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Future-proof:

Preparing young Canadians for the future of work

brookfield institute
for innovation + entrepreneurship

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Creig is a Policy Advisor at the Brook eld Institute for Innovation + Entrepreneurship (BII+E). Prior to joining BII+E, Creig held research roles with Toronto Artscape and Economic Development and Culture at the City of Toronto. Creig also worked for Public Works and Government Services Canada for several years, designing and implementing communications strategies and materials. Creig holds a Master of Public Policy from the University of Toronto and a Bachelor of Communications from the University of O awa.

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Sarah's passion for public policy led her to the Brook eld Institute for Innovation + Entrepreneurship, where she is the Director of Policy + Research, leading the development of the Institute's research agenda. Sarah previously worked on policy development both inside and outside government, and sees a need for translators with the ability to bridge sectors and disciplines. She is keen to build more collaborative spaces that allow policymakers to draw on collective insights. Sarah believes that the Brook eld Institute is ideally placed to help translate the expertise and experience of those working at the coalface of innovation and entrepreneurship into advice that is legible for governments and supports inclusive growth.

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BII+E supports this mission in three ways: insightful research and analysis; testing, piloting and prototyping projects; which informs BII+E's leadership and advocacy on behalf of innovation and entrepreneurship across the country.

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> "Canada's future prosperity and success will rely on us harnessing the innovation of our entire talent pool. A huge part of our success will depend on how well we integrate this next generation of Canadians into the workforce. Their con dence, optimism and inspiration could be the key to helping us reimagine traditional business models, products and ways of working."
>
> David McKay, President and CEO, RBC

There are a number of major trends that have the potential to shape the future of work, from climate change and resource scarcity to demographic shi s resulting from an aging population and immigration. This report focuses on the need to prepare Canada's youth for a future where a great number of jobs will be rapidly created, altered or made obsolete by technology.

Successive waves of technological advancements have rocked global economies for centuries, recon guring the labour force and giving rise to new economic opportunities with each wave. Modern advances, including arti cial intelligence and robotics, once again have the potential to transform the economy, perhaps more rapidly and more dramatically than ever before. As past pillars of Canada's economic growth become less reliable, harnessing technology and innovation will become increasingly important in driving productivity and growth.[1,2,3]

The primary burden of realizing this enormous opportunity rests on the shoulders of Canada's young people. To succeed in the knowledge economy, the pipeline of young talent will need to be dynamic and resilient, equipped with a broad suite of technical and so skills. **While youth are always the cornerstone of a country's future workforce, the rapid pace of technology-driven change makes the task of e ectively integrating them into the labour force more challenging—and more critical—than ever before.** Failure to do so will not only inhibit Canada's economic growth, but may result in a large swath of the population being le behind in the knowledge economy.

Youth are entering a labour market where job requirements are becoming more complex. Entry-level jobs are at a high risk of being impacted by automation, yet work experience is more important than ever. At the same time, underemployment, part-time, and precarious work are becoming more prevalent. As a result, it is becoming more challenging for youth to seamlessly enter the labour force.

Technological disruption is not a new phenomenon. In 1911, over 34 percent of the Canadian labour force worked in agricultural industries. By 1971, this had declined to about 6 percent largely as a result of advances in machinery.[6] However, these same advances have also been associated with a net increase in jobs across the economy.[7,8]

As technologies such as artificial intelligence and robotics become more sophisticated and commonplace, the pace and magnitude of change could increase.[9,10] These technological trends will have diverse impacts on the Canadian economy. On the one hand, they are projected to lead to a significant decline in demand for certain forms of routine or predictable labour. On the other hand, technology can be viewed as a powerful economic driver, simultaneously creating entirely new industries, improving productivity, and increasing demand for highly skilled labour.

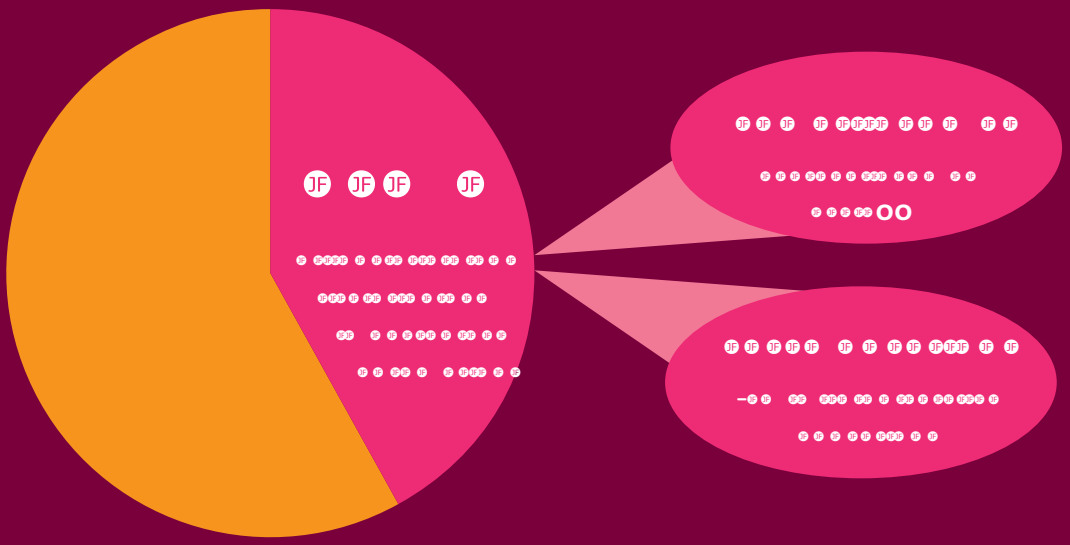
Navigating this rapidly shifting economic landscape presents unique challenges and opportunities for Canada's youth.

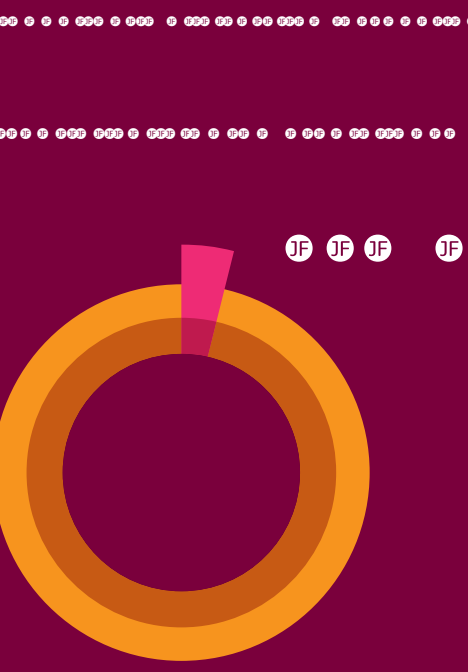
THE ROBOT REVOLUTION: CHANGING THE WAY WE WORK

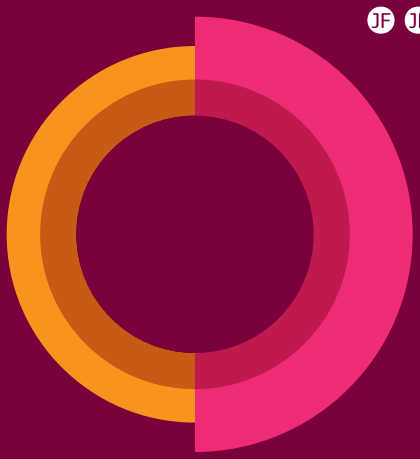
The impact that current technological trends will have on the labour force is not obvious. A range of scenarios are possible. Some project widespread job loss, while others anticipate a future in which overall employment remains relatively constant, but the nature of jobs, as well as the tasks performed within them, are significantly different. In either scenario, the benefits and risks of technological trends will not be evenly distributed.

Over the past several decades, technology has been particularly effective at replacing workers who supply primarily routine tasks, following well defined procedures. These routine tasks are often characteristic of many middle-skilled, middle-income jobs, such as those in the manufacturing sector.[11] From 2003 to 2009, Canada lost 380,000 mainly routine plant and machine operator, labourer and assembly jobs.[12,13]

Today, technologies are advancing into the realm of automating non-routine and cognitive tasks, a trend that is projected to disproportionately impact individuals working in low-skilled, low earning occupations, such as retail salespersons.[14] However, a number of white-collar occupations involving predictable tasks—for example, paralegal jobs—are also susceptible to automation.[15] A recent report by the Brookfield Institute for Innovation + Entrepreneurship (BII+E) estimated that 42 percent of the Canadian labour force is at a high risk of being affected by automation in the next 10 to 20 years. High-risk occupations earn less and require less education, on average, than the rest of the Canadian labour force.[16]







This suggests that automation is less likely to eliminate entire occupations, but instead will change the nature of work, reducing demand for routine labour while increasing the value of tasks that technology cannot replicate.

Youth aged 15 to 24 are one of the population segments that are most likely to experience changes in job roles and skill demand as a result of automation. Youth comprised nearly 20 percent of employees at a high risk of being impacted by automation in Canada, but only made up 13 percent of the labour force. More than triple the number of youth were employed in high-risk occupations, compared to low-risk occupations. [17]

The likely explanation for this is that entry-level positions, which are typically sta ed by youth, are at a high risk of being impacted by automation. This is of particular concern because these positions enable youth to acquire the skills and experience necessary to eventually enter into higher-paying, lower-risk jobs.

More than

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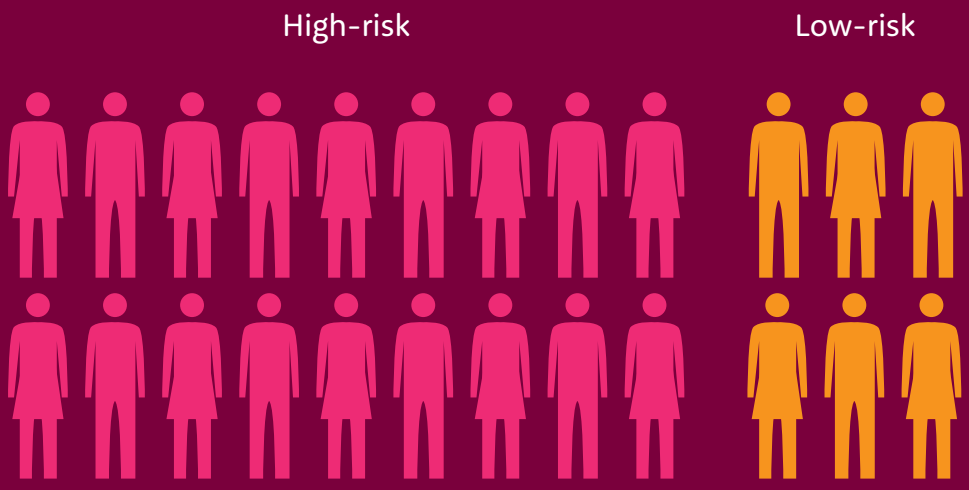
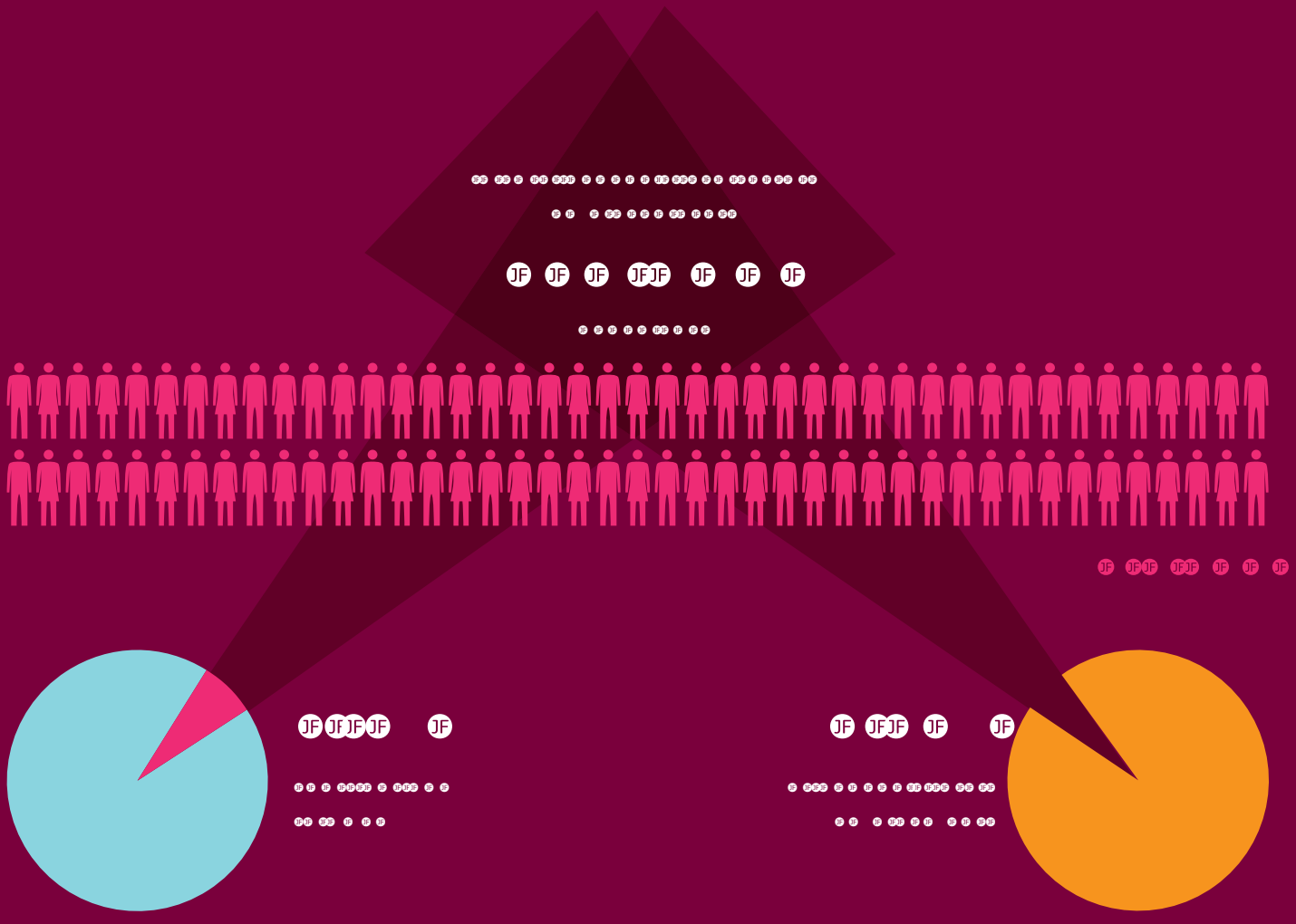
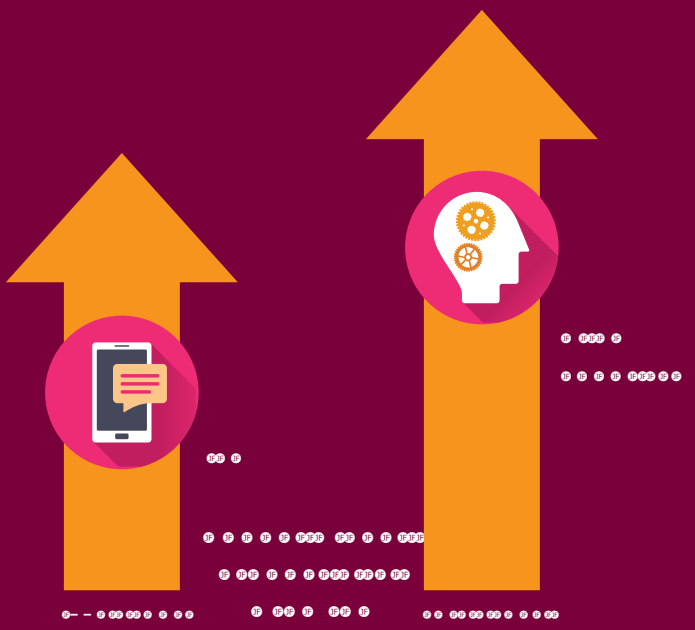
the number of youth in Canada were employed in high-risk compared to low-risk occupations.

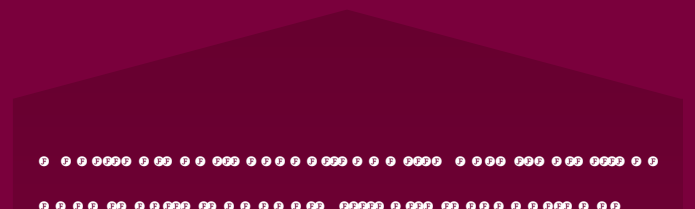


BII+E, The Talented Mr. Robot, 2016

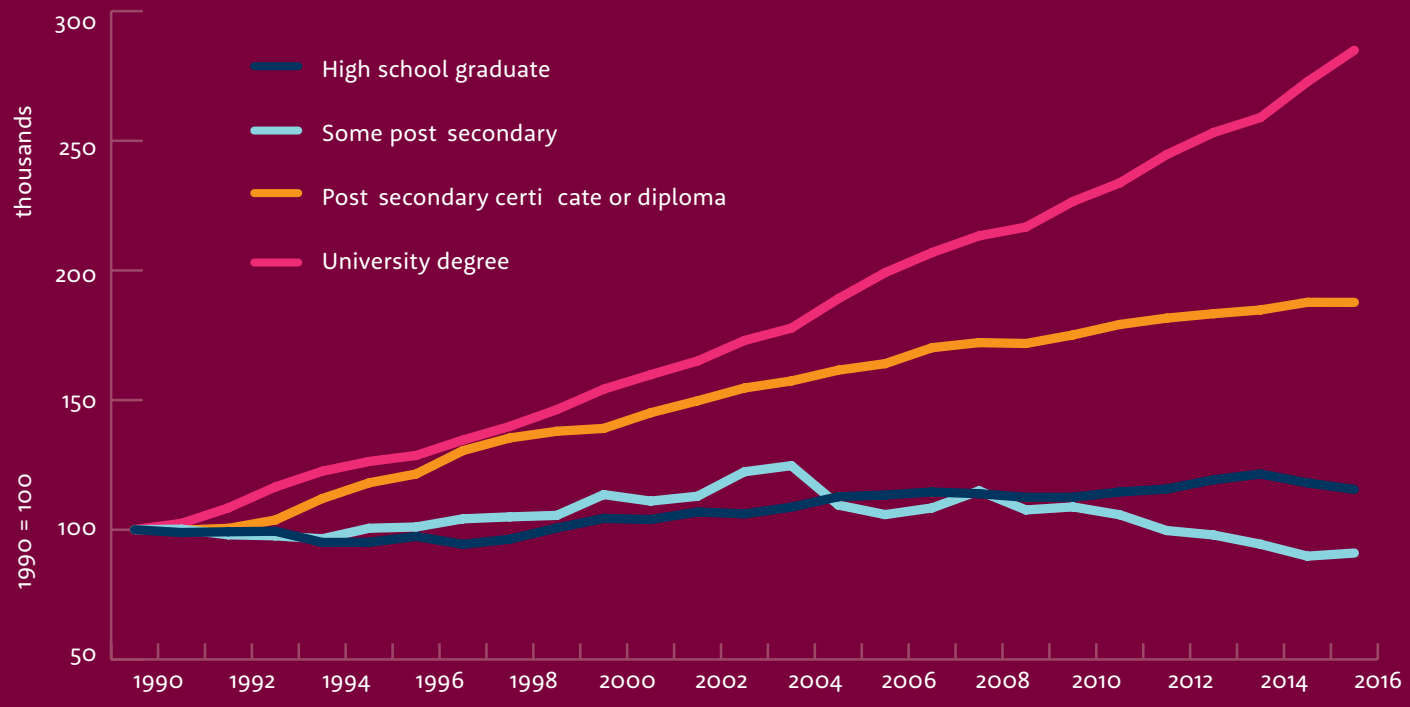


BII+E, The State of Canada's Tech Sector, 2016



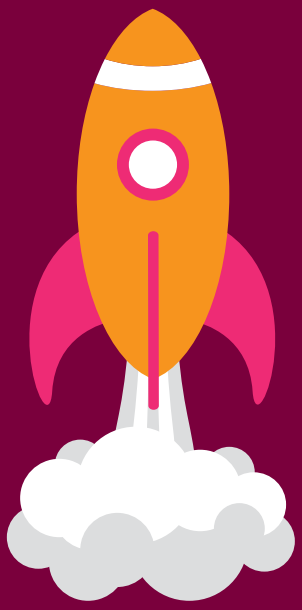


Employment by Educational A ainment



Cansim Table 282 0004, BII+E Analysis

New technologies are also increasing the rate of change in the economy. Technology has contributed drastically to the increased rate of business growth, as well as business failure. Since 2003, a technology company reached a $1 billion valuation in the US every three months. The time it takes to do so has rapidly declined.[29] According to a recent Deloi e survey of 700 business leaders across Canada, nearly 60 percent believe the pace of change will increase over the next ve to 10 years.[30] However, only 13 percent of Canadian rms are adequately prepared for disruption.[31]



Technology is increasing the pace of change. Nearly

60%

of Canada's business leaders agree.

Deloi e Canada, 2015

"In a world that is increasingly shaped by exponential changes in technology, new opportunities are arising at an ever more rapid rate. But risk also increases because of accelerating change and increasing uncertainty. What we need are entrepreneurs who are willing and able to cope with those risks and to see and harness the opportunities on the other side."

John Hagel III, Founder and Chairman,
Deloi e Center for the Edge

Other studies have shown a lack of diversity in tech jobs. For example, in the US, it was found that black and Hispanic engineering and computer science graduates were less likely to go into technology jobs than their white and Asian counterparts. The study found that 40 percent of Asian graduates continue into jobs in the tech sector, compared with 16 percent of black graduates and 12 percent of Hispanic graduates.[40] Similar trends are likely playing out in Canada.[41]

This uneven picture underlines the need for thoughtful, tailored solutions that are designed in close collaboration with the populations they are intending to support, to ensure that youth from all backgrounds are a orded equal opportunities in Canada's dynamic, growing tech economy.

"Equipping workers with the skills required to thrive in an increasingly digital world will be critical to laying the groundwork for an inclusive economy."

Canada's Advisory Council on Economic Growth; Building a Highly Skilled and Resilient Canadian Workforce Through the Futureskills Lab

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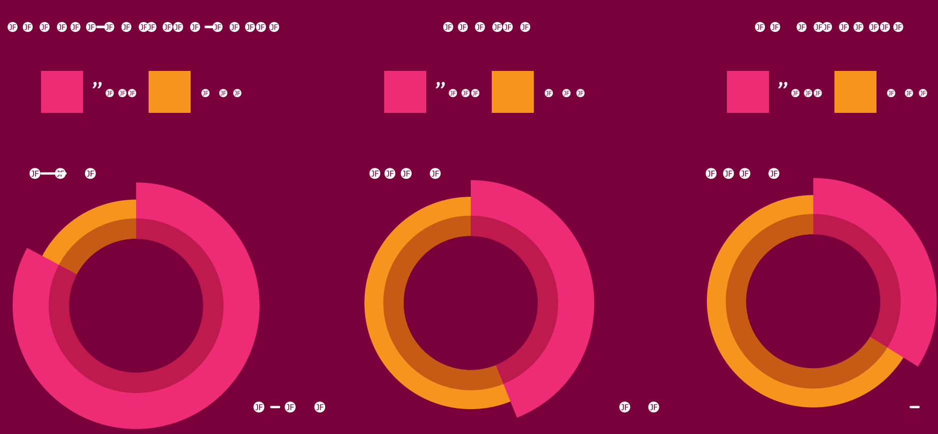

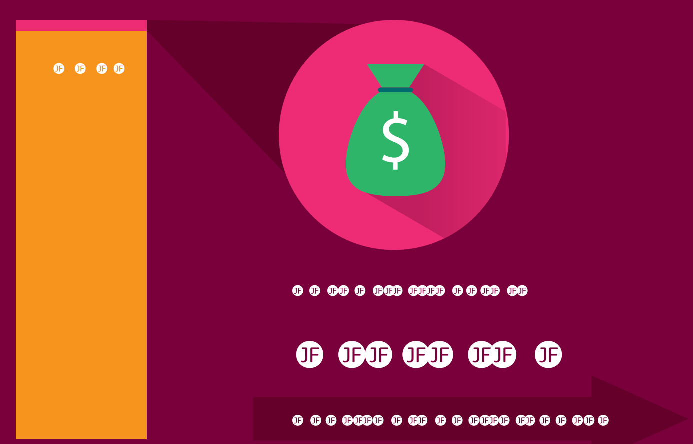

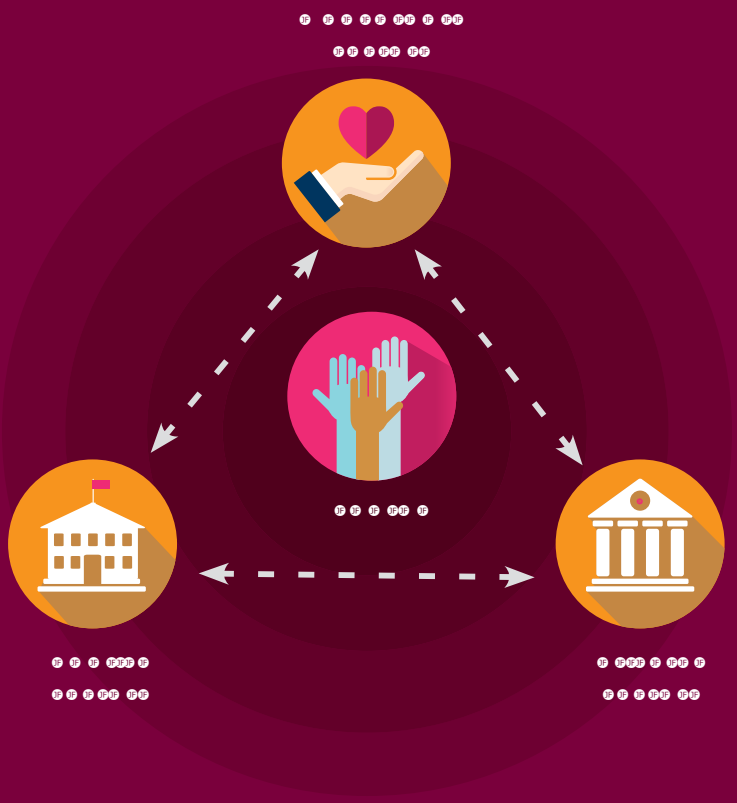

2. **Explore digital literacy programs for youth across Canada, including in urban, rural and remote communities.** While not all Canadian youth need to be coders, the jobs of the future will increasingly require an ability to interface e ectively with technology. Overall, Canada can greatly bene t from cultivating more skilled digital talent and strong computational thinkers. A range of interventions will be needed, in the formal and informal education systems, that recognize the di erent skills that make up digital literacy and their relative importance from a labour market perspective. Access to digital literacy programs for youth that have traditionally been underrepresented in the knowledge economy will also be an important area of focus.

3. **Identify and address potential barriers to youth entrepreneurship and intrapreneurship.** The future of work will increasingly require a labour force equipped with entrepreneurial skills to adapt to technological change and challenge the status quo. Youth should be introduced from an early age to entrepreneurial thinking, including acceptance of risk, failure and uncertainty. A ention should be paid to understanding how di erent demographic groups learn to ensure a diverse pool of entrepreneurial talent equipped to start new ventures and to contribute to companies that are under increasing pressure to adapt and innovate.

4. **Provide timely labour market data, career planning and mentorship support for youth entering the labour force.** Properly integrating into the labour force requires knowledge of what opportunities are out there and advice on how to capitalize on them. This requires a combination of timely labour market information—available to youth before, during, and a er their education in a format that is accessible and easy to use—as well as mentorship to help navigate the job search.

5. **Enable lifelong learning and rapid, job-speci c upskilling and retraining.** The journey for youth does not end a er they land their rst gainful position, nor does education nish a er college or university. To remain ahead of the curve in an environment of rapid technological change and disruption, it will be important for youth to have opportunities for constant upskilling and retraining. While there are a number of programs that already exist, from online, modular courses to coding camps, this is another area that will increasingly warrant a ention from employers, governments and educators.

6. **Develop a data strategy to build a stronger evidence base for policy and program solutions.** Technological trends are complex and there are a lot of unknowns in the Canadian context. New data and research is needed to develop a more granular understanding of the talent supply and demand across regions and demographic groups. This would enable governments, employers, and educators to track trends and design solutions based on labour market needs. Canada's 2016 Census data, which is in the process of being released, will help, but will leave a number of gaps that researchers and policymakers should seek to ll. Data is also needed to monitor the e ectiveness of new interventions.

These are only some examples of avenues that could be pursued to be er prepare youth for the jobs of tomorrow. Clearly, there is a need for new models that are focused both on improving youth employment outcomes and on building a stronger talent pipeline for Canada's future economy. Understanding the hurdles confronting youth and designing solutions to address them will require collaboration between governments, employers, private sector leaders, philanthropists, community organizations, innovators from all sectors, and youth themselves.

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