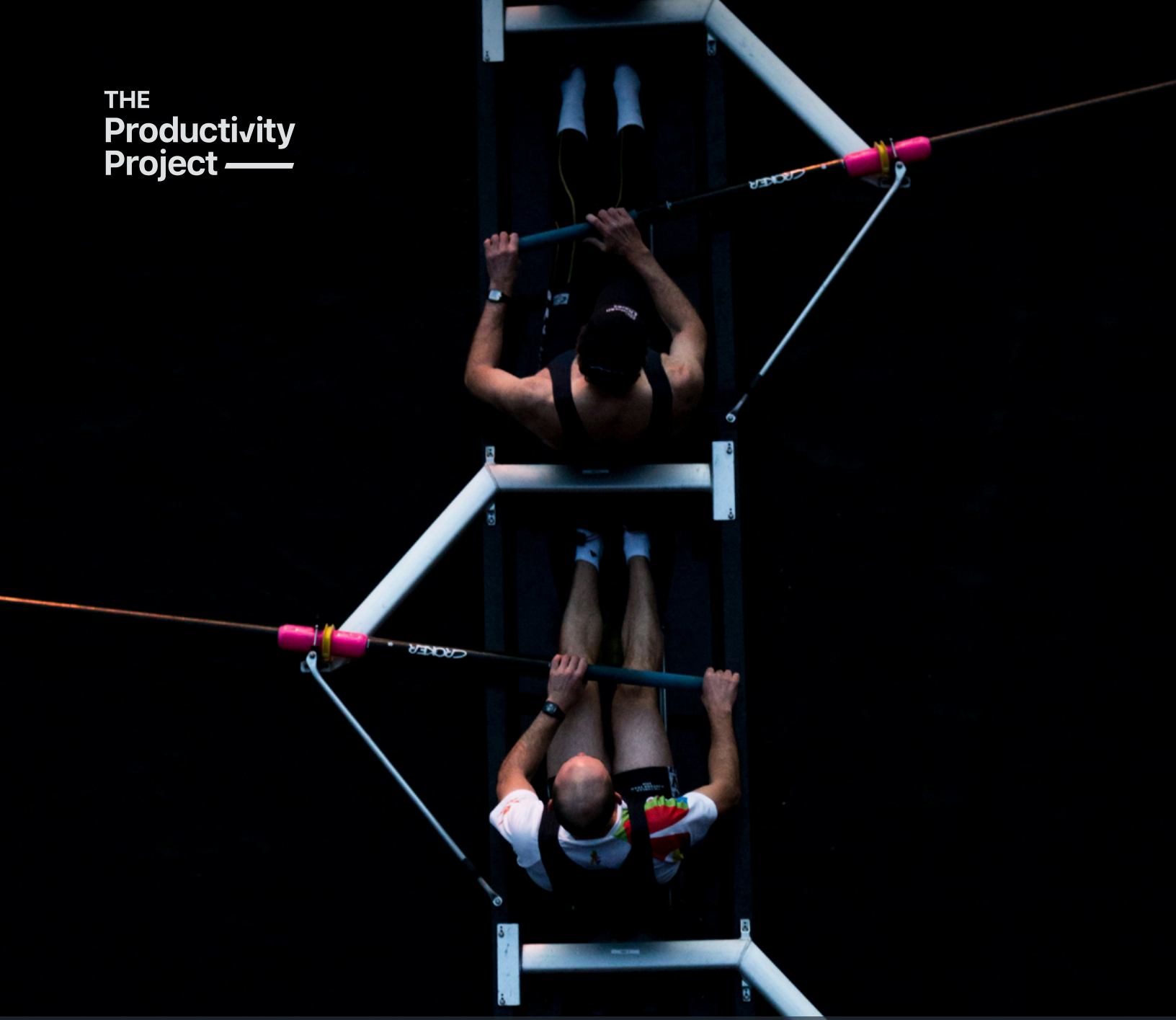
THE
Productivity
Project



PRODUCTIVITY AND PEOPLE

Exploring Human Capital and Productivity

THE Productivity Project

The Productivity Project is a collaboration of a multidisciplinary team of experts from academia, industry, and policy. Together, they address a pivotal question: ***How can human capital drive Canada's productivity?***

Series 1: Productivity and People delivers actionable insights through six research studies. For additional information on future publications, please visit ProductivityProject.ca

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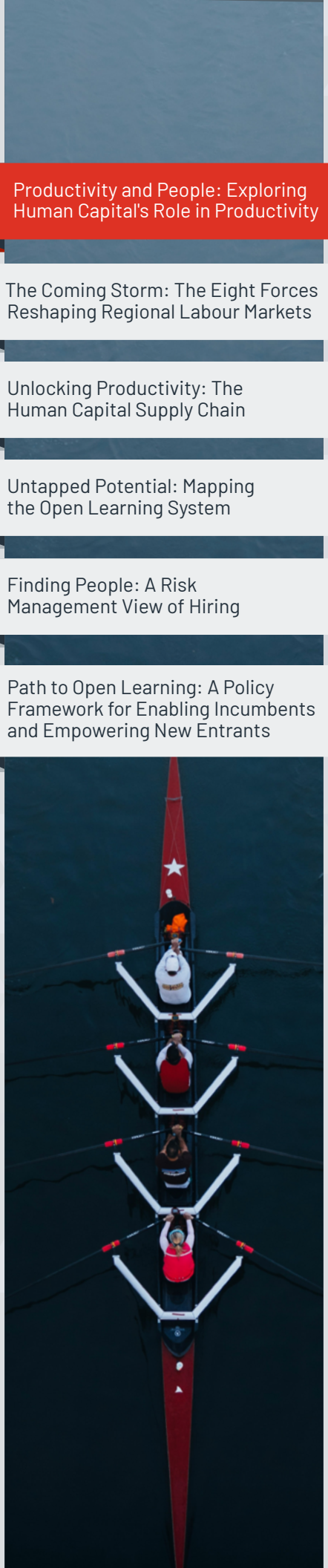
SERIES 1

PRODUCTIVITY AND PEOPLE

Economic, social, and cultural dynamics—driven by rapid technological advancements and globalization—are profoundly reshaping regional economies. A region's competitive advantage is no longer dictated by its access to natural resources; instead, it's rooted in the productivity of its labour force.

Today, labour market productivity is anchored in individuals who can navigate uncertainty and adapt seamlessly. Adaptation, at its core, is the ability to learn, unlearn, and relearn.

Today, labour market productivity is anchored in individuals who can navigate uncertainty and adapt seamlessly.



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CONTENTS

FIGURES & TABLES

FIGURES

EXECUTIVE SUMMARY

THE PROBLEM

Canada has a productivity problem. While fifty years ago, Canada's productivity surpassed that of the United States (US), it currently lags 28 percent behind the US. It also trails many of the Organisation for Economic Co-operation and Development (OECD) countries, placing it 18th overall.[1] Finally, Canada also ranks low on innovation metrics, standing at 15th out of 20 measured countries.[2]

As productivity is the efficiency with which the inputs of production are converted into outputs, these numbers matter. Countries with substantial productivity growth benefit from higher innovation capacity, global competitiveness, and resilience against inflationary pressures. Conversely, stagnation leads to economic sluggishness, wage suppression, and declining market share.

Canada's lagging productivity is rooted in a variety of factors, ranging from weak capital investment and a lack of a competitive business environment to an increasing gap between supply and demand of the competencies required to perform the jobs in the economy.

THE SOLUTION

The productivity problem is pressing, and multiple solutions have been presented. To be effective, any solution implemented must address the current issues with Canada's human capital system. There is a significant gap between workforce supply and industry demand for the competencies required to meet the needs of jobs in the economy. While regional competitive advantage used to be shaped by factors such as proximity to natural resources, it has increasingly shifted towards human capital—the collective knowledge, skills, and abilities of the workforce.

Human Capital and Productivity

Productivity is the result of the interplay of capital investment, business environment, and human capital. The physical infrastructure, machinery, and technology at work within regulatory frameworks, markets, and governing institutions are enhanced by the quality of the workforce – human capital. Human capital encompasses the knowledge, skills, and capabilities embedded in the workforce and is measured at the individual, organizational and regional levels.

Human capital development is achieved through a system comprising five central stakeholders: individuals, learning providers, credentialing bodies, policymakers, and employers.

Each of these stakeholders has a part to play in one or more links in a conceptual, interactive human capital value chain. In this value chain model, input resources (the tangible and intangible resources invested) interact to produce learning and development activities, which in turn lead to incremental gains in human capital. The increased human capital then leads to improved productivity outcomes, and ultimately, value is accrued by both individuals (through wages) and organizations (through increased profits), as well as by the economy (higher Gross Domestic Product).

Canada has the highest post-secondary attainment in the OECD, but this investment in education has not translated into high levels of productivity. Furthermore, Canada has a highly educated workforce and relatively high unemployment, with 2.5 unemployed individuals for every available job.[3] This mismatch of competencies will worsen

1 From OECD, 2025.
2 From Conference Board, 2024.
3 From Statistics Canada, 2025a; Statistics Canada, 2025b.

as technological adoption progresses. Much of the misalignment of competencies stems from foundational literacies and enabling competencies, including communication, collaboration, and adaptability, all of which are essential for fully functioning in the new and evolving jobs in the economy. There is a direct link between foundational competencies and productivity. Research indicates that a one percent increase in average literacy scores could result in a five percent increase in productivity. To improve productivity in Canada, people need to work smarter.

Canada's learning system remains tied to its 19th-century industrial roots, characterized by batch processing (e.g., age-based entry), standardized delivery (e.g., classroom learning), and conventional assessments. Given its dominant market position, public post-secondary institutions lack the culture, incentive, and structure to introduce agile and innovative learning pathways. This, combined with the credentialism culture, which values university credentials over vocational training and other forms of learning, has contributed to a significant disconnect between labour market supply and demand. Students may choose to study in programs for which there is little occupational demand and vice versa. By 2024, the number of degree holders in Canada outpaced available jobs requiring such qualifications by a factor of four – the mismatch in competencies is exacerbated by this emphasis on post-secondary education.[4]

RECOMMENDATION

The fragmentation in Canada's human capital development system also contributes to the competency mismatch. This fragmentation is evident in the lack of coordination, structural disincentives to collaboration, oversight by 13 different provinces and territories, credentialism, and an emphasis on certified learning, as well as poor alignment between programming and market needs.

At its core, productivity is about people. People influence capital investment decisions, shape the business environment, provide essential leadership necessary for innovation and perform the hands-on work of jobs created in the economy. Therefore, the overarching solution to Canada's productivity challenge lies in its people.

The solution is a reimagination of Canada's human capital system. Throughout this six-part series, Productivity and People, we will explore the human capital challenges facing Canada. These challenges are generational, as are the opportunities. What brought us to this point can also guide us into the future. This productivity challenge presents us with a unique opportunity to reflect on and reimagine the role of people—human capital—in driving future productivity and prosperity.

However, addressing this issue requires a systemic approach by policymakers, employers, credentialing bodies, learning providers, and individuals. No single stakeholder can tackle this challenge alone. Instead, a collaborative and coordinated effort is necessary. Each of the six reports in Series 1 of The Productivity Project offers unique insights into reimagining a future where human capital defines Canada's competitive advantage.

4 From Lane and Griffiths, 2023.

SERIES 1: PRODUCTIVITY AND PEOPLE

REPORT	FOCUS
Productivity And People: Exploring Human Capital and Productivity	**Report 1** establishes the foundational relationship between human capital and productivity, presenting a conceptual framework that informs the entire series. It examines how the development of human capital contributes systematically to productivity growth.
The Coming Storm: Forces Reshaping Labour Markets	**Report 2** identifies and analyzes eight macro-level forces shaping labour markets, from technological disruption to demographic shifts. It evaluates their collective implications on labour productivity and proposes strategies to mitigate challenges while capitalizing on emerging opportunities.
Unlocking Productivity: Path to a Human Capital Supply Chain	**Report 3** advances supply chain principles by proposing a dynamic human capital supply chain network. This model optimizes labour market alignment, ensuring competency supply meets demand efficiently to drive productivity gains across an economy.
Untapped Potential: Mapping the Human Capital Ecosystem.	**Report 4** assesses the outcomes of a pilot project mapping supply and demand within an open learning system. Its findings underscore the importance of synchronizing learning outputs with labour market needs to sustain long-term productivity growth.
The Risk of Managing Risk: The Challenge of Competency Verification	**Report 5** scrutinizes hiring practices through a risk management lens, revealing systemic biases in employer decision-making. By dissecting these barriers, actionable approaches to enhance fairness and productivity in talent acquisition are highlighted.
A Path to Open Learning: A Policy Framework for Enabling Incumbents and Empowering New Entrants	**Report 6** evaluates Canada's public post-secondary system as a natural monopoly, exposing its constraints on innovation and competition. It introduces a framework for an open learning marketplace designed to foster flexibility and productivity growth.

THE PROBLEM – CANADA'S LAGGING PRODUCTIVITY

Over the past several decades, Canada's productivity has lagged other countries. Until the late 1970s, Canadian productivity grew faster than the U.S., but since then, the trend has reversed. From 1995 to 2023, U.S. productivity surged by 75 percent, while Canada's grew by only 37 percent.[5] In 2024, Canada's productivity was 28 percent lower than the U.S., but Canada also lags behind most other advanced economies, ranking 18th among the OECD nations, trailing countries such as the U.K., France, and Italy.[6]

Productivity, the efficiency with which inputs are converted into outputs, is a cornerstone of economic performance. The Organisation for Economic Co-operation and Development (OECD) identifies it as a key determinant of competitiveness, living standards, and gross domestic product (GDP) growth.[7] Labour productivity, measured by output per hour worked, directly influences wages and profitability, enabling organizations to expand and invest without raising prices.[8] Meanwhile, total factor productivity incorporates broader efficiencies, including technological adoption and process improvements, serving as a barometer for future growth.[9]

Not coincidentally, Canadian businesses also demonstrate weak innovation performance compared to international peers. According to a 2024 Conference Board of Canada's benchmarking analysis, the nation ranks 15th out of 20 comparable countries on innovation metrics. This innovation gap appears to be strongly correlated with challenges in the adoption of technology. While digital investment penetration reaches 90 percent among small and medium organizations, only 5 percent achieve advanced digital maturity, characterized by transformative operational integration.[10]

Regions with substantial productivity growth benefit from higher innovation capacity, global competitiveness, and resilience against inflationary pressures.[11] Conversely, stagnation leads to economic sluggishness, wage suppression, and declining market share.

Canada's lagging productivity is rooted in a variety of factors, ranging from weak capital investment and a lack of a competitive business environment to an increasing gap between supply and demand of the competencies required to perform the jobs in the economy.[12]

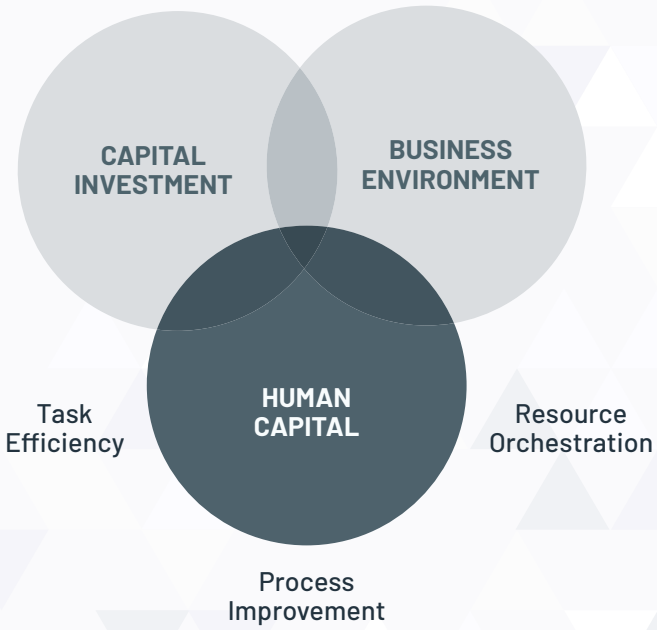
5 Sargent, 2024.
6 From OECD, 2022.
7 From OECD, 2021.
8 From Comin, 2020.
9 According to Sargant (2024), measuring output is identified as a challenge in sectors that do not sell their products, including many public and nonprofit sectors.
10 Conference Board, 2024.
11 From Fernald & Li, 2022.
12 See Sargent (2024) for an analysis of capital investment and business environment on productivity.

THE SOLUTION

Every factor contributing to Canada's productivity problem needs to be addressed. Issues surrounding our human capital system must also be considered as part of the solutions implemented. The gaps between the demand and supply of the competencies necessary to perform current and future jobs. These competencies will also be required for future workers to handle new technological solutions. At its core, productivity is about people. People influence capital investment decisions, shape the business environment, and provide essential leadership necessary for innovation. It is also people who are on the front lines of the products and services economy. Therefore, the solution to Canada's productivity challenge lies in its people – its human capital.

Historically, a region's competitive advantage was shaped by its access to natural resources, such as timber, oil, or iron ore, as well as its proximity to trade routes, which fueled economic growth through extraction, manufacturing, and commerce.[13] However, over the past four decades, the foundation of economic success has shifted towards human capital—the collective knowledge, skills, and abilities of a workforce.[14] Human capital now plays a pivotal role in driving the productivity crucial to a region's social and economic prosperity.[15]

FIGURE 1: PRODUCTIVITY DRIVERS



13 The definition of a "region" is highly contextual. This report can be applied to communities, metropolitan areas, provinces or states, countries, or continents.

14 From Government of Canada, n.d.

15 From Kotsantonis and Serafeim, 2020.

PRODUCTIVITY DRIVERS

Productivity is the interplay of capital investment, business environment, and human capital (Figure 1). Each factor contributes distinct yet interconnected mechanisms to enhancing productivity.

CAPITAL INVESTMENT

Capital investment, encompassing physical infrastructure, machinery, and technology, directly enhances productive capacity by enabling more efficient output per unit of labour. Between 1997 and 2022, increasing capital investment per hour accounted for 70-80 percent of overall productivity growth.[16] Research published by the OECD finds that sustained capital investment — particularly in digital technologies — accounts for a significant share of productivity growth in advanced economies.[17] However, diminishing returns may occur if investments are not paired with complementary innovations, including process improvements.[18]

BUSINESS ENVIRONMENT

The business environment includes regulatory frameworks, market competition, and institutional quality. The World Bank found streamlined regulations, access to credit, and robust property rights reduce transaction costs and incentivize organizations to adopt productivity-enhancing technologies.[19] Conversely, excessive bureaucracy or monopolistic practices can stifle innovation, where extractive institutions are shown to undermine long-term productivity gains.[20]

HUMAN CAPITAL

In a knowledge-driven economy, human capital plays an increasingly central role in shaping productivity outcomes. Human capital encompasses the knowledge, skills, and capabilities embedded in the workforce. Human capital acts as both a direct input and a multiplier of other productivity drivers, including task efficiency, process improvement, and resource allocation.[21]

As we explore in this report, the full potential of human capital lies not just in its accumulation but in how it is developed, distributed, and mobilized across a system of learning providers, employers, policymakers, and credentialing bodies. Understanding this systemic interplay is essential for unlocking sustained productivity gains in Canada.

16 From McKinsey & Company, 2024.
17 From OECD, 2024 Compendium of Productivity Indicators.
18 From Cette et al., 2016.
19 From World Bank, 2020.
20 From Acemoglu & Robinson, 2012.
21 From Hanushek & Woessmann, 2023; Chetty et al., 2022.

CANADA'S CHALLENGE

Canada's lagging productivity is a significant challenge. As discussed, three core factors contribute to productivity: capital investment, the business environment, and human capital.

The Productivity Project is a multidisciplinary team of experts from academia, industry, and policy. This project examines the impact of human capital on Canada's productivity, addressing a key question: ***How can Canada foster productivity growth by optimizing its human capital?***

In Series 1 – Productivity and People, six reports explore the relationship between human capital and productivity. This first report, The Productivity Puzzle: Exploring Human Capital and Productivity, delves into the critical relationship between human capital and productivity. It is then followed by five additional studies, each tackling different dimensions of this research question:

- Report 2 - The Coming Storm: The Eight Forces Reshaping Regional Labour Markets
- Report 3 - Unlocking Productivity: The Human Capital Supply Chain
- Report 4 - Untapped Potential: Mapping the Open Learning System
- Report 5 – Finding People: A Risk Management View of Hiring
- Report 6 - Unlocking Open Learning: A Policy Framework for Enabling Incumbents and Empowering New Entrants

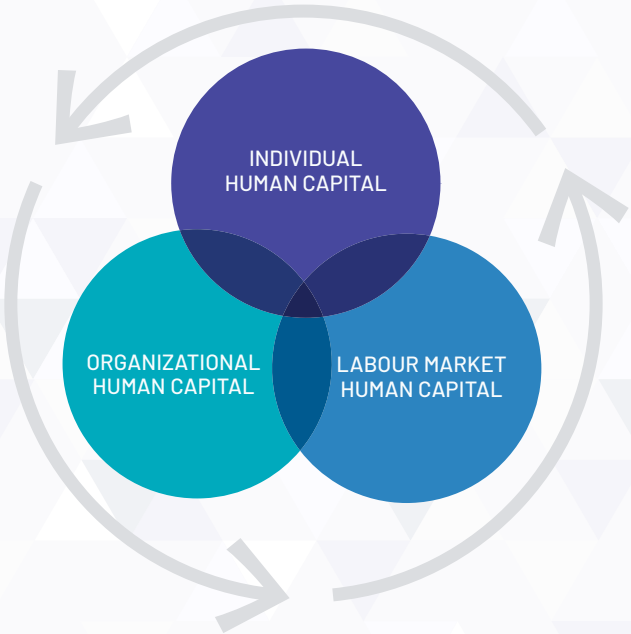
UNDERSTANDING HUMAN CAPITAL

Human capital exists at both the individual and collective levels. Collective human capital is located at both the organizational and labour market levels (Figure 2).

Individual human capital represents the value derived from a person's competencies and capabilities, encompassing the knowledge, skills, experiences, and attributes that enable them to participate effectively in the workforce and society.

At an **organizational level**, human capital refers to the collective capabilities of employees that enable an organization to achieve its strategic goals and generate a return on its human capital investments.

FIGURE 2: SCALING HUMAN CAPITAL



Finally, at a **labour market level**, human capital reflects an aggregation of individual and organizational human capital. The clustering of human capital creates the potential for generating incremental human capital by knowledge and culture diffusion, shared learning, experimentation, and social embeddedness.[22] For example, knowledge diffusion occurs when educated workers share ideas and best practices with one another. Technology adoption accelerates in high-human-capital environments.[23]

Research indicates a skilled workforce enhances productivity through improved task efficiency, effective leadership, enhanced process improvement, increased technology adoption, and more efficient capital allocation. Moreover, human capital indirectly enhances productivity by diffusing knowledge and fostering a culture of productivity.[24]

Historically, years of certified learning were the primary proxy for human capital accumulation.[25] However, recent research emphasizes the macroeconomic value of human capital depends not merely on measures of certified learning, but more specifically on the competencies and capabilities developed and their alignment to labour market demand.[26] One study found years of certified learning account for approximately 73 percent of the variation in national income levels. In contrast, measures of cognitive capabilities increase this explanatory power to nearly 96 percent.[27]

22 From Mellander & Florida, 2021.
23 From Foster and Rosenzweig, 2010.
24 From Chetty et al., 2022.
25 From Barro & Lee, 2013.
26 From Hanushek & Woessmann, 2023.
27 From Hanushek & Woessmann, 2023. Also refer to Mankiw et al., 1992.

HUMAN CAPITAL AS A SYSTEM

An exploration of the relationship between human capital and productivity requires a systems perspective. Researchers have long recognized value in a system is generated not only by the individual components of the system but also by the way these components interact with one another.[28]

Our first step is to consider the stakeholders of the human capital system; following this, we demonstrate the link between human capital and productivity forms a value chain.

Human Capital Stakeholders

Increased volatility in labour markets has led to conditions in which no single stakeholder can meet the emerging demands for human capital. In the context of regional labour market level human capital, we consider five central stakeholders:

Each of these stakeholders has a part to play in one or more of the links in the human capital value chain discussed below.

Individuals: Incorporating all residents of the region. They engage in the labour market by developing competencies through certified, non-certified, and informal learning pathways, and then apply those competencies to the workforce.

Learning Providers: Incorporating all individuals and organizations accountable for delivering certified, noncertified, and informal learning within a region.

Credentialing Bodies: Incorporating all organizations that assess, verify, and acknowledge the qualifications and competencies of individuals within a specific profession or field.[29]

Policymakers: Incorporating all levels of government with jurisdictional responsibility in the region, including local, municipal, provincial, national, or federal.

Employers: Incorporating all employers, businesses, and professional associations from the region. They engage in the labour market by hiring and developing staff.

28 For additional reading on the systemic nature of value creation, refer to Barney & Clark, 2007; Porter, 1985; and Teece, 2007. For the application of a value chain to learning, refer to Finch et al., 2016.

29 From American National Standards Institute ANSI. n.d.

THE HUMAN CAPITAL VALUE CHAIN

Increased volatility in labour markets has led to conditions in which no single stakeholder, whether a government, educational institution, or employer, can meet labour market demands alone. Value is created not from isolated components but from the systemic interplay of activities. The interconnectedness of activities leads to incremental value. Understanding this interdependence requires breaking activity levels down and mapping how variables influence one another. Together, this system is defined as a value chain.[30]

Figure 3 maps the development of human capital as a value chain. This value chain incorporates a network of stakeholders (organizations and individuals) that develop and deploy labour. These stakeholders can be clustered into five categories: individuals, learning providers, employers, credentialing bodies, and policymakers.

In Figure 3, we introduce a conceptual human capital value chain of five major components. The interaction of the first three components drives productivity and value creation.

1. ***Input resources:*** the tangible and intangible resources invested.
2. ***Learning and development activities produced:*** the certified, non-certified, and informal learning activities that are produced.
3. ***Human capital outputs:*** the incremental human capital produced through all forms of learning and development activities.
4. ***Productivity outcomes:*** the direct influence of human capital outputs on productivity outcomes. The productivity outcomes accrue to the region.
5. ***Value creation:*** value is accrued at both the individual and collective levels.

FIGURE 3: THE HUMAN CAPITAL VALUE CHAIN

30 From Porter, 1985.

INPUT RESOURCES

In this value chain, input resources include both physical and non-physical investments from stakeholders. We use the widely recognized *Communities' Capital Framework*, which identifies seven types of capital: natural, financial, built, human, political, social, and cultural.[31] These capitals collectively form the raw inputs in the value chain. As scarce resources, these reflect an explicit investment decision by stakeholders.

NATURAL CAPITAL

Natural capital encompasses environmental assets, including land, water, biodiversity, and ecosystems. These resources are essential for livelihoods (e.g., agriculture, tourism) and quality of life.

BASE HUMAN CAPITAL

Base human capital refers to an individual's foundational knowledge, skills, experiences, and attributes, which enable them to participate effectively in the workforce and society. These include intellectual, personality, and physical resources developed through early childhood, education, health, socialization, and life experiences.

FINANCIAL CAPITAL

This includes monetary resources such as savings, investments, credit, and public funding. Access to financial capital enables entrepreneurship, infrastructure development, and social programs.

BUILT CAPITAL

Built capital refers to physical infrastructure, including roads, utilities, schools, hospitals, and other essential facilities, as well as technology. Well-maintained infrastructure supports economic activity, learning, and healthcare, while poor infrastructure can hinder mobility and opportunity.

POLITICAL CAPITAL

Political capital refers to the influence one has over decision-making, governance structures, and policy development. Communities with substantial political capital can advocate for equitable resource distribution, lobby for better services, and shape regulations that benefit marginalized groups.

SOCIAL CAPITAL

Social capital encompasses networks, trust, reciprocity, and collective action. Strong social bonds (e.g., community organizations, cooperatives) improve collaboration, crisis response, and knowledge-sharing. Weak social capital can lead to fragmentation and inequality.

CULTURAL CAPITAL

Cultural capital includes shared traditions, values, arts, and heritage. It fosters identity, cohesion, and creativity, influencing learning, tourism, and intergenerational knowledge transfer. Preserving cultural capital strengthens community pride and resilience.

31 For additional background on the Communities' Capital Framework, refer to Emery & Flora 2006.

LEARNING AND DEVELOPMENT ACTIVITIES PRODUCED

In the human capital value chain, the input resources invested produce learning and development activities. These activities span certified, non-certified, and informal learning pathways, including traditional classroom-based, experiential, or self-directed learning. The goal of learning and development is to unlock the potential of human capital.

Contemporary research highlights learning is a dynamic and multifaceted process, unfolding in various forms—from traditional classroom settings to experiential and self-directed learning.[32] Drawing on the principles of open innovation, the concept of open learning emphasizes collaboration among learning providers, employers, policymakers, and individuals to optimize outcomes.

In this model, human capital stakeholders operate within an interconnected ecosystem, fostering adaptability and responsiveness to labour market shifts. This approach expands the definition of learning to include not only certified learning but also employment experiences, volunteer work, artistic pursuits, athletic engagement, and self-directed learning through books, podcasts, and other asynchronous resources. By embracing this broader perspective, open learning cultivates a more inclusive and flexible framework for human capital development.

Within this system, learning opportunities can be categorized into three key forms: certified learning, non-certified learning, and informal learning (Figure 4). Together, these clusters provide individuals with a vast and adaptable range of pathways to develop the competencies that support their personal and professional goals.[33]

Certified Learning

Certified learning encompasses structured and organized training, learning, or professional development experiences provided through learning providers, the workplace, or a professional accrediting body. It is organization- and time-bound, resulting in formal certification by a formal organization, professional body, or sanctioned certifying agency. This report clusters certified learning into four sub-categories (primary, secondary and post-secondary education, and professional certification).[34]

NON-CERTIFIED LEARNING

Non-certified learning encompasses organized or systematic learning, training, or professional development activities provided by various organizations, community organizations, or training agencies. This form of learning requires registration but does not result in an accreditation. The service provider, independent of a government or a professional body, may award individual certificates.

INFORMAL LEARNING

Informal learning incorporates diverse lived experiences and unstructured learning resources. These include paid and volunteer experiences, as well as the numerous forms of self-directed learning, such as LinkedIn Learning, free-to-learn Massive Open Online Courses (MOOCs), or instructional videos widely available on YouTube or Vimeo. A study found that approximately 90 percent of Canadian adults engage in 10-15 hours of informal learning weekly.[35]

32 UNESCO, 2015.

33 Herein, we adopt the definition of learning as behaviour adaptation triggered by regular interaction with external stimuli over time. Behaviour adaptation includes observable physical and cognitive behaviour.

34 For further information on certified and non-certified learning taxonomies refer to the reports by Powley & Childs, 2005 UNESCO, 2015; UNESCO, 2012.

35 From Kolb & Kolb, 2005.

HUMAN CAPITAL OUTPUTS

Learning and development activities produce human capital outputs. These outputs are clustered into competencies and social capital.

COMPETENCIES

Enabling Competencies

Enabling competencies are foundational to an individual's adaptive capacity. These resources are not context-specific and, therefore, are applicable in a wide range of situations. These competencies include problem-solving, collaboration, communication, core literacies, and self-regulation. Evidence shows that enabling competencies are critical to employability.[36]

FIGURE 4: LEARNING ACTIVITIES PRODUCED

Task-specific Competencies

Task-specific competencies refer to the relevant knowledge, skills, values, experience, and abilities required to perform a specific job effectively. Task-specific competencies encompass functional competencies (e.g., computer programming), sectoral competencies (e.g., expertise in a specific industry), or organization-level competencies (e.g., start-up expertise).

SOCIAL CAPITAL

Social capital encompasses the tangible and intangible value derived from networks of relationships—both strong ties (e.g., family, close friends) and weak ties (e.g., acquaintances, professional contacts)—that connect individuals to their communities and broader society. These networks foster trust, reciprocity, and access to resources, enabling collective action and creating opportunities for individuals to thrive.[37] While strong ties provide emotional support, weak ties often bridge social divides, exposing individuals to new ideas, resources, and perspectives beyond their immediate circles.[38]

Beyond facilitating social cohesion, these networks play a critical role in knowledge creation and transfer. Research highlights how social connections serve as conduits for sharing information, competencies, and innovations. In recent years, digital platforms like social media have further amplified this dynamic, accelerating the speed and reach of information diffusion across networks.[39]

36 From Finch et al., 2023.
37 From Bloom et al., 2015.
38 From Granovetter, 1973.
39 From Chetty et al., 2022.

HUMAN CAPITAL PRODUCTIVITY OUTCOMES

In this conceptual model, human capital productivity reflects the direct relationship between human capital outputs and productivity. Productivity outcomes accrue at both the individual and collective levels - within an organization, region, or country. Productivity outcomes can be categorized into three highly interdependent areas:

INCREASED TASK-EFFICIENCY

Task efficiency refers to an individual's ability to optimize resources, such as time, labour, and materials, to achieve a specific objective with minimal waste, while maintaining or improving output quality. It emphasizes maximizing output per unit of input, often measured by factors such as completion speed, error rates, and resource utilization.[40] For example:

- Remote workers increased productivity by 13 percent due to fewer interruptions and better time management.[41]
- Knowledge workers who scheduled focused 90-minute blocks ("time blocking") completed 50 percent more high-value work than peers using ad-hoc scheduling.[42]
- Workers who batched similar tasks (e.g., all calls in one block) reduced productivity losses from context switching by 40 percent.[43]
- Employees who worked in pairs had 25 percent fewer errors due to mutual accountability.[44]

PROCESS IMPROVEMENT

Process improvements are based on a culture of continuous improvement, innovation, and experimentation. Studies demonstrate organizations increasing efficiency and operational processes contribute significantly to productivity growth. Examples include:

- Organizations with a productivity-driven culture are shown to have significantly higher revenue growth and employee retention.
- Hospitals implementing Lean process improvements experienced a 15 percent increase in patient throughput without compromising the quality of care.[45]
- The adoption of Lean management practices results in a 12 percent increase in overall productivity.[46] At its heart, Lean is about fully utilizing workers, leveraging their competencies to the best advantage, rather than reducing a business' workforce.
- Manufacturing managers trained in Lean and Six Sigma reduce production waste by 30 percent.[47]
- Companies that foster experimental learning environments generate twice as many process patents as their industry counterparts.[48]

RESOURCE ORCHESTRATION

Beyond simple allocation, resource orchestration aligns and coordinates resources to ensure an enduring competitive advantage. In this report, we examine two key aspects of resource orchestration that drive productivity: enhanced technology development and adoption, and efficient capital allocation.

40 From Tabassi et al., 2012.
41 From Bloom, 2015.
42 From Newport, 2016.
43 From Mark et al., 2018.
44 From Lerner & Tetlock, 2019.
45 From McConnell, et al., 2016.
46 From Bloom et al., 2022.
47 From Shah & Ward, 2012.
48 From Bessen, 2020.

Enhanced Technology Development and Adoption

Continuous research, development, and adoption of technology are critical drivers of productivity. Examples of the role of technology in productivity improvement include:[49]

- Organizations that invest in developing human capital implement artificial intelligence (AI) solutions 40 percent faster than their competitors.[50]
- The effective adoption of automation has improved productivity by up to 30 percent in manufacturing by reducing labour waste and optimizing material use, further enhancing process improvements.[51]
- Farmers trained in precision agriculture tools, such as GPS-guided equipment and soil sensors, enhance crop yields by up to 20 percent while simultaneously reducing water and fertilizer consumption.[52]
- Workplaces with highly skilled employees tend to experience faster adoption of new technologies, contributing to measurable productivity gains.[53]

Efficient Capital Allocation

Effective resource allocation requires sophisticated financial and decision-making competencies. Examples of the role of efficient capital allocation in productivity improvement include:

- Organizations committed to analytical decision-making achieved a 12 percent higher return on investment (ROI) on capital expenditures.[54]
- High-growth organizations are three times more likely to make investment decisions holistically, systematically, and regularly, and to maintain agility.[55]
- Organizations that invest in financial literacy and capital decision training for managers achieve higher ROI on capital projects, with one study showing a 16 percent reduction in capital misallocation across business units.[56]

49 From Sargent, 2024.
50 From Bloom et al., 2022.
51 From Acemoglu & Restrepo, 2019.
52 From FAO, 2022.
53 From OECD, 2024.
54 From Bloom et al., 2020.
55 From McKinsey & Company, 2021.
56 From Lusardi & Mitchell, 2014.

VALUE CREATION

Value creation considers the impact of human capital at three distinct levels: individual, organizational, and regional (e.g. city, country). For decades, researchers have explored effective methodologies to quantify this value. While traditional approaches often focus narrowly on economic measures, contemporary frameworks recognize value creation extends to encompass broader dimensions of value.

Multidimensional frameworks developed by diverse groups, including the OECD and the New Zealand Government, mark a significant advancement in how societies conceptualize and measure value.[57] By integrating economic, social, personal, and ecological indicators, these approaches provide a more complete picture of multidimensional value (Figure 5). They acknowledge that while economic value remains essential, it must be balanced with other forms of value creation. As countries grapple with complex challenges, these comprehensive frameworks guide the allocation of resources to maximize productivity and drive social and economic prosperity.

ECONOMIC VALUE

For decades, economic value has been the dominant lens through which national productivity and prosperity have been assessed. It served as the baseline against which all other forms of value are compared and often underpins fiscal, industrial, and labour market policy.

While the economic dimension has remained the foundation of traditional value measurement, contemporary approaches have significantly expanded its scope. GDP remains a crucial starting point, but modern frameworks incorporate measures of income inequality, including economic insecurity, housing affordability, and intergenerational wealth.[58]

These additional indicators provide a more complete picture of value creation by revealing how growth is distributed and whether it contributes to long-term resilience. In the context of human capital, economic value is generated not only through wages and output, but also through improved labour force participation, higher innovation rates, and more efficient resource allocation—each of which is shaped by the competencies and adaptive capacity of the workforce.

SOCIAL VALUE

Social outcomes represent the connective tissue that binds communities together. The OECD measures multiple aspects of social value, including trust in institutions and fellow citizens. Current data reveals concerning trends, with only 40 percent of people across OECD countries reporting trust in their national governments.[59] Social connections and civic participation serve as additional critical indicators, as they correlate strongly with both individual life satisfaction and community resilience.

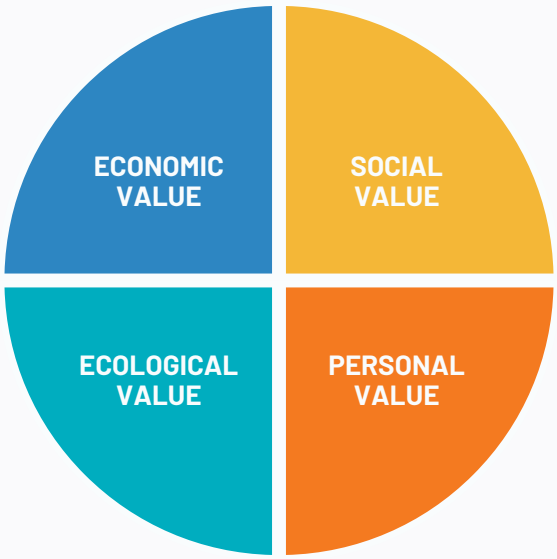
Safety represents another vital component of social value. New Zealand's approach examines both objective crime statistics and subjective feelings of security, recognizing that perception often matters as much as reality in shaping lived experience. The framework also evaluates the sense of belonging and experiences of discrimination, capturing how inclusive societies foster stronger social bonds. These measures gain particular importance in diverse societies, where social cohesion requires deliberate nurturing across cultural divides.

PERSONAL VALUE

At the individual level, value measurement focuses on human capabilities and potential. According to the OECD framework, educational attainment and competency development are fundamental to personal growth and economic participation. Health outcomes feature prominently, with

57 From King et al., 2018.
58 From King et al., 2018.
59 From OECD, 2022b.

FIGURE 5: VALUE CREATION



metrics extending beyond physical health to include mental value and life satisfaction. New Zealand's approach incorporates cultural identity and spiritual value, particularly important for Indigenous populations and multicultural societies.

These personal dimensions interact powerfully with other value aspects. For instance, strong social connections can enhance mental health, while economic stability enables greater investment in education and personal development. The frameworks acknowledge these interconnections through composite indicators that reveal how different life domains interact and influence one another. This systems perspective helps policymakers avoid siloed thinking when designing interventions.

ECOLOGICAL VALUE

The ecological dimension represents perhaps the most significant evolution in value measurement. Both the OECD and New Zealand Living Standard frameworks recognize that environmental sustainability forms the essential precondition for all other forms of prosperity. Key indicators include air and water quality, biodiversity levels, and greenhouse gas emissions. New Zealand's approach places particular emphasis on Indigenous environmental knowledge and sustainable land-use practices.

These ecological measures reflect a growing understanding that human value cannot be sustained on a planet that is degraded. The frameworks incorporate both current environmental conditions and forward-looking indicators of sustainability, recognizing true prosperity must extend to future generations. This long-term perspective represents a fundamental shift from traditional economic measurement, which often overlooks environmental externalities.

Overall, the Human Capital Value Chain is a systems-based model connecting human capital investments to productivity outcomes and broader value. Human capital is not a static resource, but a dynamic flow shaped by the decisions and interactions of multiple stakeholders. With this model in place, we now examine how well Canada's current human capital system performs.

CANADA'S HUMAN CAPITAL AND PRODUCTIVITY CHALLENGE

At 63 percent, Canada has the highest post-secondary attainment rate among adults (25-64) in the OECD.[60] Despite this high level of educational attainment, Canada's employers complain about a lack of qualified workers. High levels of education do not, therefore, guarantee the right mix of human capital in a workforce. Unemployment reached 7.0 percent in May 2025, resulting in approximately 2.5 unemployed individuals competing for every available job.[61] As recently as 2023, 53 percent of small businesses reported difficulty in hiring qualified workers, which resulted in an estimated $38 billion in annual lost revenue.[62] Canada continues to face a growing talent mismatch, and over 60 percent of the workforce is expected to be impacted by automation in the next five years, necessitating large-scale retraining efforts.[63]

Meanwhile, Canada's productivity continues to lag that of its international peers, which suggests a significant misalignment between human capital development and actual productivity outcomes. However, these factors are two sides of the same coin.

Along with mismatched competencies, Canada's lagging productivity also stems from a labour force ill-equipped to handle an increasingly volatile and uncertain market. (See Report 2, The Coming Storm: Forces Reshaping Labour Markets, for more on the factors creating this uncertainty.) In this environment, adaptive capacity has emerged as a critical competency for employers who now prioritize candidates with flexibility, resilience, and the ability to thrive in the face of disruption.[64] Research supports this shift: a McKinsey study revealed 70 percent of employers value enabling competencies, such as problem-solving and adaptability, over task-specific competencies.[65] Employees with high adaptive capacity not only strengthen team dynamics but also enhance workplace resilience, bringing the intuitive expertise needed to navigate complex decisions and emergencies. These individuals also drive innovation, helping organizations develop creative solutions to meet the evolving demands of their customers. Key traits, such as emotional intelligence and prior experience managing change, further signal an individual's ability to adapt.[66]

60 From Statistics Canada, 2025c.
61 From Statistics Canada, 2025a; Statistics Canada, 2025b.
62 From Bomal, 2023.
63 From Sado et al., 2017; Rafferty et al., 2013; Mitchell et al., 2019.
64 From Finch et al., 2023.
65 From McKinsey, 2021.
66 From Castillo & Trinh, 2019; Finch et al., 2023.; McKinsey, 2018; Breevaart & Bakker, 2018; Gonzalez-Mule & Aguinis, 2018; Yang & Liu, 2019.

There are individuals in Canada's highly educated workforce who lack the competencies required for the available jobs. As technological adoption increases, new competencies and higher levels of competence are required of individuals who have previously been fully competent in their roles. However, a significant barrier to addressing the lack of necessary competencies is the prevalence of low literacy and other foundational competency deficiencies among working-aged Canadians.

According to the OECD's most recent Programme for the International Assessment of Adult Competencies (PIAAC) study, nearly half of Canadians score below Level 3, the literacy proficiency required to participate fully in today's changing workforce.[67] There are now more Canadians with low literacy scores and fewer people with high literacy scores than there were in 1995, despite Canada's more educated population and the influx of more highly qualified recent immigrants.[68] A well-documented link exists between literacy and economic performance. A one percent rise in average literacy scores (on the 500-point scale) could lead to as much as a five percent rise in productivity.[69] Research has shown this trend underscores the urgent need for targeted interventions to upskill the labour force and bolster Canada's competitive edge. Canada's labour force is a critical driver of economic growth, directly influencing GDP. Current labour shortages in key sectors threaten the economy's expansion and Canadians' standard of living unless offset by productivity gains or increased working hours. People need to work either smarter or harder.

67 From Statistics Canada, 2024b.
68 From Griffiths, Lane and Murray, to be released September 2025.
69 From Griffiths, Lane and Murray, to be released September 2025.

DEMOGRAPHIC REALITIES

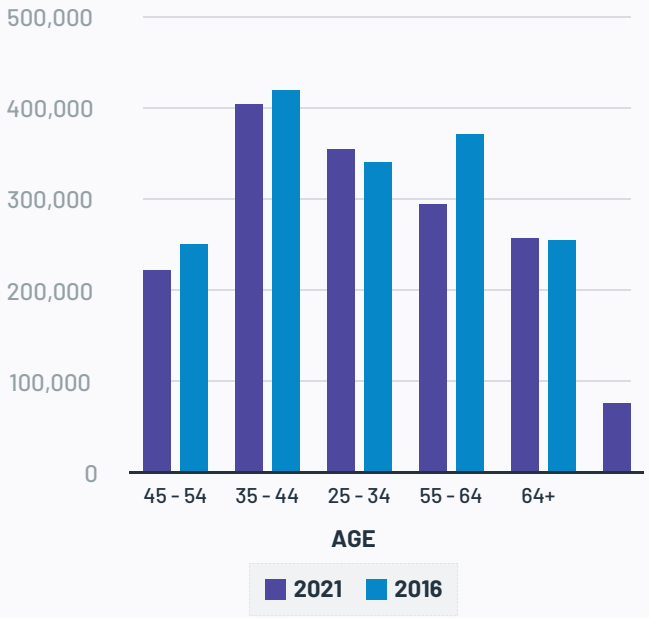
Demographics shape the economy both on the supply side, through workforce availability and productivity, and on the demand side, via consumer spending, ultimately affecting overall productivity. The aging workforce is a pressing concern, as baby boomers (born between 1946 and 1965) retire, with the last cohort reaching 65 by 2030. This shift has already reduced the labour force participation rate, which fell to 65 percent in 2021–2023, its lowest in two decades.[70]

To counter these trends, Canada has increased immigration, admitting 468,817 permanent residents and 697,701 non-permanent residents between July 2022 and July 2023, the highest levels on record.[71] This strategy has been vital given Canada's fertility rate of just 1.4 children per woman. Recent economic and social pressures have led the federal government to reduce its immigration targets to 395,000 permanent residents in 2024, followed by 380,000 in 2025 and 365,000 in 2027.[72] Even so, immigration's potential to alleviate labour shortages has been hindered by underemployment among skilled immigrants, often due to barriers in credential recognition. While programs like the Foreign Credential Recognition Program offer support, broader solutions are needed to integrate immigrant talent fully.

The aging workforce is of particular concern in the skilled trades (Figure 6). More than 245,100 construction workers are expected to retire by 2032, resulting in a deficit of 61,400 workers.[73] While Canada boasts the G7's most educated workforce, apprenticeship certifications in critical trades, such as construction, mechanics, and precision production, have stagnated or declined.[74]

Canada's trades workforce experienced a significant decline between 2016 and 2021, dropping by 5.7 percent with decreases in 28 of the 43 tracked occupations. Age disparities were stark: workers aged 65 and above grew by 11.8 percent, while younger cohorts declined sharply—those aged 45–54 fell by 20.2 percent and those aged 15–24 dropped by 12.2 percent. However, apprenticeship registrations have shown strong recovery since 2022, reaching their highest levels since 2014 with 81,141 new registrations in 2022 and continued 8 percent growth in 2023. Construction trades have led this rebound, with carpenters, electricians, and heavy-duty equipment mechanics exceeding pre-pandemic registration levels. Despite this positive trend in new entrants, certification completion rates remain below pre-pandemic levels, and Canada still faces a critical shortage, requiring over 222,000 new Red Seal journeypersons by 2028. Additionally, more than 245,100 construction workers are expected to retire by 2032.

FIGURE 6: SKILLED TRADES BY AGE



Source: OECD, 2022; 2024

70 From Vézina et al., 2024.
71 From Canada, 2024. Annual report to parliament on immigration.
72 From Vézina et al., 2024.
73 From BuildForce Canada, 2023.
74 From Statistics Canada, 2022a.

CREDENTIALS OVER COMPETENCIES

Credentialism in Canada has emerged as a significant barrier to workforce participation and productivity. Credentialism is characterized by overemphasizing grades and formal qualifications (i.e., certifications, diplomas, and degrees) as proxies for competence. However, as the OECD recognizes, "higher educational attainment does not always directly correspond with higher skills".[75]

While intended to signal expertise, these credentials often serve a status-affirming function, conferring labour market advantages to holders while systematically excluding those without them. Crucially, credentials may reflect test-taking proficiency more than substantive mastery, yet they regulate access to employment and advancement in most professional fields. As industrial economies have matured, formal certification is increasingly required for occupational licensing, further embedding credentialism into labour market mobility.[76]

In Canada, this is reinforced through deeply ingrained social conditioning—a process by which individuals internalize societal norms, roles, and hierarchies through repeated exposure to cultural and institutional signals. Over time, these signals shape employer behaviours, policy design, and learner aspirations. Credential-based legitimacy often outweighs demonstrated competence, thereby narrowing pathways for individuals whose competencies were acquired through experience, informal learning, or alternative learning models.[77]

Finally, credentialism reinforces social expectations that post-secondary education is the default—or only—legitimate learning pathway. Canada's post-secondary attainment rate of 63 percent is 22 percent higher than the OECD average. Moreover, the country invests more than 20 percent more in learning (as a proportion of GDP), compared to its OECD peers.[78] Today, 15 percent of working-age adults have completed a graduate degree, the same level as those in the workforce who had completed a bachelor's degree in 1997.[79] The result is that Canada ranks second among 37 countries for having a highly educated workforce, but also has the highest rate of underemployment among graduates.[80] As Figure 7 demonstrates, post-secondary education does not translate to higher productivity as measured by GDP per hour worked. It is worth noting that Germany educates a significant proportion of its workforce through apprenticeships, rather than traditional post-secondary education.

This credential culture creates intense financial pressures for learners, driving up demand for certified learning while discouraging non-certified or informal alternatives. Research documents how institutional bias devalues competencies gained through self-directed or work-based learning, limiting the development of open learning.[81] Moreover, the rigid status hierarchy of credentials undermines the sustainability and perceived legitimacy of non-traditional pathways, diminishing labour market mobility for many.[82]

75 From OECD, 2019.
76 From Rivera, 2011; Martin, 2017; Zheng et al., 2013.
77 From Bourdieu, 2023; Goldin & Katz, 2019; Harris & Smith, 2021.
78 From OECD, 2023.
79 From RBC, 2023.
80 From OECD, 2022a.
81 From Smith and Robson, 2020.
82 From Vaughan, 2023.

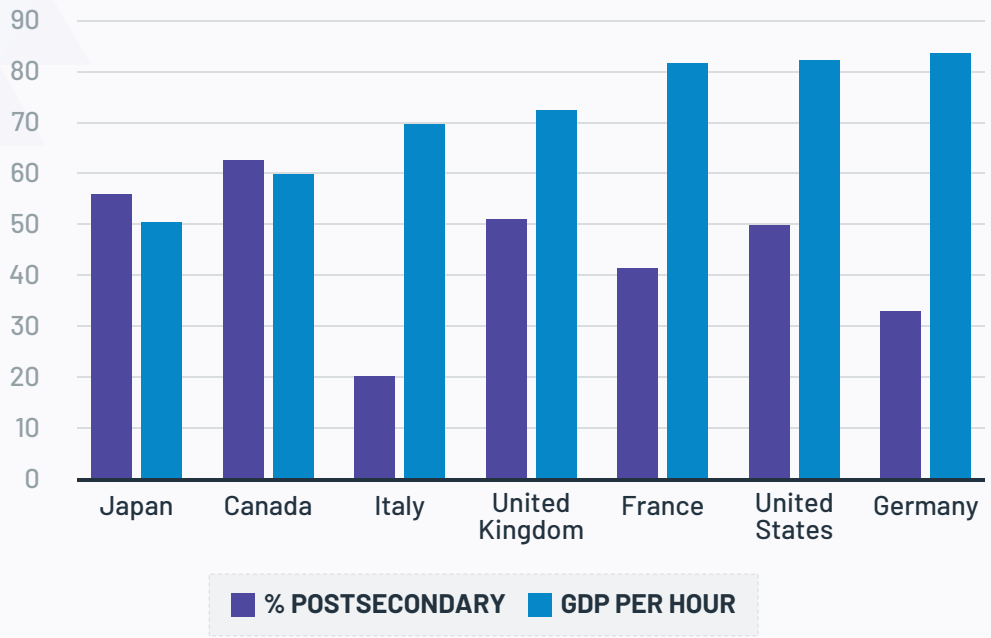
THE LEGACY LEARNING SYSTEM

Canada's leadership in post-secondary attainment is the result of a focused seventy-year strategy. Today, Canada has approximately 2.22 million enrolled students (as of the 2022-23 academic year)[83], 92 percent of whom attend publicly funded institutions, including 100 universities, over 200 colleges, and 13 polytechnic schools. There are an additional 1,500 private vocational colleges.

However, this expansion of post-secondary education has not led to enhanced productivity outcomes. Currently, Canada ranks second last in productivity among the G7 and 18th in the OECD. Moreover, Canada's employment rate for post-secondary graduates ranks 15th out of 20 selected OECD countries. This disconnect is further underscored by the fact that in 2024, the number of degree holders in Canada outpaced available jobs requiring such qualifications by a factor of four, illustrating a widening mismatch between education and labour market needs.[84]

Overall, compared to the OECD average, Canada spends slightly less on primary, secondary, and non-certified post-secondary education (3.6 percent of GDP, versus the OECD average of 3.8 percent), but significantly more on certified post-secondary education (2.6 percent of GDP, versus 1.5 percent of GDP). The United States, however, allocates a higher share of GDP than Canada at both levels—3.8 percent for primary, secondary, and non-certified learning and 2.9 percent for certified post-secondary learning. Additionally, with 92 percent of post-secondary learners attending a public institution, Canada relies more on public funding for certified post-secondary learning than the United States does.[85]

FIGURE 7: PRODUCTIVITY AND POST-SECONDARY



Source: OECD, 2022; 2024

83 From Higher Education Strategy Associates, 2024. P. 6
84 From Lane and Griffiths, 2023.
85 From Higher Education Associates, 2024.

Canada's learning system remains tied to its 19th-century industrial roots, characterized by batch processing (e.g., age-based entry), standardized delivery (e.g., classroom learning), and conventional assessments. Given their dominant market position, public post-secondary institutions lack the culture, incentive, and structure to introduce agile and innovative learning pathways. This, combined with the credentialism culture, which values university credentials over vocational training and other forms of learning, has contributed to a significant disconnect between labour market supply and demand.[86] Students may choose to study in programs for which there is little occupational demand and vice versa.

For example, while there are many under- and unemployed graduates, a Conference Board of Canada study found that two-thirds of occupations facing shortages demand a college-level education, such as diplomas or trade certificates, while one-third require university degrees. Degree holders in engineering have access to numerous opportunities, as do those trained in higher-skilled service roles, such as nursing and allied health professions, which require advanced education and credentials. This pattern is particularly pronounced in the technical job group, where 80 percent of vacancies in the top five shortage occupations call for post-secondary education.[87]

86 From Lane & Griffiths, 2023; Canadian Apprenticeship Forum, 2022.

87 From Conference Board of Canada, 2023.

A FRAGMENTED SYSTEM

Canada's human capital ecosystem is highly fragmented, contributing to an increasing gap between labour market supply and demand. Examples of fragmentation include:

- There is limited provincial coordination associated with post-secondary programs and credential recognition.
- Within many provinces, there are structural disincentives to collaborate and/or coordinate with other institutions.

- The bureaucratic culture of the provincial government oversight provides a significant barrier to post-secondary innovation and agility.
- Provincially regulated occupations (e.g. trades and professions) are fragmented both within provinces and between provinces.
- Provincial governments provide limited recognition for non-certified or informal learning pathways, increasing further fragmentation.
- Though research suggests that upwards of 80 percent of learning (certified and non-certified) occurs at a community level, few municipal governments play an active role in facilitating system-level coordination.[88]
- Canada lacks a coordinated approach for measuring human capital inputs and outcomes.
- Canada's current approach to human capital development lacks strategic regional specialization. Instead of aligning learning and skills development with the distinct economic strengths of its regions, the system remains heavily oriented toward generalized credential pathways, often privileging prestige over practical relevance. This misalignment weakens regional innovation capacity and deepens the disconnect between education, employment, and productivity.[89] Unlike Australia, there is no mechanism for holistic labour market supply and demand forecasting in Canada.[90] Consequently, governments, individuals, and businesses make human capital supply investment decisions (ranging from learning to immigration) without any clear understanding of future demand scenarios.[91]
- Unlike Singapore, Canada lacks a holistic approach to supporting individuals in exploring career and learning pathways. As a result, few learners are empowered to support continuous learning.[92]

88 From Calgary Economic Development, 2022.
89 From Breznitz, 2021.
90 From Australian Government Department of Employment and Skills, 2022.
91 From Labour Market Information Council, 2023.
92 From SkillsFuture Singapore, n.d.

THE PATH FORWARD

The path to social and economic prosperity is rooted in productivity. However, Canada is currently facing a significant productivity challenge. Over the past three decades, Canada's productivity has declined relative to most of its peers and now stands over 30 percent lower than that of the United States. The sources of this decline are multifaceted, including weak capital investment and a challenging business environment. This report is focused on the role that human capital can play in driving productivity growth.

At its core, productivity is about people. People influence capital investment decisions, shape the business environment, provide essential leadership necessary for innovation, and perform the hands-on work of jobs created in the economy. Therefore, the overarching solution to Canada's productivity challenge lies in its people.

We recommend a reimagination of the human capital system as explained in the following five reports in this series.

Throughout this six-part series, Productivity and People, we will explore the human capital challenges facing Canada. These challenges are generational, as are the opportunities. What brought us to this point can also guide us into the future. This productivity challenge presents us with a unique opportunity to reflect on and reimagine the role of people—human capital—in driving future productivity and prosperity.

However, addressing this issue requires a systemic approach by policymakers, employers, credentialing bodies, learning providers, and individuals. No single stakeholder can tackle this challenge alone. Instead, a collaborative and coordinated effort is necessary. Each of the six reports in Series 1 of The Productivity Project offers unique insights into reimagining a future where human capital defines Canada's competitive advantage.

SERIES 1: PRODUCTIVITY AND PEOPLE

REPORT	FOCUS
Productivity And People: Exploring Human Capital and Productivity	**Report 1** establishes the foundational relationship between human capital and productivity, presenting a conceptual framework that informs the entire series. It examines how the development of human capital contributes systematically to productivity growth.
The Coming Storm: Forces Reshaping Labour Markets	**Report 2** identifies and analyzes eight macro-level forces shaping labour markets, from technological disruption to demographic shifts. It evaluates their collective implications on labour productivity and proposes strategies to mitigate challenges while capitalizing on emerging opportunities.
Unlocking Productivity: Path to a Human Capital Supply Chain	**Report 3** advances supply chain principles by proposing a dynamic human capital supply chain network. This model optimizes labour market alignment, ensuring competency supply meets demand efficiently to drive productivity gains across an economy.
Untapped Potential: Mapping the Human Capital Ecosystem.	**Report 4** assesses the outcomes of a pilot project mapping supply and demand within an open learning system. Its findings underscore the importance of synchronizing learning outputs with labour market needs to sustain long-term productivity growth.
The Risk of Managing Risk: The Challenge of Competency Verification	**Report 5** scrutinizes hiring practices through a risk management lens, revealing systemic biases in employer decision-making. By dissecting these barriers, actionable approaches to enhance fairness and productivity in talent acquisition are highlighted.
A Path to Open Learning: A Policy Framework for Enabling Incumbents and Empowering New Entrants	**Report 6** evaluates Canada's public post-secondary system as a natural monopoly, exposing its constraints on innovation and competition. It introduces a framework for an open learning marketplace designed to foster flexibility and productivity growth.


TWC Studio D

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