THE
Productivity
Project

UNTAPPED POTENTIAL

Mapping the Open Learning System

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.

REPORT 01 Productivity and People: Exploring Human Capital's Role in Productivity

REPORT 02 The Coming Storm: The Eight Forces Reshaping Regional Labour Markets

REPORT 03 Unlocking Productivity: The Human Capital Supply Chain

REPORT 04 Untapped Potential: Mapping the Open Learning System

REPORT 05 Finding People: A Risk Management View of Hiring

REPORT 06 Path to Open Learning: A Policy Framework for Enabling Incumbents and Empowering New Entrants

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THE CHALLENGE

At 63 percent, Canada has the highest post-secondary attainment rate among adults in the OECD, 22 percent higher than the OECD average compared to its OECD peers.[1] However, Canada is ranked 18th in the OECD for productivity. 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.[2]

To confront its declining productivity, Canada requires a dynamic learning system that empowers people of all ages to continuously develop the competencies and social capital essential in an increasingly volatile and competitive global market.

As outlined in **Report 3** of this series, the Regional Open Loop Network (ROLN) proposes a coordinated human capital supply chain with shared taxonomies, knowledge-sharing, foresight planning, and measurement. However, a key challenge remains: without a baseline understanding of regional human capital supply, demand, and learning capacity, effective foresight planning—and thus a functional supply chain—cannot be achieved.

THE OPPORTUNITY

In **Series 1—Productivity and People,** we present six compelling policy reports, each addressing this key question: ***How can Canada drive productivity by optimizing its human capital?***

This report discusses a pilot undertaken to map the regional human capital ecosystem as the first step forward in operationalizing ROLN. This study explores three interdependent research questions.

1. What are the regional human capital demands?
2. What is the base regional human capital supply?
3. Is the regional learning system equipped to produce the human capital required to meet future demands?

Report 3 proposes an integrated human capital supply chain network. **Report 4** builds on the supply chain model and reviews the results of three complementary audits, providing a holistic snapshot of a region's human capital ecosystem.

- **Audit 1** analyzes twelve months of regional hiring data to isolate current and emerging priority competencies.
- **Audit 2** analyzes the region's existing competencies base, including post-secondary completion rates and fields of study.
- **Audit 3** analyzes existing certified and non-certified programming offered by the region's learning system.

The project team chose the **Calgary Metropolitan Area** as the pilot region for this study.

Report 3 provides an overview of the pilot results. It is complemented by a comprehensive technical guide to allow economic regions to complete their human capital audits.

1 OECD, 2023.
2 From Lane and Griffiths, 2023.

KEY INSIGHTS

A REGIONAL CHALLENGE

The pilot identified **3,063 learning providers offering 30,870 programs** in the Calgary Metropolitan Area.

- 75 percent from for-profit/ non-profit organizations.
- Only 17 percent are under provincial oversight.
- This highlights a need for regional stakeholders to become far more active in the systematic development of human capital.

LEGACY INDUSTRY IMPACT

The Calgary Metropolitan Area's learning system is optimized for the oil and gas industry. The pilot identified several issues:

- ***Lags Peer Regions:*** Lower post-secondary credentials compared to peer regions.
- ***Compensation Premium:*** High energy sector wages deter sector transition.
- ***Adaptive Capacity Gap:*** Lower levels of education in the liberal arts, including arts, design, and social sciences, negatively impact the development of enabling competencies, the foundation of adaptive capacity.
- ***Internal Learning Capacity:*** Only 25 percent earn post-secondary credentials developed in the province, relying heavily on inter-provincial migration.

THE FUTURE IS HORIZONTAL

Employers prioritize adaptive enabling (e.g., problem-solving) and functional (e.g., accounting) competencies over sector-specific competencies. However, the Calgary Metropolitan Area's system is not designed to deliver these competencies:

- ***Enabling Competency Gap:*** Fifty percent of competencies requested from employers are foundational enabling competencies, including listening, numeracy, and adaptability.
- ***Functional Agility:*** Functional competencies are 2 to 7x more sought-after than sectoral competencies.

THE CERTIFICATION OPPORTUNITY

This audit found that in the Calgary Metropolitan Area, more than 80 percent of learning programs lack a certification path.

- ***Limited:*** Competency certification in the region is limited to educational and professional occupations.
- ***Socio-economic Barrier:*** This acts as a systemic barrier to economic mobility in historically marginalized socio-economic groups.[3]

THE INCUMBENT ADVANTAGE

Adaptive competencies are anchored in highly personalized, purpose-based learning, which puts the individual at the centre. However, this audit highlighted structural barriers to the adoption of purpose-based learning.

- ***Navigation Barriers:*** No tools to navigate the 30,870 programs effectively and align with personal and professional goals.
- ***Incumbent Bias:*** Established institutions dominate, crowding out innovators.

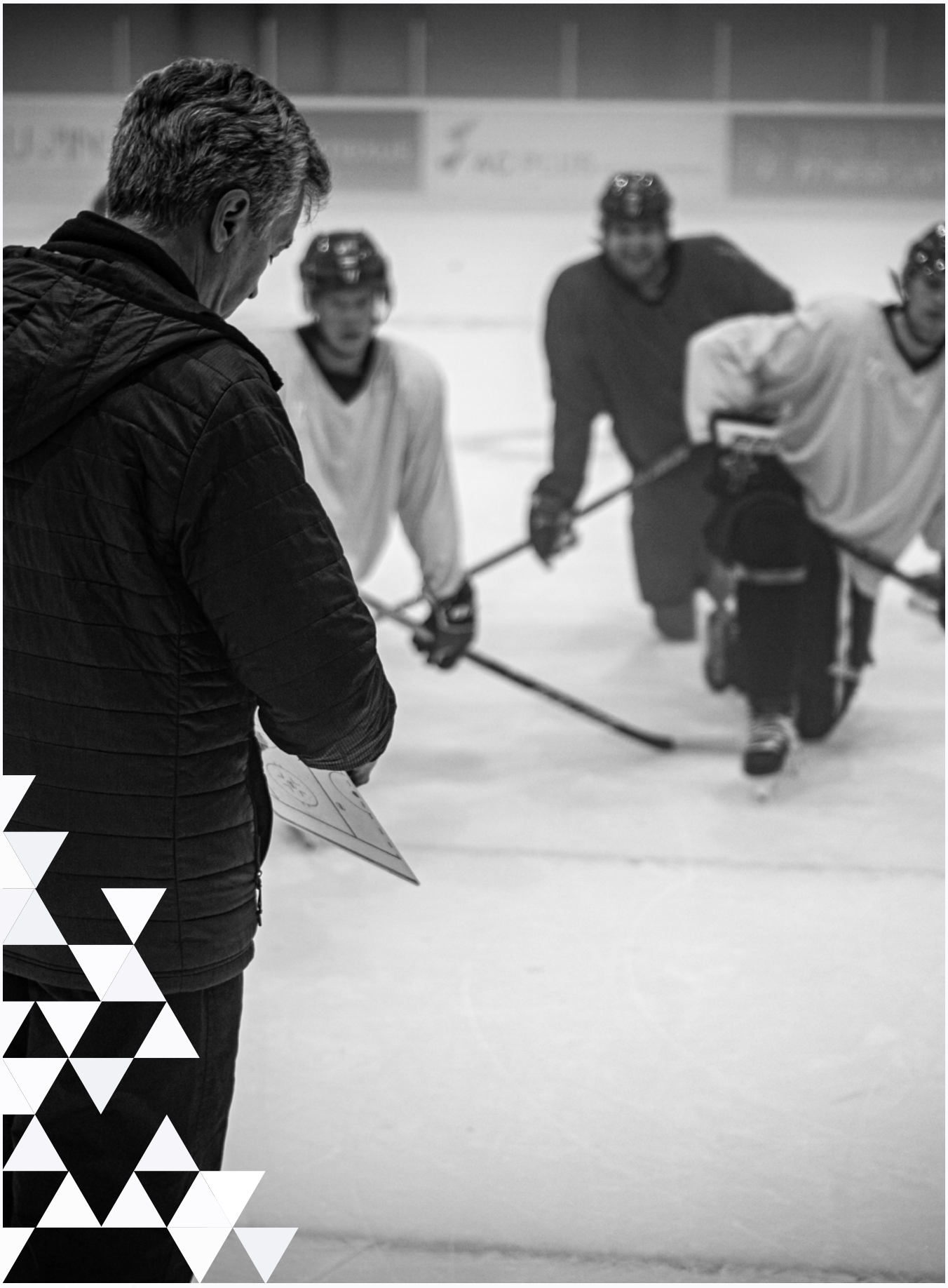
3 From Bayer et al., 2008; Beaman 2012.

WHERE TO START

This study provides empirical insights into optimizing the human capital ecosystem. Following the ecosystem mapping, 18 experts reviewed the findings, which revealed key challenges and opportunities.

TABLE 1: OPPORTUNITIES AND ACTIONS

	OPPORTUNITY		ACTION
1	Innovation & Competition	Historically, sectors with natural monopoly structures, such as telecommunications and transportation, have required policy interventions to foster competition. Similarly, the human capital sector must dismantle structural advantages to enable innovation.	Transition to a decoupled competency model that separates credentials from specific learning pathways. Structurally separate incumbent providers' divisions and transfer public infrastructure assets to an independent entity offering fair market access. Systematically leverage small and medium enterprise delivery capacity to expand learning opportunities.
2	Adaptive Competencies	The current ecosystem undervalues adaptive competencies, with only nine of 25 high-demand competencies developed at scale.	Explicitly align programs with specific competency development goals and utilize existing non-certified programming capacity to build enabling competencies.
3	Evidence-Based Employment Practices	Employers need to shift from informal proxies to competency-based hiring practices.	Implement formal competency testing to create a "learning climbing wall" that values diverse pathways, including non-certified and informal learning.
4	Empower Learners	A human capital ecosystem must empower individuals to be accountable for defining their learning pathways, aligning with their personal and professional goals.	Encourage learners to create personalized learning missions and continuously refine them. Provide tools to track competency development against personal and professional goals.
5	Harmonizing Systems	Only 19 percent of programs offer certification, creating barriers for marginalized groups.	Expand competency certification across all program types and increase experiential learning opportunities beyond traditional education settings.
6	Harmonize Navigation	Currently, 91 percent of programs target multiple life stages, creating inefficiencies.	Implement purpose-based regional learning approaches to clarify pathways and reduce duplication across providers.



PILOT OBJECTIVE

THE CHALLENGE

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 fuelled economic growth through extraction, manufacturing, and commerce.[4] However, over the past four decades, the foundation of economic success has shifted toward human capital—the collective knowledge, skills, and abilities of a workforce.[5] This transition highlights the pivotal role that human capital plays in driving the productivity crucial to a region's social and economic prosperity.[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] Productivity is the interplay of capital investment, business environment, and human capital. Each factor contributes distinct yet interconnected mechanisms to enhancing productivity.

Labour productivity, measured by output per hour worked, directly influences wages and profitability, enabling organizations to expand and invest without raising prices.[8] Regions with substantial productivity growth benefit from higher innovation capacity, global competitiveness, and resilience against inflationary pressures.[9] Conversely, stagnation leads to economic sluggishness, wage suppression, and declining market share.

The Productivity Project examines the impact of human capital on Canada's productivity by 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 third report, Untapped Potential, maps the regional human capital ecosystem as the first step in operationalizing ROLN. This study explores three interdependent research questions:

1. What are the regional human capital demands?
2. What is the base regional human capital supply?
3. Is the regional learning system equipped to produce the human capital required to meet future demands?

Understanding Human Capital

Human capital represents the value derived from a person's competencies and capabilities, encompassing knowledge, skills, experiences, and attributes which enable them to participate effectively in the workforce and society. Human capital exists at both an individual and collective level.[10] Collective human capital resides at an organizational and labour market level (Figure 1).

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.

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

4 The definition of a region is highly contextual. For consistency, we adopt the OECD definition of an economic region as a subnational unit below a national boundary. Herein, we further narrow the definition to an OECD large metropolitan region as a functional urban area (FUA) with a minimum population of 1.5 million. An FUA reflects connections between cities and their surrounding economically connected areas.

5 From Government of Canada, n.d.

6 From Kotsantonis and Serafeim, 2020.

7 OECD, 2021.

8 Comin, 2010.

9 Fernald & Li, 2022.

10 Emery & Flora, 2006.

culture diffusion, shared learning, experimentation, and social embeddedness.[11]For example, knowledge diffusion occurs when educated workers share ideas and best practices with one another.[12]

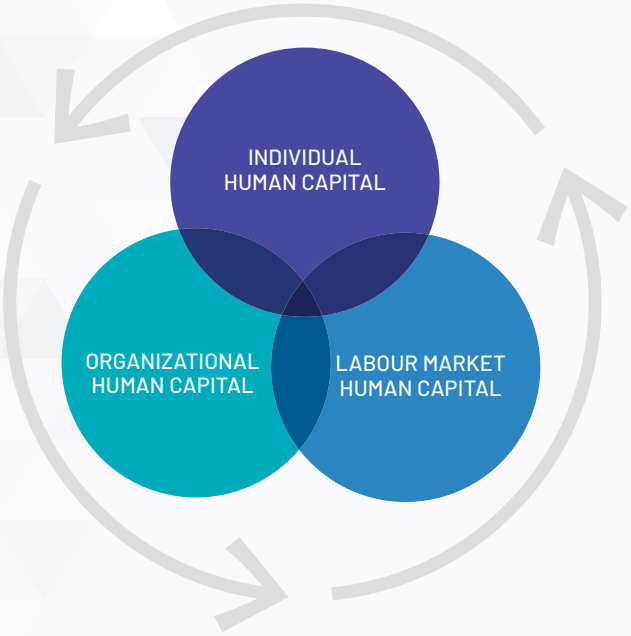
Research indicates a skilled workforce enhances productivity through improved task efficiency, effective leadership, enhanced process improvement, increased technology adoption, and more efficient capital allocation. Moreover, human capital indirectly enhances productivity by diffusing knowledge and fostering a culture of productivity.[13]

Historically, years of formal education (e.g., K-12, post-secondary) have been the primary proxy for human capital accumulation.[14] However, research has shown that 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.[15]

In the second report of this series, *The Coming Storm: The Eight Forces Reshaping Regional Labour Markets*, we examined how the convergence of eight macro-level forces is redefining local labour markets. These forces—spanning automation, extended working lives, and the rise of contingent labour—are driving profound shifts in labour force dynamics. Our analysis concluded that economic regions must fundamentally rethink how they develop and deploy human capital in this rapidly evolving landscape to remain competitive. The challenge is that the processes underlying the development and deployment of human capital in Canada remain rooted in their nineteenth-century industrial manufacturing origins, including batch entry (e.g., age), standardized delivery (e.g., classrooms), and quality assurance through conventional assessment. Moreover, the system lacks the agility required to adapt to highly volatile labour market conditions.

As a result, weak feedback loops between stakeholders have led to significant mismatches between the supply and demand of competencies. For example, in 2024, nearly four times as many university graduates in Canada were seeking jobs as there were available positions that required a degree.[16] Moreover, up to 60 percent of the Canadian labour force will require significant retraining over the next five years.[17] There is increasing concern that this legacy learning system is not optimized to drive the productivity growth essential to its economic and social prosperity.[18] The first step forward is to audit the capacity of the human capital ecosystem. The challenge is that no existing methodology has been developed to conduct a comprehensive audit of a human capital ecosystem.

FIGURE 1: SCALING HUMAN CAPITAL



11 For further information, refer to Kotsantonis & Serafeim, 2020.
12 Foster & Rosenzweig, 2010.
13 Chang et al., 2016.
14 Barro & Lee, 2013.
15 Hanushek & Woessmann, 2015.
16 From Lane & Griffiths, 2023.
17 From Lane & Griffiths, 2023.
18 From Murgatroyd, 2024; Lane & Griffiths, 2023.

THE OPPORTUNITY

Report 3 in this series developed a conceptual regional human capital supply chain, known as the Regional Open Loop Network (ROLN). ROLN is envisioned as a collaborative, open network that incorporates diverse stakeholders, embedding coordination mechanisms. These include adopting a common human capital taxonomy, implementing knowledge-sharing mechanisms, engaging in foresight planning, and harmonizing measurement.

This report reviews the results of a pilot study aimed at answering three interdependent research questions:

1. What are the regional human capital demands?
2. What is the base regional human capital supply?
3. Is the regional learning system equipped to meet the demand for human capital?

The pilot team conducted three complementary audits to answer these questions (Figure 2). These three audits provide a holistic snapshot of a region's human capital ecosystem. This report summarizes the results of these audits.

The *Unlocking Potential: Mapping the Human Capital Ecosystem Technical Guide* provides a detailed breakdown of the study methodology.

FIGURE 2: HUMAN CAPITAL MAPPING STUDY SCOPE

PILOT DESIGN

STEP 1

EXPERT ADVISORY PANEL

The study began by convening an advisory panel of human capital experts to guide the pilot through all phases. To ensure a balanced yet highly qualified group, the team employed purposeful sampling, selecting professionals who met three key criteria:

- ***Relevant Expertise:*** Current roles in human capital, spanning learning, employment, or policy.
- ***Diverse Organizational Experience:*** Backgrounds in both small and large enterprises.
- ***Gender Diversity:*** Balanced representation to incorporate varied perspectives.

The final panel included 28 professionals, ensuring depth and breadth of insight.

In the initial phase, the lead researcher conducted standardized, semi-structured interviews with panel members using open-ended questions. This method provided enough framework to maintain objectivity while allowing for in-depth exploration of key factors—minimizing bias and avoiding leading respondents to predetermined conclusions.

Seven consolidated themes emerged from the eighteen panel interviews.

1. ***Alignment:*** The data should align across all three audits.
2. ***Holistic:*** The data should incorporate all stakeholders in the human capital ecosystem.
3. ***Priority Sectors:*** The data should align with the current and future priority sectors in the region.
4. ***Standardized:*** The data should be comparable across organizations, sectors, and regions.
5. ***Forward Looking:*** The demand data should be forward-looking to make it actionable.
6. ***Multi-level:*** Learning data should be collected at the organizational, program, and learner levels.
7. ***Actionable:*** The data must drive actionable insights.

The final stage of the audit involved eighteen interviews with panel members. These interviews were designed to provide fresh perspectives on the studies' findings, insights, and recommendations.

STEP 2

LITERATURE

REVIEW

Based on the themes that emerged from the panel, the pilot team conducted a literature review.

- The objective was to ground the research design within recognized frameworks to enhance the methodology's potential generalizability.
- In addition to peer-reviewed scholarly articles, the pilot team examined government and non-government reports, as well as topologies.
    - Examples include the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Organization for Economic Co-operation and Development (OECD), Statistics Canada, the U.S. Bureau of Labour Statistics, the U.S. Department of Labour, and the Conference Board of Canada.

FIGURE 3: REGIONAL HUMAN CAPITAL ECOSYSTEM

PILOT SCOPE

The synthesized results of these two steps guided the pilot design.

AN ECOSYSTEM PERSPECTIVE

It is essential to adopt a systems perspective when exploring the relationship between human capital and productivity. The first step is recognizing the five interconnected stakeholders at the centre of this system (Figure 3):

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

Learning Providers: Incorporating all individuals and organizations accountable for delivering certified, non-certified, 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.[19]

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

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

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

AN OPEN LEARNING SYSTEM TOPOLOGY

Based on the interviews and the literature review, the pilot team adopted a three-segment open learning system topology (Figure 4) for this study.

Certified Learning

- The pilot team identified UNESCO's ISCED framework. The ISCED was designed to enable international comparison of certified learning, but due to its heterogeneity, it excludes non-certified and informal learning.[20]
- It incorporates structured and organized training, education, or professional development experiences from a learning organization, workplace, or professional accrediting body.
- It is institution-bound and time-bound, resulting in formal certification by a formal institution, professional body, or sanctioned certifying agency.[21]

Non-Certified Learning

- The pilot team extended the literature review to identify different topologies for non-certified learning. The team prioritized Canadian policy frameworks to maximize alignment with the system mapping sample population.[22]
- Non-certified learning incorporates organized or systematic education, training, or professional development activities from various learning organizations, regional organizations, or training agencies.
- This type of learning requires registration but does not result in third-party certification. The service provider, independent of a government or a professional body, may award individual certificates.[23]

Informal Learning

- Informal learning incorporates a diverse array of lived experiences and unstructured learning resources.[24] Herein, informal learning is defined as incorporating the six sub-categories in Figure 4.[25]

FIGURE 4: OPEN LEARNING SYSTEM

20 UNESCO Institute for Statistics, 2012.
21 From Powley & Childs, 2005; UNESCO Institute for Statistics, 2012.
22 From Myers et al., 2014; Powley & Childs, 2005.
23 From Powley, R., & Childs, E., 2005; UNESCO Institute for Statistics, 2012.
24 From Kolb, A. Y., & Kolb, D. A., 2005.
25 From Powley & Childs, 2005.

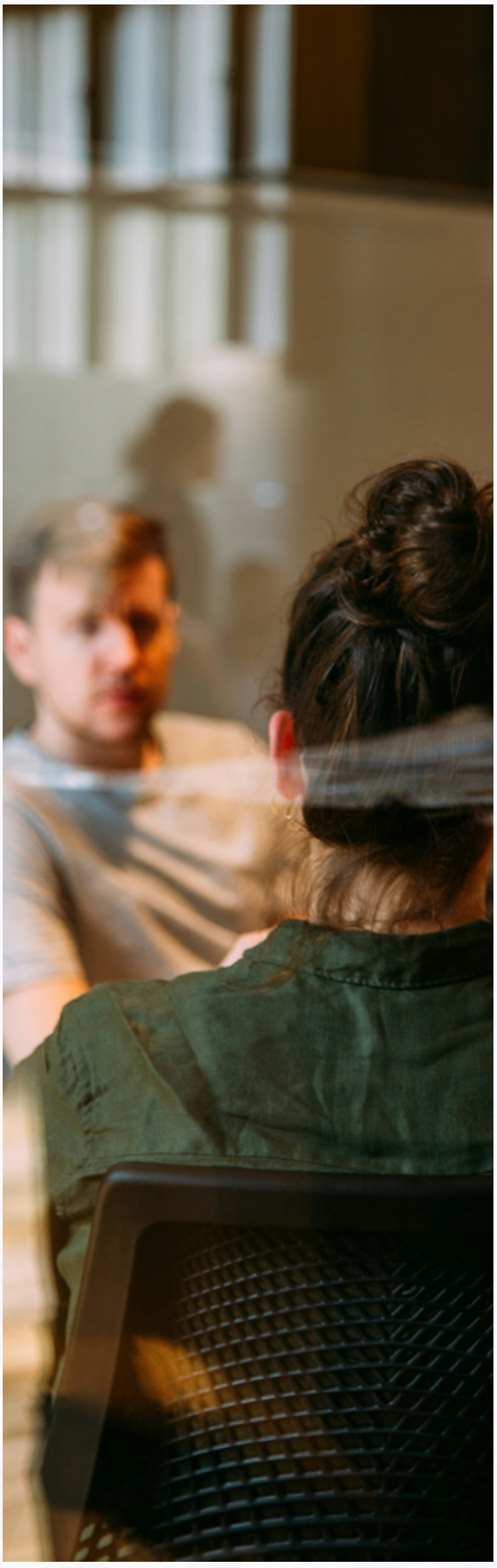
STANDARDIZED DATA FRAMEWORKS

Based on the guidance from the panel, the data must be standardized; the pilot team adopted two recognized government statistical classification systems:

- ***North American Industry Classification System (NAICS):*** NAICS is an industry classification system developed by the statistical agencies of Canada, Mexico and the United States to provide standard definitions of the industrial structure of the three countries and a common statistical framework.
- ***Classification of Instructional Programs (CIP) framework:*** The CIP framework was developed by the United States Department of Education's National Center for Education Statistics (NCES) and later in collaboration with Statistics Canada. It classifies fields of study that can be applied to programs, courses, and experiences.[26]
- There is no standardized competency data to support the demand study. As a result, the pilot team chose Lightcast to provide the demand data. Lightcast collects real-time online employment postings from 40,000 sources globally. This data provides extensive details on occupations, competencies, and qualifications employers seek.

PILOT SAMPLE

The pilot was conducted in a single economic region: Calgary, Alberta, Canada ("the region").



26 Statistics Canada, 2016.

FINAL PILOT SCOPE

AUDIT 1

REGIONAL COMPETENCY DEMAND AUDIT

Audit 1 pilots a methodology for analyzing regional-level competency demand. The methodology is designed to optimize human capital ecosystem capacity.

- The analysis used the eight established and emerging industry sectors identified in the Calgary Metropolitan Area. The scope of each sector is determined by the four-digit North American Industry Classification System (NAICS).
- Twelve months of regional employment postings were pulled from the Lightcast dataset. The final sample was 13,510 employment postings.
- The team translated Lightcast's "baseline" competencies into the six enabling competencies segments.
- The twelve-month sample includes, on average, 187 unique task-specific competencies per segment. To manage the scope of task-specific competencies, the audit divided task-specific competencies between functional competencies and sectoral expertise.

The ***Unlocking Potential: Mapping the Human Capital Ecosystem Technical Guide*** provides a detailed breakdown of the study methodology.

AUDIT 2

REGIONAL COMPETENCY SUPPLY AUDIT

Audit 2 pilots a methodology for analyzing the region's base human capital. The combined results of Audits 1 and 2 provide leaders with an empirical lens into the regional human capital supply-demand balance. This audit uses ***educational attainment*** and ***Classification of Instructional Programs (CIP)*** data from Statistics Canada. For benchmarking, the Calgary Metropolitan Area results were compared with those of five peer regions across Canada, ensuring a meaningful and contextualized analysis.

EDUCATIONAL ATTAINMENT

The most recent Statistics Canada data associated with educational attainment incorporates four dimensions:

- Percentage of the population with degrees, diplomas, and certificates.[27]
- Percentage of the population with an apprenticeship, trade diploma or certificate.
- Percentage of the population with a university certificate, diploma, or degree at bachelor level or above.
- Percentage of the population who completed studies in the province of their current residence.

CLASSIFICATION OF INSTRUCTIONAL PROGRAMS (CIP)

- CIP is a hierarchical classification system of all instructional programs, defined as:

  A combination of courses and experiences is designed to achieve a predetermined objective or set of related objectives, such as preparation for advanced study, qualification for a specific occupation or range of occupations, or simply an increase in knowledge and understanding.[28]

- CIP codes range from two to six digits, with each additional digit providing greater specificity. In this audit, two-digit codes (e.g., "Construction Trades" or "Engineering") proved too broad, as they encompassed multiple distinct fields.
- To enhance precision, we disaggregated the data into four-digit CIP codes, which offer a more detailed breakdown of program categories.

The ***Unlocking Potential: Mapping the Human Capital Ecosystem Technical Guide*** provides a detailed breakdown of the study methodology.

27 This audit follows Statistics Canada and reports educational outcomes as a proportion of the population of those aged fifteen and above.

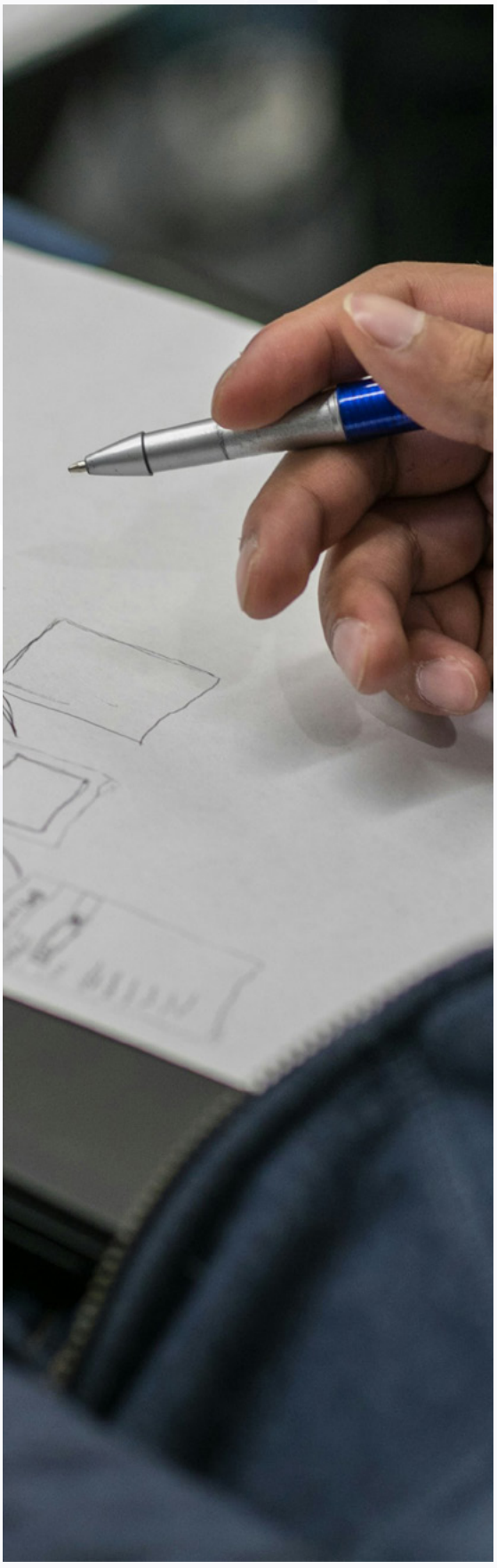
28 From Statistics Canada, 2021.

AUDIT 3

REGIONAL OPEN LEARNING SYSTEM AUDIT

Audit 3 pilots a methodology for completing an audit of a region's certified and non-certified program capacity. When combined with audits 1 and 2, this provides a holistic lens of human capital supply gaps and the existing learning capacity available to close current or emerging gaps. Together, these three audits form an evidence-based dashboard, enabling decision-makers to optimize regional learning capacity.

Methodologically, it was imperative to define a consistent and concise coding scheme. After conducting extensive literature and policy analysis, the pilot team identified that certified learning classification topologies exist within organizations (e.g., UNESCO). However, no standardized coding framework existed for non-certified programming. As a result, the pilot team developed a coding framework that could be consistently applied across both certified and non-certified learning.



DEVELOPING A HOLISTIC FRAMEWORK

Through advisory panel input and iterative testing, we developed a comprehensive codebook that synthesizes recognized methods from existing classification systems. The final framework to allow common coding across both certified and non-certified programs included 21 characteristics at three levels (Table 2):

- ***Level 1:*** Organizational (institutions, providers)
- ***Level 2:*** Programmatic (content, delivery format)
- ***Level 3:*** Individual (learner demographics, outcomes)

DATA COLLECTION & ANALYSIS

A team of nine researchers completed the data collection over fifteen weeks, taking approximately 2700 hours.

- ***Certified Programs:*** Full census of all programs.
- ***Non-Certified Programs:*** Structured representative sampling, aligned with NAIC standards and program criteria.
- After coding, we extrapolated the sampled NAIC data to estimate total annual program availability, ensuring scalability and comparability.

The **Unlocking Potential: Mapping the Human Capital Ecosystem Technical Guide** provides a detailed breakdown of the study methodology.

AUDIT 3 LIMITATION

This audit focuses exclusively on certified and non-certified learning providers within a single geographic economic region. While informal learning resources (e.g., podcasts, books, volunteering) and corporate training programs represent significant parts of the open learning system, they fall outside the scope of this study due to feasibility constraints.

TABLE 2: AUDIT 3 CODING VARIABLES

ORGANIZATION-LEVEL	PROGRAM-LEVEL	INDIVIDUAL-LEVEL
1. Orientation	1. Program category	1. Target life-stage
2. NAIC sector	2. Learning outcomes	2. Target audience
3. Learning provider segment	3. Program delivery	3. Primary value
4. Location	4. Program location	
5. Age	5. Technology requirements	
6. Size	6. Program costs	
	7. Program duration	
	8. Certification awarded	
	9. Knowledge type	
	10. Annual experiences	

PILOT RESULTS

As the first step toward operationalizing the conceptual regional human capital supply chain (ROLN), this project piloted a three-phased model for mapping a regional human capital ecosystem. Three research questions guided this study:

1. What are the regional human capital demands?
2. What is the base regional human capital supply?
3. Is the regional learning system equipped to produce the human capital required to meet future demands?

The study's outcome will be presented in three sections. The first section reports the **pilot results** of the three audits. The second section discusses the **pilot insights**. The third section translates these insights into **pilot recommendations**.

AUDIT 1

REGIONAL COMPETENCY DEMAND AUDIT

Rapid technological and economic changes are reshaping labour force requirements, with employers increasingly prioritizing adaptive competencies.[29] Our analysis reveals key insights about competency demand across sectors (see Figure 5).[30]

RESULTS

The Future is Horizontal

- Across almost all sectors, 90 percent of the total competency demand was either enabling or functional competencies. These competencies provide an individual with the maximum capacity to adapt to economic fluctuations and sectoral demands. These competencies provide an individual greater agency by decoupling their value from sector demand.
- In general, demand for functional competencies (e.g., management, marketing, operations) is three times higher than sector-specific knowledge. However, this varies significantly by sector, with creative industries seeing functional competencies in seven times greater demand than sector competencies.

Sector Context Matters, But Can Be Learned

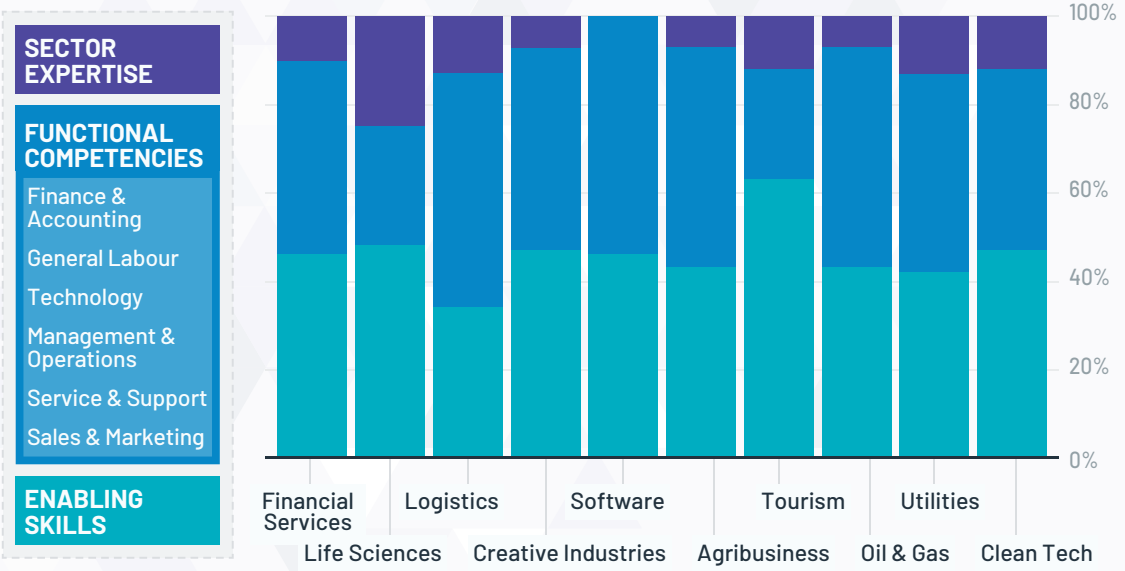
- While sector-specific experience adds value (e.g., marketing in finance vs. retail), results suggest employers believe core functional competencies are transferable across sectors.
- Contextual knowledge is best gained through professional immersion, not traditional training, highlighting the untapped potential of experiential learning.

INSIGHTS

To develop an adaptive labour force, regional leaders should:

- Prioritize the development of adaptive and functional competencies.
- Leverage experiential learning to accelerate sector-specific competencies.

FIGURE 5: THE FUTURE IS HORIZONTAL



29 From the Government of Canada, n.d.
30 From the Government of Canada, n.d.

AUDIT 2

REGIONAL HUMAN CAPITAL SUPPLY AUDIT

Audit 2 examines the Calgary Metropolitan Area's current competencies capacity relative to six Canadian peer regions. The significant results are presented below.

RESULTS

Post-secondary Credentials

- Though 80 percent of adults in the Calgary Metropolitan Region possess post-secondary credentials, such as a degree, diploma, or certificate, that proportion is among the lowest among peer regions. When considering only university credentials, the region ranked third of six.
- Of the six regions, the Calgary Metropolitan Area had the lowest proportion of those who attained their credential in its provincial jurisdiction and the highest proportion of those who completed their credential in another jurisdiction. This reflects the inward migration of human capital over the past two decades and a dependency on other jurisdictions to develop competencies for the region's labour force.

Disciplinary Strengths & Weaknesses

Leadership in Core Disciplines

The Calgary Metropolitan Area excels in business and engineering education, offering:

- 35 percent more engineering programs per capita than peer regions.
- Strong alignment with in-demand functional competencies (management, finance, accounting).

Notable Gaps in Critical Areas

The region trails peers in:

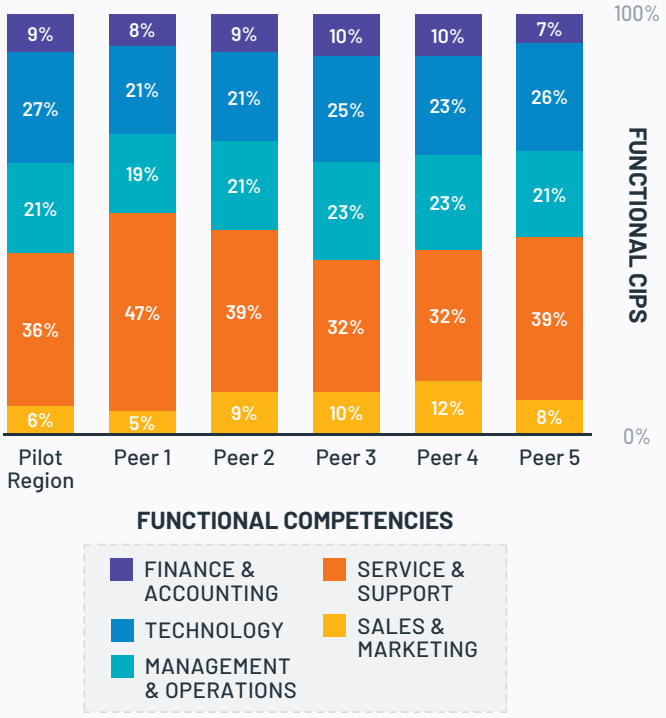
- Arts, design, and communications (23 percent fewer programs in social/behavioural sciences)
- Creative industries
- Sales and marketing education

Program distribution matches the demand for technical competencies (e.g., petroleum engineering) and functional business competencies. However, there was a significant gap in enabling competencies (i.e. communication, collaboration) and some core literacies.

INSIGHTS

- The 31 percent concentration in five functional competency categories reflects legacy economic priorities.
- The enabling competencies gap may represent a measurement challenge (poor CIP mapping) or a systemic competency shortfall. If valid, this deficiency could impair labour force adaptive capacity.

FIGURE 6: FUNCTIONAL CIP COMPARISONS



AUDIT 3

OPEN LEARNING SYSTEM AUDIT

The third pilot in this study reports the results of the quantitative audit of the certified and non-certified learning system. The results are reported at three levels: organization, program, and learner. These final results identified **3,063** learning providers delivering **30,870** certified and non-certified learning programs, resulting in over **three million** learning experiences annually.

RESULTS: ORGANIZATION-LEVEL

Organization Orientation

For-profit and non-profit organizations dominate the 3000 organizations. The roles of public organizations are primarily limited to provincially accredited, certified learning.

Private Sector Dominance

Seventy-five percent of all certified and non-certified learning organizations—including trades, HR, creative arts, and professional development—are for-profit.

Non-Profit Presence

Non-profits lead in business, labour, religious, and social learning segments.

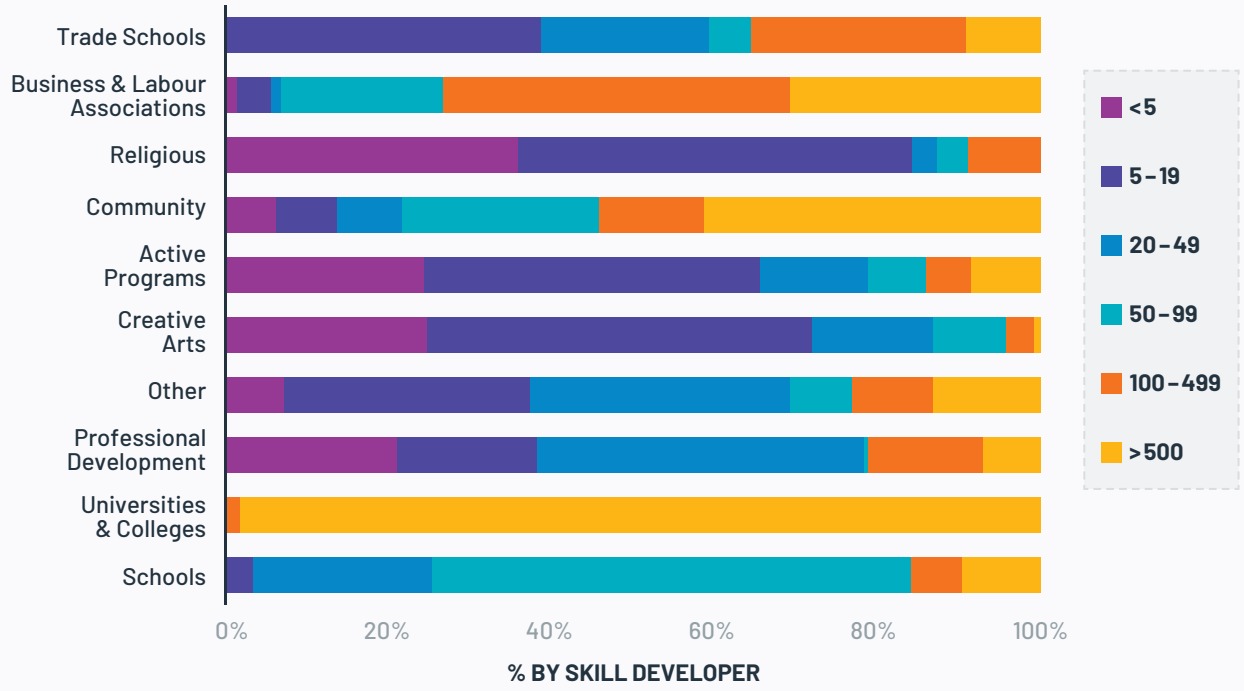
Public Sector Focus

While public institutions dominate K-12 and post-secondary education (universities and colleges), they represent only 25 percent of the broader open learning system.

Organization Size

- 70 percent of all learning providers employ fewer than 100 people (See Figure 7). This highlights a fragmented system impacting its ability to meet volatile market demand.
- Smaller organizations primarily deliver non-certified learning, including the creative arts, religion, sports and recreation sectors.

FIGURE 7: SIZE OF LEARNING PROVIDERS BY SEGMENT



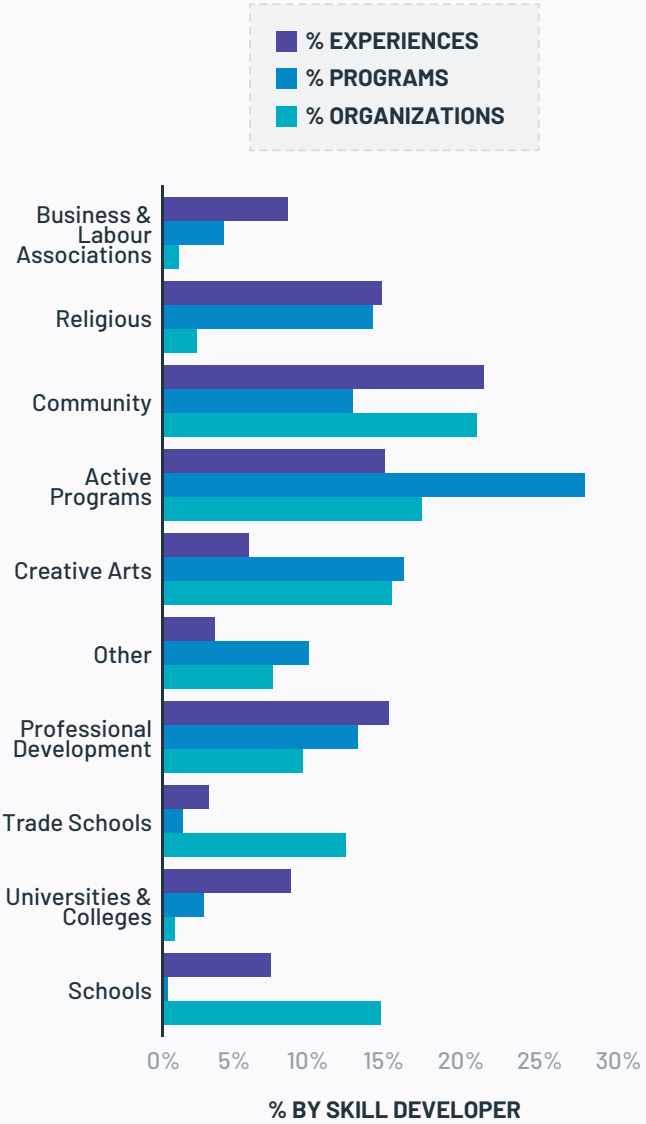
Organization Age

Almost three-quarters of learning organizations were founded over twenty years ago; only seven percent were established in the past decade.

Organization Location

The learning system is dominated by small community-based enterprises in the region, which suggests a demand for community-based solutions.

FIGURE 8: SYSTEM CAPACITY BY SEGMENT



RESULTS: PROGRAM-LEVEL

System Capacity by Provider Segment

Figure 8 compares the proportional relationship between total learning organizations, learning programs, and individual learning experiences at a segment level. The contextual nature of the learning experience influences the balance between organizations, programs, and experiences.

- ***High scalability:*** Self-directed learning (e.g., arts) shows 3- 5x more programs per provider
- ***Low scalability:*** One-on-one services (e.g., executive coaching) face natural capacity limits

Enabling Competencies Gap Analysis

All programs were coded based on their explicit goal of developing the twenty-five enabling competencies defined in the Calgary Metropolitan Area's harmonized enabling competencies initiative.[31] The results do not reflect the actual learning in each segment; instead, they highlight the explicit mention of the twenty-five enabling competencies. Figure 10 shows the relationship between enabling competency development and the learning provider segment. Figure 10 provides a breakdown of explicit enabling competency development by program type.

- Only 9 of 25 critical enabling competencies are developed at scale.
- 65 percent of competency development remains implicit (e.g., collaboration in team sports).
- Universities over-index on problem-solving (+32 percent) but under-deliver workplace competencies (-45 percent).
- Learners bear the burden of recognizing/validating competency development in the current system.
- Certification pathways exist for just 36 percent of enabling competencies.

31 The sample region developed and piloted a harmonized enabling competency framework, as described in Finch et al., 2023.

FIGURE 9: ENABLING COMPETENCIES BY SEGMENT

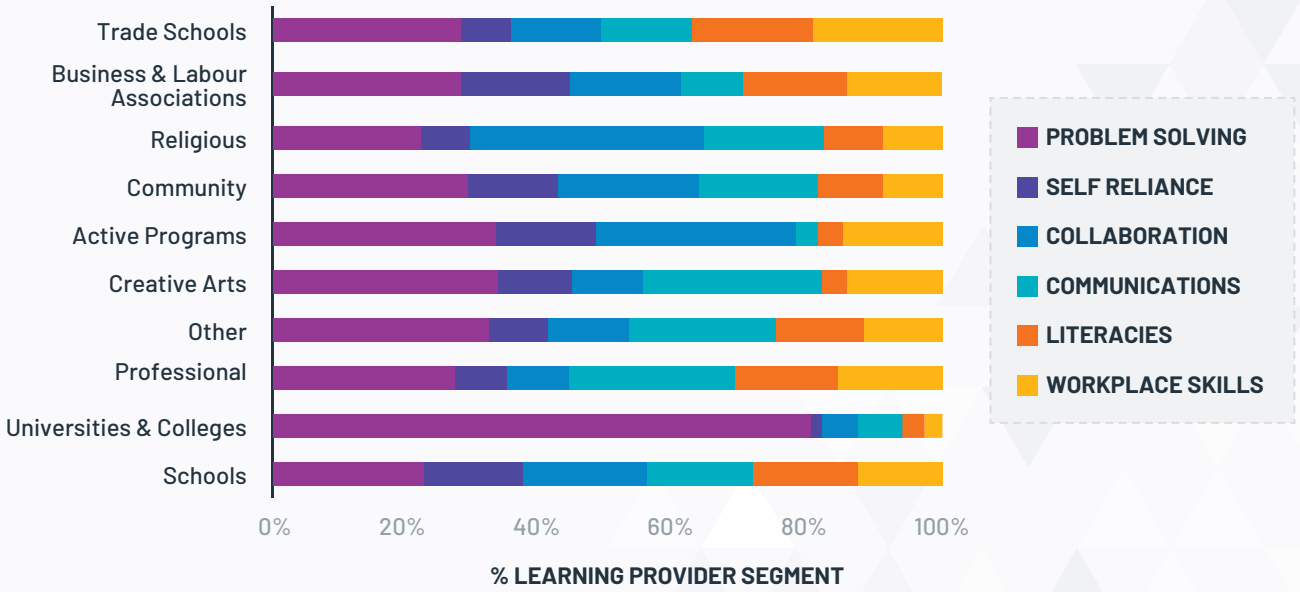
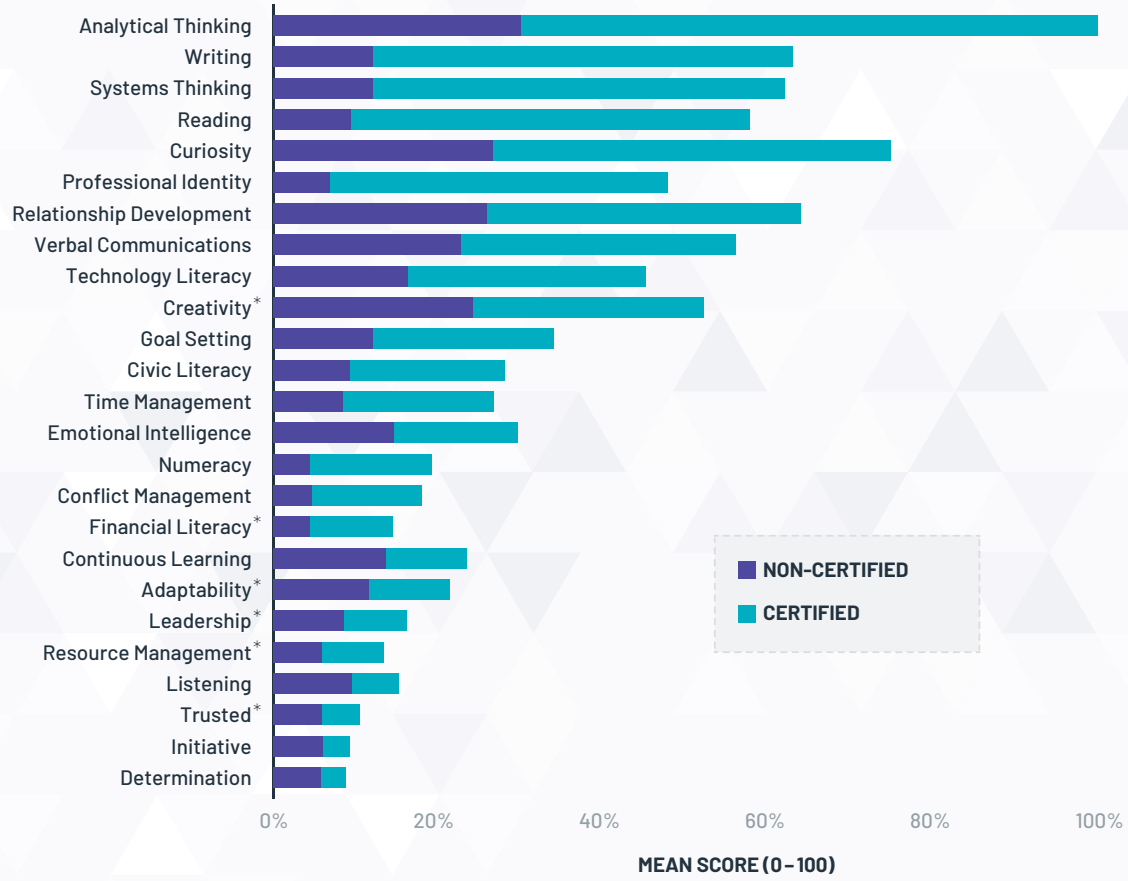


FIGURE 10: ENABLING COMPETENCIES PROGRAM CERTIFICATION



Functional Competency Development

Figures 11 and 12 report functional competency development.

- 18 percent of all learning programs (5,662 annually) focus on functional competencies.
- Generates 797,060 participant experiences yearly.
- 68 percent of functional competency experiences are certified.
- Non-accredited business schools and professional development providers deliver the majority of functional competency training.
- Sales and marketing training shows a significant undersupply.

FIGURE 11: TOTAL FUNCTIONAL COMPETENCY PROGRAMS

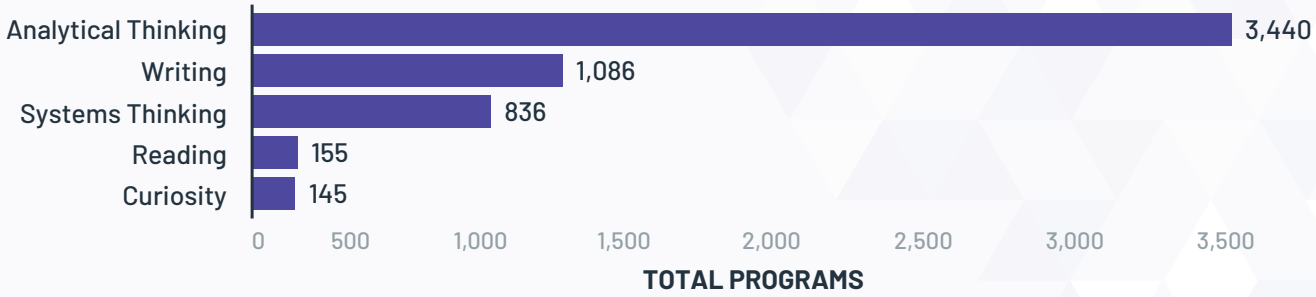
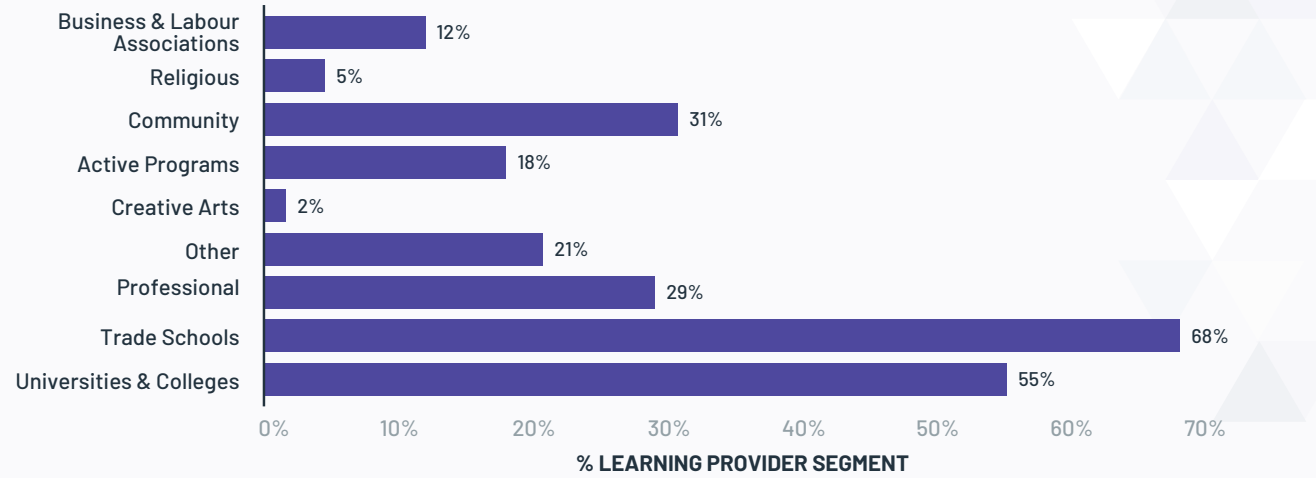


FIGURE 12: FUNCTIONAL COMPETENCIES BY SEGMENT



Sectoral Competency Development

Figures 13 and 14 report the development of sectoral competencies.

- Only nine percent of programs (2,842 annually) develop sector-specific expertise.
- The creative industries and life sciences sectors dominate sectoral competency development with a combined share of 60 percent.
- Colleges and universities deliver 49 percent of these programs, followed by creative arts (24 percent) and trade schools (18 percent).

FIGURE 13: TOTAL SECTORAL EXPERTISE DEVELOPMENT PROGRAMS

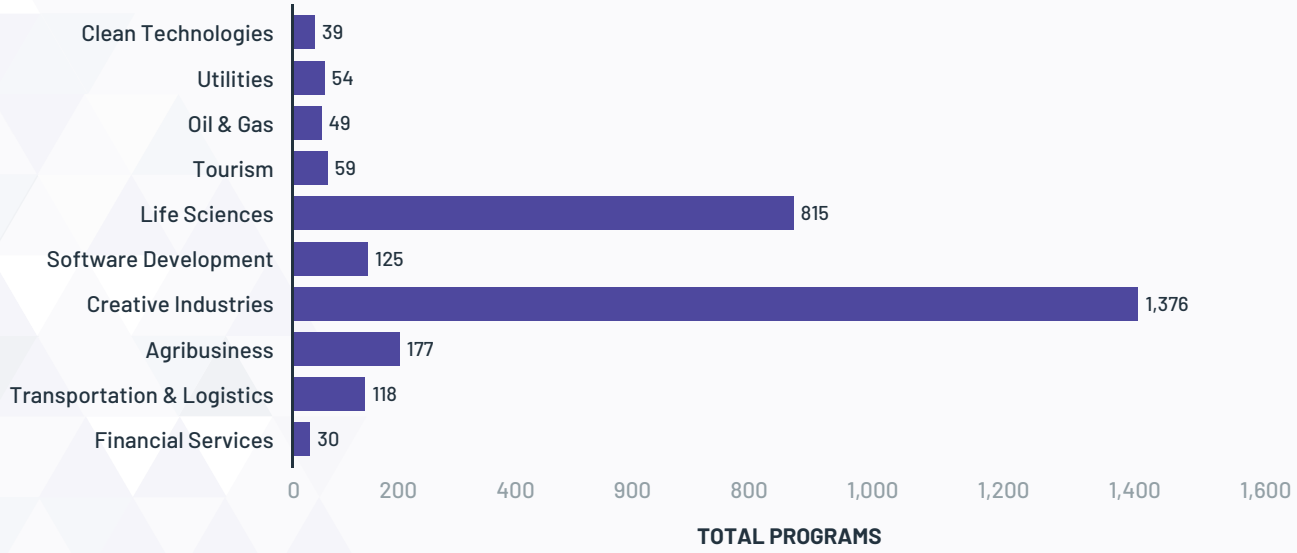
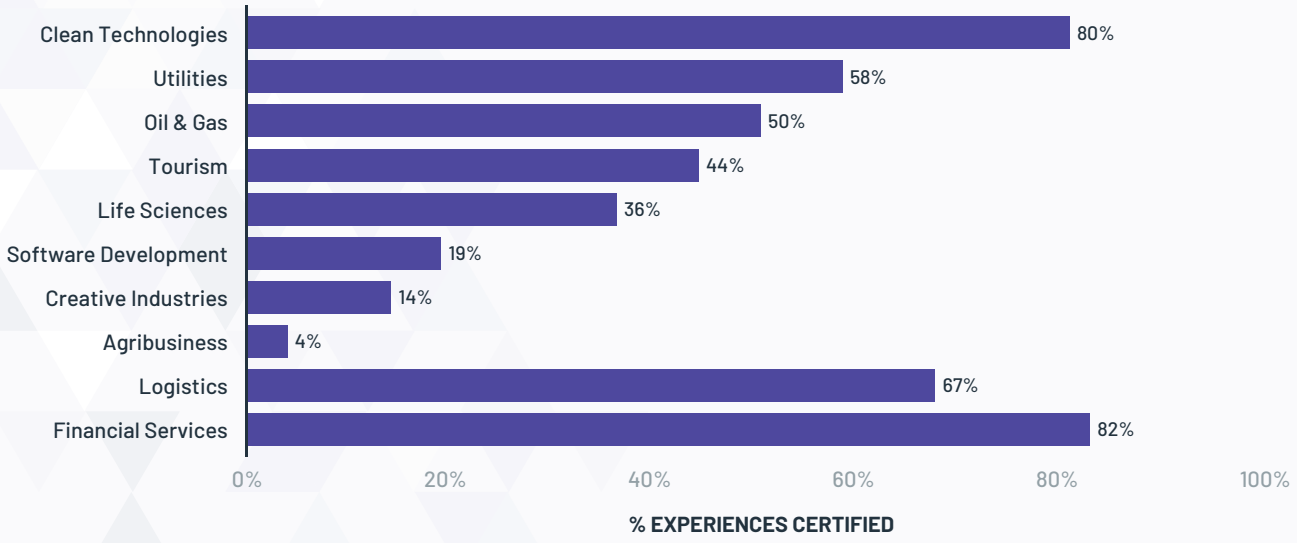


FIGURE 14: PERCENTAGE SECTORAL EXPERTISE DEVELOPMENT CERTIFIED



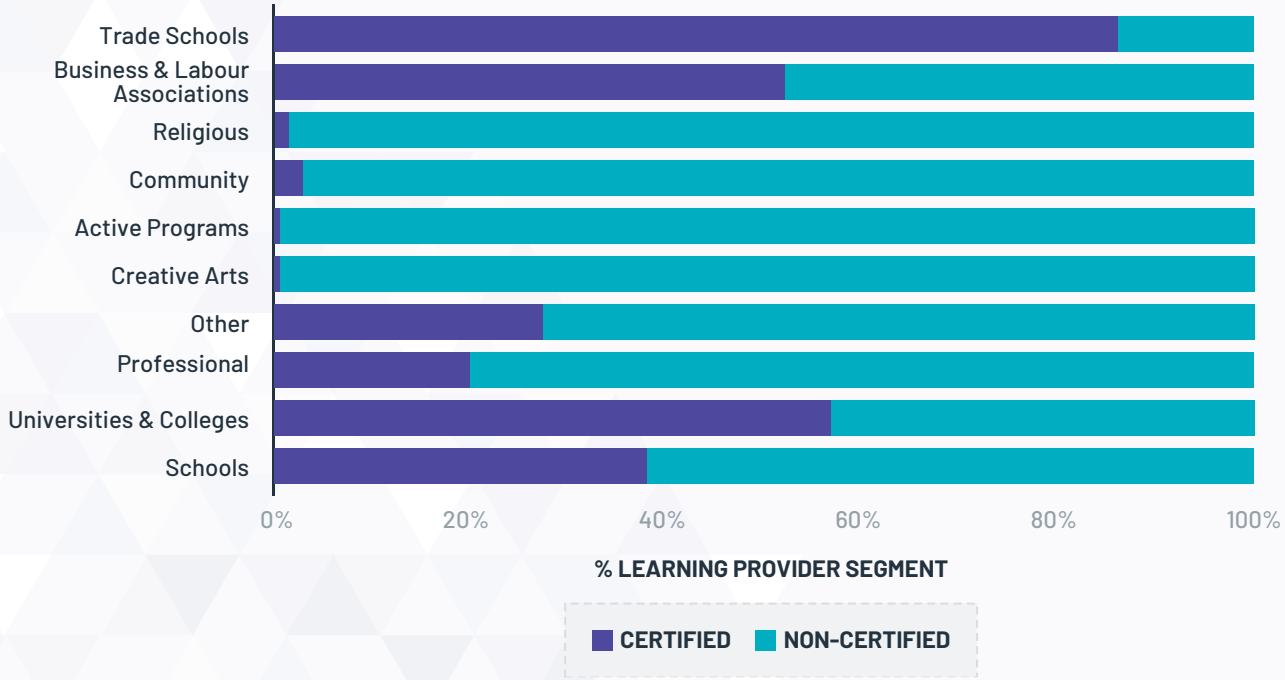
Program Certification

As per Figure 15, only eight percent of the estimated 30,870 programs certify competency outcomes. These are largely government-accredited elementary, secondary, university, and college systems. In addition, many of these are related to trades and technical competencies. Educational certification represented 46 percent of the certification methods, followed by professional certification at 41 percent. Evidentiary methods (portfolio) were recognized in fewer than 2 percent of programs.

In contrast, entire learning segments, from creative arts to active programs, provide no certification. This lack of a path to competency certification has numerous implications:

- It limits labour market mobility for those who developed competencies using non-certified or informal learning pathways.
- It disproportionately advantages privileged socio-economic groups [32]
- It undermines merit-based hiring by shifting employer dependency to competency proxies, such as education and references.
- It does not recognize existing competency development capacity in the current open learning system.

FIGURE 15:CERTIFIED PROGRAMS BY LEARNING PROVIDER SEGMENT



32 From Lane & Griffiths, 2023.

Program Logistics

Delivery Method

Figure 16 reports program delivery. Program delivery channels continue to evolve as the COVID-19 pandemic has accelerated both remote and asynchronous learning models.

- 75 percent of programs are delivered at provider facilities (i.e. classrooms, training centers)
- Only 5 percent of programs are offered in learners' preferred locations'
- The remaining 20 percent utilize hybrid or alternative delivery methods.

Program Costs

The audit found that costs vary dramatically, with 25 percent being under $100 and 20 percent being over $ 5,000 (primarily in multi-year post-secondary programs).

Program Duration

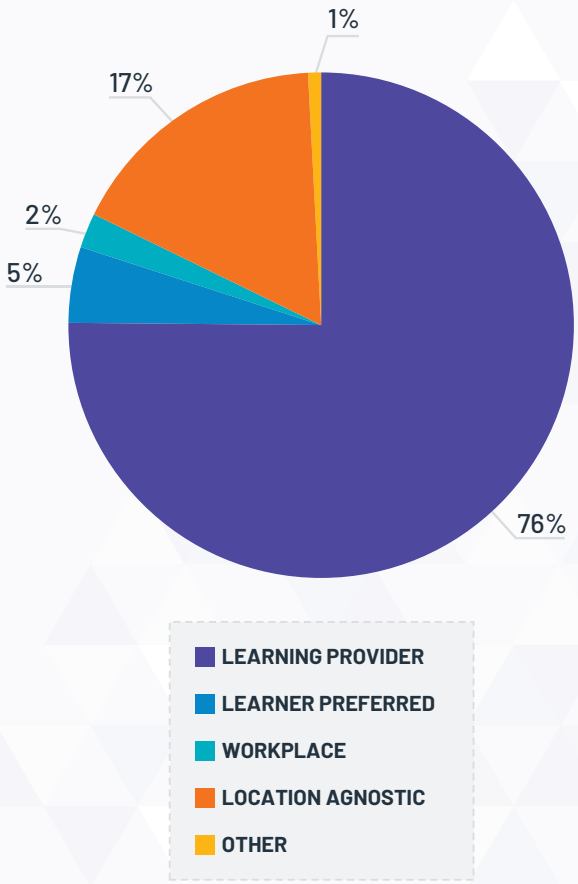
Program duration varies dramatically. Not surprisingly, certified learning has a longer duration, whereas two-thirds of non-certified learning programming is a week or less.

Experiential Learning

This audit also explores the scope of experiential learning in the current system. Experiential learning bridges conceptual learning with lived experiences through internships, apprenticeships, live case studies, field school entrepreneurship, and community-engaged research. The results show that experiential learning remains relatively limited in today's learning system:

- Only 4 percent of all learning programs explicitly embed experiential learning.
- Experiential learning is concentrated in universities, colleges, and trade schools (39 percent of their programs). Sixty percent of these experiences involve applied research projects, followed by 30 percent that are linked to internships or practicums.

FIGURE 16: PROGRAM DELIVERY



RESULTS: LEARNER LEVEL

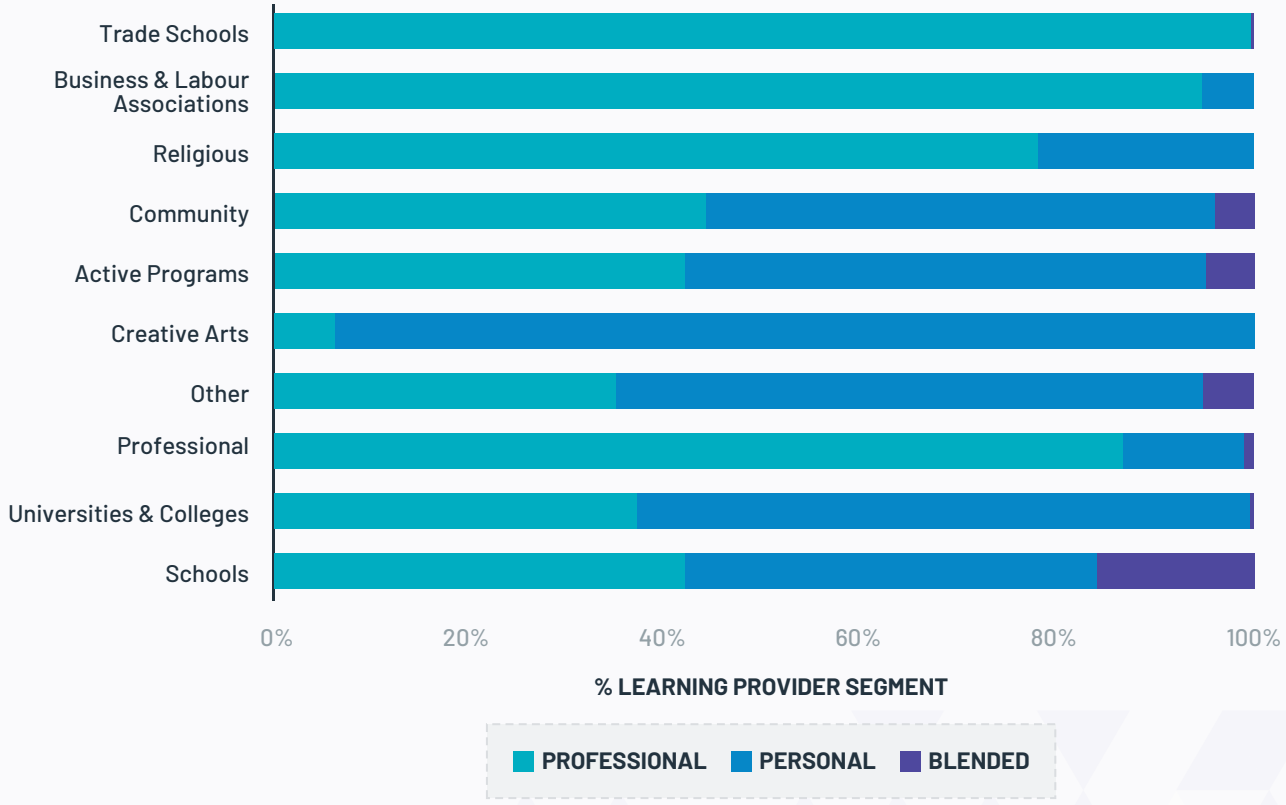
Primary Program Value

All programs were analyzed for a specific target audience. Only 40 percent of the programs were identified as targeting a clear audience. As shown in Figure 17, the proportion of programs defined as primarily professional or personal development was evenly split and logically aligned with the associated learning provider segment.

Moreover, programs were analyzed in terms of how they were positioned to serve specific life stages (e.g., children, young adults, seniors). Although competency development opportunities can often span various life stages, the programming often reflects the unique dynamics of a specific life stage. Surprisingly, only 9 percent of competency development programming targets a specific life stage "and these were overwhelmingly targeting children." The remaining 91 percent of programs attempt to target two or more life stages.

This issue warrants further investigation, as it may indicate an inefficiency in the current learning system. Programs try to be all things to all people to maximize registration, diluting the program's value to specific audiences while risking duplication, cannibalization, or programming across different service providers.

FIGURE 17: ORGANIZED PROGRAM VALUE BY LEARNING PROVIDER SEGMENT




PSYCHIATRIE DU SUJET AGÉ
PUBLIS DU LANGUEDOC
CANCERS BRONCHOPULMONAIRES
pancréatologie clinique
MALADIES INFECTIEUSES
PÉDIATRIE
Cardiolo

PILOT INSIGHTS

INSIGHT 1

A REGIONAL CHALLENGE

In Canada, education is constitutionally the provinces' purview. The provinces are "responsible for the organization, delivery, and assessment of education at the elementary and secondary levels."[33] This mandate has been carried forward since 1867, but reflects the 19th century, when learning was limited to provincially accredited learning for children and youth.

However, this audit highlights regional learning capacity expanded exponentially in the intervening 150+ years, incorporating 3,063 organizations in the Calgary Metropolitan Area today and delivering 30,870 isolated learning experiences across the the for-profit, non-profit, and public sectors.

- 75 percent of providers are for-profit/non-profit
- 75 percent are based in the region
- 17 percent fall under provincial oversight

The pilot highlights the essential role regional leaders must play in transforming these thousands of isolated experiences into an integrated human capital ecosystem optimized to deliver regional productivity.

33 Council of Ministers of Education, n.d.

INSIGHT 2

THE INDUSTRY LEGACY IMPACT

This pilot demonstrates how the design can identify legacy industry impact on a regional human capital ecosystem. In this context, the pilot team found that the legacy oil and gas industry contributed to three factors:

WEAKER OVERALL POST-SECONDARY CREDENTIALS

Although the Calgary Metropolitan Area has a well-educated population, it lags behind peer regions in post-secondary attainment among individuals who attended elementary and secondary school in the area.

LEGACY INDUSTRY ORIENTATION

Though the Calgary Metropolitan Area has the highest proportion of STEM graduates in Canada, this competency capacity is best defined as E-STEM (energy-related task-specific competencies in Science, Technology, Engineering, and Math). Conceptually, STEM provides a robust foundation for growth and diversification; however, specialization in oil and gas encourages the development of competency in highly technical areas. For example, many individuals have developed expertise in the oil and gas industry, which was historically rewarded with a financial premium.[34]

- Individuals are incentivized to deepen their expertise with the promise of increasing financial rewards.
- Automation and structural economic changes are transforming oil and gas expertise from an asset to a labour market barrier. The economics of this sector enabled many to live a lifestyle funded by an oil and gas premium. However, this premium disincentivizes a transition to sectors outside of oil and gas because moving sectors is not simply about reskilling — it also demands reframing compensation and lifestyle expectations for many individuals.[35]

LEARNING CAPACITY

At 25 percent, the Calgary Metropolitan Area has the lowest proportion of its peers who attained their credentials in the province where they reside. Concurrently, it has the highest number of citizens who completed their credentials in another province.

- This reflects the inward migration of people over the past two decades and a dependency on other jurisdictions to develop competencies. This historical capacity to "buy" competencies from other jurisdictions is rooted in the income premium of the oil and gas sector discussed earlier.
- The Calgary Metropolitan Area faces increasing pressure to mobilize regional learning capacity to support the reskilling essential to productivity growth.

34 From Statistics Canada, August 2020.
35 From Cutean & Davidson, August 2018.

INSIGHT 3

THE FUTURE IS HORIZONTAL

Employers are seeking candidates with both enabling and functional competencies to drive productivity. Both enabling and functional competencies run horizontally across the economy, providing the maximum agility to individuals and organizations. In contrast, demand for sectoral expertise depends on macroeconomic factors that expose individuals (and, more broadly, the city) to externalities. Moreover, individuals who define their professional identity as anchored to narrow sectoral expertise face the daunting task of redefining themselves in periods of weak demand.[36]

However, the audit found the Calgary Metropolitan Area's learning system is not optimized to deliver the adaptive capacity essential to enhance productivity:

THE ENABLING COMPETENCIES GAP

The competency demand audit found enabling competencies are in equal or greater demand than task-specific competencies in almost all sectors. However, this audit identified a weakness in the explicit development of the top 25 enabling competencies.[37]

- Sixteen of the twenty-five enabling competencies score exceptionally low. These competencies include listening, numeracy, and adaptability. This weakness extends across both certified and non-certified learning providers.
- The lack of explicit learning opportunities for enabling competencies may be rooted in the perception that task-specific competencies deliver greater short-term economic value than enabling competencies.
- The lack of explicit identification of enabling competencies may also be rooted in the perception of non-certified learning providers they are not part of a larger human capital ecosystem. For example, research demonstrates competitive sports contribute to the development of competencies related to collaboration and teamwork.[38] However, when analyzing sport and recreation programming, the development of these competencies is rarely explicitly identified. Many individuals participating in these programs may not recognize or value the competencies being developed, resulting in the undervaluing of both the experience and the competencies.

FUNCTIONAL COMPETENCIES AND ADAPTIVE CAPACITY

The competency demand audit identified that functional competencies are three times more in demand than sectoral expertise.

- Functional competencies drive productivity as they enable individuals to apply their functional expertise in different sector contexts. This highlights an opportunity to design certified functional competencies programs that intentionally expose individuals to different sector contexts.
- Opportunities may include a variety of pedagogical methods, such as work terms, volunteering, live case studies, and community-based research. Immersing individuals in a diverse sector context can demonstrate how to adapt functional competencies to meet the unique needs of different contexts.

36 From Ibarra, 1999; Cruess et al., 2019.
37 The sample region developed and piloted a harmonized enabling competency framework described in Finch et al., 2023.
38 From Bosch & Mansell, 2015.

INSIGHT 4

RISK AND CERTIFICATION

Only 19 percent of all programs include any form of certification, primarily limited to educational and professional certifications. This lack of rigorous and credible competency-based certification amplifies the risk to small–and medium-sized enterprises, which represent 90 percent of employers in the Calgary Metropolitan Area.

- Due to a lack of systematic and rigorous competency certification, employers must adopt various informal methods to mitigate risk during hiring. This may include social certification (e.g., references), submission of evidence (e.g., portfolio), or explicit assessment and certification during the hiring process. These proxies introduce friction into the hiring process, impacting productivity.

Research suggests these informal processes have an implicit bias that systematically disadvantages specific communities, including women, Indigenous communities, New Canadians, and those from chronically undereducated or low-income households.[39] Enhancing productivity requires a region to unlock the potential of all human capital.

39 From Bayer et al., 2008; Beaman, 2012.

INSIGHT 5

THE INCUMBENT ADVANTAGE

Purpose-based learning represents a fundamental shift from traditional models, focusing on the individual rather than the institution. This approach acknowledges effective learning integrates certified, non-certified, and informal experiences tailored to an individual's goals. However, as this audit reveals, structural barriers hinder the transition to this more dynamic and learner-driven system, establishing a significant barrier to unlocking human capital potential and the associated productivity gains.

Today's landscape consists of 3,063 certified and non-certified providers offering 30,870 discrete programs—akin to the pre-Google internet. While the content learners need may exist, the absence of a structured discovery mechanism makes it nearly impossible to navigate efficiently. Prospective learners face an overwhelming array of options, many of which lack precise alignment with their objectives. Compounding the issue, 60 percent of programs fail to define a primary audience, leaving individuals without the necessary information to assess relevance or value. The inability to bridge labour market demand and programming contributes to the underutilization of learning resources and establishes a barrier to competency development.

The results suggest minimal growth in the number of new learning providers over the past decade. Faced with a fragmented market, individuals often default to incumbent providers as a "safe haven," rather than exploring non-traditional alternatives. Similar dynamics exist in other regulated industries, such as telecommunications and financial services, where policy interventions have successfully fostered more open, competitive ecosystems.[40] The result is a barrier to learning system innovation, reskilling pathways, and productivity growth.

40 From Joskow, 2007.

THE PATH FORWARD

Our findings reveal six key opportunities and associated recommendations for enhancing the human capital ecosystem to maximize productivity growth:

OPPORTUNITY 1

INNOVATION AND COMPETITION

In other sectors with historical natural monopolies (e.g., transportation, telecommunications), the dominant incumbent possessed significant structural advantages, including existing infrastructure and an embedded customer base. As a result, these markets were unable to sustain competition. Consequently, policymakers and regulators have actively intervened to establish conditions that enable new entrants to drive innovation and productivity gains.

A prominent example is the divestiture of AT&T in 1982, which resulted in the formation of smaller regional Bell Operating Companies alongside a national long-distance carrier. Similar policy interventions include the structural separation of fixed-line and mobile services, as well as the implementation of number portability, which enables customers to switch service providers while retaining their phone numbers.

Facilitating a comparable evolution within the human capital sector requires policymakers to dismantle these legacy structural advantages and establish a conducive market environment that promotes innovation and cultivates an adaptive labour force.

RECOMMENDATIONS

Decoupled Competency Model

Transition to a decoupled competency model. This model empowers learners and opens learning pathways by decoupling the awarding of government-recognized credentials from specific learning pathways. This establishes a foundation to enhance productivity by driving learning innovation. Decoupling credentialing from a set of institutions and learning pathways narrows the government's role to competency verification and oversight. This harmonization of competency assessment and credentialing will reduce the current labour market friction caused by the fragmented model of institution-specific credentialing and proxy-based hiring practices.

Structural Separation

Structurally separate incumbent learning providers' for-profit, non-profit, and charitable divisions. For example, public universities deliver for-profit executive education programming. These programs possess a significant structural advantage over their competitors, including access to faculty, facilities, market access, and brand equity. This structural separation will unlock innovation in the delivery of learning pathways by removing structural advantages embedded in the current model. Learning innovation will drive productivity growth by establishing a more agile and adaptive human capital ecosystem.

Unbundle Infrastructure

Transfer infrastructure assets of public incumbents into an independent public entity. This entity would be mandated to provide equal access to these assets to new or incumbent learning providers based on a fair market rate

to ensure competitive balance. This "wholesale" infrastructure model has stimulated competition in sectors such as telecommunications and utilities, where access to infrastructure becomes a barrier to entry. Unbundling will remove the most significant structural advantages embedded in the current model, driving productivity growth by unlocking learning innovation.

Incentivize Innovators

The current closed learning system faces significant barriers to innovation. There is an opportunity to establish targeted incentives to unlock learning innovation, to align new programming and delivery with high-demand competencies.

OPPORTUNITY 2

ADAPTIVE COMPETENCIES

The explicit separation of professional and personal development has been counterproductive, contributing to the perception that enabling competencies are less important than functional and sector-specific competencies. This reduces learning engagement and undervalues the competencies developed through non-certified and informal learning. This has a negative impact on both the individual and the learning provider, ultimately hindering the unlocking of human capital.

This pilot reveals the current learning system is not optimized to develop adaptive capacity. For example, only nine of the 25 high-valued enabling competencies are developed at scale.

RECOMMENDATIONS

Define Learning Goals

Isolate programming by learning goals to make explicit which competencies are being developed.

Unlock Non-Certified Learning Providers

Leverage existing non-certified programming capacity to support developing enabling competencies to maximize productivity growth.

OPPORTUNITY 3

EVIDENCE-BASED EMPLOYMENT PRACTICES

Employers transition from practices rooted in ad hoc proxies to competency-based evidence.

RECOMMENDATIONS

Decoupled Competency Model

Employers transitioning to competency-based employment practices establish a market for decoupled competency certification. This model empowers learners and opens learning pathways by decoupling the awarding of government-recognized credentials from specific learning pathways. Decoupling credentialing from a set of institutions and learning pathways narrows the government's role to competency verification and oversight.

OPPORTUNITY 4

EMPOWER LEARNERS

In an open learning system, the role of the learner is reinvented. Learning and learners are placed at the centre of a vast human capital ecosystem.

RECOMMENDATIONS

Empower Learners

Learners are encouraged to become actively engaged in exploring continuous learning pathways.

Purpose-based Learning

Learners develop comprehensive personal "missions" (i.e., learning plans that lead to an intended career outcome), which they test and refine over time. This mission empowers learners and allows them to measure how their custom learning climbing wall serves them as the world changes. It also enables learners to identify and prioritize the competencies required for their success.

OPPORTUNITY 5

HARMONIZING SYSTEMS

Many programs develop valuable competencies without formally identifying them as outcomes. For instance, competitive sports build teamwork competencies, yet these competencies are rarely documented, preventing participants from including them in their professional profiles.

The study revealed only 19 percent of programs offer certification, primarily through traditional education systems.

- Most creative arts and active programs lack certification pathways, creating barriers for participants to validate their competencies. This gap particularly disadvantages marginalized groups seeking economic mobility.
- Without formal certification, employers rely on informal and proxy hiring methods like references or academic credentials, which amplifies systemic labour market bias.

RECOMMENDATIONS

Standardize Decoupled Learning

To unlock the full potential of the labour market to drive productivity growth, the certification gap between accredited, professional, and other competency-building programs must be overcome. This would reduce friction by introducing a consistent and structured competency certification system.

Expand Experiential Learning

Implement a systemic expansion of experiential learning programs into other segments of the human capital ecosystem, including community programs and the creative arts.

OPPORTUNITY 6

HARMONIZE NAVIGATION

Only 40 percent of programs were identified as targeting a precise audience. Moreover, only 9 percent of programming targeted a specific life stage (e.g., childhood). The remaining 91 percent of programs target two or more life stages, with 74 percent targeting four or more life stages. This requires further study, but it may reflect an inefficiency in the current ecosystem, as programs try to become all things to everyone to maximize engagement. The result may dilute the program's value to specific audiences while risking duplication, cannibalization, or overlap with programming offered by other service providers.

RECOMMENDATION

Purpose-based Learning

Adopt purpose-based learning at the regional level to help empower learners and support regional human capital priorities. This approach would harmonize career and competencies navigation, allowing people to explore career and competencies pathways.

PILOT LIMITATIONS

METHODOLOGICAL LIMITATIONS

One limitation is that the research questions have never been systematically answered before. Furthermore, the researchers utilized the tools available to them. Future iterations will benefit from:

- Granular data on competency demand/supply
- Advanced analytics to track competency development

SCOPE BOUNDARIES

Another recognized limitation is that the scope of the open learning system mapping was limited to certified and non-certified learning providers. The exclusion of informal learning is a practical limitation, as it is impossible to incorporate every book, podcast, volunteer, or work experience available for learners. Infinite synchronous and asynchronous learning providers are now decoupled from geography. This unlocks enormous human capital ecosystem capacity that can be optimized to address the competency deficiencies essential for driving productivity growth.

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COMMUNITY INSIGHTS

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