BUILDING A HIGHLY SKILLED AND RESILIENT CANADIAN WORKFORCE THROUGH THE FUTURESKILLS LAB

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Introduction

Canadian workers face a rapidly changing economy which will have a profound impact on the nature of work and jobs of the future. To be equipped for this change, there is a critical need for Canada to rethink our approach to learning, work, and training. Nearly half of Canadian jobs are at high risk of being affected by automation over the coming ten to twenty years.[1] The rise of the "gig economy" means that an increasing number of Canadians will find employment through independent contract work, and therefore not be afforded access to traditional employer-led training and development. While automation and technological change promises to be economically productive, and will likely result in the creation of new jobs, these changes mean that Canadian workers will have to adapt to employers' and consumers' rapidly evolving requirements.[2]

Canada currently lacks an overarching strategy to deal with the increased probability and scale of job dislocation, and must help prepare Canadian workers for the skill demands of the future economy. The United States recently released a report assessing the impact of AI-driven automation on the economy, proposing a skills strategy to prepare the American workforce for the future of jobs.[3] A report from the Foundation for Young Australians recently made the case for a new mindset towards jobs, careers, and work in response to rapid changes from automation (see Box 1 on page 5). Canada needs a similar forward-looking approach.[4]

Providing Canadian workers with the tools to adapt to a changing labour market would establish the conditions for inclusive economic growth, and create the opportunity for widespread increases in household incomes. As noted in a recent report from the Business Council of Canada, "skills make workers more resilient [and] able to adapt to inevitable change in a world where people have multiple jobs during their working lives."[5] Further, greater support for skills development among disadvantaged groups, and for workers in the low-skill jobs most likely to be affected by automation, will be critical to developing an economy that works for all. Canada must respond to the monumental shifts occurring throughout the global labour market – agile and forward-looking national action today will help prepare future generations of Canadians for work success and boost Canada's competitiveness on the global stage.

Recommendation: The FutureSkills Lab

In this paper, the Council proposes the formation of a national non-governmental organization to operate as a laboratory for skills development and measurement in Canada. Led by an executive team drawn from the private, non-profit, and education sectors, the FutureSkills Lab would invite all levels of government, private sector organizations, labour unions, not-for-profits, and other interested parties to partner on an opt-in basis. Through project partnerships and co-financing opportunities, new and innovative approaches to skills development and outcome measurement will be explored. Drawing from these experiences, the FutureSkills Lab would amass learnings and best practices. By sharing these learnings, the Lab could help inform skills and training program funding decisions of multiple players, including government ministries, researchers, employers, and organizations dealing with labour market information. The Council believes that the FutureSkills Lab could catalyze and enable much more forward-looking approaches to preparing Canadians for the workforce.

Operational independence and freedom from political influence are critical to the FutureSkills Lab's success. It must be nimble and entrepreneurial in order to respond to a rapidly changing work landscape. Much as the Canadian Institute for Health Information (CIHI) is accountable to Health Canada and the provincial and

territorial Ministries of Health which fund it, the FutureSkills Lab would be fiscally accountable to a government department – perhaps in this case Employment and Social Development Canada (ESDC) – as well as to the Canadian public. The specifics of the accountability and reporting structure will need to be considered in the design and implementation of the FutureSkills Lab.

To accomplish such an ambitious mission, the FutureSkills Lab will have three core functions.

1. Support innovative approaches to skills development: Solicit, select, and co-finance innovative pilot programs in skills and competency development that address identified gaps among workers, post-secondary students, and youth

2. Identify and suggest new sources of skills information: Gather labour market signals of skill needs by amassing a portfolio of pilot proposals, support innovative labour market information initiatives focused on employer expectations, use web-based sources to extract and synthesize emerging labour market trends, and draw links between credentials and skills

3. Define skills objectives and inform governments on skills programming: Rigorously measure outcomes of forward-looking and targeted training programs and skills information initiatives, identify and disseminate best practices broadly to education and training stakeholders across Canada, and determine a set of skills objectives for the future. Should stakeholders choose to opt in, these objectives can then help inform the more than $17 billion in annual public spending on skills and training programs, the work of organizations that generate and analyze Canadian labour market information, and researchers and practitioners directly involved with training and education programs

Skills development is important throughout a worker's lifetime. Foundational skills – including literacy and numeracy – are developed early in life, long before students choose to pursue higher education or enter the workforce. Establishing an education system where students can "learn to learn" will be critical to building a skilled and resilient labour force. There is a role for the FutureSkills Lab to play in identifying new innovations in youth training and disseminating best practices.

While the FutureSkills Lab would be an arm's length entity, its collaboration with existing organizations will be crucial to ensuring that efforts are well-coordinated and non-duplicative. In the setup of the organization, early engagement with provincial and territorial ministries of education and labour can build the connectivity required to identify priorities and translate successful pilot outcomes into mainstream policy.

The FutureSkills Lab would need to work closely with Statistics Canada and the Forum of Labour Market Ministers' forthcoming Labour Market Information Council (LMI Council) to exchange information and prioritize areas for collection and analysis of labour market information. Open communication with the Council of Ministers of Education Canada will be critical to ensure that training pilots supported by the FutureSkills Lab are aligned with provincial and territorial goals and objectives in education policy. Regular sharing of information, results, and best practices with Employment and Social Development Canada and the Forum of Labour Market Ministers would help build the FutureSkills Lab into a trusted advisor on skills development

throughout the workers' life cycle. Further, collaboration and information sharing with other pan-Canadian organizations in this space – the Business / Higher Education Roundtable (BHER), Universities Canada, Polytechnics Canada to name just a few – will ensure complementarity in efforts.

In this paper, we first explore the challenges in the Canadian labour market. We then discuss in detail the proposal for the FutureSkills Lab: its three core functions, priorities, governance, interactions with other agencies, and metrics by which its performance should be judged.

Challenges in the Canadian labour market

Canada starts from a position of strength. We rank second among OECD countries in the share of workers that are well-matched to their jobs given their level of education,[6] and we lead our peers in the share of the population aged 25-to-64 with tertiary education.[7] Yet the challenges we and other nations face are severe. Technological developments and automation require skills and behaviours that many Canadian employers believe graduates do not have. At the same time, employer investments in learning and development have declined considerably in recent decades. Finally, Canada lacks forward-looking and reliable information about its labour market to inform policy makers, educators, employers, and workers.

Rapid technological change. Even before automation takes off, it is estimated that two-thirds of current economic activity could be automated with existing technologies.[8] This will only accelerate: advances in automation and "smart" technologies could affect nearly half of current jobs in Canada, according to a study by the Brookfield Institute.[9] Lower-skill, lower-income workers will experience a disproportionate share of the impact. Occupations that mostly require predictable physical work, or rote and repetitive knowledge are most likely to be automated. Artificial intelligence (AI) could also automate significant chunks of repetitive higher-skill jobs like accounting.[10] These trends create an imperative for aligned and efficient efforts to mitigate and minimize job displacement for Canadians in rapidly transforming industries, as well as setting up future generations for work success.

The increasing pace of technological change calls for a greater focus on digital literacy as a cornerstone of inclusive growth.[11] The internet economy in Canada contributed roughly 3 per cent of GDP in 2010, and job growth in this sector is estimated to outpace that in the rest of the economy.[12] While Canada ranks relatively well compared to OECD peers in levels of computer skills and digital literacy, some segments of the population fare less well, namely Aboriginal Canadians, older Canadians, those with disabilities, and certain segments of the population whose manual jobs have been reduced or taken away altogether due to automation and other market trends. Equipping workers with the skills required to thrive in an increasingly digital world will be critical to laying the groundwork for an inclusive economy.

Changing needs in the workplace. While the majority of Canadian employers agree that most post- secondary graduates are prepared for entry-level jobs, their expectations of worker competencies are changing.[13] This suggests that training and education systems need to be updated to meet these changing needs, especially those driven by technological change and automation. With job and career transitions becoming more frequent, workers will also need to build skills throughout their working lives. And other skills will be needed, such as the entrepreneurial flair to not only start but successfully scale innovative companies in Canada.

Box 1

The New Work Mindset: How Australia is shifting the way we think about jobs, careers, and skills

By analyzing millions of job advertisements between 2012 and 2015, the Foundation for Young Australians (FYA) found that demand for certain skills is growing rapidly – digital skills and critical thinking, in particular – revealing seven new "job clusters" where requisite skills are portable between jobs within the cluster. In fact, the FYA estimates that when a person trains for one job, they gain skills in an average of 13 other jobs. In the Australian case, the clusters identified are the Generators, the Artisans, the Designers, the Technologists, the Carers, the Coordinators, and the Informers, each with a common set of skills. The Technologists cluster, for example, includes jobs requiring "skilled understanding and manipulation of digital technology", while the Artisans cluster comprises jobs requiring skill in "manual tasks related to construction, production, maintenance, or technical customer service".

The report, *The New Work Mindset*, urges a shift in focus from jobs to skills to "prepare young people for the future of work". The use of job advertisements to create clusters of overlapping skillsets is an innovative and evidence-based approach. It presents an interesting example for the FutureSkills Lab to consider in the Canadian context. A shift to a skills-based work mindset would not only lead to smoother job transitions for workers throughout their careers, but would be a promising starting point to better link credentials and degrees to skills and competencies.

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"By understanding the skills and capabilities that will be most portable and in demand in the new economy, young people can work to equip themselves for the future of work more effectively. Our mindset needs to shift to reflect a more dynamic future of work where linear careers will be far less common and young people will need a portfolio of skills and capabilities, including career management skills to navigate the more complex world of work." – The New Work Mindset

Further, the rise of the "gig economy" creates a need for new ways to deliver training to independent workers, many of whom combine multiple streams of income to earn a living. As more Canadians choose independent work over becoming employees, the need for entrepreneurial skills that drive success in self-employment and mitigate risk of job dislocation will be critical. Delivering relevant training in "bite-sized" courses for independent workers could help, much as Australia has done in their own skills program (see Box 3 on page 14).

Starting early in their careers, young workers are increasingly expected to take on more than a rigidly functional role. In a 2016 survey, large Canadian companies reported they are looking for "soft skills" like teamwork, problem solving, and communication in addition to—and sometimes in preference to—functional knowledge and industry-specific experience.[14] Further, in the 2016 Global University Employability Survey, nearly 90 per cent of employers define employability as "a set of job-related aptitudes, attitudes and behaviours," naming adaptability, teamwork, and communication as some of these traits.[15]

Workers need to learn the right skills, but also need help signaling them to employers. Recent research by the Conference Board of Canada notes that credentialing in Canada is centered on education and work experience, neglecting softer skills.[16,17] As a result, it is difficult for job applicants to signal their qualifications clearly beyond technical skills and industry exposure. Credentialing methods could be improved to reflect both technical and soft skills, allowing employers to better communicate their needs, and workers to better communicate their qualifying strengths. Finally, an increase in study-related internships, co-op placements and apprenticeships would help students learn soft skills and enable employers to learn firsthand about the soft skills of potential full-time employees.

Declining training by employers. Annual expenditures by Canadian employers on learning and development have declined by over 40 percent in the past twenty years, from $1249 per employee in the early 1990s to $800 in 2015.[18] Declines may be explained by increasing rates of employee turnover, and growing market competition and margin pressure. These outlays are lower than expenditures by American companies, which invested an average of $976 per employee in 2015. Canada also lags behind OECD peers in job-related informal education. In 2009, the last time this metric was measured, only 30 percent of Canadian workers participated in some form of informal job-related training, compared with 61 percent in Sweden and 47 percent in Norway.[19]

A shift towards part-time and contract work is likely to exacerbate the challenge, as employers will find it increasingly difficult to justify training investments for workers who have multiple employers at any given time. Part-time employment as a share of total employment in Canada increased from roughly 18 per cent in 2000 to 20 per cent by the end of 2016.[20]

Building off the important work of BHER, the private sector could partner in more varied and creative ways with educational institutions to improve workforce preparedness among recent graduates, especially as new skills are required – and new roles appear – in the workplace of the future. About half of large companies sampled by the Business Council of Canada had provided advice to post-secondary institutions on curriculum and program development, and a third had contributed to classroom instruction.[21] For some disciplines, rules from accreditation organizations limit participation by employers in curriculum development. Greater cooperation and flexibility from these organizations could help students be better prepared for the workplace.

Disorganized labour market information. Governments, academics, and others have long recognized the need for more timely and reliable labour market information. Provincial and territorial governments collect data for their regions, but its sensitivity and a lack of standardization in sampling and terminology has made it difficult to use this wealth of information for national policy making. The forthcoming launch of the LMI Council from the Forum of Labour Market Ministers should begin to resolve this – this Council is working to improve local data, standardize methods and standards in terminology, and disseminate labour market information.

Even then, there will still be gaps in information about employer skills and competency demands. While many large employers used to conduct their own occupational forecasting and produce their own data, the increasing pace of change in occupational requirements and definitions has made these exercises largely futile. There is a need for increased collaboration with employers to determine what competencies, as opposed to specific occupations, will be required in the Canadian economy.

Currently, little is done to gather information on labour demand from digital sources, in part because of a lack of mandate in this domain at Statistics Canada (or at the LMI Council). Other jurisdictions have successfully gathered such data, among them the New York City Tech Pipeline, which partnered with LinkedIn to map supply of and demand for tech labour in the region, as well as job vacancies posted by employers. There is scope to augment the work of Statistics Canada and the LMI Council in this area.

Taken together, these four trends present real challenges for Canadian workers, employers, policy-makers, and educational institutions. Canada needs a solution that will help fill the gaps outlined above and provide an overarching skills strategy to prepare the Canadian workforce for future technological change and evolving skills needs.

The FutureSkills Lab

Our proposal calls for an arm's length pan-Canadian organization with three core functions, clear priorities for investment, a strong governance model, open channels of communication with other stakeholders, and a clear way to define success.

Three core functions

1. Support innovative approaches to skills development. The FutureSkills Lab would solicit, select, and co-finance innovative training pilots that address key skills gaps. Pilot proposals would be solicited from the private sector, educational institutions, governments, and not-for-profit entities, with a requirement that submitters contribute a share of the financing required. The FutureSkills Lab's share of pilot financing could vary from a minimum of 30 percent to as much as 90 percent for those programs targeted specifically at skills development among disadvantaged groups (e.g., Indigenous Canadians, those displaced economically by industry or market downturns, Canadians with disabilities).[i]

Submitting organizations would share responsibility with the FutureSkills Lab for the design, implementation, and outcome measurement of the pilot, and would share ownership of the results. The FutureSkills Lab would offer advice and guidance on implementation. As a pre-condition for co-financing support, organizations would partner with the FutureSkills Lab to develop principles and metrics for pilot success, and would agree to share all results with the FutureSkills Lab to allow for rigorous measurement of outcomes.

Providing incentives for private sector participation. While firms are often willing to invest in the development of specific skills for their business, they generally underinvest in general skills such as problem-solving, critical thinking, and persistence. Underinvestment will only get worse as the pace of worker turnover accelerates, lowering the return on investment of general skill training. And as mentioned, research, innovation and company-scaling skills are also needed. To partner effectively with employers and other organizations, the FutureSkills Lab would remove some of the financial risk in building the skills the nation needs.

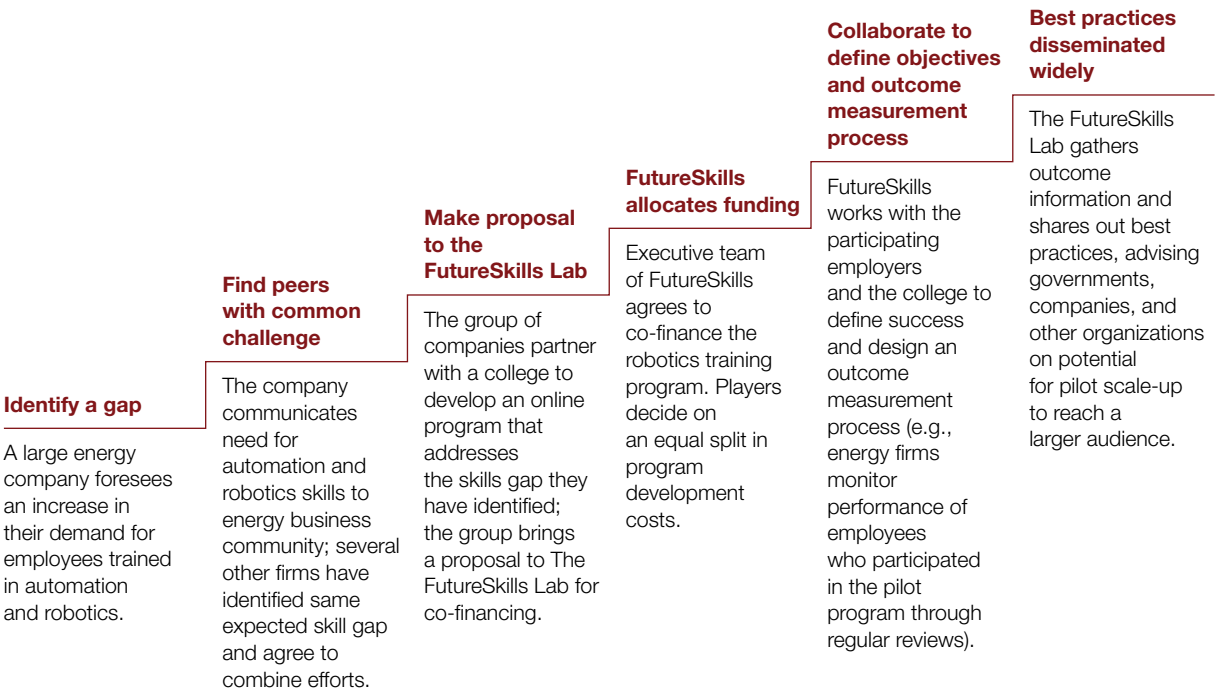
[i] Please refer to the Advisory Council's memo on Workforce Participation for a more detailed review of opportunities for Canada to expand the labour force among certain disadvantaged groups and increase standards of living and overall economic productivity.

Determining the level of co-financing. The share of the pilot program cost covered by the FutureSkills Lab would be determined by the nature of the training. If the skills involved would close a future gap, are broadly applicable and transferable, and are necessary to make the national workforce more resilient, the FutureSkills Lab should be willing to invest in the pilot. The same is true of pilots targeted at developing skills among disadvantaged groups.

Consider three hypothetical examples:

- A local technology hub develops a 6-month program in functional skills that its members have identified as under-developed: sales, digital marketing, and product management. At the end of the pilot, the technology hub and the FutureSkills Lab measure results against specific metrics, and share them along with best practices with governments, companies and other organizations. At the member companies, newly skilled employees go on to optimize their companies' performance and train other workers. Because this pilot aims to develop skills for which a real gap has been observed, are transferable across many industries, and are needed for effectively starting and scaling companies, the FutureSkills Lab might choose to finance 60 to 70 per cent of total costs.

Exhibit 1 **An example pilot proposal for The FutureSkills Lab**



- A group of manufacturing companies determines that their employees need stronger soft skills such as communication, teamwork, management, and problem solving. They submit a proposal for a program of coaching for managers and directors, in which coaches provide regular virtual help over 12 months. The program calls for specific key performance indicators (KPIs) for each participating manager and director. At the end of the pilot, results are measured against the KPIs and shared, along with best practices, with governments, companies and other organizations. Because the soft skills being developed are highly transferable to other employers, and important for building a resilient and successful future workforce, the FutureSkills Lab would commit to co-financing of perhaps 70 to 80 per cent.

- A large energy company observes a shortage of Canadian graduates with knowledge of robotics and machine learning – "hard skills." The costs of developing specialized training in these fields are substantial, and the training methodology new and relatively untested. The energy company approaches a few of its peers across Canada and finds that they have observed the same gap. Together, the companies submit a proposal to develop a training program for early-tenure workers to build capabilities in robotics and machine learning, drawing from courses taught at a college in Ontario (see Exhibit 1, on page 8). As one outcome, the engaged employers enjoy an expansion of the Canadian talent pool. The FutureSkills Lab is able to extract information about skills gaps in the Canadian labour market and best practices from the pilot, with which it can advise governments on their skills-related spending, including the broader scale-up of successful programs or ongoing support for high-impact programs. Because the skills involved are somewhat company-specific, the FutureSkills Lab would commit to a lower level of co-financing, perhaps 30 to 40 percent. If the pilot were specifically targeted at building skills in Indigenous communities, co-financing would increase to perhaps 90 percent.

Selecting pilots to co-finance. The FutureSkills Lab would support skills development across every industry, region, and stage in the learning lifecycle. See Box 2 for examples of real-world, high-impact programs that the FutureSkills Lab might support in a pilot stage.

2. Identify and develop new sources of skills information. In its second function, the FutureSkills Lab would identify gaps in the measurement, data collection, and analysis of skills and competencies in Canada. Improved information would help all concerned— workers, employers, students, parents, policy makers, and training and education providers—make better informed decisions.[22] If it is to be valuable in this regard, the FutureSkills Lab must make all its knowledge, data, and outcomes widely accessible and visually comprehensible to Canadian workers, job seekers and employers.

In areas where organizations such as Statistics Canada or the LMI Council have a clear mandate for data collection and analysis, the FutureSkills Lab would assume an advisory role by proposing areas for data analysis. In other areas where information exists but is not used, the FutureSkills Lab would support innovative approaches to data collection and analysis, for example by leveraging data from its portfolio of pilot proposals. This includes areas like employer expectations of future skills and competency needs, digital signals from job posting websites and other online sources, and links between credentials and skills.

Box 2

Some existing training programs are examples of the types of pilots the FutureSkills Lab might support through co-financing

For post-secondary and lifelong learners, George Brown College invests in the development and delivery of e-learning courses using labs and robotic simulation software, reaching a wide and diverse audience of students and minimizing per-student training costs

For young girls, the Actua National Girls Program and Technovation Challenge offer boot camps to develop technical, business-plan, and presentation skills

For women wanting to reenter the workforce, Après provides coaching and training, a support network, and direct access to job opportunities

For lifelong learners, Canada Learning Code aims to bring digital education to 10 million Canadians over the next 10 years through private-public partnerships, educator training, and research and advocacy

For female entrepreneurs, Fierce Founders Bootcamp at Communitech offers founders an opportunity to learn from experienced entrepreneurs about how to refine their business model and pitch

For Indigenous workers, BladeRunners helps 15-to-30 year-olds gain skills related to local industry. Seventy per cent of program participants are Indigenous

For youth, The Brightworks School uses project-based learning to build soft skills like teamwork, communications, and problem solving

For high school students, SHAD is a one-month program to learn about leadership in STEAM (science, technology, engineering, arts, and math)

For disadvantaged youth, the forthcoming 40KEY Coalition is a commitment among employers to link training programs to job opportunities to ensure job seekers invest in skills demanded in the labour market

Portfolio of pilots. The portfolio of pilots gathered from private-sector employers, educational institutions, and not-for-profits would inform policy-makers and educational providers about where they should focus their investments and efforts. Currently, governments receive a considerable number of unsolicited proposals for funding of training programs each year, but they are not aggregated and analyzed for trends. The FutureSkills Lab would manage the solicitation, review, aggregation, and analysis of such proposals, and would share widely the trends it observes in competency requirements.

Employer data. Corporations have a significant role in the generation and collection of labour market information; such employer data is a critical resource for forecasting needed competencies. An employer may not know exactly how many engineers it will need in five to ten years, but can more likely articulate the types of foundational competencies (e.g., technical literacy) it will need. Some employers keep high-quality data, though less than before as occupational forecasting has become more difficult. The FutureSkills Lab would consider ways to unlock this valuable proprietary data, perhaps by engaging employers on an annual skills and competency survey and offering a report of trends and findings in exchange.

Digital signals. While the forthcoming LMI Council has signaled intent to explore digital signals, development of the required expertise is likely beyond the LMI Council's immediate scope. The FutureSkills Lab would fill this gap by employing specialized data scientists to forecast market competency requirements from job listing sites (e.g., LinkedIn, Crunchbase, AngelList, and Talent Egg), and cull useful insights from other sources (e.g., conference topics from groups like NextGen, and research priorities of academic institutions). More broadly, the FutureSkills Lab should regularly scan the global landscape for innovative, forward-thinking and comprehensive approaches to competencies development.

Credentials and skills. Finally, the FutureSkills Lab could use the information collected to identify innovative ways of linking degrees and credentials to skills and competencies. This is a complex challenge and one that will need to be addressed with a coherent national approach. As one potential tactic, the FutureSkills Lab might map the skills demanded by employers, as expressed through pilot proposals, with information about the credentials of the employees who have been most successful in the past. Progress on this front would provide greater transparency to employees looking to hire workers with competencies not reflected by traditional credentials, and to students looking to obtain the qualifications they need to succeed in their desired field of work. Working towards national accreditation standards would also create a more mobile Canadian workforce, to the benefit of employers who hire nationally, and workers who would qualify for a larger pool of jobs.

3. Define skills objectives and advise governments on skills programming. The FutureSkills Lab would measure outcomes of its skills initiatives and pilots and offer that data to inform the tens of billions of dollars in program-funding decisions made by federal, provincial and territorial governments. In addition, it would aggregate information about best practices and lessons learned. These would have many uses; for example, they might be used to review the effectiveness of existing investments in Canada Job Grants and other federal transfers in the training realm. Funding from underperforming programming can be diverted to more successful methods as identified by the FutureSkills Lab, in close collaboration with provincial and territorial governments.

Based on its experience in identifying, supporting and measuring outcomes of training pilots and data initiatives, the FutureSkills Lab would define a set of forward-looking, employer-backed Canadian skills objectives—and would continually update them, as needs evolve. These objectives would be shared with the public and other organizations through regular publications and data releases.

The FutureSkills Lab would also track the effectiveness of specific education and training resources and methods used for the various pilot programs, and share a list of the most effective with relevant and interested parties across Canada.

Priorities for co-financing

The FutureSkills Lab would have three broad priorities when choosing programs to co-fund: support for *lifelong learning to increase resiliency* among workers throughout the totality of their career lifecycle; exploring *innovations in post-secondary education*; and through *youth training*, setting the proper foundation for future career resiliency and greater national economic productivity. While education policy sits outside of federal jurisdiction, there is an opportunity for Canada in wider information sharing on labour market trends and innovative education practices to ensure inclusive and best-in-class education for the future

success of all Canadians. There is broad opportunity in the training and education space in Canada. To ensure success, the organization must focus on the top priorities within each of the three demographic groups outlined below.

Lifelong learning and workforce resiliency. The FutureSkills Lab would identify innovative skills development interventions for workers of all ages and in all industries. With the strategic objective of tempering longer-term job disruption from automation, technological change and other market forces, the FutureSkills Lab would prioritize programs that allow workers to gain the skills required by employers, either by building skills in their respective industries, or acquiring new skills needed to enter other sectors or types of work. Interventions might include innovative approaches to on-the-job retraining, retraining for workers who dropped out of the labour force to care for family members, and for unemployed workers in disrupted sectors.

The FutureSkills Lab should work to develop an ROI-based business case for needed but overlooked skills development training by Canadian employers of all sizes. If targeted outreach and co-financing does not persuade more Canadian employers to participate in targeted skills training, the FutureSkills Lab should work to renew employer engagement in training and learning, especially among smaller companies with smaller budgets.

Post-secondary education. The FutureSkills Lab would support programs that can equip students and new graduates with the skills employers need, or skills associated with successful and scalable entrepreneurship. This support might include increasing opportunities for work-integrated learning, or delivering training tied directly to market-identified skills needs. Increased collaboration between employers and educational institutions is the first step in bridging the gap between employer expectations and graduate competencies. While many employers collaborate with post-secondary institutions, these arrangements mostly involve Canada's largest employers. Approximately 70 percent of large Canadian businesses partner with post-secondary institutions to support internships or cooperative learning programs.[23] This proportion is considerably smaller among small and medium-sized companies. The FutureSkills Lab should work with organizations such as BHER, Universities Canada, and Polytechnics Canada to increase collaboration, communication and experiential learning opportunities between employers and post-secondary institutions. The Lab could act as a conduit by, for example, co-financing innovative co-op programs or experimenting with cross-disciplinary programs.

The FutureSkills Lab would focus on identifying innovative approaches to skills development within both trade industries and knowledge-related disciplines, so collaboration with both colleges and universities will be important. Priority for co-financing support would go to those pilots that build skills important for future work success and are not being made redundant in the near term via automation or other forms of innovation.

Youth learning. The increasingly fast pace of labour market change makes the continued evolution of holistic education and solid foundational training important for young students. The FutureSkills Lab would explore innovative approaches to youth training and competency development, enlisting support from employers and industry groups to help young Canadians learn about future job opportunities. Curriculum creation and delivery of youth education sits within provincial and territorial jurisdiction, and willing and interested provincial and territorial governments would have the opportunity to collaborate with the FutureSkills Lab at their

discretion. Outside of the formal learning environment, there is scope for the FutureSkills Lab to support innovations in extra-curricular training programs, such as the Actua National Girls Program or Technovation Challenge (see Box 2 on page 10).

According to the OECD Survey of Adult Skills, rates of literacy and numeracy among Canadian youth have declined in recent years.[24] While basic numeracy and literacy skills are not in the FutureSkills Lab's purview, it is hoped that the education system will continue to build and refine the conditions necessary for the development of these foundational skills during all Canadians' early education.

Crucial Design Considerations

Governance

To determine the optimal governance and operating model for the FutureSkills Lab, we looked at several international examples of countries that have undertaken efforts of similar scope (see Box 3 on page 14). We found a highly useful example right here in Canada with the Canadian Institute for Health Information (CIHI).

CIHI is an independent, publicly funded, and not-for-profit organization that brings focus and guidance to health information and policy advice in Canada. Using the CIHI model (see Box 4 on page 15), we recommend that the FutureSkills Lab be established as an arms-length organization, led and staffed by an inter-disciplinary team nominated by both governments (federal, provincial and territorial) and non-governmental organizations. While CIHI is a sizeable organization at nearly 750 employees, this Council recommends that the FutureSkills Lab be established initially at a considerably smaller size and funding level for the first five years of operation, after which proven success and efficacy in the skills space may justify gradual growth and expansion of responsibilities (see the discussions on executive and staff, and scale, below).

Independence for the FutureSkills Lab is essential to bring all stakeholders to the table on equal footing, to align well with intergovernmental organizations while avoiding the perception of undue federal government influence, and to remain nimble and thoroughly informed. Unlike education, which is under provincial and territorial jurisdiction, skills must involve all levels of government as well as the private sector, labour unions, industry associations, and other stakeholders to ensure Canada has a robust and forward-looking strategy. Achieving what needs to be done in the skills space would be challenging to do within the current framework of support and institutions. An independent pan-Canadian center of excellence like the one we propose is a vital cog in the machinery of skill analysis and development.

Accountability. While non-governmental and politically neutral in strategic direction, the optimal accountability and reporting structure will need to be considered for the FutureSkills Lab. Taking CIHI as an example, the organization is fiscally accountable to its funding agencies, Health Canada and the provincial and territorial Ministries of Health. The FutureSkills Lab would develop a similar structure to maintain transparency in funding, activities, and outcomes. The federal government should work with relevant ministries and departments to develop the appropriate configuration.

Executive and staff. An interdisciplinary executive team would ensure that the organization serves a broad audience. Members would be drawn from the private, non-profit, and education sectors (both practitioners and education researchers) representing all stages of lifelong learning. The executive team would be

Box 3

International examples of innovative skills development programs

Few countries have undertaken large-scale and forward-looking policy action in this realm, but there are partial examples from Singapore, Denmark, the United Kingdom, Australia, and the U.S. from which Canada can draw lessons and best practices. In the set-up of the FutureSkills Lab, we recommend that the government conduct their own consultations with the ministries of our peer countries who have executed similar programs. We think that the SkillsFuture Singapore example is a particularly interesting one for the FutureSkills Lab to consider for application in Canada.

SkillsFuture, Singapore. Launched in 2016, SkillsFuture aims to invest in human capital through education and training. The SkillsFuture credit provides every Singaporean over the age of 25 with a $500 credit to use towards a range of government-supported training and education courses. The credit never expires and is topped up periodically over the individual's career. The program's intent is to make every student and worker the leader of their own learning path, where they are free to choose the type of training they need to reach their own career goals, whether that means pivoting to a new industry or gaining specific hard or soft skills. SkillsFuture leverages a Skills Framework to enable informed decision-making by students, employees, employers, and training providers. The framework provides information such as workforce profiles, career pathways and wage trends, and desired skill sets of particular roles. A list of training programs that address skills gaps in each sector and role are included in the Framework. Launched only in 2016, Singapore is gradually rolling out this framework sector-by-sector. More information is available here: www.skillsfuture.sg

Adult vocational training, Denmark. Unemployed workers in Denmark are granted the right to an "activation offer", which can be used towards private job training, public job training, classroom training, or residual programs like job search assistance or counseling. Private and public job training occur at the workplace as a form of work integrated learning; private organizations receive a 50 per cent wage subsidy for a low salary for up to 12 months to incent participation in the program, while jobs in public institutions pay a fixed wage. Programs offered aim to build skills in 120 competencies, each applicable to more than a single job area. Types of training include development of job-specific skills, general skills, and labour management skills. More information is available here: eng.uvm.dk

UKCES Futures Programme, United Kingdom. Starting in 2014, the UK Futures Programme trialed innovative approaches to workforce development through co-investments with employers and industry. The UKCES engaged in real-time outcome measurement of all initiatives supported, and identified what worked well for policy-makers and businesses to adopt in their own training and learning practices. More information is available here: www.gov.uk/government/publications/ukces-futures-programme-an-introduction

Jobs NSW, Australia. In 2016, the Australian state of New South Wales committed to working towards a "stackable" vocational education and training system, where workers' existing skills could be measured and efficiently built upon with new training modules. Offering "bite-sized" courses that each add different soft and technical job-readiness skills– interactive communication skills or specialized robotics skills, for example – allow mid-career employees to add skills for little time investment. The program relies on competency-based qualifications to assess the current skill level of an employee seeking additional training. More information is available here: www.jobsfornsw.com.au

New York City Tech Talent Pipeline, United States. In 2014, New York's mayor announced the launch of a tech talent pipeline to support the growth of the tech sector and expand the pool of qualified homegrown tech talent. Part of this program included leveraging online labour market data to better understand the current state of the tech ecosystem. The initiative analyzed aggregated LinkedIn data to identify "in-demand" tech skills in real-time. The NYC Tech Talent Pipeline leveraged this new source of labour market information to mobilize industry partners to create and deliver tech skills programs to help close these gaps (e.g., tech skills training programs, scholarships, critical research, and funding support). More information is available here: www.techtalentpipeline.nyc

responsible for the operation and strategic direction of the FutureSkills Lab, including the approval of pilots and information initiatives to be co-financed, and the determination of Canadian skills objectives. The size of the executive team should be large enough to effectively represent multiple perspectives, but small enough that the group can function nimbly and effectively – a team of between eight and ten could strike this desired balance. Importantly, the FutureSkills Lab's executive team should formally seek insight and advice from provincial and territorial ministries of labour and education to ensure policy makers are engaged in the process. Further, the team would regularly seek expertise from relevant labour unions, industry associations, accreditation bodies, and Statistics Canada.

We recommend that the CEO of the FutureSkills Lab be unaffiliated with the federal government to ensure the organization is perceived – and acts – as neutral and objective. Further, it is critical to the success of the FutureSkills Lab as a nimble, innovative and forward-looking organization that the CEO be entrepreneurial in mindset and experience, and a collaborative leader who can effectively convene stakeholders.

The full-time staff would include researchers, analysts, data scientists, technologists, and marketers. They would be responsible for attracting and screening pilot proposals and submitting a shortlist of proposals to the executive team, collecting a library of Canadian skills opportunities and information gaps, and collaborating with leaders of co-financed pilot projects to set project metrics, measure outcomes, and establish and share best practices. The strategic direction of the FutureSkills Lab, as set by the executive team, would determine the number of full-time staff to be appropriate for the first five years of operation.

Scale. To accomplish its mandate of investing in innovative approaches to skills development and labour market information collection, the FutureSkills Lab should target funding of $100 million per year for its first five years – though it may reasonably begin with less than the full $100 million as it works to build a pipeline of pilot proposals. This level of funding was determined by looking to the initial annual budgets of comparable organizations, including CIHI. In its fifth year of operation, the FutureSkills Lab should be

Box 4

Principles to learn from CIHI

Independent and not-for-profit to ensure impartiality

Funded through bilateral agreements between the federal government and provincial and territorial ministries

Fiscally accountable to Health Canada, provincial and territorial governments, and the Canadian public

Governed by an interdisciplinary team, nominated by both governmental and non-governmental organizations

Provides open access to information for governments, providers, and Canadians

Advises policy-makers through evidence-based recommendations

assessed on its relative success in identifying new best practices in training and skills development as well as data collection. If proven successful, the government may choose to expand the FutureSkills Lab's funding and scope of activities.

Annual funding of $100 million would allow the FutureSkills Lab to directly reach more than 20,000 workers and students per year, assuming a per-intervention cost of $7,700 per person and an average co-financing rate of 50 per cent.[25] Costs could be less for some pilots such as those using digitally delivered instruction. This is a modest estimate, and represents the potential reach and impact of the FutureSkills Lab's initiatives in only the most direct sense. In addition, the FutureSkills Lab would provide significant indirect benefits by validating innovative pilot programs (which can then be expanded by governments and organizations), and by aggregating and disseminating information.

Decisions to expand successful pilots would be made by individual governments for their respective jurisdictions, or by employers and non-profits for their own training and skills development agendas. As the FutureSkills Lab matures and initial pilots prove successful, we recommend that a more detailed process for the roll-out or scale up of successful pilots be determined by these stakeholders.

Interaction with other relevant government organizations

To avoid redundancy and aim for complementary value creation, the FutureSkills Lab would need to collaborate with existing organizations, in particular the Forum of Labour Market Ministers (FLMM) and its LMI Council, the Council of Ministers of Education Canada (CMEC), Statistics Canada, the Business / Higher Education Roundtable (BHER), Universities Canada, and Polytechnics Canada (see Exhibit 2, on page 17). The FutureSkills Lab would play a complementary role to the important work of these entities, and should be considered as an additional resource for stakeholders to experiment with innovative approaches to skill development and information generation. Specifically, the FutureSkills Lab's engagement with government agencies and provincial and territorial partnerships could involve the following:

FLMM and CMEC: The FutureSkills Lab would provide advice and recommendations to the FLMM and CMEC on skills objectives, skills development, and measurement priorities, including reporting on outcomes. The FutureSkills Lab's recommendations could be used by the FLMM to help guide roughly $4 billion in annual training investments, and over $13 billion investments in post-secondary education. The CMEC could work with the FutureSkills Lab to ensure that co-financed pilot programs are aligned with overarching goals and objectives for educations systems in the provinces and territories.

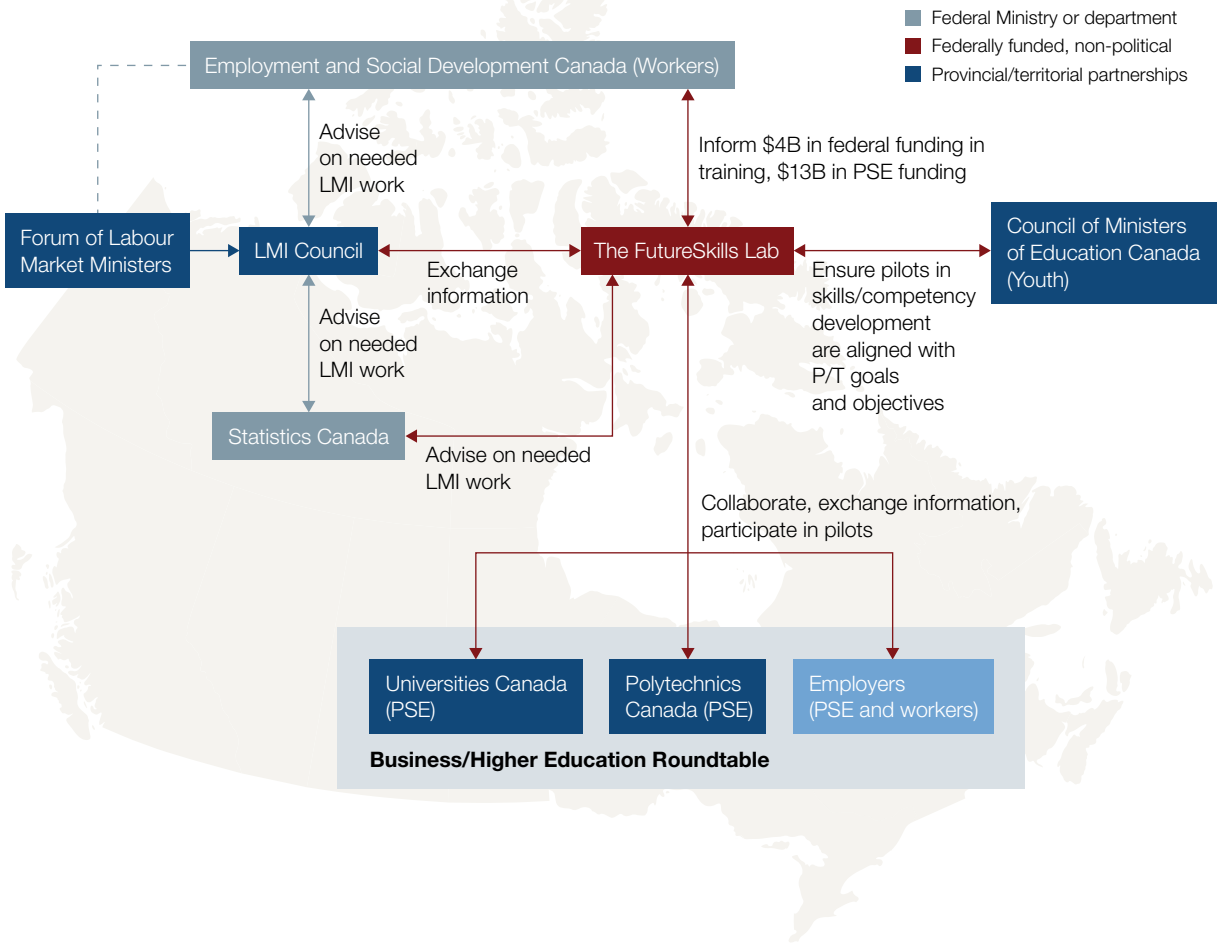
LMI Council and Statistics Canada: The FutureSkills Lab would identify gaps in skills measurement and data, and recommend areas for information collection, analysis, and dissemination to both the Labour Market Information Council and Statistics Canada. While not yet fully operational, the LMI Council is expected to focus on the standardization of large provincial labour datasets, a critical undertaking to improve the quality and timeliness of labour market information in Canada. The FutureSkills Lab can complement this work by functioning as a test space for the identification of new sources of forward-looking labour and skills data, digital or otherwise. To ensure alignment and consistency in national LMI efforts, the Chief Statistician of Statistics Canada could be represented on the FutureSkills Lab, just like the LMI Council.

The establishment of the FutureSkills Lab must be accompanied by a strengthening of other organizations involved in skills measurement, most notably Statistics Canada and the forthcoming LMI Council. Without coordinated action, the value of an independent advisory body such as the FutureSkills Lab would be limited. First and foremost, Statistics Canada should be given increased funding to expand its labour market surveys, engage in greater analysis of the results, and be encouraged to make results widely available and comprehensible at no cost to the public.

Measuring success

The FutureSkills Lab would be responsible for measuring both the results of the pilots it co-funds and the effectiveness of its own processes, which should include a transparent mechanism for employers, governments, educational institutions, and not-for-profits to propose, lead, and co-finance necessary training. The FutureSkills Lab would also be measured on how well it functions as a source of new, meaningful and

Exhibit 2 **Where FutureSkills Canada fits into the existing system**



forward-looking information and as an advisory body for information dissemination. Success of its processes would be measured by the increase in useful innovation in learning and training programs, more efficient matching of employee skill sets and competencies to evolving employer needs, and greater use of skills measurement among employers, policy makers, and educational and training institutions.

In a more macro sense, the FutureSkills Lab would strive to achieve specific labour market outcomes for the Canadian economy. These outcomes include putting Canada on par with OECD leaders in level and breadth of employer-supported training, improving employer perceptions of the job-readiness of fresh graduates, a reduction in the duration of average unemployment periods, higher educational attainment and employment for vulnerable populations, and smoother re-entry into the labour force for those who take time away from the workforce.

Conclusion

The economy is changing rapidly. Advances in automation and digitization, combined with continued forces of globalization, are leading to fluid and mobile labour markets where employers' skills requirements evolve quickly and workers transition between jobs and industries more often than they did in the past. To prepare Canadian students and workers for the future of jobs, there is an urgent need for Canada to develop new approaches to training and skill development. The FutureSkills Lab would provide a forum for all levels of government, employers, educators, and other stakeholders invested in the building of a highly skilled and resilient workforce to come together to test new methods for training delivery and share best practices across jurisdictions and industries. ■

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