

**WATERLOO INTERNATIONAL**

# **MAPPING OUT THE GLOBAL INNOVATION LANDSCAPE CONFERENCE REPORT**

**April 15, 2025**



**UNIVERSITY OF  
WATERLOO**

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# WATERLOO INTERNATIONAL

## ABOUT THIS REPORT

On November 21<sup>st</sup>, 2024, the University of Waterloo's Waterloo International office convened a conference called *Mapping Out the Global Innovation Landscape* and focused on the Indo-Pacific region.<sup>i</sup> The Indo-Pacific comprises 40 countries and economies: Australia, Bangladesh, Bhutan, Brunei, Cambodia, Democratic People's Republic of Korea (DPRK), India, Indonesia, Japan, Laos, Malaysia, Maldives, Mongolia, Myanmar, Nepal, New Zealand, the Pacific Island Countries (14), Pakistan, People's Republic of China (PRC), the Philippines, Republic of Korea (ROK), Singapore, Sri Lanka, Taiwan, Thailand, Timor Leste, and Vietnam.

In November 2022, Canada announced its Indo-Pacific Strategy, providing a framework to cultivate and build key relationships in the Indo-Pacific region to address joint priorities. Building on these efforts, Waterloo International's conference aimed to identify and explore Canada's opportunities in the Indo-Pacific region within emerging and disruptive technology sectors.

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# METHODOLOGY

The workshop hosted approximately 60 researchers and policy community members specializing in innovative fields of study. Participants represented a spectrum of professional and academic backgrounds, contributing to the breadth of perspectives during the sessions. The workshop was structured around three thematic panel discussions: the importance of collaboration, opportunities for collaboration, and challenges ahead, each addressing a distinct dimension of innovation. Following each panel, the panelists and attendees participated in facilitated roundtable discussions designed to generate dialogue and insights related to the panels' key themes.

To capture the full breadth of the discussions, a dual-recording method was employed. Each of the six roundtables was equipped with an artificial intelligence (AI)-powered diction application for real-time transcription of discussions. This software provided a verbatim record of the exchanges while simultaneously generating automated summaries with hyperlinks to specific points in the transcript for ease of reference. To mitigate the risk of missing words or inaccuracies, a conference rapporteur was assigned to each table to produce handwritten notes, serving as a secondary layer of documentation. Participants were instructed to rotate between roundtables between sessions, ensuring diverse group compositions and unique discussions throughout the conference.

The transcription outputs and rapporteurs' notes underwent a rigorous review process to identify recurring themes and points of convergence that emerged from the breakout discussions. Automated summaries from the diction app provided a high-level overview, while the full transcripts and handwritten notes allowed for further examination of the content. The process thus involved identifying thematic patterns and validating the relevance of the themes against the original transcripts.

The key themes and topics identified during this process were then fact-checked to ensure accuracy and alignment with the original discussions. These findings were then synthesized into this report, which supported the primary themes. This report maintains participant anonymity by utilizing generic identifiers such as "academic" ensuring confidentiality while preserving the integrity of the contributions. This approach ensured that the findings were not only reflective of the workshop's discourse but also adhered to rigorous standards of qualitative data analysis.

**60**

Participants from  
researchers to  
policy experts

**3**

Thematic panels  
exploring collaboration,  
innovation  
opportunities, and  
future challenges

**6**

Roundtable  
discussions

# THEME 1

## COLLABORATION WITH THE INDO-PACIFIC

### 1.1 COMMERCIALIZATION OPPORTUNITIES

Key to Canada's Indo-Pacific strategy is its recognition of the region's market potential when compared to the rest of the world. For example, Standard & Poor's (S&P) Global projects 4.5 per cent GDP growth in the region (excluding China) for 2024 compared to 2.7 per cent globally.<sup>ii</sup> By 2040, the Indo-Pacific is expected to constitute 50 per cent of the world's GDP.<sup>iii</sup> A growing economy is one more likely to invest in research and development, commercialization, and in educating its workforce. As one of the fastest-growing regions in the world, the Indo-Pacific provides Canada with not only a great opportunity for research collaboration but also provides Canadian post-secondary institutions a large market for recruiting students and expanding the commercialization of Canadian research.

One potential avenue for collaboration is joint industrial research and development projects between Canada and Indo-Pacific nations. For example, the recent call for proposals between Taiwan and Canada focuses on key sectors, such as health and biotechnology, Information and Communication Technology (ICT), digital technologies, semiconductors, advanced materials, advanced manufacturing, quantum technologies, artificial intelligence, and clean technologies. Organized through the Canadian International Innovation Program (CIIP) and Taiwan's Department for Industrial Technologies (DoIT) in collaboration with the Industrial Technology Research Institute (ITRI), this initiative provides funding for eligible Canadian small and medium-sized enterprises (SMEs), as well as potential university and research institute partners, to collaborate with their counterparts in Taiwan.<sup>iv</sup> Similarly, another opportunity to support commercialization efforts is through the Eurostars call for projects, where eligible Canadian SMEs, along with potential university and research institute

### FIGURE 1: ANNUAL GDP GROWTH RATE OF SELECTED EMERGING INDO-PACIFIC COUNTRIES

Source: *World Bank*



partners, to collaborate with their counterparts in Taiwan.<sup>iv</sup> Similarly, another opportunity to support commercialization efforts is through the Eurostars call for projects, where eligible Canadian SMEs, along with potential university and research institute

partners, can collaborate with organizations in Singapore or South Korea on innovative projects or technology-based services with a civilian purpose in any area of technology.<sup>v vi</sup>

Both proposal calls aim to develop commercially viable technologies while fostering deeper research collaborations between the participating countries.

Beyond fostering research collaboration, initiatives like these create pathways for knowledge exchange and innovation. It is clear there is a growing demand for high-quality education in Indo-Pacific economies, as outlined by the Economic Research Institute for ASEAN and East Asia (ERIA). The rapid digitisation of the region's economies also places a premium on workers who possess the skills to not only create but also engage with digital technologies. As investment in automation increases, a modern education is essential to ensure that workers in labor-intensive sectors like agriculture—who still constitute a significant portion of the Indo-Pacific population as of 2023—are not left behind.<sup>vii</sup> This presents an opportunity for Canadian universities and companies to attract and invest in the Indo-Pacific's human capital.

## 1.2 ACCESSING THE TALENT PIPELINE

As Indo-Pacific economies expand, their populations are also experiencing growth. Emerging countries like Indonesia and the Philippines have large numbers of young people eager for educational and professional opportunities. Malaysia and Vietnam also share this demographic advantage. As of 2020, approximately 40% of Malaysia's population was between the ages of 15 and 30, while in Vietnam, around 21% of the population was aged 10 to 24 as of 2019.<sup>viii</sup> According to the United Nations Population Fund (UNFPA), Vietnam's workforce advantage due to demographic trends is expected to continue until 2039.<sup>ix</sup> The Indo-Pacific region, particularly Vietnam, Indonesia, Malaysia, and the Philippines, is fueled by large youth populations that offer a demographic dividend, alongside rapidly expanding digital ecosystems that accelerate their economic growth.<sup>x xi xii</sup> A vital way for Canada's post-secondary institutions to leverage this demographic group is to expand inbound student mobility programs.

Bilateral student mobility programs, such as research internship exchanges or international co-op opportunities, allow young talent to share knowledge and develop research networks between countries. The aim is to attract international students and retain them for graduate studies and post-doctoral positions in Canada; however, it is important that this relationship be reciprocal. Bilateral student mobility

*“I think there needs to be some more considered thought on initiatives that are more medium term and long term, that may require a reallocation of resources that are beyond the immediate payback of student attraction for revenue and fundraising. That's more about medium and long term, particularly for those economies that have the youth dividend and desiring for that educational partnership. That will be a win.”*

- Canadian civil servant

programs enhance research collaboration, skill development, and employability while strengthening institutional ties and fostering cultural exchange between Canada and Indo-Pacific partners.<sup>xiii xiv</sup>

As one workshop participant observed, despite a general interest in exchange agreements among Indo-Pacific institutions, Canadian universities struggle with a lack of interest from domestic students to participate in exchanges in Asia.<sup>xv</sup> One reason for this appears to be a lack of funding, with a participant sharing that their exchange to China was funded by Beijing and an international foundation. American students can also access generous funding from the U.S. State Department through the Fulbright Program, for example.

Similarly, Canadian researchers may be eligible to apply for NSERC Alliance International grants as a potential funding source for international research collaborations. However, this grant specifically requires that the international academic collaborator be an assistant, associate, or full professor. Therefore, the key to Canada benefitting from the Indo-Pacific's youth dividend is to incentivize student mobility and exchanges.<sup>xvi</sup>

Student mobility allows Canada to access the youth dividend of countries like India, Indonesia, and the Philippines, creating a pipeline of skilled talent that benefits both Canada and student home countries. Student mobility helps strengthen people-to-people ties but also has the potential to drive innovation and economic growth in both Canada and the Indo-Pacific by cross-fertilizing knowledge.

Knowledge cross-fertilization can be achieved through collaboration on high-priority technologies such as artificial intelligence, which is a key focus for both regions as they work to accelerate growth and develop expertise in AI. In Thailand's 2022 National Artificial Intelligence Strategy, one of the objectives is to cultivate more than 30,000 AI professionals within the next six years, with international cooperation with researchers and experts being a key strategy.<sup>xvii</sup> This presents a potential avenue for Canada to expand research collaborations with Thailand by leveraging its strong AI ecosystem.

Given the significant presence of youth in the Indo-Pacific, the region offers numerous opportunities for knowledge exchange and technology development. In Indonesia, for example, nearly half the population is under

**60%**  
of international students  
in Canada come from the  
Indo-Pacific region

the age of 30.<sup>xviii</sup> Engaging with young people can introduce them to potential opportunities to study at Canadian institutions and build lasting partnerships. Existing programs can also be leveraged to strengthen the talent pipeline between the two regions, such as the Canada-ASEAN Scholarships and Educational Exchanges for Development (SEED) program, which provides students from ASEAN member states, particularly women, with short-term study or research opportunities in Canada. This is especially relevant given that about 60% of international students in Canada come from the Indo-Pacific

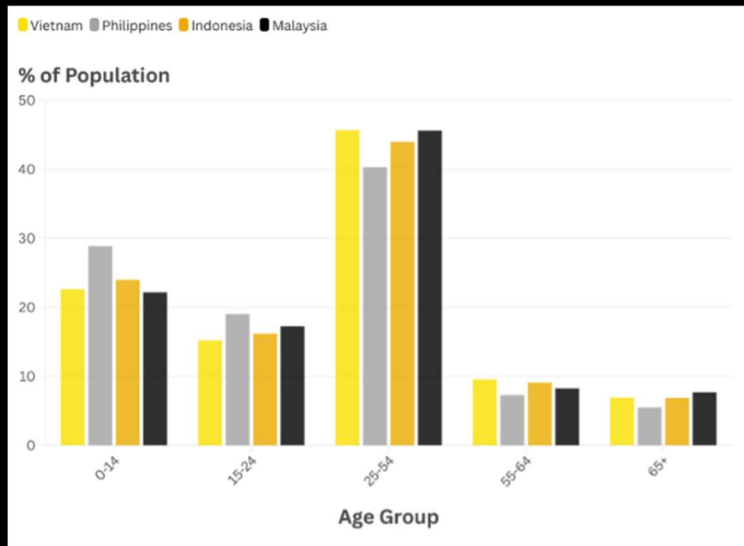
region, highlighting the strong educational ties between the regions.<sup>xix</sup> As of October 2024, 142 students from Thailand have received scholarships under this program to study in Canada.<sup>xx</sup>

Programs like SEED, which actively support women while fostering educational collaborations, are critical to advancing gender equity in STEM education and research. Increasing women's participation and leadership strengthens scientific innovation by bringing in diverse perspectives and addressing a wider range of challenges. Without this, the field risks missing out on key insights and limiting the impact of research. In knowledge exchange partnerships, scholarships and other incentives, along with fostering equitable learning environments, play a key role in ensuring more women and other underrepresented groups can actively contribute to STEM fields.

The ASEAN Science, Technology, and Innovation (STI) cooperation agenda has initiatives in place for fellowships and awards for women scientists to promote mobility of scientists for knowledge exchange partnerships while ensuring the inclusivity of women in STI. This is particularly important in fields where women's lived experiences are directly relevant to research and policy. For example, in many regions, women are primarily responsible for water collection, yet they remain underrepresented in water management research and decision-making.<sup>xxi</sup> <sup>xxii</sup> Building on insights from the Advancing towards gender mainstreaming in water resources management report, promoting women's influential involvement in these processes integrates their firsthand experiences and perspectives, resulting in more responsive and equitable water policies.<sup>xxiii</sup> Ensuring women's participation in areas where their lived experiences provide valuable insights, such as water resource management, leads to more practical, community-driven solutions that better address the needs of those most affected.

## FIGURE 2: DEMOGRAPHIC BREAKDOWN OF EMERGING INDO-PACIFIC COUNTRIES AS PERCENTAGE OF TOTAL POPULATION

Source: *UNESCAP*



overshadowed by closer and more active countries like Australia, China, and India. To counter this, a visiting scholar from the Indo-Pacific argues, Canada needs a more region-specific strategy that recognizes the unique dynamics of Southeast Asia, South Asia, and East Asia, rather than grouping them together under a broad Indo-Pacific policy.

### 1.3 TECHNOLOGICAL INNOVATION

The Indo-Pacific region has emerged as a powerhouse of technological innovation, particularly in fields like artificial intelligence, cybersecurity, and quantum computing.<sup>xxvi</sup> For Canada to maintain its competitive edge and leadership in these rapidly evolving sectors, collaboration with key players in the region is not just beneficial but essential. Japan, South Korea, and China stand out as technological giants in the Indo-Pacific, each with unique strengths. Japan's robotics industry and advanced manufacturing capabilities, South Korea's semiconductor expertise and 5G technology, and China's massive AI ecosystem and quantum computing advancements offer rich opportunities for Canadian researchers and businesses to engage and learn.<sup>xxvii</sup>

Building on these opportunities, Japan's ASPIRE (Adopting Sustainable Partnerships for Innovative Research Ecosystem) program issues proposal calls in priority research fields to foster global research collaboration and mobility. Canada is currently listed as a partner country in key areas such as AI and information, biotechnology, energy, materials, quantum technologies, semiconductors, and telecommunications.<sup>xxviii</sup> <sup>xxix</sup> This presents a potential avenue for Canadian institutions to collaborate with Japan-based researchers in science and technology through the next open call for international joint research.

However, Canada faces challenges in distinguishing itself in this competitive landscape. The country's decentralized approach to research and innovation, while fostering creativity, can sometimes hinder the

Another program that Canadian institutions could benefit from leveraging is the research collaboration agreement between Canada's Mitacs and Taiwan's National Applied Research Laboratories (NARLabs). In 2023, Mitacs announced a three-year agreement aimed at cultivating talent through international research collaborations for Canadian and Taiwanese students and postdoctoral fellows.<sup>xxiv</sup> Mitacs also has partnerships with the Japan Society for Promotion of Science (JSPS) and the National Research Foundation (NRF) in Korea.<sup>xxv</sup> These initiatives provide a valuable entry point for Canadian universities to access and engage with talent in the Indo-Pacific region. That said, Canada and its universities must first overcome its limited visibility in the region. As noted by several workshop participants, Canada is often perceived as a marginal player,

development of a cohesive national strategy.<sup>xxx</sup> As one workshop participant pointed out, countries like China have clear, long-term plans for dominating specific technological sectors, backed by substantial government funding and support. To leverage the opportunities in the Indo-Pacific, Canada needs to adopt a more strategic approach. This could involve identifying niche areas such as clean technologies, quantum technologies, and artificial intelligence, where Canada has a competitive advantage and focusing limited resources on these sectors.

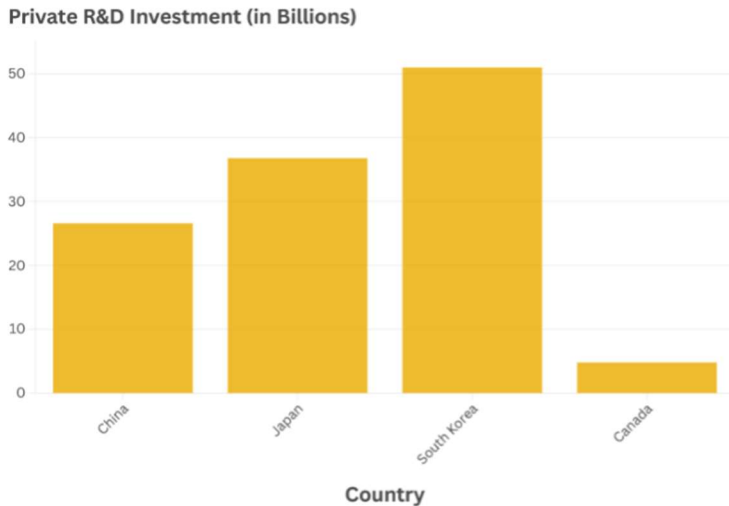


Figure 3: Comparative Levels of Private R&D Investment

Source: [UNESCO Institute for Statistics](#)

## 1.4 ADDRESSING GLOBAL CHALLENGES THROUGH INSTITUTIONAL PARTNERSHIPS

Tackling global challenges like climate change requires a collaborative approach, and the Indo-Pacific region, one of the most vulnerable to environmental changes and climate-related disasters, plays a vital role in fostering partnerships to address these issues. As the source of 53% of global carbon emissions, the Indo-Pacific is central to addressing climate change and advancing environmental sustainability. This region's unique biodiversity, coupled with its rapid economic growth and geopolitical significance, makes it a key player in tackling global issues.

Climate change is another pressing issue where collaboration with the Indo-Pacific is essential. Countries like the Philippines face frequent natural disasters, such as typhoons, which are exacerbated by climate change. Canada can offer expertise in disaster risk reduction, clean technology, and sustainable practices. For example, Canadian innovations in green technology and energy security could help Indo-Pacific nations reduce their environmental footprint while continuing their technological and economic advancements. This approach not only addresses immediate challenges but also fosters long-term resilience and sustainability in the region. For Canada, engaging with the Indo-Pacific offers an opportunity to contribute to solutions that have far-reaching global impacts while leveraging its own strengths in research, innovation, and environmental expertise. Canada's leadership in biodiversity research, particularly in DNA barcoding and bioinformatics, makes it a valuable partner for Indo-Pacific countries.<sup>xxxi</sup> The region's biodiversity is unparalleled, yet much of it remains undocumented. While many developing countries in the Indo-Pacific prioritize immediate economic concerns, rising standards of living and economic growth are likely to bring biodiversity conservation into sharper focus. By forming partnerships now, Canada can play a pivotal role in shaping future conservation efforts and training local experts in biodiversity science. This proactive engagement ensures that Canada is involved in foundational work that will influence environmental policies and practices in the region for decades to come.

While the Indo-Pacific presents vast opportunities for Canada to enhance its technological leadership and global competitiveness, success will require a strategic, long-term approach that plays to Canada's strengths while addressing its current limitations in the global innovation landscape.

While collaborative research is essential to scientific innovation, it also opens the door to research security threats. It is important to strike a balance between ensuring research security while maintaining the open and internationally collaborative nature of Canada's research ecosystem.

Recognizing the importance of international cooperation, in 2023, Colleges and Institutes Canada (CICan) and a delegation from the Vietnam Higher Education Network of Entrepreneurship & Innovation (VNEI) signed a Memorandum of Understanding (MoU) to facilitate joint scientific research projects between the two countries. This agreement focuses on high-priority areas such as climate change mitigation, adaptation, and energy transition. This provides Canadian institutions with opportunities to collaborate with Vietnamese counterparts in tackling these critical challenges.<sup>xxxii</sup>

*“A lot of the policy makers are waking up to the reality about the environmental footprint of, for example, constructing a data center in your country. This is an opportunity where Canada could come in and can introduce best practices and technologies and tools to keep continuously leap frogging on your AI journey, but at the same time providing you with the tools to sort of reduce the environmental footprint, because that's already been an ongoing discussion”*

- Unattributed

# THEME 2

## OPPORTUNITIES FOR COLLABORATION

### 2.1 ARTIFICIAL INTELLIGENCE AND QUANTUM TECHNOLOGIES

Canada's growing leadership in AI and quantum computing, supported by strategic investments and research initiatives, creates valuable opportunities for international partnerships and collaborations. Canada is already home to prominent AI hubs like Toronto, Montreal, and Edmonton, as well as research centers such as the Vector Institute, MILA, and the Alberta Machine Intelligence Institute (Amii). Canada's vibrant quantum computing ecosystem, supported by hubs like Waterloo's Quantum Valley, home to the University of Waterloo's Institute for Quantum Computing, and Quantum City in Calgary, positions it well for international collaborations in artificial intelligence and quantum technologies.

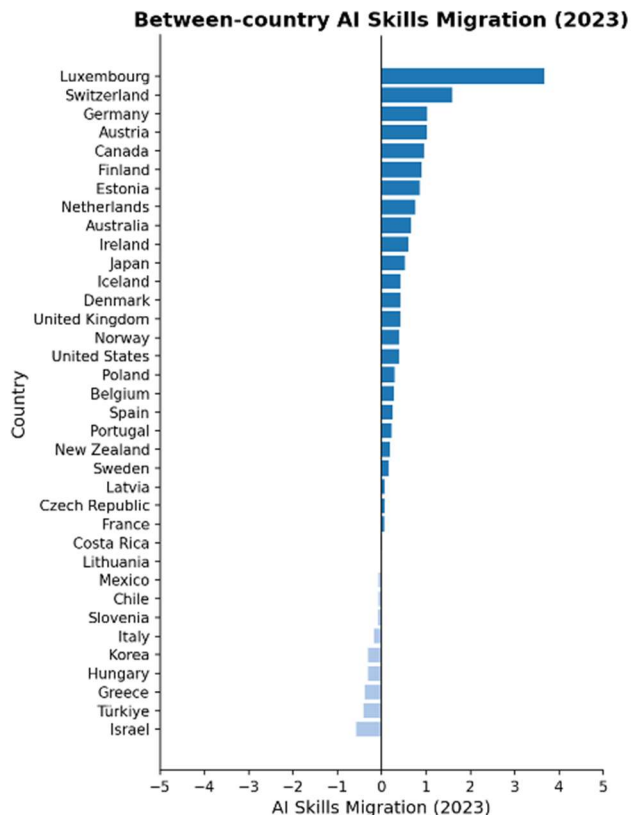
Canada's growing AI ecosystem also positions it as a possible AI hub. Figure 4 illustrates the net migration flows of LinkedIn members with AI skills between 2019 and 2023. Canada shows a net gain, highlighting the country's ability to attract and retain AI talent, reflecting the impact of its investments in AI research, education, and funding. With a strong presence in the global AI landscape, Canada serves as a strategic partner for cross-border collaborations, particularly with Indo-Pacific countries interested in advancing AI and quantum technologies.

*"The next big conversion piece that I'm going to suggest is the combo between AI and Quantum. Are we looking at it? And if we are, great, in which timeframe, and how is it going to disrupt you?"*

- Canadian civil servant

Canada's ability to attract and retain AI talent has allowed its companies to expand expertise globally and address skills gaps through strategic partnerships. For example, BlackBerry identified both a market opportunity and a significant skills gap in Malaysia. While providing cybersecurity tools to the Malaysian government, BlackBerry recognized the need to address the shortage of skilled workers in this area.<sup>xxxiii</sup> To bridge this gap, BlackBerry collaborated with Toronto Metropolitan University (TMU) to establish a Cybersecurity Center of Excellence in Malaysia, offering education and training to upskill local talent.<sup>xxxiv</sup>

The graph below highlights the relative interest in AI courses in English across various countries, including several in the Indo-Pacific region, such as Malaysia, Singapore, Thailand, and the Philippines. It reveals that interest in AI education in these Indo-Pacific countries remains relatively low compared to regions like the EU, the United Kingdom, and the United States. This suggests a smaller but potentially growing demand for AI training and education as industries in the region adopt new technologies. Canada, with its strong foundation in AI research, education, and development, is well-positioned to help address this gap. Leveraging its expertise and existing partnerships, Canada can play a key role in strengthening AI education and fostering innovation in the region, ultimately contributing to the global expansion of AI talent and application.



**Figure 4: Between Country AI Skills Migration**

Dark blue bars indicate net gains in AI talent, light blue represents net losses in AI talent.

Source: [OECD](#)

abroad to facilitate knowledge exchange, aligning with the National Strategy's goal of positioning Vietnam among the top four countries in AI research and development within ASEAN.<sup>xxxvi xxxvii</sup> These efforts highlight Vietnam's commitment to integrating into the global AI ecosystem and strengthening its AI talent pipeline through international engagement.

Beyond AI, Thailand is also prioritizing investments in quantum technologies, with a substantial number of scientists receiving training from international universities through government-funded programs focused on quantum technology and global collaborations. Thai universities, such as Prince of Songkla University, are actively fostering international partnerships, with its Faculty of Science hosting an international quantum science and technology conference in December 2024.<sup>xxxviii</sup>

With shared priorities in quantum computing, quantum communications, and quantum sensing, strengthening research and educational partnerships with Thailand could help Canada expand its existing quantum ecosystem through global collaboration.

Canada's recognized expertise in AI and quantum technology research and development positions it as a valuable partner for countries in the Indo-Pacific region like Thailand and Vietnam in addressing skills gaps and fostering innovation through collaborative training and education programs. Such collaborations highlight Canada's potential to build stronger research partnerships and address regional challenges in the Indo-Pacific, solidifying its role as a key partner in advancing technological solutions. Taiwan is quickly positioning itself as a leader in quantum technology, building on its strong foundation in semiconductor manufacturing and making major

As interest in AI talent development continues to grow, Thailand's Office of National Higher Education Science Research and Innovation Policy Council recognizes the need to build a skilled workforce in AI engineering and data science. There is a strong emphasis on education and training to support the expansion of Thailand's AI ecosystem.<sup>xxxv</sup> Given Thailand's focus on AI education and Canada's established leadership in AI research and development, this presents potential opportunities for educational partnerships.

Vietnam's National Strategy on Research, Development, and Application of Artificial Intelligence (AI), published in 2021, outlines key priorities for advancing AI capabilities by 2030. The strategy emphasizes fostering international collaboration through expert exchanges, facilitating partnerships between Vietnamese and foreign AI research and training institutions, and encouraging participation in global AI associations and networks. Additionally, it seeks to attract foreign AI experts and overseas Vietnamese professionals to contribute to AI research, training, and advisory roles within Vietnam.

Established AI research hubs, such as the International Research Centre for Artificial Intelligence at Hanoi University of Science and Technology, prioritize international partnerships as a core objective. The center aims to expand collaboration with research groups

investments in research and development. This is emphasized by recent breakthroughs such as Taiwan's development of a photonic quantum computer that operates at room temperature. Taiwan's National Science and Technology Council (NSTC) has committed \$259 million (NT\$8 billion) over five years, prioritizing quantum innovation through initiatives like the National Quantum Team, which brings together experts from government, academia, and industry.

Taiwan is also strengthening its global partnerships through collaborations with the United States, France, and Finland. In April 2024, Taiwan and Canada signed the Science, Technology, and Innovation Arrangement as a commitment to advancing research collaboration and talent exchange. The agreement focuses on key areas like AI, semiconductors, and biotechnology, building on Taiwan's Chip-Based Industrial Innovation Program to drive industry growth and tackle global challenges.

With strong research capabilities, supportive policies, and a focus on commercial applications, collaborations and partnerships drive innovation in advanced manufacturing.<sup>xxxix</sup>

## 2.2 ENVIRONMENTAL SUSTAINABILITY

Canada's expertise in renewable energy, water management, carbon capture, and bioinformatics aligns closely with the Indo-Pacific's urgent needs in biodiversity conservation and climate change mitigation. Experts highlight the potential for upskilling and research collaborations for institutions working in these sectors.

Emerging technologies, like AI, are also now being integrated into sustainability efforts, such as smart irrigation systems. AI optimizes water usage by monitoring environmental factors like sunlight and moisture rather than relying on basic timers. This highlights the intersection of research in sensors, water management, and AI, an area where institutions like the University of Waterloo excel due to their interdisciplinary strengths, including those fostered by the Water Institute. Leveraging such cross-disciplinary knowledge creates innovative solutions that could be commercialized, especially to countries where this type of integration is not a research priority.

Canada's strong expertise in environmental research, which surpasses that of many other countries, creates further opportunities for collaboration in regions like the Indo-Pacific, where such expertise is in high demand.

Indonesia is increasingly prioritizing environmental sustainability and the transition to a green economy. The agriculture and marine industries are key areas of focus, alongside biotechnology, to drive innovation in agriculture through genetically modified crops, precision farming, and bioengineering.<sup>xi</sup>

The 2024 National Roadmap for Indonesia's Circular Economy (2025-2045) emphasizes the role of international partnerships in achieving these targets.<sup>xii</sup> Hasanuddin University (UNHAS) in Indonesia has an internationalization program dedicated to fostering global partnerships, particularly in the marine and fisheries industries.<sup>xiii</sup> Collaborations with Canadian institutions, such as the University of Waterloo's Water Institute, could create valuable opportunities for knowledge exchange, benefiting both Indonesia and Canada.

Countries like the Philippines have shown significant interest in conducting environmental research. The director of a policy research institute explained the opportunity for Canada to play a significant role in addressing the environmental challenges associated with technological advancements in regions like the Philippines and the broader Indo-Pacific. There is a growing awareness among policymakers of the environmental impact of developments such as constructing data centers, creating a demand for sustainable solutions.

Canada's ongoing partnerships with the Indo-Pacific region demonstrate a shared commitment to advancing sustainability, technological innovation, and economic growth. By leveraging its strengths in AI research, clean

energy, and advanced manufacturing, Canada is well-positioned to deepen collaborations, address global challenges, and support the global transition toward a more resilient and sustainable future.

Canada has an opportunity to position itself as a leader in AI best practices, green technologies, and tools that allow countries to continue advancing their AI capabilities while mitigating the technology's environmental footprint. For example, Canadian investors could complement existing U.S. investments, like those from Amazon Web Services, by introducing clean or renewable technologies, particularly in areas grappling with climate challenges like typhoons and disaster risk reduction. This is especially relevant as conversations around green and energy security in the region are currently dominated by China, known for its solar panel production and related technologies. Canada's ability to offer sustainable and innovative solutions could provide a compelling value proposition to countries in need of environmentally responsible development.

The Philippines' economy is susceptible to environmental degradation and climate change due to its dependence on climate-sensitive sectors such as agriculture, fisheries, and eco-tourism. Frequent and severe weather events, such as typhoons, cause displacement, financial losses, and infrastructure damage, exacerbating resource scarcity, livelihood challenges, and inequalities. Canada supports the Philippines by facilitating climate financing and providing technical expertise to promote sustainable practices. One way Canada is collaborating with the Philippines on environmental sustainability is through a \$28.15 million investment, announced in early 2024, to support development programs focused on climate adaptation and disaster resilience.

As part of its broader environmental research efforts, the Philippine Council for Industry, Energy, and Emerging Technology Research and Development is currently seeking research proposals on wastewater treatment and reuse, as well as the assessment and remediation of contaminated inorganic and organic soils.<sup>xliii</sup> This funding opportunity, aimed at universities and research institutions in the Philippines, highlights the region's commitment to advancing environmental research. Universities such as the University of the Philippines Los Baños (UPLB) and the Natural Sciences Research Institute University of the Philippines Diliman have been active institutions in these fields of study.

Collaboration with international partners, including Canada, could further enhance these efforts and provide mutual benefits through shared expertise and innovation.

## **2.3 ADVANCED MANUFACTURING AND SEMICONDUCTOR COLLABORATION**

The semiconductor industry is a focus area for both Canada and the Indo-Pacific region, where collaboration between the two regions can serve as a favourable approach for technological progress.

Vietnam is actively collaborating with international educational institutions to strengthen its semiconductor technology sector. The director of the National Innovation Centre (NIC) in Hanoi has highlighted the importance of forming partnerships with leading global universities to develop long-term semiconductor training programs. While the NIC currently offers short-term courses in this field, there is a growing recognition of the need for deeper cooperation to align with Vietnam's 2030 objectives. These goals include expanding participation in advanced microcircuit design, mastering microcircuit packaging and testing technologies, and building greater expertise in semiconductor manufacturing.<sup>xliv</sup>

In addition to Vietnam, Canadian institutions have opportunities to establish research and development partnerships with counterparts in Taiwan. In April 2024, the Canadian Trade Office in Taipei signed a Science, Technology, and Innovation Arrangement with the Taipei Economic and Cultural Office in Canada. This agreement enables both regions to collaborate on research initiatives and business-led co-innovation partnerships in high-tech sectors under the Canadian International Innovation Program (CIIP). Through this program, Canadian organizations can engage in international research and development collaborations with foreign

partners on projects that have commercialization potential.<sup>xlv</sup> Eligible partners for these initiatives include South Korea, Taiwan, and India.<sup>xlvi</sup>

As part of a previous CIIP partnership development initiative, a call for applications was issued in 2024 for participation in the Canadian semiconductor technology research and development delegation to Taiwan. With a focus on the silicon photonics and photonic compound semiconductor sectors, the delegation took place in September 2024, aiming to foster partnerships between Canadian SMEs, Taiwanese SMEs, and research institutions.<sup>xlvii</sup>

These collaboration opportunities through CIIP enable Canada to work alongside partner countries to drive innovation in advanced manufacturing and the semiconductor industry. Future calls for applications under CIIP can enable participating Canadian organizations to further drive knowledge exchange and advancements in these sectors through research and development partnerships.

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# THEME 3

## CHALLENGES AHEAD

### 3.1 POTENTIAL SPILLOVER EFFECTS

Emerging economies in the Indo-Pacific, such as Malaysia, Vietnam, and Indonesia, maintain strong economic ties and research partnerships with China, further complicating Canada's position which is increasingly distancing itself from China because of research security concerns.<sup>xlviii</sup> Malaysia recently signed an MOU with the Chinese Academy of Sciences (CAS) reaffirming its commitment to strengthen collaboration in science, technology, and innovation.<sup>xlix</sup> Similarly, the Vietnam Defense Strategy Institute has partnered with Chinese Academy of Military Science, while Indonesia continues to deepen its research collaborations with China in strategic fields.<sup>1</sup>

These changing geopolitical dynamics underscore the importance of a balanced approach by Canada which fosters international research partnerships in the region without compromising Canada's research security.<sup>li</sup> However, a researcher noted that the academic community is often "confused and cautious" about navigating new research security policies without clear, actionable guidance. There were also genuine concerns among conference participants regarding the challenge of creating balanced policies that protect national interests while still enabling meaningful global collaboration. Although Canada is working on creating more coherent policy frameworks for research security—such as the Sensitive Technology Research and Affiliations of Concern (STRAC),<sup>lii</sup> which aims at ensuring research security in 11 sensitive technology areas by preventing research collaborations with institutions linked to military and national defense entities—there is growing concern among the research and academic community about the unintended negative consequences of such policies.

*"Indonesia has a very open policy in terms of its trade arrangements, because once you adopt the strategic trade control that's very heavily US influenced, there is a tendency that you will exclude Chinese technology suppliers and investors, and so Indonesia [and] the rest of the ASEAN countries are very conscious of that consequence if they do accede to the strategic trade control regime."*

**- VISITING SCHOLAR FROM  
THE INDO-PACIFIC**

Some argue that policies like this can negatively impact academic exchange and research collaboration, hindering the translation of research into innovation for 'global good.'<sup>liii</sup> Some have raised concern that some definitions are still too broad, potentially barring Canadian researchers from accessing useful, valuable international research databases.<sup>liv</sup> Similarly, the CEO of the U-15 Group of Canadian Research Universities has voiced concerns that such policies can potentially undermine Canada's international reputation.<sup>lv</sup> To address these challenges, participants emphasized the importance of training researchers to navigate complex policies and creating balanced policies that support international research collaboration while safeguarding national interests.

### 3.2 VISA AND IMMIGRATION ISSUES

Visa and immigration challenges represent a significant barrier to attracting global talent and fostering research collaborations between Canada and the Indo-Pacific region. Conference participants highlighted that Canada is falling behind the global race for talent due to its restrictive visa policies, delays in visa processing, and the growing negative perceptions of Canada as a destination for international talent. These factors significantly hinder the mobility of students and researchers, weakening Canada's ability to establish and sustain international partnerships.

Furthermore, there is a risk of Canada becoming an increasingly unattractive destination for global talent as the anti-immigrant sentiments sweep across Canada and new policies restricting the intake of international students, along with the recent cap introduced on the number of permanent residencies take effect.<sup>lvi</sup>

Visa processing delays and new policies limiting the number of international students admitted were frequently mentioned as significant barriers to attracting and retaining the talent Canada needs to bridge its current talent gap. International students play an important role in Canada's research landscape and economy,<sup>lvii</sup> but persistent visa delays disrupt their enrollment and settlement plans, making Canada less appealing as an education destination.<sup>lviii</sup> Such delays not only hinder research timelines but also have a negative impact on Canada's ability to maintain a robust talent pipeline. The Canadian government has restricted visa application intakes to reduce the backlog and address long wait times. Measures such as capping permanent residence applications under the Start-up Visa program, which aims to attract entrepreneurs to build businesses in Canada and pausing applications for the Self-Employed Persons Program have been implemented to mitigate visa delays and prioritize processing current applications more efficiently.

As of October 2024, for example, 33% of the study permit applications were backlogged, leaving students uncertain about their immigration decisions and delaying the start of their academic journeys.<sup>lix</sup> Recent caps introduced by the government on the number of study and post-graduate work permits (PGWPs), combined with rising anti-immigrant sentiment in Canada, have created further confusion and uncertainty among prospective students. These factors collectively deter talent from choosing Canada as their destination.<sup>lx</sup>

The situation is not limited to students. Canada is also falling behind in attracting innovative entrepreneurs who could contribute to the economy on a global scale. The Start-Up Visa program, designed to bring in global entrepreneurs, is also suffering from significant backlogs, with an average processing time of 40 months.<sup>lxi</sup>

These inefficiencies are taking a toll on Canada's global competitiveness. Canada ranked 5th on the OECD Indicators of Talent Attractiveness (ITA) in 2019 but has now fallen to the 10<sup>th</sup> rank, lagging behind other OECD countries in the global race for talent.<sup>lxii</sup> To remain competitive, Canada must introduce new immigration programs and policies tailored to attract highly skilled international students and professionals, especially from the Indo-Pacific.

Participants at the conference emphasized that new restrictive visa policies and limited post-graduation pathways have negatively impacted Canada's popularity as an education destination in the Indo-Pacific. As one participant noted, this perception weakens Canada's ability to attract and retain talent. Canada needs to do more to promote its education brand in these emerging economies, which can provide a rich stream of talent for critical sectors.

Talent retention is a critical challenge for Canada in its collaborations with the Indo-Pacific region. Many international students and skilled professionals face barriers to staying in Canada, often due to restrictive visa policies, limited post-graduation pathways, and underutilization of their skills.

*"Projects that have gotten approved, professors have already identified a postdoc or grad student, and then they end up not being able to come because **they couldn't get a visa**, and then the professor had to start all over again."*

— A senior official at a research organization.

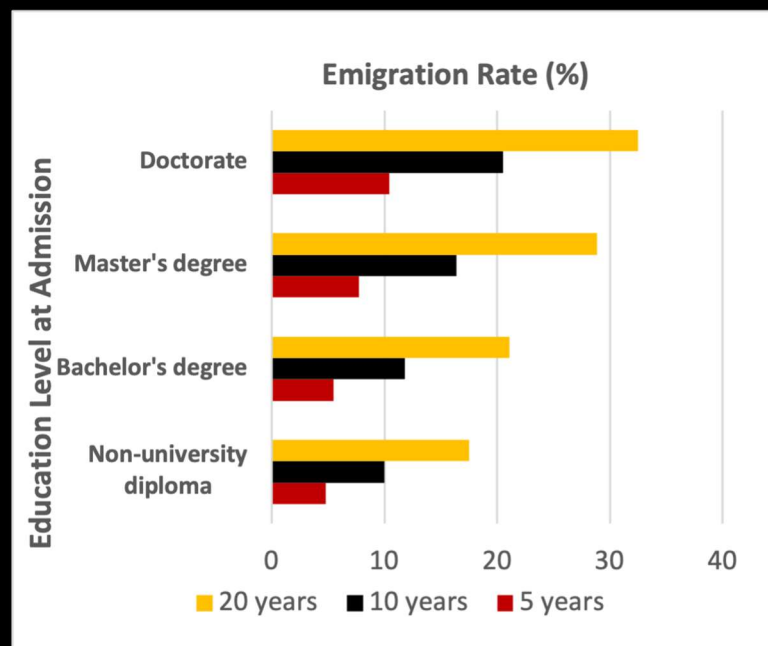
A recent survey on immigrant retention in Canada found that 32% of international students or temporary foreign workers are likely to leave Canada within two years primarily due to expensive housing, financial strain, and insufficient wages, with high housing costs being the most significant factor.<sup>lxiii</sup> This is particularly alarming when it comes to Canada's aim to attracting and retaining new talent from the Indo-Pacific as part of its Indo-Pacific Strategy because 60% of the international students coming to Canada are from the Indo-Pacific region.<sup>lxiv</sup> With limited post-graduation permanent residency pathways, in light of the recent cuts in the permanent residency numbers, many international students and foreign workers (many of whom are former international students) will be forced to leave Canada.

Figure 5 shows a clear trend: the likelihood of educated immigrants leaving Canada rises with their education level. Over 10% of doctorate-holding immigrants emigrate within five years of admission, climbing to 30% after 20 years.<sup>lxv</sup>

The underutilization of skills is another important factor contributing to Canada's newcomer talent retention problem. Reports suggest that many immigrants face difficulties continuing work in their fields of expertise, mainly due to the lack of 'Canadian experience' or the lack of recognition of foreign experience and credentials they bring.<sup>lxvi</sup> For example, in 2021, over 25% of all immigrants with foreign advanced degrees were employed in job roles that did not require such qualifications.<sup>lxvii</sup> According to Statistics Canada, as of November 2024, the unemployment rate for recent immigrants who landed five or fewer years ago is more than double that of those born in Canada.<sup>lxviii</sup> This is the same category of immigrants who are most likely to leave Canada with the annual emigration probability peaking at 1.4% in their fourth or fifth year of admission.<sup>lxix</sup>

**FIGURE 5: TRENDS IN EMIGRATION RATES BY EDUCATION LEVEL (1982-2017)**

Source: *Statistics Canada*



Streamlining visa processing, expanding post-graduation pathways, and improving the recognition of foreign credentials are essential steps to retaining international talent and sustaining research collaborations. By tackling these issues, Canada can strengthen its global competitiveness and position itself as a leading destination for skilled talent and innovation in the Indo-Pacific region.

**3.3 FRAGMENTED POLICIES AND UNDER-INVESTMENT**

As global competition intensifies in high-tech and critical sectors, leading countries are reinvesting heavily in Research and Development (R&D) to secure their positions in the value chain. As the competition to develop talent

and technology to deal with the global challenges of the 21st century intensifies, Canada is lagging its peers in scientific training, research, and development.

Canada’s limited and inconsistent funding for research and development was identified as a major barrier to both domestic R&D and international collaborations. Many argued that Canada's stagnant funding in R&D and lack of a cohesive long-term investment strategy hinder its ability to compete with other global leaders like the US, Germany, and China in emerging technologies such as AI, quantum computing, and deep tech. Conference participants further observed that these challenges are worsened by fragmented policies, insufficient support for international collaborations, and a lack of strategic foresight.

This challenge reflects systemic issues noted in the report by the advisory panel on the federal research system. While Canada is recognized for its research excellence, the fragmentation in its research support system creates gaps in support, making it difficult to fund certain types of research initiatives, especially ‘intersectoral research’ and ‘international programming.’<sup>lxx</sup> The report also highlights a lack of coordination among granting councils, resulting in inefficiencies, overlaps, and administrative burdens.<sup>lxxi</sup>

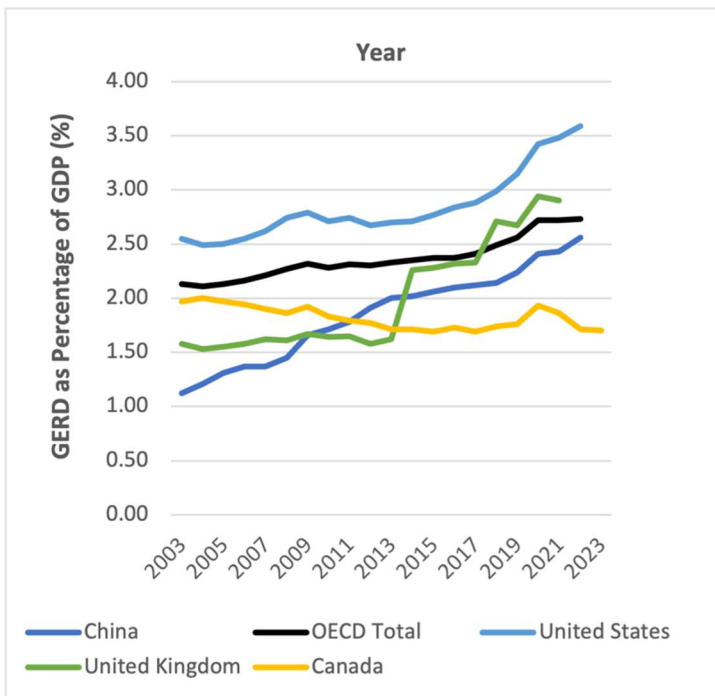


Figure 6: Comparative GERD Trend (2003-2023)

Source: [OECD](#)

said they're "likely" or "very likely" to leave Canada for better opportunities upon completion of studies. The study also showed that 46% of all those who left Canada were postdoctoral scholars.<sup>lxxiv</sup> While the increase in funding allocation for federal graduate student fellowships scholars in Budget 2024 is a great first step in the right direction, much more needs to be done.<sup>lxxv</sup> At present, federal fellowships fund only a small fraction of graduate student researchers in Canada—around 10 percent—and the proposed increases will only expand this to 15 percent.<sup>lxxvi</sup>

Increasing funding for research and talent must be prioritized, which can be done by increasing the core funding of the granting councils to address the effects of inflation, retain and fund the growing number of graduate students and postdoctoral researchers.<sup>lxxvii</sup> Some participants also highlighted that Canada excels in foundational research, particularly in AI and quantum technologies, but struggles to provide the necessary early-stage funding to start-ups to be able to translate innovations into scalable businesses. As a result, a lot of early-stage start-ups

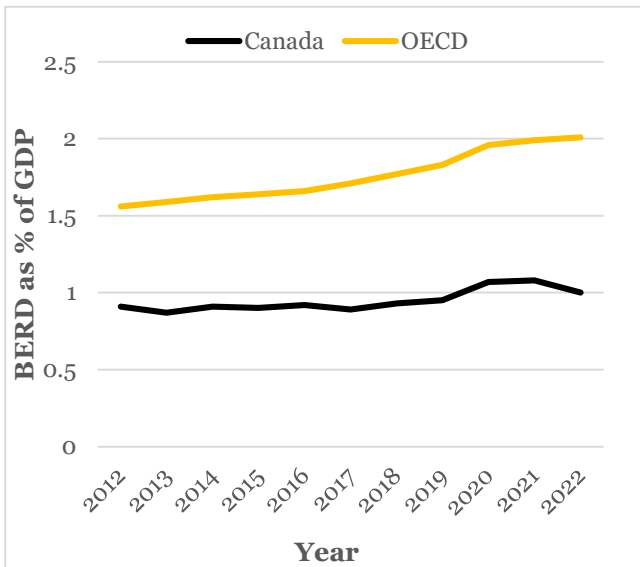
Research studies have shown that investing in R&D for innovation boosts economic growth in the long run.<sup>lxxii</sup> However, Canada's gross domestic expenditures on research and development (GERD) as a percentage of the gross domestic product (GDP), as shown in Figure 6, has remained consistently below the OECD average for over two decades.<sup>lxxiii</sup>

Underfunding of R&D limits Canada's ability to develop a robust talent base by attracting and retaining global talent, it further limits Canada's ability to translate its strengths in research and science into innovation that can be commercialized and provide economic benefits to Canada.

Several researchers and academics at the conference emphasized that Canada's underinvestment in research and training is significantly adding to the country's 'brain drain' problem. A recent study by the Ottawa Science Policy Network showed that nearly two-thirds of current graduate students surveyed for the study

*“Canadians are risk-averse, and so are our investors. So, we don’t want to invest in the early stage, because that’s a lot of risk-taking, but those jurisdictions are willing, like Singapore... another great example [is] China... those investors in those jurisdictions are now reaping those benefits that could have been ours.”*

**- EXPERT IN BUSINESS DEVELOPMENT AND RESEARCH PARTNERSHIPS.**



**Figure 7:** Trends in BERD as % of GDP: Canada vs. OECD (2012-2022)

Source: [OECD](#)

innovation landscape. Some of the suggestions made at the conference included increasing base-level R&D funding in emerging and disruptive technologies while introducing strategic long-term investments to bridge the gap between research and commercialization.

end up pitching to US venture capitalists to get funded, eventually leading to a loss of potential economic benefits for Canada as well as a potential brain drain to the US.<sup>lxxviii</sup>

A tech entrepreneur at the conference criticized Canada's private sector for under-investing in R&D and prioritizing short-term gains over long-term investments, which hinders the commercialization of innovative technologies. For example, compared to \$528 billion invested by US firms in R&D in 2021, Canadian firms only invested \$5.2 billion.<sup>lxxix</sup> Moreover, Canada's business expenditure on R&D (BERD) is currently 1 percent of the country's GDP and has remained consistently below the OECD average over the past decade.<sup>lxxx</sup>

Addressing these challenges related to fragmented funding systems, insufficient R&D investments, and talent retention is crucial if Canada is to remain competitive in the increasingly competitive global



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# CONCLUSION

This conference report summarizes the key points and discussions from the "Mapping out the Global Innovation Landscape" conference hosted by Waterloo International and held at Balsillie School of International Affairs (BSIA) on November 21st, 2024. The conference brought together experts, scholars, industry leaders, and innovators from different fields to explore opportunities in emerging and disruptive technologies, with a focus on the Indo-Pacific region.

Also highlighted within this report are discussions on leveraging opportunities for international collaborations to enhance Canada's global innovation presence, particularly in the Indo-Pacific region. Participants identified the Indo-Pacific's rapid economic growth, technological leadership, and young talent as key opportunities for partnership.

Discussions at the conference also highlighted leveraging Canada's strengths in AI, quantum technology, and environmental research, which align closely with the needs of Indo-Pacific countries, such as tackling climate change, biodiversity loss, and advanced manufacturing challenges. Experts emphasized the importance of building partnerships to advance shared goals while, at the same time, enhancing Canada's global competitiveness.

Significant challenges are addressed relating to international collaborations, including the new restrictive immigration policies, research security concerns, and Canada's limited funding of research and development (R&D). Participants emphasized the need for clearer policies, streamlined visa processes, and strategic long-term investments for enabling effective international partnerships.

Additionally, in light of the current global situation—particularly the evolving dynamics between the US, its allies, and other global powers—the opportunities highlighted in this report are more timely than ever. The ongoing global shifts, driven by the recent US policy shifts under the current administration, underscore the need for Canada to diversify its economic and strategic partnerships.

In this context, strengthening ties with the Indo-Pacific countries through deeper engagement in innovation, research, and emerging technologies presents a crucial opportunity for Canada. As the global economic landscape changes, investments in innovation and strategic partnerships could offer outsized opportunities for Canada, enabling it to strengthen its international position and capitalize on emerging markets and technologies. This context reinforces the importance of the opportunities and recommendations outlined in this report, especially in fostering international collaborations that will benefit both Canada and its global partners in the Indo-Pacific region.

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