial capabilities
- Perceived entrepreneurial opportunities
- Researchers intensity
- Scientific articles per million population

Innovation Activity

- Business enterprise expenditure on R&D as a % share of GDP
- Global corporate R&D investors
- Robot density
- Total early-stage entrepreneurial activity (TEA) rate
- VC investment as a % share of GDP

Innovation Results

- Competitive industrial performance (CIP)
- High-tech exports
- Industrial design registrations per million population
- Mobile app creation
- Multifactor productivity (MFP) growth rate
- Patent Cooperation Treaty (PCT) patent publications per million population
- Trademark registrations per million population

Click the button below to download the indicator definitions and sources:

Appendix B

All indicators table

Table 1

All indicators for all comparator countries

| Country/indicators | Government R&D as a % of GDP | Higher education R&D as a % of GDP | Scientific articles per 1,000,000 population | Graduates in science and engineering as a % of all graduates | Total researchers (FTE) per thousand total employment | ICT use | Perceived entrepreneurial opportunities |
|--------------------|---------------------------------|---------------------------------------|---|---|---|---------|---|
| Australia | C | B | B | C | C | A | B |
| Austria | C | B | C | A | B | A | C |
| Canada | D | B | C | B | B | A | A |
| China | B | D | D | D | D | D | B |
| Denmark | D | A | A | B | A | A | B |
| Finland | C | B | B | B | A | A | B |
| France | B | C | D | B | B | B | B |
| Germany | A | B | C | A | C | B | B |
| Ireland | D | D | B | B | B | A | B |
| Israel | D | C | C | B | B | B | B |
| Italy | C | D | D | B | C | D | C |
| Japan | B | C | D | B | B | C | D |
| Korea | A | C | D | A | A | A | C |
| Netherlands | D | B | B | C | B | B | A |
| Norway | C | B | A | C | B | A | A |
| Singapore | B | C | B | A | B | A | D |
| Sweden | C | A | B | B | A | A | A |
| Switzerland | D | A | A | B | B | A | B |
| United Kingdom | C | B | C | B | C | A | B |
| United States | B | C | C | C | C | B | A |

(continued ...)

Table 1 (cont'd)

All indicators for all comparator countries

| Country/indicators | Perceived entrepreneurial capabilities | Fear of failure rate | Business R&D as a % of GDP | VC investment as a % of GDP | Average R&D spending of domestic companies | Industrial robots installed per 10,000 employees in manufacturing industry | Total early-stage entrepreneurial activity (TEA) |
|--------------------|--|----------------------|----------------------------|-----------------------------|--|--|--|
| Australia | A | D | D | D | D | D | C |
| Austria | A | C | C | D | D | D | D |
| Canada | A | D | D | C | D | D | A |
| China | A | D | D | D | D | D | D |
| Denmark | C | C | D | D | D | D | D |
| Finland | B | C | C | D | C | D | C |
| France | B | C | D | D | B | D | C |
| Germany | C | C | C | D | A | C | D |
| Ireland | A | D | D | D | C | D | B |
| Israel | C | D | A | A | D | D | C |
| Italy | B | C | D | D | D | D | D |
| Japan | D | D | C | D | B | C | D |
| Korea | A | A | B | D | A | A | B |
| Netherlands | B | C | D | D | B | D | B |
| Norway | B | C | D | D | D | D | D |
| Singapore | D | C | D | D | D | B | C |
| Sweden | B | C | C | D | C | D | C |
| Switzerland | B | B | C | D | B | D | C |
| United Kingdom | B | D | C | D | C | D | B |
| United States | A | C | C | B | B | D | A |

(continued ...)

Table 1 (cont'd)

All indicators for all comparator countries

| Country/indicators | PCT patents per million population | Trademark registrations per million population | Industrial design registrations per million population | Multifactor productivity | Competitive industrial performance (CIP) | Mobile app creation/bn PPP\$ GDP | High-technology exports, % of manufactured exports |
|--------------------|------------------------------------|--|--|--------------------------|--|----------------------------------|--|
| Australia | D | D | D | C | D | D | C |
| Austria | D | C | D | D | C | D | D |
| Canada | D | D | D | C | D | D | D |
| China | D | D | D | C | A | D | C |
| Denmark | C | C | C | B | C | D | D |
| Finland | B | D | D | C | D | C | D |
| France | D | D | D | D | C | D | C |
| Germany | C | D | D | C | A | D | D |
| Ireland | D | D | D | B | A | D | C |
| Israel | C | D | D | A | D | A | C |
| Italy | D | D | D | D | C | D | D |
| Japan | B | D | D | D | B | D | D |
| Korea | B | D | C | A | B | D | B |
| Netherlands | C | D | D | D | C | D | C |
| Norway | D | D | D | D | D | D | C |
| Singapore | C | C | D | C | B | B | A |
| Sweden | B | C | D | D | C | C | D |
| Switzerland | A | A | A | C | B | D | D |
| United Kingdom | D | D | D | D | C | D | C |
| United States | D | D | D | C | B | D | D |

Source: The Conference Board of Canada.

Click the button below to download the indicators table:

Appendix C

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Acknowledgements

This research was prepared with financial support provided through the members of the Canadian Centre for the Innovation Economy. Visit the [Centre's website](#) for further information.

Many Conference Board of Canada colleagues collaborated to bring this research to life. Alain Francq, Director, MBA, conceived of this research project and provided overall project direction and oversight. Zafer Sonmez, Lead Research Associate, PhD, was the lead researcher on this project. Daniel Carpenter, Research Associate, MA; Nicholas Palaschuck, Senior Research Associate, MSc.; and Michael Bassett, Director, MA, contributed to the research. Support was provided by Jennifer Espy, Chief Research Officer, PhD; and Dianne Williams, Executive Director, MBA.

We also thank the members of the Research Advisory Board who supported this research:

- Jayson Myers, CEO, NGen
- Kendra MacDonald, CEO, Canada's Ocean Supercluster
- Melissa Judd, VP, Research Operations & Academic Partnerships, Vector Institute
- Patrick Tammer, Director of Investments, Scale AI
- Liane Coulahan, Director, Marketing and Communications DMZ
- Luvy Hardy, Public Relations Lead, DMZ
- Emily Smiley, Director, Partnerships and Investor Relations, DMZ

This impact paper was designed by Sarah Casselman, Senior Graphic Designer.

2024 Innovation Report Card: Benchmarking Canada's Innovation Performance

The Conference Board of Canada

To cite this research: Conference Board of Canada, The. *2024 Innovation Report Card: Benchmarking Canada's Innovation Performance*. Ottawa: The Conference Board of Canada, 2024.

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