STRATEGY CORP | Institute of Public Policy and Economy

The Future of Ontario's Workers

June 2020

The Future of Ontario's Workers

Authors

Mitchell Davidson
(Executive Director, StrategyCorp Institute of Public Policy and Economy)

Shiv Ruparell
(Associate, StrategyCorp)

Contributors

Leslie Noble
(Principal, StrategyCorp)

Ian Smith
(Vice President, StrategyCorp)

Designer

Fenil Shah
(Graphic Designer, StrategyCorp)

The StrategyCorp Institute of Public Policy and Economy provides thought leadership on important public policy issues facing Canadians and their governments across the country by combining policy expertise with key political insights.

Colleges Ontario commissioned the StrategyCorp Institute of Public Policy and Economy to produce an independent white paper on the future of work and Ontario's college sector. For questions specifically regarding this document, please contact the authors listed above. For other questions on Ontario's college sector or regarding a specific college, please contact Colleges Ontario directly.

© 2020 StrategyCorp Inc. All Rights Reserved.

Published in Toronto, ON | June 2020

Contents

Executive Summary: The Future of Workers	VI
Recommendations	VIII
Part I: Ontario's Changing Economy and the Future Role of Workers	X
Introduction	1
Ontario's Growing Skills Gap: Will High Tech Replace High Touch?	2
Diminishing Opportunities for Less Educated Workers	8
Ontario's Urban–Rural Labour Market Divide	11
The Future of Ontario's Workers	13
Part II: The College Sector as an Answer for Ontario's Workers	14
Introduction	16
Colleges for Students	17
Colleges Employers and the Economy	22
Colleges for Communities	23
Colleges for Government	25
Part III: Solution Definition – Empowering Colleges to Power the Economy	28
Embracing Microcredentials	29
Funding of the College Sector	34
Autonomy Over Course Offerings	37
Reimagining Online Learning	40
Empowering International Students	41
Investing in Colleges Post-COVID-19	43
Connecting Ontario Secondary Schools and Colleges	45
Conclusion	47
Notes	48
Bibliography	51

Foreword

Dear Reader,

When the StrategyCorp Institute of Public Policy and Economy partnered with Colleges Ontario to produce a white paper, it was decided at the outset that we would not attempt to forecast the precise nature of the future of work in Ontario. Countless papers had already been penned examining how trends like automation will turn entire sectors on their heads. Producing the same kind of analysis under a different banner would derive little value for everyday Ontarians and their policy makers. We instead decided to concentrate more on the impact to the Ontarian affected by the change than the change itself: less on the future of work and more on the future of workers.

When starting with the premise that something transformational was coming to Ontario's labour market, we recognized - in many instances - that it was already here. Accepting that significant change was coming allowed us to focus on more immediate questions: What will the future of work mean for Ontario's workers in the medium-term? How will automation impact everyday Ontarians, their families, and their livelihoods? What does the future of work, or the future of workers, mean for Ontario's educational institutions, notably the province's 24 public colleges?

Knowing that the future worker and their education system are inextricably linked, we reached out to the senior leadership at Ontario's colleges. We held in-person consultations with 14 college leadership teams and their local employer filled Program Advisory Committees (PACs), sat down with student associations, and compiled research from across Canada and the world.[i] Shortly after we concluded these consultations, the global outbreak of COVID-19 reached Canada. In a few short months, the pandemic impacted every aspect of society in unpredictable ways.

Although COVID-19 was not anticipated during our research, it may well serve as a catalyst for some of the labour market trends we observed including rapid automation and job redistribution to knowledge-intensive sectors. We knew that workerless tasks would help businesses lower labour costs and foster productivity growth, but now automation's benefits include an increase in company resiliency to change and an imperviousness to human-borne illnesses. COVID-19 has made automation more attractive, meaning it may very well speed up job displacement that was already in progress due to technological change.

In the present day, however, it has already dealt a historic blow to Ontario's workforce. The closure of businesses throughout the province has led to record-high unemployment. 1.1 million Ontarians have lost their jobs since the economic shutdown, the vast majority through no fault of their own, while another 1.1 million workers have seen sharply reduced hours.[1] Whether or not the unemployed will have a job to return to remains unclear. 70 per cent of the province's job losses are in low-paying industries including store clerks, grocers, transit operators, and wait staff, and were already at the highest risk of being automated before the pandemic.[2]

The subsidization of Ontario's workforce by all levels of government, though necessary thus far, cannot continue forever. Eventually, government will reach the bottom of its pockets and the largest deficits in the province's and country's history will need to be reconciled. [3] Workers will need to adapt in order to return to the labour force; government has every reason to both enable and promote that adaptation.

Ontario's young and lower-skilled workers are some of the hardest hit by the pandemic. The April 2020 employment rate fell by 11.7 per cent for those aged 25 years and over, yet dropped by 32.4 per cent for workers between the ages of 15 and 24.[4] While the employment rate for workers with a post-secondary credential fell by 12.3 per cent, workers without any post-secondary education saw their employment rate fall by a staggering 18.6 per cent.[5] High-skilled workers, many of whom are older, have proven to be the most resilient to the pandemic's economic fallout. Ontario must therefore actively work to cultivate a more highly skilled workforce, and in doing so, reduce its exposure to future economic volatility. If workers need to gain new skills quickly to find meaningful employment, they will need their government to help them get there.

Here, Ontario's college system can play a key role. Ontario's colleges are unique in their close collaboration with employers, their more than 200 locations across the province, and their flexible faculty structure. With these advantages in hand, Ontario's colleges can adapt quickly to changing market demands and circumstances better than any other post-secondary institution. Despite this potential, colleges have not been given autonomy over their own operations and courses.If they were empowered to do so, they could and would adapt to meet the demands of students who need to upskill in order to return to the newly evolved labour market in short order.

Today's economy is constantly changing, and Ontario's colleges need to continue to change with it. The 17 recommendations outlined in this paper, including a full embrace of microcredentials and more program autonomy at Ontario's colleges, will enable these institutions to adapt to the impacts of both COVID-19 and the future of work. These changes would ensure that students, and therefore workers, do not fall behind. We believe that swift action on these recommendations will help colleges retain their position as global leaders in education and safeguard Ontario's economic competitiveness.

Ontarians will no longer hold one job for the whole span of their career. Most of today's students must prepare for a labour market that prizes flexibility and adaptability above all else. In the new economy, regular upskilling and retraining will be essential. Both employers and employees will need to work in tandem to ensure that the demand for evolving skills is being met. In a post-COVID-19 Ontario, enabling colleges to truly fulfill their mandate will be necessary to protect jobs, grow the economy, and ensure that the future of work is built for the worker.

We would like to thank all those who took part in our consultations including: the dozens of Ontario employers that participated through their college PACs, the 14 college leadership teams we met with, the College Students Alliance, the Colleges Ontario leadership team, each of Ontario's 24 college Presidents, and Colleges Ontario President and CEO Linda Franklin. We encourage you to enjoy the paper, consider its recommendations and challenge its conclusions.

Sincerely,

Mitchell Davidson
Executive Director
StrategyCorp Institute of Public Policy and Economy

Executive Summary: The Future of Workers

Countless articles and papers across a variety of disciplines have been penned regarding the future of work. A quick search in Google Scholar for "future of work Canada" or its French-language equivalents yields approximately five million published results. This immense catalogue of research fails to reach a consensus on what the future of work will ultimately entail for Ontarians and Canadians. In the Canadian literature reviewed by this paper alone, the number of jobs forecasted to be automated ranges from as low as six per cent of the workforce to as high as 59 per cent.[6] The projected timeline for automation ranges from the next 10 to the next 50 years.[7]

The predicted skills that Ontario's future workforce will need to succeed in the labour market are similarly inconsistent. Although common themes arise, such as the growing demand for employees with robust 'soft' skills such as verbal communication and problem-solving, forecasts for technical skills both change and contradict each other frequently. While it is impossible to accurately predict the nature and magnitude of labour market change, there is no doubt that change is on its way. In many instances, including in Ontario, that change is already here.

Trends in the province's evolving work patterns have been expedited substantially by the COVID-19 pandemic. The health-turned-economic crisis has thrown many of even the most informed labour market projections into disarray. With businesses and policymakers navigating through uncharted territory, job postings have plummeted, unemployment has reached historic highs, and many businesses have been forced to close permanently. For many Ontario businesses, the automation of certain functions is no longer just a potential cost-saver, but a health necessity. While the ultimate role COVID-19 will play in shaping Ontario's future of work remains uncertain, the province's workforce will undoubtedly neither look nor behave the same as it did before the pandemic.

Lost amid of the web of studies on Ontario's future economy, or more recently on the potential labour market implications of COVID-19, is what the 'future of work' will mean for the individual worker. Both pre- and post-outbreak analysis has largely focused on how labour market change will impact large businesses and governments, rather than the individuals employed by them or even small business owners and entrepreneurs. The 'future of work' problem presented by economists is often pitched for government and industry leaders to solve, rather than for individuals to address in their day-to-day lives. Indeed, while much has been written on what Ontario's' future workforce will look like one day, less attention has been paid to how individual workers actually make the transition from the work of today to the work of tomorrow. This paper therefore seeks to address the gap between the future of work and the future of workers, with particular attention paid to the role of an Ontario college education in preparing the workforce for a volatile economy.

The reality future workers will face must reconcile with, and ultimately be embraced by, Ontario's institutions. Governments will be forced to react swiftly to profound concerns by voters over the lack of stable employment or jobs for which they are qualified. Ontario's re-employment centres will face a spike in demand, and simply connecting the unemployed with publicly listed job vacancies will no longer suffice in an economy where up to 94 per cent of new jobs created are impermanent by nature.[8]

The most important necessity that will arise from this transition is the ability for institutions, primarily those in education, to adapt quickly and address demand. Programs that fail to value speed or updated curricula will not alleviate the pressures of putting food on the table. A tendency toward lengthy programming will not satiate governments' desire to swiftly reduce unemployment, generate tax revenue, and lower the number of individuals relying on welfare support. For workers unable to pinpoint and plan for future skill shortages, flexibility must be the priority.

When the town of Janesville, Wisconsin lost its General Motors plant, some 2,000 people in a town of just over 60,000 enrolled in the local community college. Nearly half of the attendees never finished their degree, primarily because they could not afford to take even two years away from the workforce.[9] If governments want to be prepared for the millions of unemployed workers to return to the workforce in a stable and long-term manner, they will need to start preparing now, primarily by empowering their educational institutions to embrace new models that have a direct impact on employment.

In this paper, the labour trends occurring in Ontario before COVID-19 will be explored in-depth, including but not limited to, the growing skills gap and the factors underlying that trend. Further, Part I will explore the diminishing opportunities for less

educated workers and the exacerbation of these trends in Ontario's rural communities. Next, the paper will show how COVID-19 is likely to accelerate these trends, ultimately establishing that the most skilled positions are the ones most impervious to change, be that automation caused by technology or by COVID-19. Transforming the labour force is not a new challenge but doing so at the pace demanded by a combination of automation and COVID-19 impacts on low-skilled jobs, will demand the most from our post-secondary institutions.

In Part II, it will be clear that the institutions best suited to adapt to this change are Ontario's 24 colleges. These schools have already been highly focused on the jobs of today and tomorrow. Before COVID-19, 86 per cent of 2016-17 college graduates were actively working in the labour force in less than six months after their graduation.[10] Ontarians themselves have recognized the direct applicability of a college education too, with 18 per cent of college attendees having already completed a university degree before enrolling in a college program.[11] When the positive and unique impact of Ontario's colleges on its diverse communities – urban, rural, francophone, immigrant and Indigenous – are combined with the focus on student success in the labour force and meeting the needs of local employers, it is clear that Ontario's colleges are best positioned to take on this upskilling challenge.

However, Part III of the paper will show that, despite the past success of the college system, colleges have not yet been empowered to adequately handle the challenges of tomorrow as they must seek the Ontario government's approval to offer everything from three-year degrees to in-demand microcredentials. If colleges are to be front and centre in the rapid re-training of Ontario's labour force, they will need to be able to adapt faster than ever. They will face significantly higher demands on capacity due to increased enrolment, a need for quicker and more frequent learning, employer targeted course structures, adaptable curriculums, more online capabilities, and even a potential need to stabilize rural and Northern communities and their economies. Among others, they will primarily need autonomy over their programming, including the ability to offer microcredential programming.

This brings the present paper to its core thesis: if colleges are to succeed in taking on the challenge of rapidly re-training the labour force for the challenges of the future, they will need to be given the tools to do so. In Part III, 17 detailed recommendations are made. If enacted, they will empower the college sector to help Ontario's workforce and employers respond to a rapidly

Transforming the labour force is not a new challenge but doing so at the pace demanded by a combination of automation and COVID-19 impacts on low-skilled jobs, will demand the most from our post-secondary institutions.

changing labour market at the pace that students, workers, and employers expect. The college system is ready to help Ontario ensure a qualified, gainfully employed, and sustainable supply of workers for generations to come.

Ontario's workers have very real constraints on their time: rents and mortgages, the cost of childcare and food, other household debts, and paying for the care of loved elderly all make time and money difficult to come by. These factors pull Ontarians into easier to find, lower skilled jobs and push them away from upskilling through a proper post-secondary education into a higher skilled position and a better quality of life. Now, COVID-19 has made these lower skilled positions harder to come by, while making the push and pull factors even harder to overcome.

Today's economy demands solutions that are no longer just four-year theory-based university degrees. These solutions must be faster, nimbler, and directly focussed on creating an employable graduate. By government actioning the 17 recommendations outlined in the paper, Ontario's colleges can fill that role to ensure the future of Ontario's workers is a bright one.

Recommendations

Embracing Microcredentials

Recommendation 1: Colleges Ontario and the Ontario government should work together to develop and implement a robust microcredential framework as a rapid re-training tool for displaced workers.

Funding of the College Sector

Recommendation 2: The Ontario government should work with Colleges Ontario to address issues with the province's funding model for part-time students and provide student assistance for microcredentials through enrolment-based funding instead of OSAP subsidies. Any changes to the funding model must be considered in the context of ongoing work around new Strategic Mandate Agreements (SMAs).

Recommendation 3: The Ontario government should immediately evaluate the efficiency, effectiveness, and demand for the Second Career Program. This review should evaluate options to adapt the program to cover costs of microcredential enrolment or wind down the program in favour of funding microcredential programming.

Recommendation 4: The Ontario government should review the relationship between microcredential enrolment and Ontario Works. Specifically, they should review the requirements to seek employment opportunities while enrolled, claw backs of income from paid work integrated learning opportunities available through colleges, and options for microcredential tuition to be deducted as eligible income similar to how childcare expenses are treated

Recommendation 5: With the exception of potential funding changes to reflect the increase of part-time student enrolment in microcredential programs, the Ontario government should continue to implement their previously announced changes to the Strategic Mandate Agreements. However, government should pause all funding formula changes – be they positive or negative – for two years to allow for an economic realignment post-COVID-19 and for the proper incorporation of microcredentials into the SMA framework. This funding pause should include freezing any changes to the formula for grants to colleges or tuition subsidies in place for two years

Autonomy Over Course Offerings

Recommendation 6: The Ontario government should give colleges autonomy over their microcredential offerings and allow for in-program changes without prior consent from the Ministry of Colleges and Universities. Government should further focus on quality assurance and compliance with the agreed upon microcredential definition and broader framework through regular program reviews conducted by the Ontario Quality Assurance Service. A risk-based approach to these evaluations should be considered whereby repeat offenders are subject to review more often than institutions that regularly meeting evaluation standards.

Recommendation 7: As Colleges Ontario and the Ontario government empower microcredential programming, they should also move to a competency-based education system that allows for the fast-tracking of traditional degree and the diploma programs as well as revamps elective programming to focus on essential soft skills and cross-program hybridization where applicable. To enable this, the province should update Ontario's Essential Employability Skills (EES) framework on a regular, if not annual, basis.

Recommendation 8: The Ontario government should give colleges more autonomy to offer demand-driven programming. This includes not only allowing colleges to offer three-year degrees, but also removing the arbitrary cap on the number of four-year degrees they can offer and giving them greater flexibility to offer applied master's programs where applicable

Reimagining Online Learning

Recommendation 9: The Ontario government and Colleges Ontario should work together to address the barriers to online programming, including funding and regulatory issues. As part of this work, the government should consider how eCampus Ontario and Ontario Learn can assist with this transition.

Recommendation 10: The Ontario government should make substantial investments in broadband infrastructure so that rural college students are able to reliably access as high quality of an education as those living in urban areas.

Recommendation 11: The federal government should evaluate loosening the rules around international student employment while in school. This work could include easing the full-time student requirement, reducing the six-month minimum to four months (i.e. one semester), or allowing any student enrolled in an accredited post-secondary education course, regardless of whether they are in a program that ultimately leads to a credential, to work off-campus during their education.

Recommendation 12: The federal government should make it easier for international students to participate in work integrated learning opportunities, such as co-ops or internships, regardless of whether their study program requires it. They should further raise the number of hours per week that international students are allowed to work off-campus from 20 to 24 hours.

Recommendation 13: The federal government should consider reducing the eight-month benchmark for international students to qualify for Post-Graduation Work Permits and should work with Ontario colleges to offer additional English or French language proficiency training for international students. This recommendation may involve coordination with the Ontario government or local municipalities, which may be able to assist in delivering supplementary services to students who are permitted to stay and work in Ontario.

Investing in Colleges Post-COVID-19

Recommendation 14: The Ontario government should allow college satellite campus investments to qualify for regional development funds such as the Southwestern and Eastern Ontario Development Funds, and should strongly consider investing in capital infrastructure at Ontario colleges in order to generate economic activity while benefiting from their amortization schedules and accounting treatment.

Recommendation 15: When the Ontario government deploys their Rapid Re-Employment and Training Service teams to an affected community, they should house those teams in the local college or satellite college campus to allow a seamless transition to re-training programs and local employer connections.

Recommendation 16: Private Career Colleges should be added to Ontario's Public Sector Salary Disclosure List (commonly known as the 'sunshine list') to increase transparency and financial accountability at these institutions.

Connecting Ontario Secondary Schools and Colleges

Recommendation 17: The Ontario government should ensure that the secondary school system does not disproportionately encourage university enrolment over other forms of post-secondary education. This should be accomplished in part by mandating that secondary school guidance counsellors receive adequate information about the benefits of college programming, as well as by reviewing post-secondary nomenclature used in Grade 11 and 12 classes to ensure that any curricular or institutional bias against college education is removed.

Part I

Ontario's Changing Economy and the Future Role of Workers

Introduction

Organizations from government agencies to private multinationals have sought to predict the precise extent to which automation will impact the workforce and wider economy. For instance, McKinsey & Company recently estimated that up to 375 million workers, or 14 per cent of the global workforce, will need to switch occupational categories due to the automation and digitization of the world economy.[12] In Canada, their estimates suggest that a quarter of current work activities will be displaced by automation between 2016 and 2030.[13] On a sectoral level, McKinsey and the Canadian government's Advisory Council on Economic Growth found that as much as "three-quarters of all tasks performed by truck drivers in the mining, oil and gas, and forestry sectors could be automated."[14]

The COVID-19 pandemic and subsequent economic shock will undoubtedly delay, accelerate, or alter these trends on a sector-by-sector basis. The long-term labour market implications of the pandemic will likely not be understood fully until well after the health crisis has subsided. The best way to prepare for the future of work is therefore to first look at recent and historical labour market trends and their development into today's economy. Once understood, each trend can be applied to a future state alongside any new trends that might emerge from the pandemic, such as the rapid e-commercialization of Ontario's many small and medium-sized enterprises (SMEs) and the mainstreaming of work-from-home.

Throughout its history, Canada's economy has reinvented and revolutionized itself in ways that fundamentally changed how Ontarians worked and which work was demanded. Take, for instance, an example recently illustrated by former Bank of Canada Governor Stephen Poloz at Queen's University. He outlined how, at Confederation over 150 years ago, nearly 50 per cent of the Canadian workforce was employed in agriculture. Just over 50 years later, that number had dropped to a third of all workers. By 1950, less than 15 per cent of Canadians were employed in agriculture, while today the sector employs less than two per cent of Canadian workers. Despite this, agricultural output has increased threefold.[15] While demand for agri-foods has skyrocketed alongside population growth, less and less Canadians have pursued farming. Instead, growth in demand spurred innovation in agricultural technology as producers sought to realize economies-of-scale and increase productivity, which in turn shifted the demand for labour elsewhere on the overall supply chain.

The shift from the field to the city required a distinct policy response, much as the change to an automated workforce will. Faced with such change, governments have typically responded by adjusting their education systems. During the industrial revolution in the United States, for instance, secondary school became mandatory up to the age of 16. Similarly, when the labour market was flooded with workers following the Second World War, governments stimulated the economy through programs such as the G.I. Bill in the U.S., which helped retrain war veterans.[16]

Today, Ontario faces a similar dilemma – technological overhaul, unprecedented and unevenly distributed unemployment as a result of COVID-19, and a labour market that demands new skills over those of the generation prior at an exponential rate. For today's governments to best position themselves in face of such change, they must do as governments have done before them and proactively reimagine and reinvigorate the education system. In the current economic climate, colleges are at the forefront of that process.

In order to assess how best to bolster Ontario's educational framework, particularly at institutions such as colleges, pre-pandemic trends in Ontario's economy must first be explored. Only then can these trends be examined with a post-pandemic lens to determine whether they will be exacerbated, accelerated, or diminished by COVID-19. Foremost among these trends are Ontario's growing skills gap, diminishing opportunities for less-educated workers, and a widening rural versus urban labour market divide.

Ontario's Growing Skills Gap: Will High Tech Replace High Touch?

Where Do Workers Fit?

Using traditional labour metrics, Ontario's economy was performing relatively well prior to the onset of COVID-19. Unemployment was either at, or close to, record lows and tracking in an overall positive direction since 2008. Unemployment rates, however, paint only a partial picture. While Ontarians were working, they were working well below their full potential. In other words, Ontarians faced widespread underemployment, filling jobs they were overqualified for while more fulfilling higher-skilled roles were left on the table. Moreover, jobseekers faced significant employment instability. Between October 2015 and 2016, 89 per cent of jobs created in Ontario were part-time.[17] As discussed earlier, these positions were hit hardest by the pandemic.

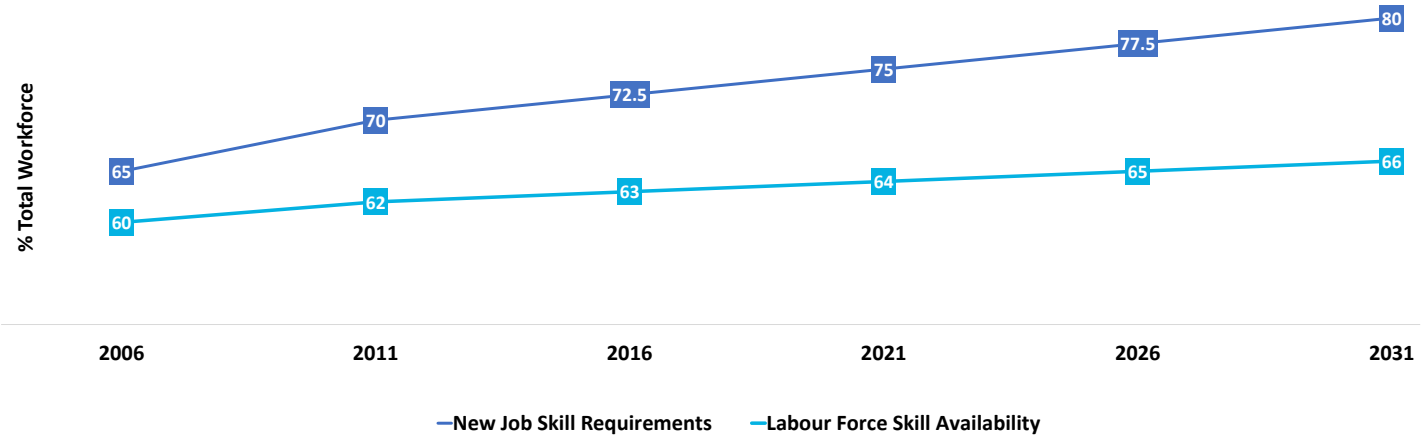
In 2019, Ontario had a banner year for job growth, generating 243,000 new jobs or 76 per cent of all jobs created across the country. Despite that impressive growth, 244,000 jobs were created in the service industry with Ontario actually posting job losses in the 'goods-producing' sectors, netting out at 243,000 new jobs.[18]

These goods-producing sectors typically require workers with specialized training. The inability to find workers trained for specialized tasks is commonly referred to as the skills gap but can more appropriately be thought of as a skills shortage. While Ontario employers are able to find workers for low-skilled positions in sectors such as retail or service, they struggle to find employees with the qualifications necessary to work in skilled trades such as welding, forestry, or software development. The province's overall high job growth conceals a skills shortage preventing Ontario businesses from achieving their full potential, and in many instances eroding their competitive advantage.

For the past several years, low-skilled jobs have been plentiful. Positions such as waiters and cashiers have been in high demand due to a generally growing economy. In fact, provincial estimates predict that Ontario's labour demand will be as high as 9.5 million workers by 2031, compared to the 7.6 million employed Ontarians as of January 2020.[19] This has largely been driven by companies hiring for low-skilled or entry-level positions at record rates.

At the same time, the proportion of low-skilled jobs to those requiring post-secondary credentials has been decreasing over time and will continue to do so at an accelerating rate. As seen in Figure 1 below, Ontario's demand for skilled workers is outpacing its supply at an alarming rate. In 2006, only 65% of new jobs required post-secondary education or training. This demand was largely met by the 60% of Ontario workers with post-secondary credentials. Over time, however, the gap is expected to widen by as much as 14 percentage points. In 2031, 80% of all new jobs in Ontario will require skilled workers, while only 66% of the province's labour force will be able to offer the necessary skills.

Figure 1 : Ontario's widening skills shortage



Source: Statistics Canada

The widening of Ontario's skills gap can be attributed to a perfect storm of labour market trends. Low-skilled jobs were plentiful and attractive given they pose few barriers to entry for prospective workers, enabling those without post-secondary credentials to delay obtaining them indefinitely. At the same time, the middle-class jobs, once populated by semi-skilled workers were being hollowed out by a combination of automation and a lack of qualified candidates as "the Ontario economy alone shed nearly 70,000 jobs from 2001-2015 within the traditional middle-class job category."[20] A widening gap makes it more challenging for those less and semi-skilled workers to make the leap.

Take, for instance, the potential automation of an accountant. A traditional accountant, faced with at least a partial automation of their role, might respond by upskilling to instead take on a more specialized role, like a forensic accountant, because it is harder to automate at the same rate. That transition to a forensic accountant may be relatively seamless for someone already trained in traditional accounting. However, for someone looking to enter the accounting practice for the first time from their current low-skilled job, they now must skip a rung in the training ladder. That individual will have to go straight from their current low-skilled employment to the more advanced forensic accounting position, without taking on the traditional accounting role first since those positions have been automated. Therefore, the existing worker may be able to upskill to retain employment relatively easily, but the barrier to entry for new candidates has become even higher because of automation.

From 1987 to 2015, employment in high-skilled jobs increased by 91 per cent nationwide. Employment in low-skilled positions over the period grew by 78 per cent. Employment in traditional middle-class jobs, those which require semi-skilled workers and involve routine tasks such as data entry, grew by only 27 per cent.[21] In short, high-skilled jobs have become available but are harder to achieve, low-skilled jobs are plentiful and attainable, and jobs of the former middle-class are increasingly rare.

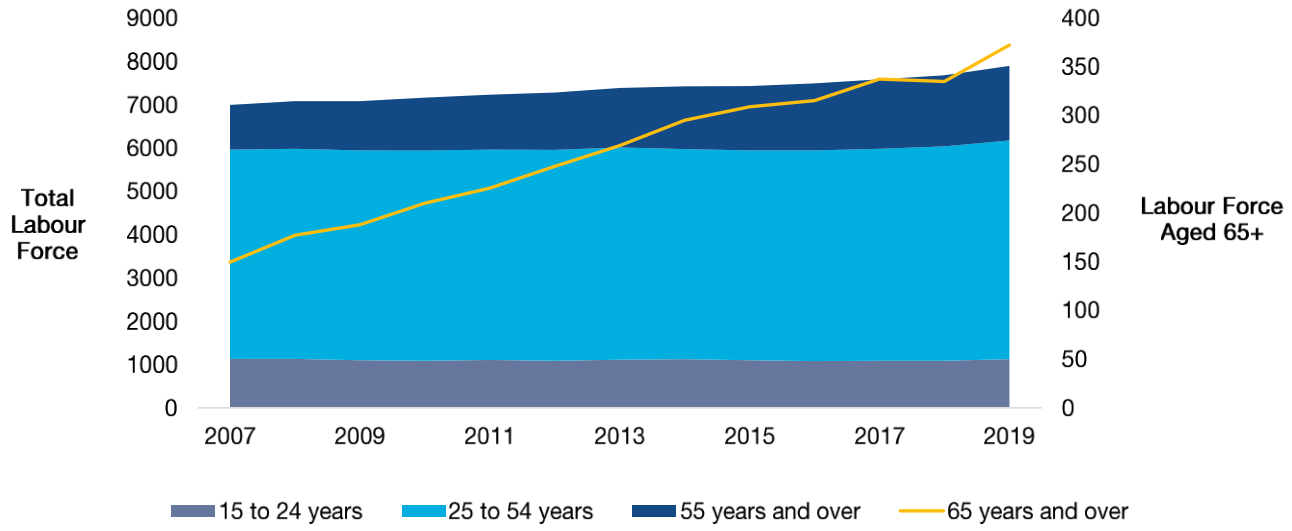
With low-skilled jobs still on the table for now, many Ontarians are failing to invest in post-secondary programs that will set them up for future success once those jobs become obsolete. Consequently, Ontario's labour shortage continues to deepen and Ontario businesses are forced to look elsewhere to fill skilled positions. The Conference Board of Canada estimates the skills gap to represent a $24.3 billion loss to Ontario's GDP in essentially untapped potential (and $3.7 billion in potential provincial tax revenues).[22]

Why Have Workers Been Unable to Fill the Gap?

It is important to understand exactly how the skills gap proliferated in Ontario to determine if the trend will continue during COVID-19 recovery efforts and beyond. There are several mitigating factors which have widened the skills gap beyond a hollowing out of middle-class workers.

First, more and more Ontarians are self-employed. Between 2011 and 2019, self-employed Ontarians grew by 15 per cent.[23] Employers will have a harder time finding employees to fill positions when eligible workers are opening their own businesses, who in turn need to find skilled employees of their own. This trend has accelerated in recent years and is likely to continue to do so in light of COVID-19. Between 2015 and 2018 the number of self-employed Ontarians grew by three percent, while between 2018 and 2019 self-employed Ontarians grew by six per cent.[24]

Figure 2: Ontario labour force growth by age (thousands)



Source: Statistics Canada

Second, employers themselves have invested less in their employees than ever before. The Conference Board of Canada estimates that while employers in 1993 spent approximately $1,200 on training and development per employee, by 2010 that investment dropped to just $700 per employee.[25] Without employer assistance, many employees are unlikely to take on the additional time and cost of upskilling, despite potential long-term benefits to their lifespan earnings cycle.

Third is Ontario's aging workforce. For instance, the median age of an electrician is 37,[26] a welder 40,[27] a car mechanic 40,[28] and a millwright 44.[29] For supervisory positions the trend leans even older. The median age of a supervisor for a logging operation or a supervisor of hydro linesmen is 45 years old, a notable increase from previous generations.[30]

In Ontario specifically, the fastest growing segment of the labour force is those 65 years and older (see Figure 2). The 65 years and over demographic has grown by 149 per cent over the last 12 years, while workers aged 55 years and over have grown by 67 per cent.[31] This comes as Ontario's overall labour force has only grown by 13 per cent. As baby boomers age, the total labour force is aging with it. That also means that the province's skilled workers are aging to retirement without the same number of younger students backfilling those positions. These retirements cause employers to have additional openings, but there are no trained candidates to fill them, causing the skills gap to widen.

These trends have been accelerated by automation, which has reduced the cost of using technology to increase productivity, in turn allowing firms to cut back on labour costs. Deloitte's Future of Canada Centre frames it well – "in 1992, you'd pay $222 for a million transistors; today you'd pay $0.06."[32] Lower cost barriers to automation have resulted in an increasing number of semi-skilled jobs to be automated. While the advent of such technology carves out new jobs for those who repair, design, operate, and maintain these systems, there must be enough workers will the skills necessary to do so.

For instance, the McKinsey Global Institute estimates that the invention of the personal computer eliminated 3.5 million jobs. However, since 1980, it created 15.8 million net new jobs.[33] The jobs directly eliminated by the computer included typists, secretaries, and bookkeepers. The jobs the computer created were computer engineers, information and technology specialists, and software designers. Essentially, the computer eliminated semi- or mid-skilled jobs and in turn created a new set of high-skilled positions. The computer therefore single-handedly widened the overall skills gap. The more technology in the workplace, the more the skills gap grows.

Lastly, the widening skills gap has been abetted by the advent of the gig economy, or the greater prevalence of short-term or contract-based work. Specifically, gig economy roles, particularly those reliant on technology platforms such as Uber, have enabled Ontarians to pursue multiple low-skilled positions at the same time to make ends meet. An individual could work part-time as wait staff in a restaurant, run a freelance photography service, and drive for Uber or Lyft sporadically. By having multiple points of entry to low-skilled work, many workers have been dissuaded from the type of upskilling the near-future economy will require. The gig economy, it should be noted, is not limited to drivers and delivery services, but also applies to roles including lawyers, landscapers, accountants, and tutors. The widespread nature of contract-based work is evidenced by the fact that the gig economy is currently growing at a rate of 14 percent a year.[34]

All told, the advent of the gig economy, lower costs for technology-induced automation, demand for high-skilled and specialized workers, an aging workforce, decreased employer investment in training, and a rise in self-employment has created a demonstrable skills gap. For policymakers seeking to address the province's skills shortage, they must first answer the question of the extent to which the skills gap will widen or shrink over the years to come.

Will Ontario's Skills Gap Worsen?

In forecasting how the skills gap will develop soon, the trends underlying the gap must be examined more closely to isolate them from the added fallout of the pandemic.

Beginning with the age of the workforce, the median age of skilled workers would continue to increase without demonstrable action to reverse this trend. The Ontario government has attempted to attract younger workers to the trades with investments in new advertising campaigns promoting the skilled trades and by reducing the burden to pursue apprenticeship training, but the impact of those actions is less than immediate.

Additionally, the gig economy was already shown to be growing by 14 per cent annually and self-employed Ontarians were increasing at a pace of six per cent per year. Both trends were accelerating before COVID-19, with no indication they would reverse anytime soon.

There was also no indication that employer investments in training would demonstrably increase. In fact, the federal government's Advisory Council on Economic Growth argued that SMEs, which employ approximately 70 per cent of all

private-sector workers, "...often lack the resources to develop internal training programs...[and] face relatively high employee turnover, which discourages them from investing in staff training."[35] Ultimately, they predicted that employers would not make significant new investments in training their employees.

Workplace technology, by all accounts, will become cheaper and more accessible. Former Bank of Canada Governor Stephen Poloz suggested in a 2018 address that lower technology costs are enabling Canada to embark on its "fourth industrial revolution" which would consist of "the integration of digital technologies in virtually every part of our lives."[36] With that technological change comes a growth in the creation of highly skilled and technically complex jobs. The World Economic Forum forecasts that rapid advances in technology will result in 65 per cent of school children graduating into jobs that do not yet exist.[37]

The concept of a fourth industrial revolution is more commonly referred to as the future of work, or even more directly as automation. Automation is neither a new nor unappealing word for a growing number of Ontario employers. For many Ontario businesses, from grocery stores to auto manufacturers, automation enables them to lower their input costs, make their systems more efficient, expand and expedite operations, or offer lower prices to consumers and gain an edge over competitors.

While modern automation makes one think of AI-powered assembly machines, it has in fact existed in one form or another dating back to the first industrial revolution, becoming particularly popular during the early 20th century. The creation of the assembly line by Henry Ford in 1913 was among the most revolutionary forms of automation, even though human labour continued to be the primary input. That innovation created 84 distinct tasks – which would later be further automated – allowing the Ford Model T-3000 to be built in 90 minutes instead of 12 hours. The price of the vehicle dropped by more than 60 per cent as a result.[38]

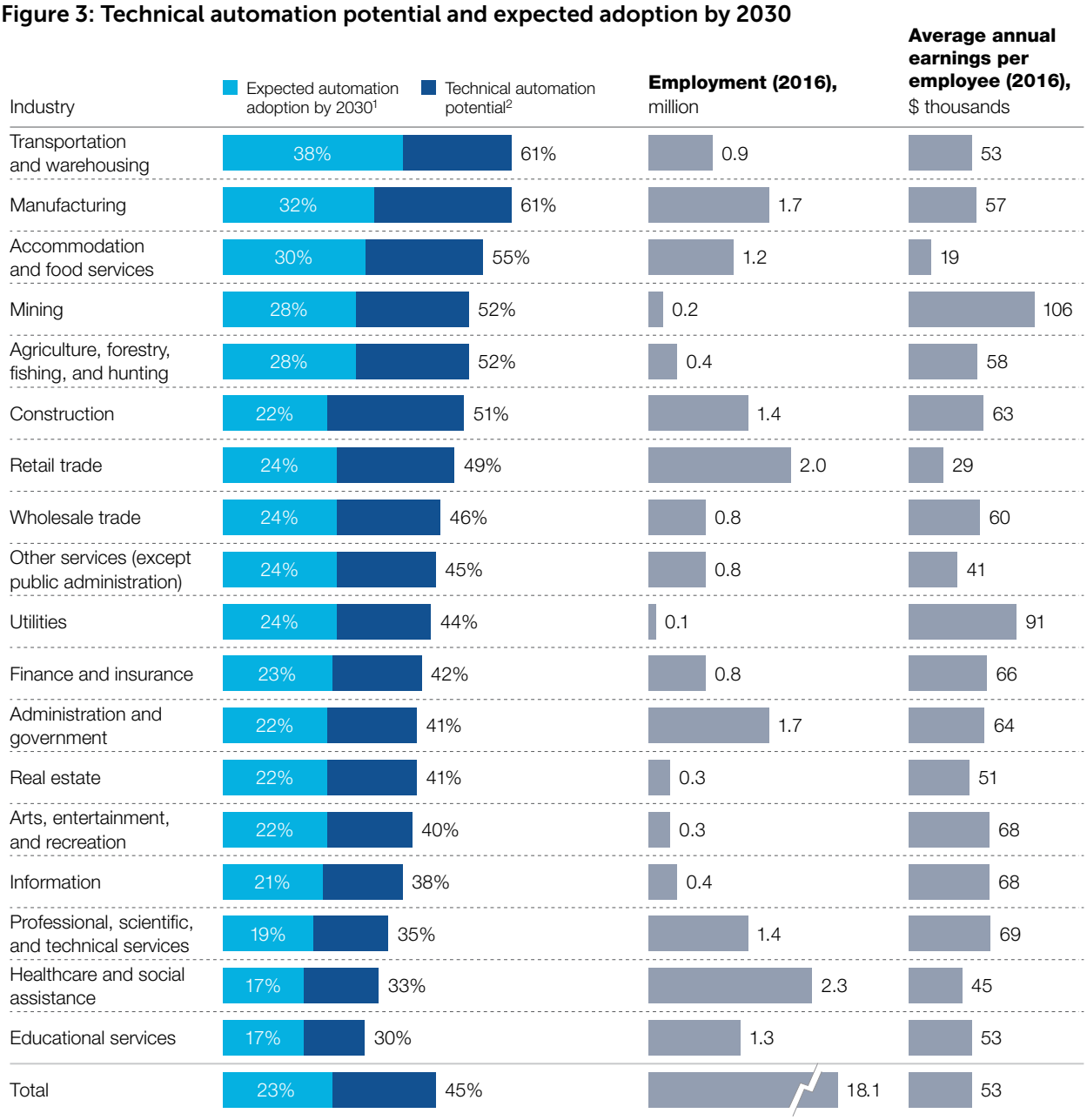
Henry Ford's automation changed the way goods were manufactured, whereas the automation of today focuses primarily on changing the way we live. Today's automation can be broadly sorted into three categories: data automation, physical automation, and self-automation.

Data Automation: The design of digital systems or programs to replace a previously held manual task. Data automation has been most common in collecting or processing raw data, and normally replaces or complements traditional middle-class roles such as bookkeeping, accounting, back-office transaction processing, or logistics.[39] In one instance, during consultations conducted with employers for this paper, a logistics company owner in the Bay of Quinte area explained how his company automated its pen and paper manual reporting system. The company shifted from reporting truck movements to its dispatch centre by hand with a digital tracking system on each truck that automatically reports the movements of its semi-trailers.

Physical Automation: The replacement of repeatable, rhythmic tasks with artificial intelligence or machines. This is the most understood form of automation as it commonly replaces an individual human task on an assembly line, such as the current evolution of Ford's automotive assembly line concept. In Ontario, General Motors' main facility in Oshawa employed as many as 23,000 people in the 1980s, but by the time it closed in 2019 it employed less than 3,000.[40] Physical automation allowed the plant to produce a greater quantity of increasingly complex automobiles than ever before despite retaining less staff.

Self-Automation: The replacement of tasks by having the consumer complete them instead. This is the hardest form of automation to measure as it can be subconscious. For instance, many fast food establishments now have customers fill their own drink at a self-serve station, such as at many Burger King or McDonald's franchises. Most Ontario gas stations have completely removed full-serve attendants and automated the cashier process with pay-at-the-pump technology. Further, e-commerce has eliminated the need for large retail footprints. Though difficult to measure, this transfer of tasks to the customer should be seen as a form of automation as it typically relies on a form of new technology and allows for business processes to become more efficient.

Figure 3: Technical automation potential and expected adoption by 2030



[1] Percent of work activities in the sector expected to be automated by 2030
[2] Percent of work activities in the sector with potential for automation given current technology.

Source: Advisory Council on Economic Growth (2017), McKinsey Global Institute, Statistics Canada

All three forms of automation have been prevalent in Ontario over the past few decades, but as technology becomes cheaper and AI systems more accessible to everyday businesses and consumers, the speed of automation is set to increase substantially. The Boston Consulting Group (BCG), for instance, found in 2015 that the "prices of robotics hardware and software … are around 40 per cent lower than they were a decade ago" for custom machines in large automotive factories.[41]

In another example, when government policies such as allowing for accelerated depreciation of investments are considered, the cost of spot-welding machines – including maintenance and installation – can be amortized to a cost of approximately $8 an hour. That compares to a human spot welder at a cost of $25 an hour if employee benefits are included.[42]

The rapid decline in costs and the rapid increase in technological advancement could mean as many as 59 per cent of jobs are at risk of automation in the near future.[43] Job forecasts specific to Canada estimate that 10 per cent of all jobs could be automated by 2030, less than a decade from

now.[44] In any case, the impact of automation before COVID-19 is taken into account is likely to be substantial.

One particularly troubling trend for policymakers is the ability of automation to replace tasks across multiple employers at once. When particular innovation becomes inexpensive and reliable enough to be implemented in one business, it soon becomes sought after and implemented by its competitors. Online accounting software, for instance, has become so inexpensive and readily available that traditional personal accounting companies have been relegated to charging fees for assisting online tax filers with the free online programming, or else reviewing results for input errors rather than charging premium rates to complete the original tax filing itself.[45]

At first glance, automation appears solely to reduce the size of human workforces. In 2018, the World Economic Forum surveyed employers that together employed more than 15 million people. Their survey concluded that, by 2022, nearly half of all employers expected automation to lead to a smaller workforce.[46] This perspective, however, does not paint the full picture. A further 38 per cent of businesses surveyed expected to re-deploy their workforces to more efficient tasks and more than 25 per cent expected automation to create new roles within their business.[47]

When the Automated Teller Machine (ATM) was deployed in the United States, the number of bank tellers employed actually increased for several years as banks trained their tellers to perform more tasks than just cashing cheques or processing cash withdrawals.[48] When the services offered by the ATM and tellers were combined, a bank branch could offer more to customers with fewer or the same compliment of staff. Between 1991 and 2007, branches became cheaper to operate as one teller could effectively do more than ever before, including other revenue generating activities. During this time, more bank branches opened across the United States despite the main activity of cash withdrawals being automated. That trend of bank branch openings was only reversed when, ironically, most banking transactions were again automated through online banking.[49]

The integration of technology in the workplace is accelerating, forcing workers to learn how to work alongside new systems at a rapid pace. The Brookfield Institute estimated that jobs in Ontario will evolve approximately every 15 years, meaning that "a job that could be done by an unskilled worker will require skilled training as the result of technological change, increased responsibility, and/or different processes or systems."[50] Simply put, the popularization of automation acts as a catalyst

As technology integrates faster into the workplace, employees must increasingly learn to adapt and work alongside those systems, or less be replaced by them.

for a more skilled workforce. As seen with bank tellers, existing employees may need to become more skilled in order to operate and work with new technologies, be re-deployed to perform more complicated tasks that require additional training, and receive a similar salary despite the new functionalities.

On the contrary, workers may be freed up to perform more of the same task they were performing before automation. For instance, when Panera Bread introduced computerized order takers, the number of orders they received per hour increased.[51] When Starbucks released its online ordering mobile application in 2015, they effectively allowed more orders to be placed at once, thereby increasing demand on their workforce. By the next year they had increased their overall employment by eight per cent to handle the new demand, with most workers completing the same tasks as before the mobile application was created.[52]

Therefore, automation creates three classes of workers. There are those workers who are laid off given their role is fully automated, workers who must acquire new skills in order to work alongside technology, and workers who are given extra capacity to perform additional low-skill tasks. The semi- or mid-skilled worker is quickly becoming a class of the past as workers evolve to become faster low-skilled workers or more specialized high-skill workers. All in all, automation is poised to increase the skills gap in Ontario.

This widening of the skills gap was likely to occur in a pre-COVID-19 world. Ontario was likely to continue to see large numbers of workers employed in low-skilled jobs, a continued evaporation of semi- or mid-skilled positions, and a large demand for highly skilled workers to take on new challenges with high-skilled positions being created faster than they could be filled.

However, COVID-19 appears to have created one significant deviation: the glut of low-skilled jobs upon which Ontario had shakily built its recent job growth is being eliminated at an exponential pace. Alarmingly, these low-skilled jobs, such as a cashier or transit operator, may potentially be eliminated forever.

Diminishing Opportunities for Less Educated Workers

The various factors contributing to a widening skills gap left many workers to pursue one of two options: jump between various low-skilled positions or upskill and pursue a more fulfilling, longer-term job. For many, inaccessibility and systemic labour market barriers rendered the former path easier to follow. Though that may have been true under a relatively robust economy, an increase in automation in a post-COVID-19 world may dramatically reduce the positions available for lesser educated workers.

From 2009 to 2014, over 70 per cent of the jobs generated in the private sector across Canada were in fields defined as highly skilled work.[53] Estimates showed that trend would continue with as many as 77 per cent of all positions estimated to require a post-secondary credential of either an apprenticeship certificate or a college or university credential by 2031.[54] The labour market was already shaping up to be one that demanded post-secondary education and the specific skill sets that come with it. When automation and COVID-19 are factored in, that trend will accelerate.

First, there is a real possibility that the lower skilled positions that many Ontarians rely on for employment will become harder and harder to come by. For instance, Restaurants Canada has estimated that, as of the end of March 2020, COVID-19 has caused more than 800,000 layoffs in the restaurant industry nationwide with one in 10 restaurants closed permanently.[55] The number of restaurants closed permanently will only increase the longer quarantine measures that close non-essential businesses are in place.

Even when some quarantine measures are lifted, the restaurants that can open will likely need to incur higher costs to increase food safety measures, sanitation of public spaces, and to ensure proper social distancing requirements among patrons. A 50-seat restaurant may now only be able to safely seat half that, driving its costs up and its margins down. Additionally, the lack of disposable income and job security among Ontario households will mean less money spent on non-essential expenses like going out for dinner. The fear of contracting viruses in social spaces may also mean a slow return to normal customer attendance.Ultimately, the traditional service industry – like the restaurant and hospitality sector – is likely to be hit permanently.

Second, automation will become more enticing to employers. If processes can be automated, they become impervious to human viral infections. If an employer can cut its labour force, it automatically reduces its risk of infection and quarantine related closures. Though this was always a benefit of automation, the costs of ignoring automation are now front of mind for business owners.

Businesses will be extremely cautious of being caught behind the times. When combined with policies such as accelerated capital depreciation of technology and potential political responses to this crisis, like a mandated increase in the minimum wage or of the salaries of front-line workers, employers will see more benefit than ever in pursuing automation. Researchers at the University of Zurich and the University of British Columbia have found that, over the three major recessions of the last 30 years, 88 per cent of the job loss occurred in low-skilled, routine based and automatable jobs.[56]

Third, it is highly likely that the positions that are available, even if lower-skilled, will become combined, hybrid positions for which several different sets are needed. For instance, among occupations with at least 10,000 postings, there were only 12 occupations in 2012 that required "data skills." By 2018, that number had increased to 32 different occupations, representing an increase from approximately 270,000 to 861,000 job postings requiring data skills.[57] These occupations are not necessarily newly created occupations, but rather pre-existing professions that, for the first time, require data analysis as a prerequisite skill.e.

Dr. Rick Miner warned of this trend in his 2010 paper People Without Jobs, Jobs Without People when he wrote that, "unless we take effective action to increase the proportion of skilled labour in our economy, we face a future with large numbers of unskilled workers looking for jobs that require skills they do not possess."[58] The Ontario labour market was already witnessing Miner's prediction come true, but with the impact of COVID-19 making rapid automation more likely, this prediction will become even more accurate.Fourth, because of COVID-19, March 2020 saw the largest single drop in employment in any month in Canadian history. Over 1 million Canadians lost their job in March 2020. By the end of April, Canada's unemployment rate hit 13%, with another 1.1 million Canadians not counted as unemployed since they were not actively looking for work.[59] If they were included, Canada's unemployment rate would have been 17.8%.[60] Another 2.5 million workers were still employed but worked reduced hours in April compared to February, the last month before COVID-19 hit.[61] As of April 19, 6.7 million Canadians had applied for the Canada Emergency Response Benefit or Employment Insurance, which both require

significant hours reduction or employment loss to qualify.[62]

The long-term impacts of COVID-19 remain to be seen. However, the millions of workers who built their future on the service economy will suddenly find that future unreliable. Essentially, these workers – for the first time – will be faced with the reality of how impermanent their career path was, and how large a bridge they must cross to attain a high-skilled, higher-paying and more permanent position.

As noted earlier, a particularly troubling aspect of an automated future was the potential for layoffs of thousands of workers at the same time – like one large plant closure in a small town. In just a matter of months, COVID-19 has laid off millions across the entire province all at the same time, creating perhaps the most daunting labour force challenge in a lifetime for policy makers.

Fifth, even if lower skilled service jobs become available, as has been seen with some businesses that have increased demand during quarantine, such as delivery companies, the sheer amount of people competing for these positions will have increased significantly. Canada already had more post-secondary educated adults in its working population than any other Organization for Co-operation and Economic Development (OECD) country at 55 per cent of the workforce.[63] Having a post-secondary credential may not be enough to set a prospective candidate apart from other applicants. For lesser educated workers, they will be surrounded by applicants with far more educational experience than themselves, making their chances at securing employment even worse.

Recent studies suggest that employers had already reached the point where a main hiring differentiator was actually a candidate's possession of soft skills, which are essentially inter-personal skills such as the ability to communicate, empathize, problem-solve, and work well with others. A 2018 Ontario Institute for Competitiveness and Prosperity survey found that "nearly 40 per cent of employers said they are changing their recruitment policies to reflect the need for soft skills."[64]

During our consultations with 14 employer-led PACs, every single group identified the need for strong soft skills as an urgent priority. In other employer survey work (see chart below) it is quite common for employers to identify entry-level positions as the ones that require the highest amount of soft skills. Therefore, in a post COVID-19 world, with potentially dozens of suitable candidates for a single position, soft skills may be the differentiator.

Lesser educated workers will have a much more difficult time gaining meaningful, well-paying employment in a post COVID-19 world. They will have to contend with an emphasis on soft skills they may not possess, a massive unemployed labour force with a higher level of education competing for similar jobs, a hybridization of jobs which increases the overall qualifications needed, an increased push towards automation, and a loss of many low-skilled job openings for the foreseeable future.

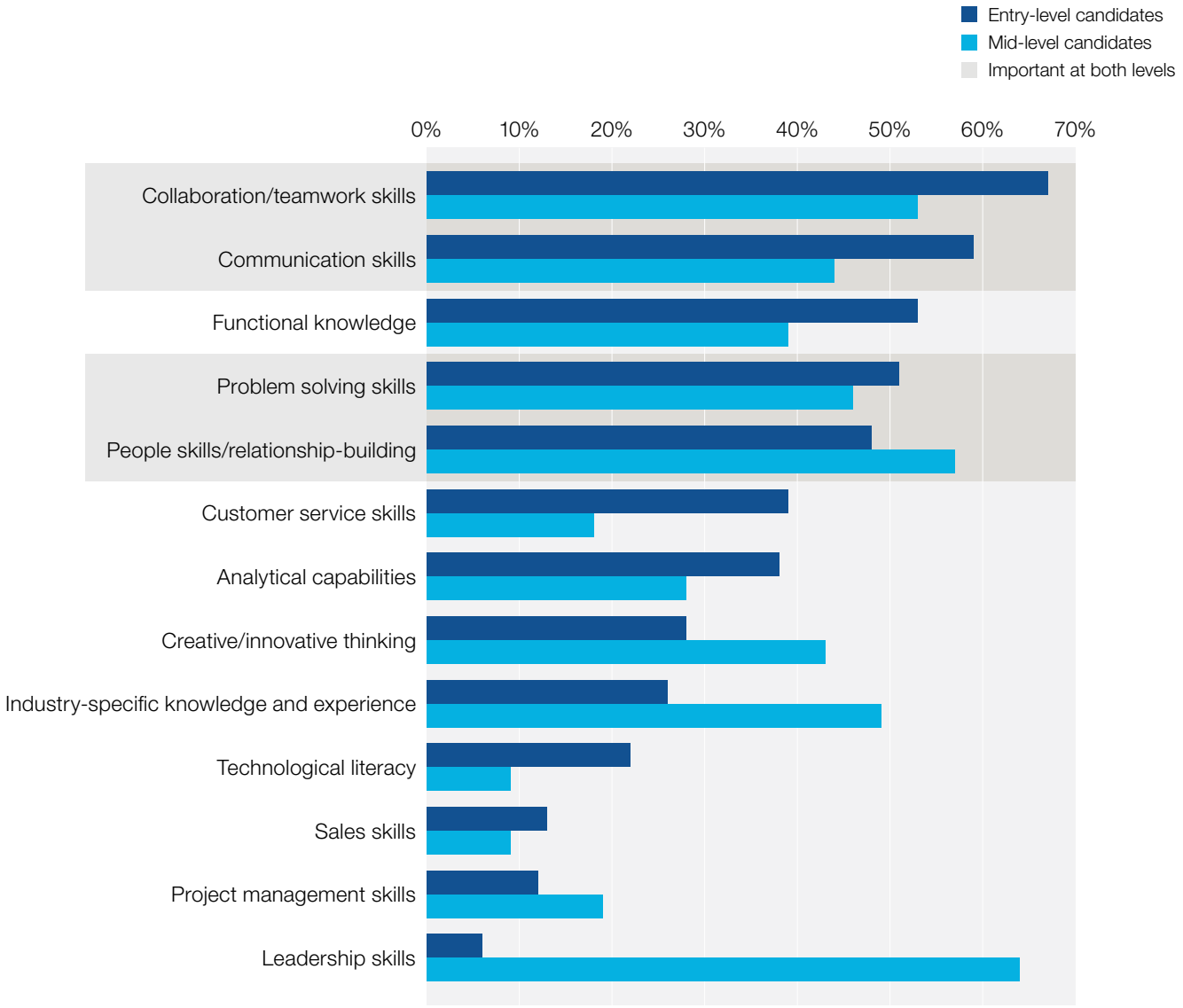
The Brookings Institute describes this as not just an end to the "plentiful supply of jobs" but rather that "any downturn is likely to bring a new bout of structural change in the labor market and its demand for skills. If it extends for a while, the downturn could include firms in food service, retail, and administrative work to restructure their operations toward greater use of technology and higher-skilled workers."[65]

Further, there are possibly even more complications for less educated workers, as COVID-19's impact on the gig economy remains to be truly seen. In certain instances, the gig economy may benefit from an 'online first' society due to its mobile and impermanent nature. However, in many cases, the gig economy also replaces a service that most people could complete themselves. How many ride sharing trips are taken by people who own vehicles? How many students are hired as painters by people who simply do not want to perform the task themselves? If services can be performed online, they may increase in take-up, but if they need to be performed in-person, Ontarians may choose to do the tasks themselves. It is uncertain if the gig economy is a potential avenue for less educated workers to pursue, however, the unreliable and commission-based nature of the gig economy may not provide the income security many need.

Additionally, youth workers are another segment of the economy that will be particularly hard hit by COVID-19 and its ramifications. It is very common for labour force participation rates to drop during bad times and grow during good times, however young Canadians still had not achieved pre-Great Recession participation rates before COVID-19.[66] The 15 to 24 year-old age bracket has, in many cases, pursued post-secondary education without first entering the labour force or only after entering the labour force for a short period of time.

Specifically, Ontario youth labour force participation is lower than the national average. Young Ontarians who do pursue work are less successful on average than their counterparts in the rest of Canada, with a 2019 youth unemployment rate of 12.1% compared to a national average of 11%.[67] As potentially millions

Figure 4: Share of employers considering skill important for candidates at a given level %



Source: Advisory Council on Economic Growth (2017), Business Council of Canada, Aon Hewitt (2016)

of Ontario workers across the age spectrum are laid off from their positions they will pursue income in whatever form, including positions typically filled by younger workers, such as fast-food employees. Statistics Canada projected that 15 per cent of 'school leavers' between 2015 and 2024 will go into retail, food and beverage, cashier work, or kitchen help despite those segments only making up eight per cent of the job market and being "ripe for more automation."[68] With as many as 900,000 young Canadians not currently enrolled in any education or training program, this risk of youth unemployment rising is very real.[69]

Further, given the competition that will now come from older candidates with greater levels of education, experience, reliability, and soft skills, Ontario's youth will find even greater difficulty participating in the post-COVID-19 labour market. Given that youth are, by definition, 'less' educated workers due to their lack of post-secondary credentials, they are likely to be hardest hit by the phenomena described above. Without the 'pull-factor' of a lively labour market, additional incentives must be there to ensure youth continue to invest in a post-secondary education.

Ontario's Urban-Rural Labour Market Divide

The other major trend in Ontario's economy in recent years has been the exacerbation of the rural-urban divide. More accurately, the divide is between urban Ontario, primarily the Greater Toronto Area, and both rural and Northern Ontario. As Ontario has moved from a goods producing economy to a service economy, it is only natural that those service jobs were primarily located where population density is higher.

Research conducted by Sean Speer, Assistant Professor of Public Policy at the University of Toronto's Munk School, estimates that of the 865,000 jobs created in Ontario between January 2008 and August 2019, 87 per cent were created in either Toronto or Ottawa.[70] Even worse for non-urban Ontario, rural areas that do not belong to one of Statistic Canada's Census Metropolitan Areas (CMAs) lost 76,000 net jobs during the same time period.[71] Quite simply, little to no new investment is being made outside of the province's major cities. Only 12 of Ontario's 49 CMAs have seen an increase in foreign direct investment since the Great Recession, with the other 37 CMAs seeing no net new investment or an overall loss.[72]

It was always accepted that Ontario's larger cities would lift more than their fair share of the economic burden in the province ever since the move away from traditional agricultural employment was made. However, these trends have intensified. Between 2011 and 2019, the number of Ontarians working in agriculture has dropped by 22 per cent. Over the same time period, the number of Ontarians working in resource extraction has dropped by 9.1 per cent and the number working in manufacturing has dropped by 1.6 per cent.[73] All three of those industries happen to be commonly located in rural and Northern Ontario.

From a province-wide perspective, the labour force is being re-deployed away from asset-based employment (traditional manufacturing, mining, farming) where goods are made with physical labour to an "intangibles economy" where both goods and services are produced through technology and computers (intellectual property, mobile applications, supply chain management).[74] Though this re-deployment may average out across the province – as the province-wide unemployment rate continually declined over the last decade – it does not mean that the benefits are distributed evenly.

Between 2007 and 2019, the participation rate (number of people looking for work) in Ottawa, Toronto, Hamilton and the Kitchener-Waterloo corridor grew by an average of 18.3 per cent. In the rest of Ontario's CMAs, that growth rate was just 7.4 per cent, with negative growth in Greater Sudbury, Thunder Bay, and London.[75] In the rural areas outside of CMAs, the labour force shrunk by more than 20 per cent between 2011 and 2019.[76]

An illustrative example of this phenomenon is the closure of movie rental stores such as Blockbuster Video giving way to digital streaming platforms like Netflix. Those stores would have been located across the province with multiple locations in most CMAs. Any jobs created in Canada by streaming services – such as post-production work, film crews, or software support – are most likely located in the technology corridor of Kitchener-Waterloo to Toronto. Even if the number of employees in the industry netted out to be the same over time, the geographical distribution pulls net jobs away from non-urban areas to the urban core.

Moreover, the fall in rural and Northern employment, including in Indigenous communities, is masked by traditional labour metrics. With a declining labour force in these parts, rural communities are either seeing fewer births per capita or people of working age are leaving to seek employment and education elsewhere. Either way, the shrinking labour force reduces the unemployment rate given few people stay in the area to look for work.

Indeed, some rural communities are now reporting exceptionally low unemployment rates as their pool of workers shrinks and their employment demand remains relatively constant. There are pockets of Ontario where unemployment rates are now under two per cent, such as in Bruce and Wellington Counties.[77] To the naked eye, these areas seem to be doing quite well. But, in reality, they are quickly turning into an aging populous in need of services and support with no local workforce to provide them.

Politically, the rural-urban divide may very well be the single greatest demographic challenge facing Ontario. Providing adequate services to underpopulated areas is costly. Underfunding of services like rural doctors or new school infrastructure leads to an acceleration of the rural brain-drain. That culminates in a less diverse economy that cannot sustain itself through periods of change in global demand and supply. It also means a concentration of political power in urban areas, causing potential polarization and political dissention.

Automation looks poised to further this trend of unequal geographic job growth as retail positions continue to move towards e-commerce

avenues and larger manufacturing plants are being either automated to contain fewer workers or decentralized to bring products closer to consumers.[78] Increased virtual capability also implies that certain categories of service workers no longer have to be physically located in rural areas. Doctors and home care workers can perform virtual visits or offer help via telemedicine. Resource surveying can be done by drone. Even pastors and personal trainers can conduct their work from behind a camera.[79]

Luckily for rural communities, automation and especially a COVID-19 recovery effort have the potential to slow or even reverse the trend of negative rural growth. COVID-19 has forced companies throughout urban Ontario to embrace teleworking technologies that, even though they already existed, were likely not used to their fullest capacity. Now that companies have had to figure out how to have entire workforces perform remotely, they may be questioning the need for expensive downtown office space. Employees may be questioning the need to live in markets with expensive home prices and mortgages.

The flexibility of a digital workplace provides opportunity for rural communities. Policy Horizons Canada suggests, "this could lead to new types of winners and losers: areas that can offer attractive amenities and lifestyle, such as safe walking communities, green space, and good public schools could draw remote worker populations (and consumer-driven revenues) away from less attractive locales."[80] The attributes of a rural lifestyle, and the often cheaper costs associated with it, may be a draw to workers who are no longer tied to their current location.

Though rural economies may not be creating jobs in this scenario, the addition of workers and families in their locales will lead to increased spin-off positions and the consumer revenues that come with them. Essentially, rural Ontario could benefit from the digital service economy for the first time.

Rural and Northern communities could greatly benefit from spread out digital workforces, but they will still need to be cognizant of the impact of automation in their own communities. These areas would be best served by pushing for government stimulus investment in the form of infrastructure upgrades as part of COVID-19 recovery efforts regardless of changes to their populations in the immediate term.

Additionally, these communities should also be taking advantage of the push for more domestic supply chains and manufacturing. If more is to be built in Ontario post COVID-19, it will need to be built in areas with excess land, cheaper access to resources, and potentially vacant commercial real estate – all assets found in rural and Northern Ontario.

If, as a result of COVID-19, rural and Northern communities can attract digital work-from-home employees, government stimulus infrastructure investment, or new domestic manufacturing mandates, they will need more workers and, specifically, more skilled workers.

Even if these potential benefits do not come to pass, automation will still impact the resource economy forcing the surviving rural and Northern jobs to become more skilled and specified. Humans may no longer be cutting down trees or mining minerals themselves, but the equipment that is will need to be serviced and operated by trained technicians. Either way, like urban Ontario, rural Ontario will need a more skilled workforce. COVID-19, however, will determine exactly how many of these skilled workers they need.

The Future of Ontario's Workers

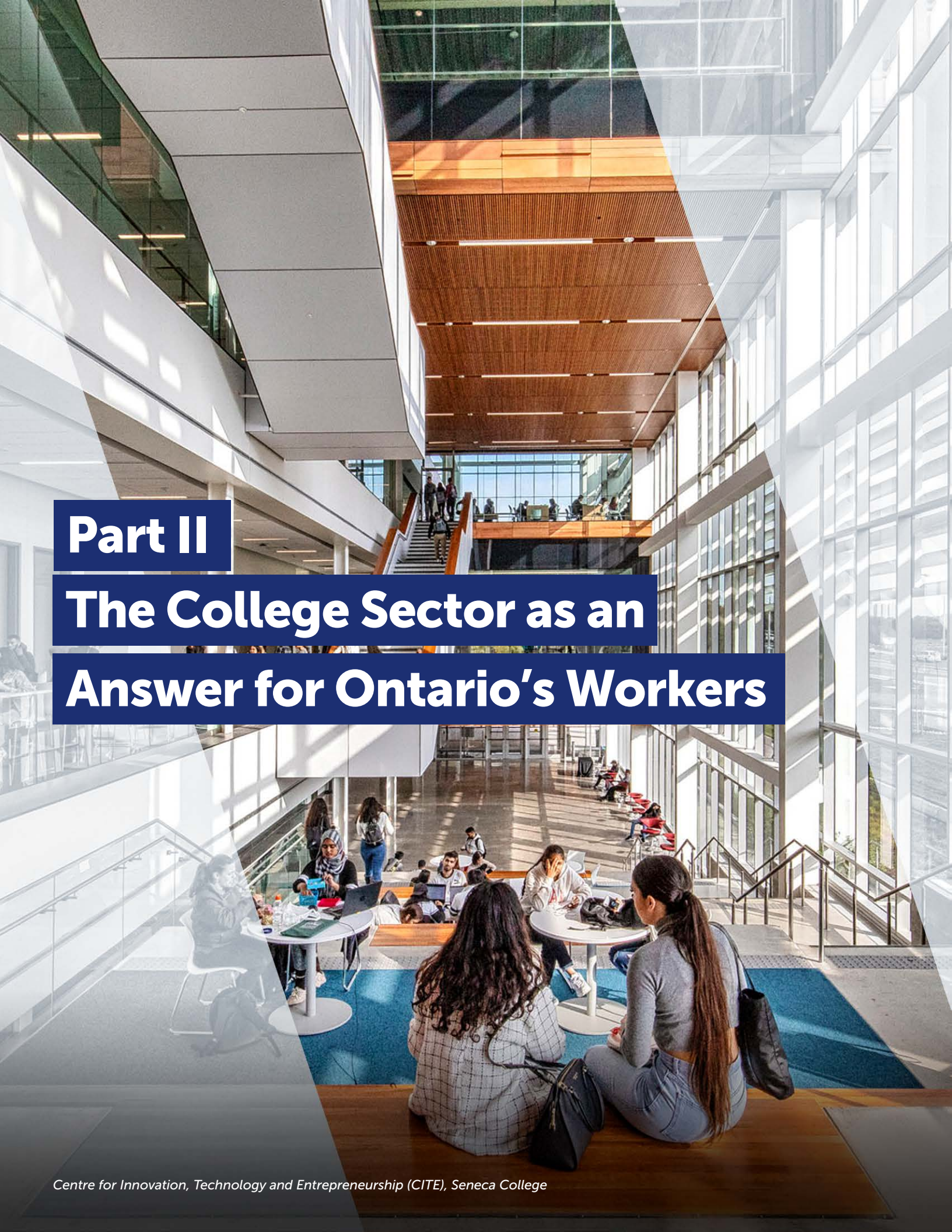
Before COVID-19, Ontario's labour force was constantly evolving. A rift between employment in rural and urban Ontario was growing while the skills gap was widening and automation was poised for large-scale implementation. Though COVID-19 has dramatically impacted the Ontario economy, it has largely served to accelerate the unemployment that automation could have brought.

Certainly, COVID-19 will accelerate the need for a more skilled workforce. Ontario's lesser educated workers will see many of their previous jobs eliminated while more candidates step forward to take what positions are left. Millions of Ontario adults will need to learn new skills to compete. Some can be learned on the job, but most will require some form of additional education to adapt to the new world of employment.

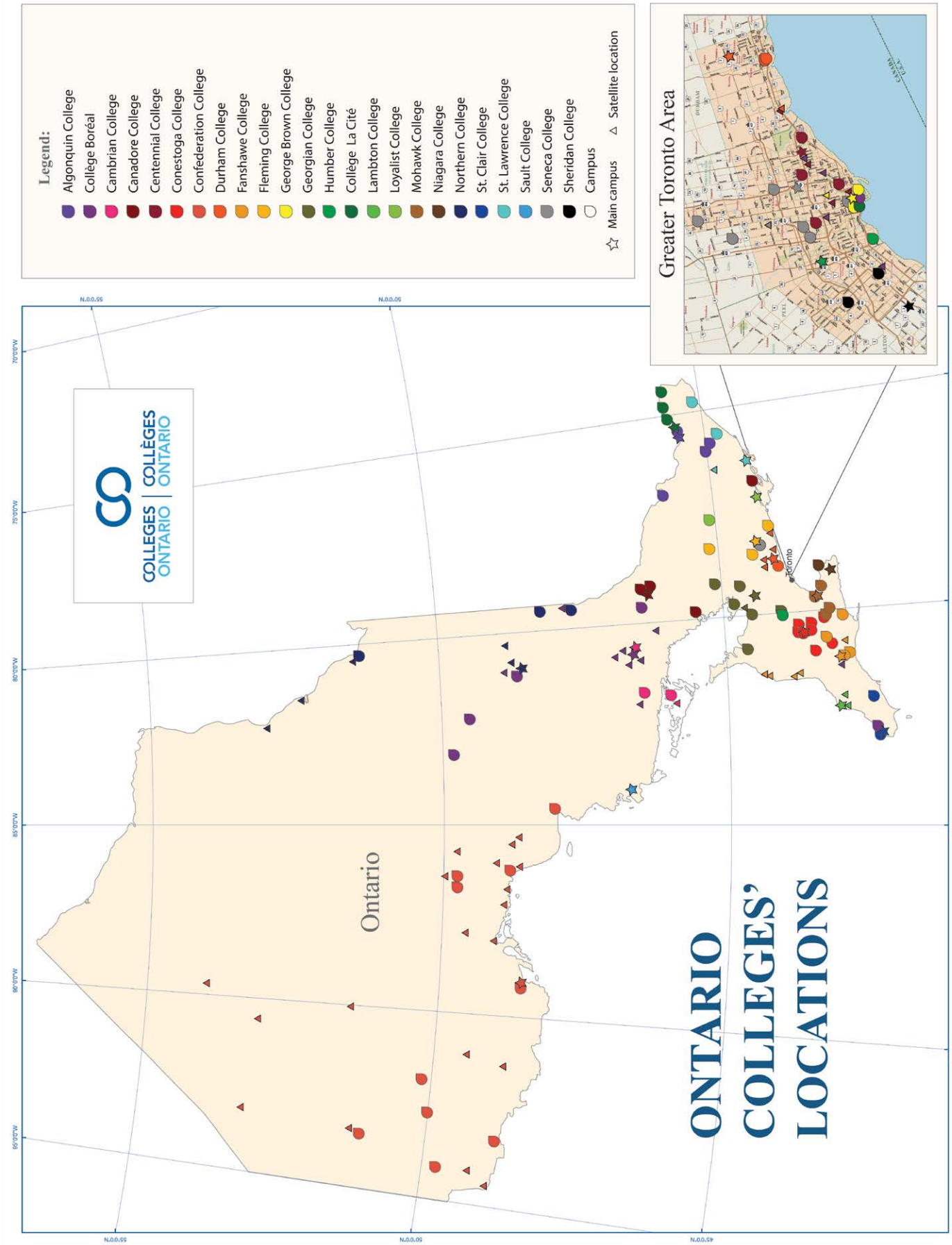
Before COVID-19, the future of work was estimated to necessitate as much as $15 billion in annual investments in adult skills development by governments, employers, and employees.[81] Given the mass unemployment caused by COVID-19, that number is sure to escalate. Making matters worse, education theorist Alex Usher writes succinctly that "adults are far more expensive to train than young people because their labour has significant market value – it costs them money to take time off work, and their free time is limited due to things such as child or elder care."[82] Put simply, adults need to put food on the table and pay their mortgages. The recently unemployed cannot afford to defer working income long enough to pursue a multi-year degree or diploma. Ontario will need to create a system of rapid re-education and re-deployment, and as explored in Part II, they should turn to the college sector to do just that.

Part II

The College Sector as an Answer for Ontario's Workers



Centre for Innovation, Technology and Entrepreneurship (CITE), Seneca College



Source: Yvonne Flores (Project Manager, Multimedia), Colleges Ontario

Introduction

When Ontario's college system was established 53 years ago, its creators intended it to operate independently of the province's existing universities. Where universities offered a broad-based liberal arts education, colleges were to equip students using a more practical, applied framework. Unlike a four-year bachelor's program, the college diploma was designed for students to realize a specific labour market outcome immediately upon graduation. The distinction between the two systems was deliberate. Universities were to house academia and colleges were to house applied and vocational programming. Where one was rooted in theoretical learning, the other was to develop a concrete set of skills needed for a particular job. The separation was so entrenched that no formal transfer mechanism existed between institutions in either system; colleges were not seen as steppingstones to universities, and for students in university that was the end of their post-secondary journey.

In 1967, then-Minister of Education and eventual Premier Bill Davis created the college system along the following rationale:

> *"We now have accepted the principle of secondary education for all. We ... must now recognize the inevitability of some form of post-secondary education for all capable of profiting from it."* [83] *– Ontario Minister of Education Bill Davis, 1967*

At the time, Davis was referring to the technological revolution of the 1960s, which had led to the disappearance of many unskilled and semi-skilled jobs. Both Davis and then-Premier John Robarts recognized the problems with young people graduating from universities and entering a rapidly changing job market without the skills necessary to compete. Davis' rationale for the college system was underscored by what Premier Robarts highlighted as the broader need for institutional change to keep Ontario's economy relevant:

> *"The first implication of technological change will be the change in the nature of individual jobs and each such change eventually leads to changes in values, patterns of behaviour and our social institutions."* [84] *– Ontario Premier John P. Robarts, 1967*

Davis and Robarts correctly predicted not only that technology would disproportionately displace less-skilled workers, but also that Ontario's institutions would need to undergo significant reform to keep pace with the accelerating rate of change. In a feat of clairvoyance, Robarts went on to emphasize that the displacement of workers would arise not because new technology would solely replace workers outright, but because operating those technologies would require a new set of skills that workers were unequipped for and unable to easily obtain from universities:

> *"It is almost a paradox that future growth in Ontario may be hampered because of skill shortage rather than by displacement of workers by sophisticated machines."* [85]

To address the skills deficit arising from the surge in post-war innovation, Davis and Robarts offered a straightforward solution: colleges. Today, Ontario faces a similar, if not wider, technology-induced skills gap. As in 1967, colleges remain the province's best tool to fix it.

With 24 institutions, Ontario has more public colleges than any other province in Canada.[i] [86] In fact, that Canada has the highest attainment rate for tertiary education in the Organization for Co-operation and Economic Development (OECD) is owed largely to high enrolment in Ontario colleges. [87] [88] Including their satellite campuses, Ontario's colleges are present in more than 200 of the province's 444 municipalities, ranging from Northern College in Timmins to St. Clair College in Windsor. [89] [90] Each year, these colleges train 30,000 apprentices, offer over 900 unique programs, and educate half a million Ontarians throughout 700 buildings or 25 million square feet of infrastructure.[91] Of the province's small businesses, over 280,000 are currently owned by Ontario college graduates.[92]

College programing has evolved to cover subjects from 3D manufacturing and digital animation to culinary management and hospitality innovation. Traditional trades, such as welding and carpentry, continue to play an important role in colleges' service offering. Instructors in these disciplines are commonly practitioners in their field and bring the latest industry technology directly to the classroom, thereby preparing students to apply their skills to technically advanced sectors such as aerospace manufacturing and high-rise construction.

Additionally, each college program is specifically designed to help students achieve a targeted labour market outcome. Where other institutions accommodate work-integrated or experiential learning programs such as co-ops, colleges centre their entire curricula around them. The combination of practical skills training and field experience equips students with both applicable 'hard' skills

[i] This statistic does not count Quebec's Collège d'enseignement général et professionnel (CEGEP) school category.

and increasingly demanded 'soft' skills, ultimately delivering well-rounded and work-ready graduates.

Over time, Ontario's colleges have grown in physical size, population, and economic importance. Moreover, the once clear lines between the college and university systems have blurred. Colleges offer four-year degrees normally found at the university level. Universities have realized their offerings lack the practical application of skills found in the college sector, leading many universities to establish joint programs with colleges. Some college graduates go on to pursue a university degree, while a growing number of university graduates later enroll in college to acquire skills that their bachelor's degree did not teach them.

All the while, colleges have never lost sight of their original mandate to train Ontarians for a changing world. Shifts in technology and automation, the fields in which Ontarians work, how Ontarians are working, and which Ontarians attend college and when, necessitate that the sector evolve. If colleges are to continue their role as consistent and relevant contributors to Ontario's economy, particularly in the context of COVID-19, they must be given the tools necessary to adapt. A changing labour market requires a flexible education system that can respond to its chief constituent – the worker.

Colleges for Students

A college education, like any other form of post-secondary education, should be considered an investment in one's own human capital. While some students may attend college or university purely for the learning experience, the vast majority invest their time and money to grow their earnings potential and secure a better future for themselves. When evaluating the benefits of attending college, it is therefore important for Ontarians to consider the opportunity cost of attending college over another institution given the size of the investment and the return they hope to see.

From a student perspective, the return on investment of an Ontario college education is significant. A recent study by the University of Ottawa's Education Policy Research Initiative found that, on average, individuals with a college diploma see their mean annual earnings increase by 59 per cent within eight years after graduation.[93] While university graduates see their mean annual earnings increase by a few percentage points more at 66 per cent, the overall return of a university education is not necessarily greater than a college one given the higher cost of university on three fronts:

1. **Cost of Tuition:** For comparable arts and science programs in Ontario, the average annual tuition for college is $2,768, while the average annual tuition for university is $6,160.[94] Over the course of a student's post-secondary education, the difference in tuition can be significant, especially if they need financial assistance to attend post-secondary.

2. **Completion Time:** Most university degrees in Ontario require at least four years to complete, whereas many college programs can be completed in two years or less. That allows college graduates to enter the labour force earlier, thereby earning a full salary sooner.

3. **Cost of Returning to School:** An increasing number of university graduates are forced to pursue an additional degree after obtaining their bachelor's degree due to the lack of employable skills acquired during their undergraduate experience. A recent paper from Ontario's Institute of Competitiveness & Prosperity found that 47 per cent of humanities and 43 per cent of social science graduates in Ontario are back in school six months after graduation, including 15 per cent who enroll in college to become "more career ready".[95]

Across Canada and in all disciplines, nearly one in four university graduates report having gone back to school for another certificate, diploma, or university degree of equal or lower level, often to pursue business and public administration at 27 per cent, education at 18 per cent, or health at 13 per cent.[96] College graduates, on the other hand, have lower 'repeat enrolment' rates, and those who do pursue further education often enroll in another college. Between 2014-15, only 5.5 per cent of college students transferred to a university, down from eight per cent in 2006-07.[97] Between 2007-08, only 5.6 per cent of college graduates were pursuing a university degree.[98] Because such a high proportion of university graduates return to school, the 'lifelong cost' of a university education over a college one is elevated substantially.

Consider **St. Lawrence College in Kingston, ON**. During the 2012-13 school year, St. Lawrence students paid a total of **$19.4 million** to cover tuition, fees, books, and supplies. Had these students been working rather than attending college, they would have collectively earned $112.8 million.

Did the investment cost of a college education merit students foregoing what they would have otherwise earned had they remained in the workforce? Consider this:

In return for their investment, 2012-13 **St. Lawrence** students are projected to receive **$583.2 million in increased net earnings** over the course of their working lives

Thinking in terms of costs vs. benefits, students therefore incurred a **cost of $132.2 million** ($19.4 million for tuition and expenses + **$112.9 million** in foregone earnings) in return for a **benefit of $583.2 million** (i.e. benefit-cost ratio = **$4.40**)

In other words, students not only recover the cost of their original investment, they also receive an additional **$3.40 in benefits for every $1 in costs**

With an **average annual internal rate of return of 18.9 per cent,** it is safe to say the students of St. Lawrence College made a wise investment decision.

[99]

Applying similar cost-benefit analyses to Ontario universities reveals that, on a per dollar and per year basis, the return on investment for a college education is greater than it is for a university one. The return for colleges is further compounded by the fact that it takes less time, and therefore requires less money, to graduate from college than it does from university. It is worth noting that in the context of an increasingly contract-based workforce, it is unlikely that workers will be successful with only a single post-secondary credential.

The accelerating rate at which new skills are required for the same occupations, or at which new occupations arise altogether, necessitates that workers continuously upskill and re-skill. The new educational journey will require repeat visits to post-secondary institutions, therefore it is crucial that Ontarians realize that colleges offer the best value for money time and time again.[100] In that vein, a college education offers Ontarians a solid long-term deal on a worthwhile and accessible investment.

The college value proposition also extends to job prospects. Ontarians with no other post-secondary credential other than a college degree or diploma face an increasingly wide net of opportunities. The Institute of Competitiveness & Prosperity recently found that only 26 per cent of the province's projected non-management job openings will require a university degree, compared to 37 per cent that will require a college education or apprenticeship training.[101] Many of these job openings, despite being non-management, are for high-paying and skill-intensive positions in high-growth sectors. The same paper projected nearly 215,000 job openings in Ontario's apprenticed occupations between 2017 and 2021.[102] This indicates a positive return on job prospects for a standalone college education.

The emphasis of Ontario's colleges on cultivating both hard and soft skills serves their graduates well in the skills-based economy. Specifically, colleges are well-positioned to respond to growing demand in the business community for graduates with relevant prior work experience. For instance, one study recently found that among employers who participate in work-integrated learning programs such as co-ops, 82 per cent offer employment to at least one graduate who participated in the program at their worksite.[103]

Work-integrated learning is a crucial component of any college program. A 2014 survey conducted by the Canadian Council of Chief Executives found that over three-quarters of its members hire co-op students through partnerships with various post-secondary institutions, and that these companies almost always prefer to hire students with work-integrated learning experience than those without.[104] In 2013, the Higher Education Quality Council of Ontario found that 68 per cent of college students were involved in work-integrated learning programs, compared to only 48 per cent of university students.[105]

Only 34 per cent of employers feel that Canadian youth are adequately prepared for the workforce, compared to 83 per cent of education providers. Therefore, it is essential that post-secondary institutions not only offer a strong value-proposition, but also convey that value proposition to students in a way that enables students to clearly communicate their add-value to prospective employers.[106]

While this is an area of concern for both colleges and universities alike, survey data indicates that college students are in a relatively stronger position. In Colleges Ontario's 2019 student survey, 86.2 per cent of students across institutions reported being "very satisfied" with the extent to which their program gave them "knowledge and skills that will be useful in [their] future career." [107]

By contrast, many students in a Canada-wide university survey 56 per cent of respondents said their school did little or nothing to contribute significantly to their employment. Another 60 per cent said the school did little to support their computer literacy while 80 per cent said the same for fostering students' entrepreneurial skills.[108] Even worse, more than half of students reported that their university did little or nothing to contribute to their knowledge of future career options.[109]

The Institute for Competitiveness & Prosperity suggests that part of this discrepancy can be explained by the focus of universities on content knowledge rather than skills development.[110] A university transcript, for instance, conveys mastery of a disciplinary subject as opposed to transferrable skills. This "awareness gap" can lead to a situation where "many new graduates are unable to communicate the skills they have developed, and employers must [therefore] attempt to infer graduates' skill sets from their content knowledge".[111]

In many aspects, the value proposition of Ontario's colleges for students has never been stronger. Inevitably, for some learners, Ontario's robust university system will be the best option. However, for many Ontarians the value proposition of colleges, measured by the return on investment against its more limited costs, offers them the best path forward in a volatile labour market. For those workers most impacted by automation, and COVID-19 in particular, colleges offer a secure and cost-efficient alternative to other forms of post-secondary education.

Over the past several decades, the profile of students being served by Ontario's public colleges has grown in number and become more diverse. In 2019, Ontario's colleges served more than 500,000 students and clients of which 266,202 were full-time.[112] Of all new fall 2018 entrants to Ontario post-secondary institutions, including universities, 58 per cent enrolled in a college.[113] Demographically, college students today are more diverse in age, gender, minority status, Indigenous status, nationality, geographic distribution, and family income. Often, underrepresented groups in Ontario's wider economy rely on colleges as their primary source of post-secondary education, and therefore as their main tool to grow their income. To respond to a changing student demographic, colleges must be given the tools necessary to best serve these students while also empowering them to contribute more broadly to the province's economy.

Compared to students in university, the average college student in Ontario is more likely to come

from a lower-income family, be a visible minority, have been born outside of Canada, and reside in a rural area.[114]

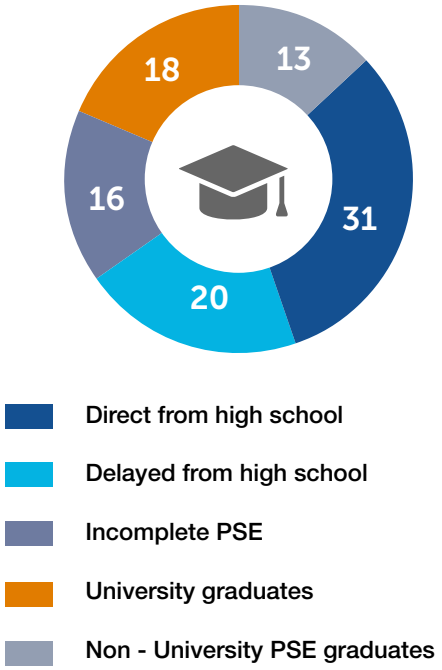
- Just over 25 per cent of college applicants report household incomes of less than $30,000 and almost 50 per cent have incomes of less than $60,000 [115]
- 31 per cent of college students identify as visible minorities and four per cent as Aboriginal (of which 20 per cent study at colleges in northern Ontario) [116]
- As of 2019, 33.4 per cent of Ontario's college students are international and 32 per cent of students speak neither English nor French as a first language [117]
- 35 per cent of college applicants come from communities with fewer than 100,000 people while only 32 per cent of Ontarians live in communities of this size [118]

It is important to highlight that because of their many satellite campuses, colleges are often the first post-secondary institutions with which rural Ontarians interact. A paper from the Higher Education Quality Council of Ontario found that post-secondary students from rural Ontario are 27.8 per cent more likely to enroll in college and 58.6 per cent less likely to enroll in university than urban students are.

Many rural college students are also Indigenous. Self-identified as Aboriginal learners, these students are twice as likely to attend a college over a university.[119]

Additionally, the labour market-driven necessity of lifelong learning is beginning to bear out in student demographics through the advent of mature learners. In 2018, 36 per cent of students enrolled in Ontario colleges were aged 25 or older, compared to only 22 per cent of university students.[120] Further, 69 per cent of college students did not enroll directly from high school with 31 per cent of the total student body having already graduated from another post-secondary institution.[121]

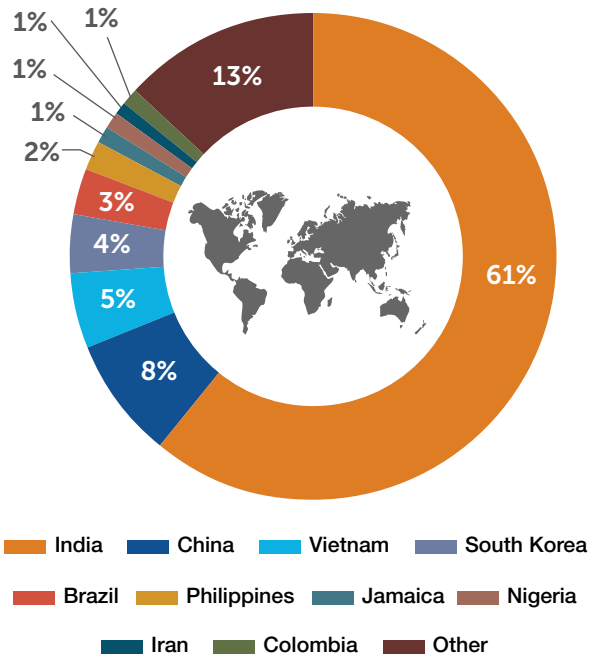
Figure 5: Pathways to Ontario colleges (% total students)



Source: Colleges Ontario (2019)

Perhaps the most dramatic trend in student demographics is the increased reliance of Ontario's colleges on international students. Between 2008 and 2017, international enrolment grew by 258 per cent.[122] Last year, 89,035 full-time college students, out of a total of 266,202, were international.[123] Moreover, although overall international enrolment is up, students from abroad are increasingly coming from a fewer number of countries. In 2019, just over 84 per cent of international students came from Asia, of which the vast majority were citizens of only a handful of countries, predominately India and China.[124]

Figure 6: Foreign citizenship of Ontario college students, 2019 (%)



Source: Colleges Ontario (2019)

Helping colleges to successfully integrate international students into the labour market is likely to reward the future provincial economy. Much as a college education is an investment for the learner, international students represent a key asset to the province with significant potential to appreciate in value. International students tend to enter college with more advanced credentials, as 41.9 per cent already hold a university degree compared to 9.1 per cent of domestic students, and often choose programs with the greatest long-term employment prospects such as business, technology, engineering, and hospitality.[125]

Ontario's colleges are serving a very different group of students than they served at their inception. Consequently, the sector must be given the flexibility to adapt and cater to these students in order optimize their learning experience, and in doing so expand the extent to which they can contribute to the provincial and Canadian economy. This becomes particularly pertinent during the period that follows the COVID-19 pandemic, as international enrolment will drop, and domestic enrolment may spike as out-of-work Ontarians look to re-train and improve their employability.

Figure 7: Distribution of ontario college students by international status and region, 2011 – 2014

Distribution Of Ontario College Students By International Status And Region, 2011–2014.

	Toronto		Rest Of Province	
	International	Domestic	International	Domestic
Business	43.9%	20.8%	31.3%	16.4%
Community service	6.5%	19.4%	11.6%	20.2%
Creative and Applied Arts	10.5%	17.4%	9.3%	13.0%
Health	3.5%	11.8%	9.3%	15.4%
Hospitality	14.8%	8.8%	8.2%	3.6%
Preparatory/Upgrading	3.5%	6.9%	5.9%	9.7%
Engineering/Technology	17.3%	14.9%	24.4%	21.7%

Source: Canadian Bureau for International Education (2016)

Colleges for Employers and the Economy

Humber College, led by industrial design professor Odin Cappello and a team of students, partnered with Ooyavah Inc., a Scarborough-based auto-stereoscopic technology company, to develop the 'Pryzma', an iPad case that integrates 3D lens technology. Students designed and prototyped the case, developed the interface, conducted market research, and prepared the materials for launch.[140]

Colleges themselves are an important driver for the Ontario economy, both in terms of the people they directly employ, and the local investment generated by the institutions. However, the skilled workers they produce for employers are even more important to the economy. Additionally, colleges are the province's most important source of applied research.

All of Ontario's 24 public colleges, particularly through their satellite campuses in remote communities, are significant employers in their local area. Specifically, more than half of Ontario's colleges are among the top 10 largest employers in their region, of which several are among the top three. For instance, with over 450 employees Sault College in Sault Ste. Marie is the city's fifth largest employer.[126] The seventh largest employer in all of Simcoe County, which includes communities as diverse as Barrie, Orillia, Collingwood, Innisfil, New Tecumseth, and Oro-Medonte, is Georgian College with 2,250 employees. [127]

In addition to offering employment, colleges generate significant economic activity for their communities through regional institutional investments and student expenditure. The 3,500 students of Canadore College in North Bay, for instance, account for $11 million of annual spending in the region.[128] Sault College's overall economic impact to the wider Algoma Region is estimated at $150 million a year.[129] In the 2012-13 academic year, St. Lawrence College added $861.3 million in income to the Eastern Ontario's regional economy, or approximately 5.9 per cent of the region's GDP. [130] These benefits often continue well after a graduating cohort as, of the 5,040 students from outside the Eastern Ontario Region who attended St. Lawrence College between 2012-13, 56 per cent relocated to the region permanently to pursue work in the area.[131]

For employers, particularly SMEs, colleges offer a means to fill a growing skills shortage. In a survey conducted by Colleges Ontario of employers who hired 2017-18 college graduates, 89.6 per cent were "very satisfied" with the skills and performance of their college hires.[132] The fact that employers have a growing demand for college graduates is further illustrated by the fact that the graduate employment rate for college students six months after graduation increased from 83.6 per cent in 2012 to 86.2 per cent in 2018.[133] Unlike credentials offered by other non-university post-secondary institutions, such as private career colleges (PCCs) and online-only platforms, employers recognize Ontario college credentials as consistent indicators of particular skillsets.

Today's employers especially rely on colleges for reskilling and upskilling their workers. Across Canada, employer spending on training and development has declined considerably since 1993.[134] This is likely due to the fact that SMEs, which employ around 70 per cent of all private-sector workers in Canada, lack the resources to educate staff internally.[135] The rise in 'gig economy' behaviour and contract-based work across the labour market further disincentivizes employers to invest in training, as high staff turnover reduces the return on investment. As a result, colleges are left to fill the gap, often partnering with local businesses to do so. Workers benefit in turn from such partnerships. For instance, an agreement recently signed by McDonald's Canada and Colleges Ontario enables McDonald's employees to count their in-house management training as credit towards a college business diploma.[136]

While the contribution of colleges to local economies through jobs and labour supply is significant, colleges' role as a source of applied research is perhaps even more valuable. As Ontario retrofits its workforce for the future, no investment will be as meaningful as those made in research and innovation. Unlike other post-secondary institutions where research is often confined to academic journals, colleges cultivate practical innovation which directly benefits local businesses in real time. In Ontario, there are currently more than 1,300 applied research partnerships between colleges and business.[137] These partnerships often result in

At Cambrian College in Sudbury, students worked with a local business to promote greater use of a new underground mining technology through the creation of shock-resistant charging station for USB-powered devices.[142]

A team of student researchers and faculty at Sheridan College's Centre for Mobile Innovation (CMI) in Oakville worked with Tech4Life, an Ontario-based telehealth company, to design the 'NewPneu'. The device, which has been recognized by the World Health Organization, offers a portable and cost-effective system for diagnosing childhood pneumonia in low-resource settings.[143]

distributable innovations, with real opportunities for commercialization, that genuinely help SMEs become more productive.

A study by the Conference Board of Canada of such partnerships found that nearly every college-business collaboration in Ontario, "has led, or will soon lead, to the development of a new or improved good, service or process."[138] Of the partnerships studied, 50 per cent led directly to a reduction in firms' time to market, 80 per cent resulted in or are expected to result in increased firm sales and revenues, 79 per cent led to the firm improving its competitive market position, and approximately one-third of partnerships resulted in the firm increasing their overall spending on research and development.[139] Despite the obvious value of this important work, the research capabilities of colleges are often overlooked compared to those of universities. Moving forward, all levels of government should realize the benefit of Ontario colleges' applied research capabilities when investing research and development dollars.

Student researchers at Lambton College in Sarnia partnered with Canadian sanitization company, Sani Sport, to adapt the firm's sports gear cleaning cabinet technology to be used for firefighting gear. Their work has subsequently had an important regulatory impact on the firefighting industry.[141]

Colleges for Communities

An often-overlooked benefit of Ontario's college system is its physical reach into hundreds of different communities. The province's 24 colleges are geographically spread out, reaching every corner of the map from Southwestern Ontario to the North and everywhere in between. In addition, those 24 institutions run satellite campuses with smaller service offerings throughout Ontario's smaller towns, ultimately leading to a college presence in more than 200 of Ontario's 444 municipalities.

This form of localized education provided by colleges is imperative to Ontario's overall success. Economist Marc Frenette has written extensively about the impacts of distance on post-secondary education access. In his work, he finds an 80-kilometre radius from universities and colleges to be a tolerable commuting distance for students. He found that, across Canada, 17 per cent of high school students live more than 80 kilometres from the nearest university, but only three per cent of high school students fall outside of the radius from the nearest college.[144]

If students must leave home to access a post-secondary education the costs increase, both financially for fixed costs such as rent, but emotionally as well as young adults are removed from their families. Frenette found that distance did not discourage students from households in the top third of income to attend post-secondary, but he did find that college enrolment increases among middle and lower-income families.[145] Even with tuition support or financial assistance from governments, the increased costs of going away to post-secondary may not be tenable for middle to lower-income families.

Parrott Centre, Loyalist College

Across Canada, rural households average 25 per cent lower financial earnings annually than urban households.[146] Rural students are already most likely to be physically distant from a university, meaning increased costs to attend, and are also likely to be worse off financially. This combination makes localized education critical, or it will likely not be pursued. By providing a high-quality education in a local setting, Ontario's colleges ensure proper access to a post-secondary education no matter where an Ontario student may live.

As the demographic of students changes to include more older students who were previously active members of the workforce, this local dimension will become even more important. For mature students, the local college campus can be a savior when considering they may need to find a part-time job, have a mortgage or fixed assets tying them to a community, or have children in local school systems. All these factors would prevent mature students from being able to move to a new city to pursue further education. The localized nature of college campuses situates them in the best position to handle the challenges coming from the changing nature of work.

Second, if Ontario's rural communities are to compete properly in the future economy, they will need to increase their overall level of education as studies have projected that, by 2031, 77 per cent of all positions in Ontario will require some form of post-secondary education.[147] A recent Ontario 360 study noted that "55 census subdivisions in Ontario (roughly 12 per cent of [census subdivisions]) have higher numbers of people who have not graduated from high school than who have earned a high school diploma; 54 of these subdivisions are considered rural."[148]

As automation and the impacts of COVID-19 hit rural economies, many workers will need to be re-educated or access post-secondary education for the first time in order to become employable. The need for rapid training programs will be especially felt in rural areas where the educational starting point is lower. College campuses can provide that training and can even serve as a local hub for connecting people to employers and opportunities, which some colleges already offer as an in-house service.

Third, having so many local campuses and a strong local presence means a unique tie-in to the local economy and its needs. By being in touch with local communities, colleges can create programs that are in demand in their locale. These programs can be tailored to individual local employers and allow for an ease of recruitment. For instance, Conestoga College currently trains students in warehousing logistics given employers like Adidas and Ferrero Rocher have complex warehouses nearby, while St. Lawrence College offers training tailored specifically to the needs of local employer Shopify. Northern colleges can provide mining and forestry programs while Southwestern colleges can provide programs in areas such as agriculture, winery, or viticulture.

Not only does their localized positioning give colleges an advantage in tailoring the courses they offer, but it also makes them a prime candidate for further re-training and upskilling programs. 65 per cent of all jobs will require training after a high-school or post-secondary education is attained.[149] An employer's need for skilled labour is constant and evolving, and often necessitates building on the skill base of existing staff where those skills can't be imported through outside hires. Most local employers already use colleges to recruit new staff – there is opportunity to use them further as a destination for additional mid-career training.

Recent studies have suggested that "nearly 50 per cent of the subject knowledge studied in the first of a four-year technical degree will be outdated by the time the individual [has] graduated."[150] This alarming figure is likely to worsen as workplace technology continues to advance at a rapid pace. A computer science degree from the mid-2000s would have little to no applicability to today's technology. Colleges can be at the forefront of re-training simply because they are, by design, located where employers are. Therefore, colleges can use these local networks to provide specifically tailored re-training programs that help create more complete workers who, in turn, will be rewarded with higher pay and more stable employment.

Lastly, if the onset of rapid automation and an overall embrace of the digital economy due to COVID-19 isolation measures takes hold, work in Ontario will far less location dependent than ever before. The ability to live in a rural or suburban area while effectively working for a 'big city' employer is now a reality for many Ontarians. By making remote working more attractive, smaller communities can attract more people – a problem these communities have struggled with for decades.

Instead of having to create unique immigration programs, rural communities may be able to attract domestic workers for the first time in generations. If they are successful in that pursuit, they will need to provide more trades and spinoff services. That means a need for more carpenters, electricians, and other skilled positions. More people mean more opportunities and a greater demand for educational programming that Ontario's colleges are already well-suited to provide.

Satellite campuses are expensive for colleges to run, given they have smaller student populations to draw from but require similar levels of programming that is offered on main campuses. Though the cost to colleges may be high, the value of the colleges in rural communities is proportionately higher than in urban locales. Given that colleges are consolidated on the province's financial statements, these investments should be considered not in purely financial means, but also in their ability to stimulate rural economies and enable the provision of high-quality services in less densely populated areas.

As Ontario's economy evolves, rural communities may be best positioned to take advantage of the shift, though only if they are able to utilize the existing college infrestructure in place.An Ontario 360 study analyzing Ontario's rural-urban divide provided six recommendations to help invigorate rural economies and unlock their full potential. One of those recommendations was simply to "leverage the role of post-secondary institutions as catalysts for attracting and developing human capital – including prioritizing the retention of international students in nonurban centres and creating satellite campuses or distance education opportunities for non-urban students." Luckily, Ontario's colleges already have a network of more than 175 satellite campuses that can be leveraged for this pursuit.

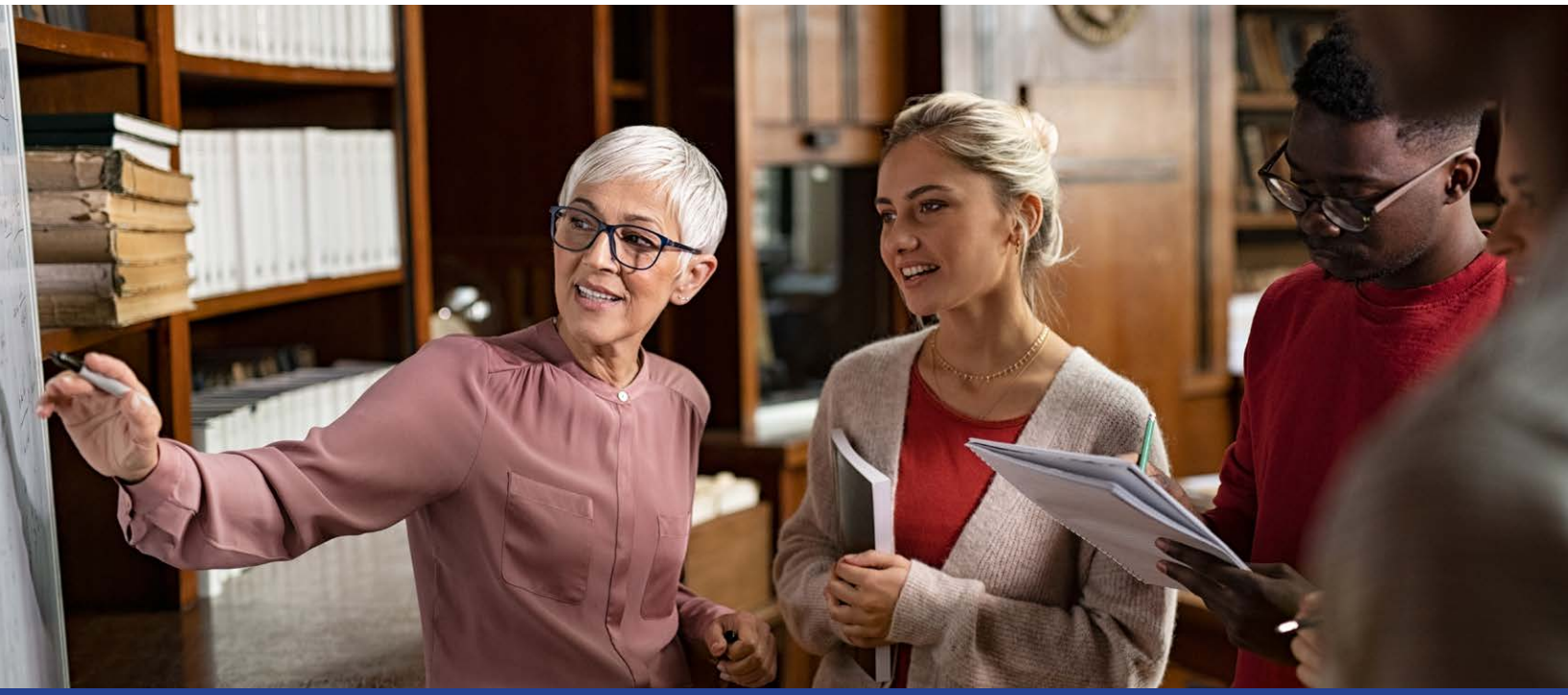
Colleges for Government

As Ontario's workforce and economy evolve, governments will be faced with the urge to use whatever tools exist in their toolbox to respond. One of the main tools they should utilize is the empowerment of the college system.

Ontario's colleges are consolidated on the province's financial books, meaning if they experience a financial surplus so does the government. However, that relationship also works in an inverse manner, where an operating deficit at a college will also mean a deficit for the province. Therefore, the financial interests of colleges and the province are one in the same.

As international student enrolment likely drops – even with interim online course measures available – colleges will need to find more students. If colleges are empowered with new tools to provide new forms of programming that are attractive to domestic displaced workers, they will become more financially sustainable all while educating the populous to help repair the economy faster. An investment in the college system, financially or through more operating flexibility, is by extension an investment in the province itself. Given that stimulus measures and relief programs will already cost the province tens of billions of dollars, allowing colleges to adapt to a changing labour market through regulatory flexibility can be far more cost-effective.

Next, of all post-secondary institutions, colleges are best prepared to handle this rapid set of changes due to their straightforward approach to learning modules. Since college programs are rooted in



the education of specific skills and less theoretical learning, the elements of courses are more straight forward and practical in nature. This means that faculty have a clear set of goals to teach students over the course of a semester or class. Those goals and tasks are less susceptible to the often-individualized nature of teaching via full academic freedom, which can lead to different conclusions for different students.

For instance, a political philosophy professor in a university could easily leave out utilitarian teachings from theorists like Jeremy Bentham and still have a robust, complete course offering for a student. If a college professor teaching a course in the electrical engineering technician program left out a component – like installation or troubleshooting of electrical circuits – they would leave that student unprepared for the workforce, unable to pass trade credentialing requirements, and with an incomplete academic study. The components of a college course are, in many cases, technical in nature and thereby fixed. The fixed nature of college programming makes it far less susceptible to a professor's interpretation of academic freedom than in the traditional humanities or in the university system more broadly.

Given college course components are often times fixed year-over-year and progressive in nature, they can be broken down into specific components more easily, meaning an easier translation of a course to an online structure or to smaller course offerings targeted at upskilling and re-training workers already in the field or in the labour force. It is difficult to disentangle or speed up a university philosophy degree, whereas a college carpentry program can more easily be pulled apart into individual sections that students may use to build on their existing carpentry knowledge or skills.

In addition to the building block nature of college programming, colleges also have more flexibility than other post-secondary institutions with their faculty and structures, while still providing a recognized and lauded credential. Universities are too tightly bound by faculty tenure and collective agreements that do not allow for technological change. College faculty can also be part-time faculty members who are practitioners in their field, meaning their teaching methods keep up with the latest trends and advancements as their work-life goes through the same transition. Additionally, the current collective agreement between colleges and their faculty has specific provisions in case technological changes force adjustments to staff compliments, which further increases flexibility. [151]

These agreements are important and critical to an effective employee-employer relationship, but the colleges are well-suited, through a more flexible bargaining agreement than in the university sector where, regardless of demand, universities must continue to employ professors with tenure in fields that may be experiencing little to no enrolment or economic value in a recession. Importantly, colleges do not have individual pieces of legislation governing each institution's existence and do not have an independent senate structure, meaning college executives and administrative staff can more easily alter the path of the institution to adapt to changing labour market demands than is possible in a university setting. Despite having more flexibility than the university sector, colleges will still be bound by the nature of their collective agreements. Therefore, further collective agreement flexibility may be needed to adapt to a post COVID-19 economy. The current agreement expires September 30, 2021, meaning an opportunity for significant revision is approaching.[152]

On the contrary, other post-secondary institutions that offer credentials may have more flexibility than the college system, but they may not provide recognized and approved credentials in the eyes of employers. For instance, a private career college or online provider like LinkedIn Learning may have the ability to create new programming faster, but that programming is not regularly reviewed or up to the same educational standards as college programming. Therefore, students may graduate from these institutions only to find that they are not capably trained. Employers need to have trust in the institution in order to have faith in the training of graduates. Each of our 14 employer consultations expressed that the rigour needed to acquire a college certified credential provides a level of surety to employers that the student is qualified in their field.

In addition to educational quality, academic flexibility, and financial security, governments will also see a definite benefit through the demographic profile of college students. As well as the benefits to rural economies (see D, Colleges for Communities), when "compared to universities, colleges have historically attracted more students from lower income families, more new Canadians or minorities, [and] more students who have been less successful in previous academic experience."[153] Given automation and COVID-19's likely disproportionate impact on lower-skilled positions held by minorities, the lesser educated, and lower-income Ontarians, it is critical to empower an institution that reflects those populations. Government will need to help these specific classes of Ontarians and therefore should empower the institutions that they are most likely to attend.

Be it the benefit to government, communities, employers, the economy, or students themselves, empowering colleges is a clear roadmap to success in an increasingly automated world post-COVID-19. The institutions need to be empowered to be as flexible as possible, respond to economic challenges in real-time, continue to be financially sustainable, and to help repair the Ontario economy. The question quickly evolves from a debate on whether colleges should be empowered to a question of how.

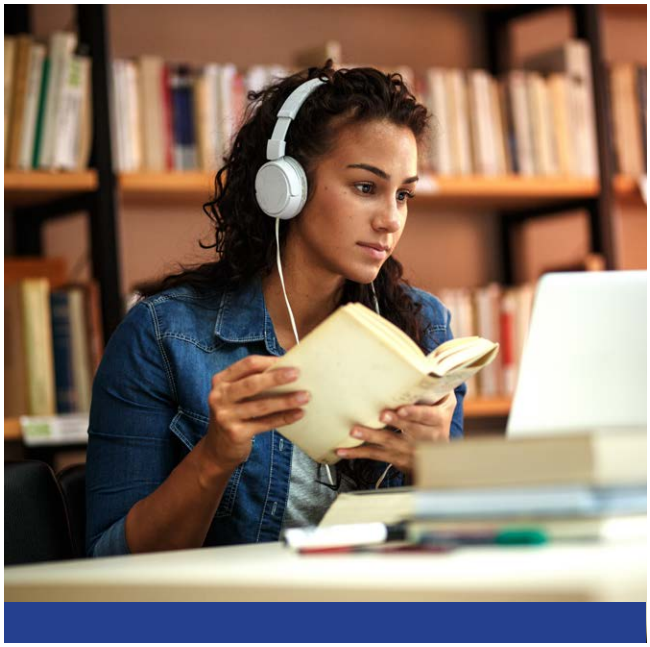
Part III
How to Empower Colleges to Power the Economy

In retrospect, Ontario's college sector was uniquely designed to respond to the labour market challenges of today. Faced with a growing skills deficit and record unemployment, few other institutions are as well placed to address the skills gap and move the province toward a more robust economic future. As discussed in Parts I and II, Ontario's colleges represent undervalued assets ready to realize their full potential. The question faced by policymakers is exactly how to unleash the college sector in a way that matches the greatest number of people with the most fulfilling jobs of tomorrow. In response to this question, outlined below are 17 recommendations for government developed in consultation with several stakeholders both in and around the college sector, including employers across the province. The expeditious implementation of any number of these recommendations will only serve to better prepare Ontario for both the near-future of work and a post-COVID-19 world.

Embracing Microcredentials

Though not an entirely unfamiliar term among students, the concept of a microcredential (or micro-credit) is certainly not new to Ontario's post-secondary institutions and policymakers. While no jurisdiction in Canada has yet agreed upon a single definition of microcredentials, they are in their truest form a granular, digitally administered and competency-based certification "focusing on specific knowledge, skills or competencies while being heavily market/society-driven."[154] RMIT University in Australia defines them as credentials that "certify an individual's achievements in specific skills and differ from traditional education credentials, such as degrees and diplomas, in that they are shorter, can be personalised and provide distinctive value and relevance in the changing world of work."[155]

To date, there are approximately 600 microcredential offerings in the province of Ontario. The majority of these microcredential programs focus on training already-employed workers in a specific skill needed to fulfill or upgrade their current job. For instance, Humber College and Purolator have teamed up to train their freight and parcel workers in data fluency to better understand and work with the organization's complex tracking and warehouse systems.[156] This form of microcredential programming is a specific and expedited add-on to an existing skillset or credential already possessed by an employee. The company gains the benefit of employee retention and improved human capital, while the employee expands their productivity by working with technology and avoids becoming a victim of automation.



However, while there are a few shining examples of microcredentials being effectively administered in the province, most of the 600 microcredentials on offer are either one-off programs to address a particular employer's immediate needs or are out of step with the general consensus on what a microcredential actually is. For the microcredential system to serve as a solution to re-training a mass amount of Ontario's workforce, the offerings will need to be greatly increased, become more regular and consistent, and be designed to offer clear linkages between programs so they can become 'stackable' in nature towards a larger accreditation.

In the joint context of increasingly automated supply chains and the disruption caused by COVID-19, microcredentials could act as a wider solution to the mass layoff of mid-career workers. Short, outcome-oriented programming especially benefits most working adults who do not have the luxury of returning to school for an extensive period of re-training. In a 2017 survey, 31 per cent of working-age Canadians reported a desire to complete additional training but identified significant cost and time commitments preventing them from doing so, such as family and their full-time job.[157] This comes despite research from Carleton University demonstrating that mid-career training boosts an employee's earnings by five to nine per cent on

average and by up to 15 per cent for low-skilled workers.[158]

More traditional college offerings might be broken down into individual microcredentials that each represent a singular, clearly defined competency. These programs can either be taken as one-off courses or as multiple microcredentials stacked and taken in succession to build towards a more well-rounded set of skills in a given field. Students would be examined and assessed before completing a microcredential with progression based on proven mastery of content, rather than simply the time spent 'in class'. Colleges would be well positioned to conduct such pre-assessment given they already employ their own robust 'prior learning assessment and recognition' (PLAR) system to evaluate mature applicants. PLAR results are used to award credits for courses based on "formal demonstration of prior learning usually acquired through study, work, and other life experiences that is not recognized through formal credit transfer mechanisms."[159] A similar approach might be taken to determine entry into microcredential programs, albeit in an expedited fashion given the digital accessibility of microcredentials.

A key component of any microcredential framework is stackability – microcredentials need to be 'stackable' in nature so that students can build upon each skill they master online. Take, for instance, a manager at a restaurant who has been working in the same role for several years, and whose position has been eliminated from the economic fallout of the pandemic. Without other restaurant positions to turn to, that individual may choose to pursue a diploma in a related field such as restaurant and hotel operations management. Given their background in the industry, they may already have some of the basic proficiencies needed to operate a point-of-sale system or track inventory needs – both skills typically taught during the diploma program. If they had to begin the program from the start, they may find themselves repeating content they already know, costing them precious time and resources while they are unemployed.

Instead, with a microcredential framework, students' competency would be assessed before entering the program. For the former restaurant manager mentioned above, it might be determined that they need only a few microcredentials, say in food service accounting, to have gained the skills necessary to find employment in the field. The learner would not be forced to re-take microcredentials for skills they are deemed to already possess. Learners could then obtain as many microcredentials as they wish, either completing one or two and entering the workforce again or finishing the remaining microcredentials in the diploma program to earn full certification. Such an assessment framework, though similar to that of PLAR, would need to be tailored to each program and rolled out on a larger scale to manage the influx of mid-career learners.

In a recent study, the Royal Bank of Canada found that these career transitions need not necessarily be between highly similar fields, such as a restaurant manager moving to a more corporate or strategic role in the food services industry. In fact, they found that many of the core skills needed to perform tasks in vastly different fields are the same. Depending on how microcredential programs are structured, they estimate that a transition from a role as different as a dental assistant to a professional photographer would require only four skill upgrades, or that a miner transitioning to a veterinary technician might require only three skill upgrades.[160] The profound potential for microcredentials to help Ontario rapidly retrofit its workforce for the future is worth the investment in a robust, comprehensive, and accessible system.

To create a microcredential system that can be embraced by colleges, and, ultimately, by employers, it is important to create a standard public definition of what a microcredential is and entails. If the business community does not understand or recognize what a microcredential is, they will not value the credential when making hiring decisions. Employers will not value a microcredential unless they can be assured that there has been a standard form of academic rigour and a form of examination included in the student's achievement of the credential.

Most of the employers we consulted had significantly high trust in the competency of the college system due to their experiences hiring college graduates. If employers begin to hire college microcredential graduates but the requirements to obtain a microcredential are not similar in rigour to a traditional college credential, that trust in the college system will erode. Therefore, a proper definition of microcredentials needs to be set. That definition must be followed to be able to offer a microcredential program. Please see the attached callout box for our proposed definition.

Proposed Definition of Microcredentials:

Microcredentials represent a portion of a traditional credential and are competency-based. They represent skills that are in demand by industry and both the learning and assessment of microcredentials are focused on discrete workplace competencies. Microcredentials should be stackable and transferable to other credentials.

Microcredential programs should adhere to the following principles:

a. Microcredentials are not a substitute for traditional credentials (certificate, diploma, or degree) but complement them.

b. Microcredentials should be designed to meet employer needs and thus be developed through consultation and partnership between employers and colleges.

c. Microcredentials must be based on competencies identified by employers as relevant to the labor market.

d. Microcredentials should be stackable, trackable, and provide clear and seamless pathways across different credentials, thereby facilitating student mobility, lifelong learning, and reskilling.

e. Microcredential should represent a portion of a traditional credential and should not be based on time spent learning but rather on mastery of competency.

f. A microcredential should represent one competency and that competency should be clearly defined.

g. Microcredentials will contain at least one opportunity for assessment and feedback, followed by further activity which allows students to integrate what is learned into practice.

h. Microcredentials should be verifiable, clear as to how competency is assessed and subject to a rigorous quality assurance process.

i. Microcredentials should be secure and portable.

Colleges Ontario and the Ontario government should define microcredentials, including a set of principles that microcredentials must adhere to, that can be used for program evaluations. These standards should be developed in conjunction with the Postsecondary Education Quality Assessment Board and should be added to the Ontario Qualifications Framework. The definition and principles of microcredentials should be based upon emerging national consensus.

Critical to the definition of microcredential programming is that a student can only graduate from the program once they have mastered the content. Being able to use Microsoft Excel is very different from mastering the application. If the employer community is going to put faith in microcredential graduates as 'work-ready', those students must be able to demonstrate off-the-shelf mastery of content rather than base level familiarity. This principle applies for both soft and technical skills.

Though individual microcredential programs are important, if Ontario colleges offer only one or two microcredential programs at each campus or at a time, it will be difficult for all students to use them as a tool to transform careers. As noted earlier, a student may only need three to four different microcredentials to shift from one profession to another, but if only one of those programs exists at their nearest college, they will be unable to complete the transition. Therefore, to allow students to build towards new careers, it is important that – whenever possible - microcredentials are stackable.

In order to follow that stackable model, students must be assessed for competency before enrolling. If a student has been working in a similar field for several years, they may already be able to demonstrate mastery of certain skills. For instance, they could show proficiency in arc welding but not in welding at heights. An initial test will help determine where on the learning journey the student should be placed. The Australian state of New South Wales has created a stackable vocational system already "whereby workers' existing skills are measured and then built upon with new training modules."[161] That system may serve as a helpful model when creating an Ontario microcredential system.

Even though stacking microcredentials to a more traditional form of accreditation like a degree or diploma is laudable, it may not always be possible. Each individual student may have their own unique combination of microcredentials needed in order to build to a full accreditation. Two employees with the same title and laid-off from the same workplace may have different competencies. Second, those employees may both pursue different second-career paths, requiring different microcredentials. It will not be possible for each college to offer each microcredential needed for each possible career path.

To solve for this, colleges should evaluate their most unique course offerings and, should there be reasonable expectations for demand, microcredentials in those fields should be made available. For instance, if a Northern college offers

unique mining programs that are not readily available at any other college, they should endeavour to provide those programs in microcredential format. Given the uniqueness of this programming, the government should consider financially assisting the creation of these programs especially if they serve underprivileged communities or are offered by financially smaller colleges.

Similarly, part of this new approach to microcredential programming should include the ability to transfer programs. Given that each microcredential offering will adhere to a quality standard and set definition, they should be recognized much like existing programming and be transferable so that they can be used towards larger credentials at other Ontario colleges. Colleges may need to re-do student competency assessments if a transfer is needed, but building towards a diploma or degree program via microcredentials should be made transferrable wherever possible to allow students who may need to relocate to continue their education. For some workers relocating to move-in with other family members or to allow a spouse to continue employment elsewhere will be a by-product of lost income and wages.

When it comes to providing microcredentials, having the most in-demand offerings available at each college in Ontario would be ideal, but it is not necessarily realistic or cost-efficient. COVID-19 has the potential to impact each region of the province differently, which can impact course offerings. In addition, some Ontario colleges have healthy reserve funds to apply to new programming while other colleges may not have as much financial flexibility. Financially, the impact of reduced international student tuition will impact each college differently. Layoffs and automation may also differ geographically. For instance, American research suggests rural and manufacturing based towns will be the first hit by the next wave of automation.[162]

All these factors mean that each individual college will have a unique set of circumstances as they pursue microcredential offerings. Some may be able to get programs up and running immediately while others may not. During this period of transition, it is important that colleges coordinate to ensure proper programming is available and temporary mitigation plans can be put in place. Ontario's six Northern colleges already coordinate on program offerings to ensure a full selection is available throughout the region. This model could be built upon and replicated as microcredentials are implemented.

Colleges within geographic proximity to one another should endeavour to ensure the most in-demand microcredential programs are offered by at least one of their institutions. The Ontario government should assist in funding the creation of microcredentials for unique programming at these colleges if it serves an underprivileged demographic or if the college cannot be reasonably expected to fund the creation of the microcredential on its own.

Further, since microcredentials are specifically designed to create employable workers with programs that reflect the needs of employers, institutions will likely find many employers require similar skills and training. For instance, between 2017 and 2021 it is projected that there will have been a total need for 215,000 additional apprentices.[163] In many cases, especially in clearly defined and often unionized trades, programming at each college can be identical.

In Singapore, the government, local employers, and unions have created 'Skills Framework', which "defines existing and emerging skills needed for specific occupational roles and facilitates the recognition of skills acquired by maintaining a database of approved courses."[164] By working together, these groups identify what programs are most needed and educational institutions then curate courses to meet that demand. Most importantly, those base level courses that will need to be offered in multiple institutions are made available in a shared database to cut down on the time needed to stand up a new program.

The Ontario government should designate course offerings that are likely to be consistently in-demand across the province as shared microcredentials, making the content available to all colleges and those colleges should be pre-approved to offer those courses without further Ministry consent.

When looking at the needs of local employers, it is important to remember the public sector can be one of the largest local employers in some communities. Depending on the definition used, the number of public sector employees in Ontario can be as high as 1.3 million workers.[165] This workforce includes everything from employees within traditional government ministries, to hospital employees, to employees within government business enterprises such as the Liquor Control Board of Ontario. These employers will also embrace automation over time and/or may need differing skillsets among their workers.

The Ontario government should review its employee and employer needs throughout the Broader Public Service and coordinate with colleges to create microcredential programming for their own employees where needed.

When colleges create new programming, their proposals are evaluated by the government against various labour metrics that purport to showcase worker demand. Though the Ontario government approves courses, they often use

federal government labour classifications and data called National Occupation Classification codes to assess market demand. Despite the rapidly changing nature of work, these codes have not been updated since 2016 and have only been updated five times since their creation in 1992, meaning in-demand occupations may not appear that way to provincial decision makers.[166]

The federal government should endeavour to update National Occupation Classification codes annually.

Microcredentials are targeted at individuals who need rapid re-training and may not have the flexibility to choose when they take a program. Many of these students will need to work part or full-time jobs to make ends meet and may have family obligations like childcare that limit when they can be in a classroom. Similarly, if course offerings are limited only to the English language it will serve as an unnecessary barrier to education and re-training for Ontario's francophone population. Knowing this, microcredentials should be created with maximum flexibility in mind when it comes to the format of program offerings.

Part of that flexibility needs to consider the rapid and reoccurring nature of microcredentials. Students may enter a post-secondary institution multiple times throughout their career. Tracking students who enter different institutions in potentially different fields and potentially decades apart can be a challenge for each individual college's admissions departments. Further, accessing official proof of graduation documents, especially if done by traditional transcript, would be a challenge in this environment. To allow for maximum flexibility and an ease of transition, colleges should pursue a centralized Ontario Education Number (OEN) under the Ontario College Application Service instead of managing the current OEN at each individual college. This centralized OEN should feature permanent non-transcript-based credential ownership for microcredential graduates.

Microcredential programming should always target maximum flexibility, including - where possible - online formats and/or at differing hours such as via night classes, offerings in both official languages, as well as student tracking through a centralized Ontario Education Number managed by the Ontario College Application Service with permanent, non-transcript based credentials ownership upon graduation.

Recommendation 1: Colleges Ontario and the Ontario government should work together to develop and implement a robust microcredential framework as a rapid re-training tool for displaced workers .

Funding of the College Sector

As colleges pursue microcredentials they will see an influx of part-time students. Microcredentials will not take root unless this programming is financially viable for colleges to offer. Creating new programs contains higher start-up costs to secure new equipment, faculty, and design curricula. In some cases, the cost of microcredential programs can be shared by the employers that colleges are coordinating with. In most cases, these costs are recovered over time through enrolment in the program through two primary streams – tuition and government enrolment-based funding. Microcredentials pose an interesting challenge to this framework.

First, some microcredentials may be cheap to create given they are essentially components of already existing programming. At the same time, aptitude tests will need to be created and administered and students may progress on unpredictable timelines compared to traditional program offerings. Additionally, microcredential programming can change frequently. Changing labour market demand and changing technologies will force colleges to rapidly adjust their microcredential offerings. The shorter shelf-life of microcredential programs means a shorter period of time to recover the funds invested in the creation of the program.

On top of these factors, a vast majority of microcredential students will enroll as part-time students, which will have implications on enrolment-based funding. In its most basic form, each program has a program weight to account for the costs to offer the class. Courses that use expensive technologies, laboratories, or materials – such as engineering programs – have a higher weight than more traditional classroom programs like business offerings. The higher the weight, the more funding a college gets for a student enrolled in that program. However, if a student is enrolled part-time, the Ontario government automatically applies a low funding weight no matter the course offering. This means that even if the part-time student is enrolled in a high cost program, the college only receives low-level funding. Given that microcredentials can be in the higher cost program offerings, this problem will need to be addressed.

As the province builds out a microcredential framework, it will also need to consider funding, and therefore access, to such programs. Given the scarcity of financial resources available to government due to COVID-19, it will need to carefully consider where it can procure the best return on investment. Investing in microcredentials, and therefore in everyday workers, offers the province an innovative way to secure such returns. A provincial investment in microcredentials could play out in one of two ways. Government could either fund students, or credential-seekers, directly through the existing Ontario Student Assistance Program (OSAP), or it could increase funding for institutions that offer microcredentials, such as colleges, for every student that enrolls in an approved microcredential program.

While both options would achieve the same result of reducing the consumer cost of microcredentials and therefore promoting uptake, the latter may prove more effective. Although OSAP links directly to individuals, the transfer mechanism the Ministry of Education uses to direct financial aid to students is cumbersome and time-intensive. Microcredential programs are both short by nature and designed to be accessed swiftly at any given moment in order to meet employer demand. If a student is forced to go through OSAP to obtain funding, the administrative burden presented might negate the quick benefits of microcredentials to begin with. On the other hand, by providing funding directly to institutions, colleges would be able to consistently offer lower enrolment fees equivalent to the aid students would have received through OSAP. Given that colleges are consolidated on the province's books, the institutions could easily be made whole at fiscal year end by the government.

An enrolment-based funding system would eliminate the traditional application burdens associated with OSAP but could also allow for centralized tracking through an Ontario Education Number system recommended earlier. In turn, colleges would offer microcredential programming to domestic students at little to no charge, thereby ensuring students already in financially difficult situations are not temporarily removed from necessary funds in anyway.

Recommendation 2: The Ontario government should work with Colleges Ontario to address issues with the province's funding model for part-time students and provide student assistance for microcredentials through enrolment-based funding instead of OSAP subsidies. Any changes to the funding model must be considered in the context of ongoing work around new Strategic Mandate Agreements (SMAs).

The demand from COVID-19 related unemployment is immediate. Even with an aggressive microcredential approach, it will still take time to dramatically expand the current microcredential offerings in Ontario. Therefore, as is common in times of recession, governments may turn to funding re-training programs in a bid to help revitalize the economy.

For instance, Ontario created the Second Career Program in 2008 in response to the negative labour impacts of the Great Recession. This program provides students with up to $28,000 to enable them to enroll in re-training.[167] Given the scale of COVID-19 related unemployment, financial assistance through a program like the Second Career Program could become astronomical given that a 2016 audit found that the Second Career program only helped 8,600 individuals and, at that, only 35 per cent of those individuals found employment by the time they ended the program.[168] Funding colleges to get microcredentials up and running would be a much more cost-effective option for large cohorts and a faster way for government to assist in re-training Ontario workers.

Recommendation 3: The Ontario government should immediately evaluate the efficiency, effectiveness, and demand for the Second Career Program. This review should evaluate options to adapt the program to cover costs of microcredential enrolment or wind down the program in favour of funding microcredential programming.

Recognizing the impact COVID-19 has had on the individual worker is critical. When temporary federal employment assistance runs out, many Ontarians will find themselves without a job to return to. This could lead many to seek out government financial assistance through Ontario Works at the same time they pursue other employment or a microcredential program. A prerequisite of Ontario Works eligibility is that each recipient must continually prove they are searching for employment or taking part in activities related to finding a job.[169] This is a logical requirement given that the main premise of the welfare system in Ontario is to empower Ontarians to return to the labour force and remove themselves from the welfare rolls. The Ontario government should ensure enrolment in a microcredential program, provided the program is regularly attended and satisfies Ontario Works' job searching requirements.

Secondly, if Ontario Works recipients are also enrolled in microcredential programs, they will have to navigate a confusing network of income claw backs and eligible deductions. In order to ensure enrolment in additional microcredential education is as attractive as possible for people on Ontario Works, the government should immediately review the relationship between Ontario Works and college enrolment to eliminate negative barriers. Specifically, the Ontario Government should ensure paid Work Integrated Learning opportunities that may be available through college microcredential programming does not have a negative impact on Ontario Works recipients because of aggressive income claw backs.

The government should also determine how microcredential tuition payments should be treated for Ontario Works recipients. Specifically, tuition should be treated as an eligible income deduction, much like childcare expenses are treated, to reduce income claw backs. This is especially important given the significant impact COVID-19 has had on women's employment. If tuition is not a deductible expense, that increased cost may be too burdensome to overcome compared to receiving full Ontario Works benefits.

Recommendation 4: The Ontario government should review the relationship between microcredential enrolment and Ontario Works. Specifically, they should review the requirements to seek employment opportunities while enrolled, claw backs of income from paid work integrated learning opportunities available through colleges, and options for microcredential tuition to be deducted as eligible income similar to how

It should be noted that issues with enrolment funding will fade over time as the province moves toward funding colleges through a Strategic Mandate Agreements (SMA) funding formula. In this SMA formula, the Ontario government will determine up to 60 per cent of a college's operating funding based on their performance on certain metrics previously agreed to by the college. This 60 per cent level is up substantially from the 2018 level of 1.2 per cent of a college's operating funding being tied to external metrics.[170]

The percentage of operating funding tied to SMA performance was to be phased in over the next few years with the full 60 per cent target being reached by 2024-2025. However, changes to operating funding based on SMA performance are currently on pause due to COVID-19 impacting enrolment and the overall financial situation of colleges.

Even though the SMA framework is currently paused, it should not be abandoned. Instead, the government should balance the need for funding certainty with the long-term benefits of an SMA system. In the immediate term, the government should continue the freeze of SMA outcome-based funding for the next two years to allow for the impacts of COVID-19 to be measured, accommodated, and solved for. In the meantime, the data by which colleges would have been collected under their individual SMAs should still be accounted, assessed, and reported on.

Essentially, this two-year window can serve as a trial run of the SMA framework to see what the impacts would have been – positive or negative – of the new system. Colleges can then be better prepared for the actual implementation of a more aggressive SMA framework, while government can ensure they protect these important local institutions during COVID-19 recovery efforts. To be clear, the SMA process should continue to develop, but the negative funding consequences associated with poor performance should not be implemented since the impacts of COVID-19 will hamper colleges' ability to perform.

Lastly, both sides of the financial equation should be frozen in place for two years, meaning no new tuition increases during this time. This is fair to students, will be popular politically, and will ensure stability in college funding during any transition to microcredentials. During the freeze, the Ontario government can use this time to develop a proper incorporation of microcredentials into the SMA framework.

Recommendation 5: With the exception of potential funding changes to reflect the increase of part-time student enrolment in microcredential programs, the Ontario government should continue to implement their previously announced changes to the Strategic Mandate Agreements. However, government should pause all funding formula changes – be they positive or negative – for two years to allow for an economic realignment post-COVID-19 and for the proper incorporation of microcredentials into the SMA framework. This funding pause should include freezing any changes to the formula for grants to colleges or tuition subsidies in place for two years

Autonomy Over Course Offerings

The SMA framework previously proposed by government aims to rightfully fund colleges based on their levels of success and performance. However, if colleges are to be evaluated on their successes, they need to be given the tools to succeed. First and foremost, that means giving colleges autonomy over their own program offerings.

Control over microcredential programming is key to ensuring a successful inclusion of this new form of programming. Seeing as one of the main benefits of a microcredential system is its immediate responsiveness to labour market needs, colleges will need to have flexibility when implementing, designing, and even removing these programs. Microcredentials can be developed faster than multi-year programming. They can also be removed from a college's offering faster than a multi-year program can be removed. Part of the system's design is to mimic the needs of the labour market in rapid fashion.

In order to allow for that rapid evolution of programming, the Ontario government will need to approve microcredential programs in a different way than they have traditionally approved programs. As recently as October 2019, the Ontario government has taken steps to streamline new course approvals for traditional programming from a process that took as long as two years to a process that takes three to six months.[171] This trend of increased flexibility for the college system will need to be accelerated.

Some microcredential programs could be as short as a few weeks long and could need to evolve rapidly. In fields like science, engineering, or coding "updating course curricula annually or even semi-annually means students graduate with out-of-date knowledge."[172] If a new software is being implemented by an employer and they need to rapidly train their employees on it using a college microcredential program, they cannot wait months or years for ministerial approval.

Recommendation 6: The Ontario government should give colleges autonomy over their microcredential offerings and allow for in-program changes without prior consent from the Ministry of Colleges and Universities. Government should further focus on quality assurance and compliance with the agreed upon microcredential definition and broader framework through regular program reviews conducted by the Ontario Quality Assurance Service. A risk-based approach to these evaluations should be considered whereby repeat offenders are subject to review more often than institutions that regularly meeting evaluation standards.

The demand for microcredentials will be very real for workers who are left unemployed mid-career due to a combination of automation and COVID-19 impacts. However, there will still be hundreds of thousands of students who have entered post-secondary before entering the workforce in any meaningful way. It is important that colleges be empowered to best help those students too, instead of just mature learners looking to re-educate.

For a student who has not entered the workforce before or has not earned previous post-secondary credentials, a microcredential program is not for them. These microcredential offerings are not meant to replace traditional degrees and diplomas, but rather to supplement them or even to help these traditional programs evolve.[173] Even though microcredentials may not be for younger pre-career students, the spirit of rethinking Ontario college offerings should still be applied to more traditional programming.

The arguments used to put forward microcredentials as a solution apply to traditional programming as well. The labour market will be rapidly changing. Colleges will need to become "nimble, cross-circular institutions," that are properly "built for the 21st century."[174] Students will need to have a mix of soft skills and hard skills if they are to compete with the potentially much larger unemployed labour pool that already has a mix of skills. These students will also need to be prepared for an economy that demands more and more skills from them.

Shorter term programs ensure that curricula are more up to date. Work-integrated learning opportunities ensure students get practical experience to master their skillsets and gain soft skills like communication and leadership abilities. Pursuing hybridization during a college education ensures students are prepared for the practical application of their abilities in the real world.

First, the rule of competency equalling certification could be applied to traditional programs. If a student is demonstrating a mastery of the material, why are they forced to take the same educational journey as a student who is not? As colleges adapt to a competency-based education system for mature learners, they should be empowered to make that adaptation to existing programming. However, most of the credentials in the Ontario Qualification Framework expressly state semester and time requirements, thereby preventing this type of adaptability.

A competency based model would "disentangle the concept of seat time from earning a degree or diploma; allowing for students to learn at their own pace."[175] Students could earn their credential faster, join the labour market quicker, contribute positively to the tax base for longer, and generally pursue a greater quality of life by increasing their income earning potential. This system of individual advancement will be easier to accommodate if microcredential programming already sees colleges break their programming down into skill modules instead of full semesters or credits.

Similarly, this new form of thinking can be applied to the purpose of elective or breadth courses. Students with previous post-secondary experience can already take bridging courses in certain instances that allow them to skip some introductory classes and fast-track their degrees. However, this fast tracking cannot be done for students who have not completed any form of prior post-secondary education.

This concept of fast-tracking could be implemented for traditional degree and diploma courses by eliminating non-core courses, allowing students who wish to reach the labour market faster to focus on only the classes essential to their degree or diploma. This reform would effectively quicken the diploma or degree process without devaluing the foundational skills acquired.

In addition to allowing for fast-tracked courses, elective courses can be further reformed to better reflect employer needs as many students may still choose non-fast-tracked programs. Given the vital importance of soft skills to the employment community, these electives could be reformed to focus on education in soft skills like entrepreneurial skills, communication and leadership skills, or financial literacy skills. These types of courses, though not necessarily core to the credit being earned, are sure to be relevant to any graduate's career.

Secondarily, electives could be reformed to encourage job hybridization. For example, several of the courses in Centennial College's public relations programs are offered by their business school in order to ensure a cross-pollination of skill sets given how intertwined public relations and the business world can be. Colleges can pursue this hybridization on their own without government intervention and should continue to do so, especially as an alternative to existing 'free-for-all' elective programming.

Given the importance of soft skills, it is important to consider the role of Ontario's Essential Employability Skills (EES) framework. The EES framework was created in 2005 to ensure that all colleges "teach, reinforce and assess" what the government viewed at the time as being essential skills to transmit to students.[176] Colleges are required to incorporate these skills, many of which would be categorized as 'soft skills', into all program development and must ensure that each of the six EES categories and 11 learning outcomes are taught to students. Though many of the skills listed are pertinent today, the fact that Ontario has not updated the EES framework since 2009 is problematic given the extent to which the labour market has evolved over the past decade. Both the skills categories (communication, numeracy, critical thinking and problem solving, information management, interpersonal, and personal) and each of their corresponding learning outcomes should be updated by the Ministry on a more frequent basis and in conjunction with both colleges and employer groups to ensure they reflect the skills needed in the labour market.

Recommendation 7: As Colleges Ontario and the Ontario government empower microcredential programming, they should also move to a competency-based education system that allows for the fast-tracking of traditional degree and the diploma programs as well as revamps elective programming to focus on essential soft skills and cross-program hybridization where applicable. To enable this, the province should update Ontario's Essential Employability Skills (EES) framework on a regular, if not annual, basis.

Another restriction faced by colleges is the limitation on the types of degree programming they can offer. At present, Ontario's colleges are only able to offer four-year degrees and shorter certificate programs. Additionally, for five colleges (Humber, Sheridan, Conestoga, George Brown, and Seneca), the four-year degrees they can offer are not permitted to exceed 15 per cent of their overall programming; for the other 19 colleges, the threshold is only five per cent.[177] By contrast, Ontario's universities are permitted to offer short-term certificate programs, three-year degrees, four-year degrees, and various postgraduate offerings such as master's and doctoral programs. While colleges and universities serve different roles in the province's postsecondary landscape, both seek to offer programming that best meets student and employer demand. Only the latter of the two institutions, however, are given the autonomy to actually do so. Despite the maturity of Ontario's college system, colleges are unable to structure their degree programs to keep pace with changing demand and both student and employer expectations.

In order to offer in-demand degrees, many colleges must team up with a university to create joint-programming. If a university is far away, offers a competing program, or is not interested in a partnership, colleges have no form of recourse. Recently, the Ontario government allowed colleges to offer four-year nursing degrees,[178] however, to provide them, nursing program colleges must eliminate other four-year degree programs they already offered or get closer to their arbitrary cap, thereby limiting future offerings.

Arguably, this cap exists to differentiate university offerings from colleges even though these institutions compete for the same students. Students should be able to evaluate which institution they wish to attend based on a variety of factors including cost, student experience, location, employment prospects, program offerings, and credentials earned. With these caps in place, colleges cannot truly compete for student enrolment.

Even though colleges could benefit from some of the flexibility enjoyed by universities, it is important to understand that colleges should not aim to become universities. Their programming will always be rooted in the practical application of skills instead of largely theory-based education. The move to microcredentials highlights this distinction. In the vein of providing more flexible but expedited program offerings, colleges should be able to provide three-year degrees.

In most parts of the world, students who take a three-year program earn a degree whether or not their education focuses on applied studies. Even though diplomas and applied studies are inherently valued by employers, many job postings sort out candidates based on the degree credential nomenclature. From an employer perspective, a three-year applied studies diploma is more valuable than a three-year liberal arts degree. However, due to the nomenclature used, these diplomas can be excluded from consideration. Ultimately, if a student wants the recognition of a degree combined with the employability of a college education, they must either take a four-year program with limited offerings or graduate with a three- or four-year university degree, and then take a college course. This creates a trend of colleges as 'finishing schools' rather than the primary learning choice. This is a growing trend – 18 per cent of college students already have a university degree.

Given shifting labour market trends, the Ontario government should be seeking to expedite the education process for students, not lengthen it. The additional flexibility provided by a three-year college degree would see the same benefits as a fast-tracked credential by allowing a student to join the labour market earlier, contribute to the tax base sooner, increase their lifetime earning potential, and fulfill employment needs in the existing skills gap. This not only means allowing colleges to offer three-year degrees, but also to provide options for masters-level programming where appropriate and in response to specific workforce demands in their local area. Since colleges already offer three-year diploma programs, the transition to being able to offer three-year degrees would be swift and immediate. Of all the recommendations presented in this paper, this is perhaps the simplest policy change that would yield the fastest results.

Recommendation 8: The Ontario government should give colleges more autonomy to offer demand-driven programming. This includes not only allowing colleges to offer three-year degrees, but also removing the arbitrary cap on the number of four-year degrees they can offer and giving them greater flexibility to offer applied master's programs where applicable.

Reimagining Online Learning

Given the unpredictability of the novel coronavirus, Ontario may very likely experience multiple waves of the virus that would induce repeated lockdowns and physical distancing measures. Even without a future spike in cases, the return of students to large classrooms will be slow as such environments are viewed as potentially unsafe.

In Ontario, there are currently "20,088 online courses and some 981 certificate, diploma or degree programs available online – far more than any other province or territory."[179] The government found in 2011 that students complete online courses at similar rates to traditional in-class programming, meaning the move should not disproportionately increase dropouts.[180] Despite this access, only seven per cent of Ontario college students have taken at least one online course. [181]

Colleges and their faculty will need to fully embrace available online learning tools and create new online programming immediately in order to guarantee student offerings in the 2020 fall semester. In order to develop online programming over such a short period, all parties will need to work together over the summer months.

By mid-April 2020, private online learning provider Coursera, which provides free online introductory theory-based programming through partnerships with universities, has seen an eightfold increase in annual enrolment.[182] Though this spike in interest is certainly directly related to millions of individuals self-isolating who have free time, it does show a willingness to not just tolerate but proactively seek out online programming.

Ontario's colleges will need to adapt to the desire for online programming to stay competitive and financially viable. In making this transition to online programs, there are several roadblocks that need to be addressed. The Council of Ontario Universities estimates that it costs anywhere from $25,000 to $50,000 to transition a single course from in-person to online programming.[183] Faculty members will need to be trained on everything from online course design to creating new methods of student assessment. The government will need to work with regulators to allow virtual or augmented reality in place of in-person training courses. Finally, colleges will need to upgrade their information technology systems to handle the new demand that comes with virtual programming.

Recommendation 9: The Ontario government and Colleges Ontario should work together to address the barriers to online programming, including funding and regulatory issues. As part of this work, the government should consider how eCampus Ontario and Ontario Learn can assist with this transition.

In rural communities, the transition to online programming will not be seamless if communities don't have access to reliable broadband infrastructure. It is crucial that rural communities be given the same access to a modern college education as urban centres have, and a reliable broadband connection is paramount in ensuring this. Equal access to broadband not only benefits rural and northern colleges, but also the local businesses with which these schools supply workers. Rural and northern employers will continue to lose both business and skilled employees to their nearest urban competitors if they are unable to operate on an equal digital playing field.

For rural and northern communities, reliable broadband access represents the foremost barrier to crossing the learning gateway. This holds particularly true in light of COVID-19 given the move to remote learning, a system with which rural students are unfortunately all too familiar. Investment in broadband infrastructure is needed but getting these systems up and running will take time. In the meantime, government should coordinate with rural and northern colleges to explore temporary access measures such as the distribution of devices with free wireless data given in remote areas.[184] Without such investments, the long-term economic and social health of these communities will be continue to be in jeopardy.

Recommendation 10: The Ontario government should make substantial investments in broadband infrastructure so that rural college students are able to reliably access as high quality of an education as those living in urban areas.

Empowering International Students

Online programming will be especially important for international students who, even if colleges were physically open to students, may not be allowed into the country due to closed borders or high levels of infection in their home country. Given that limitation and the significant source of revenue that international students provide to Ontario colleges, the Ontario government and Colleges Ontario should ensure that programs with high levels of international enrolment are moved online immediately.

In addition, the federal government has announced that online programming will not negatively impact an international student's eligibility for the Post-Graduation Work Permit Program. They also announced that international students can begin courses online and complete up to 50 per cent of their programming online.[185] These are much needed steps that may need to be strengthened if COVID-19 impacts last longer than anticipated. To ensure these steps are effectively retaining international enrolment in Ontario colleges, the federal government should regularly review the 50 per cent cap on online programming for international students.

Separate from immediate online concerns, all colleges and employers consulted for this paper raised a consistent ask for the federal government regarding international students to let them stay and work. Many policy action committee employers surveyed complained of not being able to hire international college students for more than a short period despite both parties wanting to continue employment and there being an abundant supply of qualified candidates.

For employers outside of the Golden Horseshoe Region, this issue is compounded by the fact that international students who graduate from local colleges soon leave for the Greater Toronto Area, as there they believe they can find a job faster through a wider network of immigrants from their home country. As discussed earlier, international students now constitute a slim majority of all college students in Ontario. While COVID-19 is likely to lessen the demographic weight of international students over the short- to medium-term, they will continue to be an important constituency for the sector. It is therefore essential that Ontario remain attractive to them.

Unlike other countries that Canada competes with for international students, such as Australia, where the government recently implemented its comprehensive "Vocational Education and Training International Engagement Strategy 2025," Canada does not have a targeted strategy to retain international students in non-university post-secondary institutions such as colleges.[186] While the federal government has made positive first steps through "Building on Success: Canada's International Education Strategy (2019 – 2024)," it should commit more concretely to reducing work barriers while also considering the unique challenges faced by international college students.

However, some elements of the government's current approach are to be lauded, particularly in the context of COVID-19, such as the need for Canada to diversify the countries from which it accepts most of its international students, which are currently India and China.[187] With regard to the biggest challenges threatening Canada's competitiveness in the international student market, government has been largely silent. For instance, in the national strategy mentioned above, the word 'visa' is not mentioned once despite visas constituting the most significant barrier to international students staying and working in Canada. In this domain, despite their best efforts, provinces are powerless to affect change. Unless Ottawa acts swiftly to ensure an easier pathway for international students to work in Canada both during and after their studies, Ontario's colleges will lose market share, and therefore a significant source of funding, to competing jurisdictions.

Currently, international students may only work off-campus if they are enrolled full-time in a program lasting at least six months that leads to a degree, diploma, or certificate. Part-time international students may only work off-campus if they are in the last semester of their program, have fulfilled their course requirements, and were enrolled full-time up until their last semester. Many international students, however, choose Ontario colleges precisely because of the flexibility to learn part-time, and because otherwise lengthy programs are efficiently condensed into a short timeframe which may last for a period of less than six months .

International students who wish to pursue such programs, yet face financial barriers to do so, are therefore disincentivized to choose a Canadian college given the lower capacity to earn income and finance their studies while still in school. Making changes to this barrier would ensure international students choose Ontario first while still completing a high-quality education found at a college. It is important that a high-quality college education be a requirement to discourage those who are looking to use institutions like Private Career Colleges as a backdoor around the immigration system. This

problem becomes particularly acute as Ontario develops its microcredential framework, which would ostensibly promote the value of programs that could be completed in six months or less.

Recommendation 11: The federal government should evaluate loosening the rules around international student employment while in school. This work could include easing the full-time student requirement, reducing the six-month minimum to four months (i.e. one semester), or allowing any student enrolled in an accredited post-secondary education course, regardless of whether they are in a program that ultimately leads to a credential, to work off-campus during their education.

Next, the federal government could allow international students to work for more hours each week. International students are currently able to work on-campus for as many hours as their employer permits, which is an attractive position to many international students. However, on-campus jobs are often few and competitive to obtain. To finance their studies, most international college students rely on off-campus jobs, for which they are unable to work more than 20 hours a week.

While this limit is consistent with peer jurisdictions, the cost of studying in Canada is for most programs more expensive than in other countries such as those in Europe and Oceania, where the need to work longer hours is therefore lower. By raising the hours cap, Canada would set itself apart and attract top talent to its post-secondary institutions. This change would especially benefit colleges in particular, as even international college students tend to come from lower-income families than those in universities.

Most importantly, employers routinely requested changes to this limitation during our consultations, specifically by employers that operate in a shift work environment. Most shift offerings are eight-hours and are not flexible or adaptable to individual employees as companies operate three cycles of eight-hour shifts a day. Therefore, when limited to 20 hours an international student can only work two shifts. By adding four hours to the allowable hours per week, that same employee would be able to work an additional shift per week, thereby helping the student and the employer.

Changes to shifts would help international students wishing to complete co-op or internship work during their studies. These students must currently obtain an 'open work permit'. This requirement is in addition to students having to obtain both a 'temporary resident visa' and a 'study permit' in order to study in Canada. Canada is one of the few

countries among its competitors for international students which requires documentation in addition to a visa for students to complete co-ops or internships.

In the U.S., by contrast, the ability to work - granted as 'Optional Practical Training' or 'OPT' - is built into the F-1 student visa. Moreover, international students in Canada may only apply for an open work permit before they begin their studies and if they are required to do so by their study program. This policy has negative and disproportionate consequences for Canada's college sector for which experiential learning is a hallmark of almost all curricula. While virtually all Ontario college programs recommend students partake in work integrated learning through a co-op or internship, not all programs require students to do so. In programs where student participation in work integrated learning is expected, though not mandated, international students are put at a significant disadvantage.

Recommendation 12: The federal government should make it easier for international students to participate in work integrated learning opportunities, such as co-ops or internships, regardless of whether their study program requires it. They should further raise the number of hours per week that international students are allowed to work off-campus from 20 to 24 hours.

International students who wish to work in Canada after graduating must apply for a 'post-graduation work permit' (PGWP). The duration for which a student's PGWP allows them to work in Canada depends on the length of their study program. The PGWP is structured in such a way that discriminates against international students graduating from a non-university post-secondary institution, such as a college or polytechnic. For programs longer than or equal to two years, PGWPs are issued for a three-year period. For programs longer than or equal to eight months but less than two years, PGWPs are issued for a period equal to the length

of the program (i.e. a graduate of a 10-month program will receive a PGWP for a period of 10 months). Graduates of programs lasting less than eight months are ineligible for a PGWP altogether, and are therefore unable to work in Canada.

Many colleges, both in Ontario and throughout Canada, cater to students seeking short-duration programs of which many last less than eight months. Under the current system, an international student studying in Canada for less than two typical 4-month semesters is disqualified from participating in the Canadian job market. The framework therefore creates perverse incentives for colleges, which rely heavily on international student tuition, to extend certain programs longer than necessary in order to reach the eight-month benchmark.

If this barrier to post-graduation work is reduced, international students will spend less time exposed to the French and English language during their studies. Many of our employer consultations cited improved language proficiency skills as needed among international students. If less classroom time is needed to qualify for a PGWP and online courses are more common due to COVID-19, international student language proficiency may suffer even further. Therefore, with these changes, it is highly likely international students will be in even greater need of language proficiency programs.

Recommendation 13: The federal government should consider reducing the eight-month benchmark for international students to qualify for Post-Graduation Work Permits and should work with Ontario colleges to offer additional English or French language proficiency training for international students. This recommendation may involve coordination with the Ontario government or local municipalities, which may be able to assist in delivering supplementary services to students who are permitted to stay and work in Ontario.

Investing in Colleges Post-COVID-19

When the crisis policy responses to COVID-19 pass, self-isolation measures are lifted, and life begins to return to a version of normal, the Ontario government will transition its thinking from crisis management to recovery. In doing so, they will quickly realize the need to stimulate economic activity, but also the need to reduce non-essential expenses. The Ontario government is already projecting a $20.5 billion deficit for 2020-21, the largest in provincial history. That deficit is likely to be much higher as COVID-19 throws the flat GDP growth rate currently embedded in that projection off course.

First, the Ontario government will likely turn to stimulus measures to reinvigorate economic activity. Luckily, students enrolled in Ontario college programming are eligible for the nearly $9 billion in federal student assistance. Therefore, the focus of any assistance funds should be for mature learners who were not previously enrolled in college programs and thus are ineligible for that student assistance. Many of these potential new mid-career students will have family and economic pressures that may cause them to prioritize low-paid, low-skill work over making an investment in themselves and returning to school for a microcredential program. If the Ontario government helps defray the cost of college programming in-part or in-full, this calculation will change for tens of thousands of Ontarians. These recommendations have been previously explored in Part B of this section.

Second, if stimulus money is still available after the costs of programs are defrayed, investing in college infrastructure should be a particularly attractive stimulus option for the Ontario government. Stimulus investments in Ontario colleges would help colleges update their facilities and equipment needed to keep up to date with rapidly changing technologies. Many colleges had previously prepared green infrastructure projects under the previous government's climate change strategies that were never implemented. These projects may serve as useful shovel-ready projects for the current Ontario government to consider. Additionally, given the geographic location of Ontario's colleges and satellite campuses, this stimulus funding could be spread out to all corners of the province.

Also, since colleges are consolidated on the province's financial books, capital investments in colleges can be amortized over the useful life of the asset. That amortization is commonly upwards of 20 or 30 years. By stretching the cost out over time, the government can get the immediate benefit of generating economic activity while ensuring the 2020-21 and 2021-22 deficits do not balloon to an unmanageable size. Since universities in Ontario are not consolidated on the province's books, this benefit would not apply to the university system.

When considering colleges for stimulus funding, it is important to recognize that, when compared to main campus operations, satellite campuses are much more expensive to run. Similar levels of

student services and programming must be provided at these campuses, but those costs are spread over a smaller student population. Therefore, when colleges are looking for future savings, they may offer up cuts to satellite campuses as an option. Cutting regional campuses should be avoided at all costs due to the massive benefit to rural economies and the increase in access to post-secondary education that they offer to millions of Ontarians.

Instead, the Ontario government should recognize the importance of these regional communities when making stimulus investments but also in long-term policy changes. One such change would see satellite campuses included in the eligibility for provincial assistance programs. In Northern Ontario, colleges are eligible for Northern Ontario Heritage Fund monies under the Strategic Economic Infrastructure Program.[188] However, under both the Southwestern and Eastern Ontario Development Funds, colleges are ineligible fund recipients.

Recommendation 14: The Ontario government should allow college satellite campus investments to qualify for regional development funds such as the Southwestern and Eastern Ontario Development Funds, and should strongly consider investing in capital infrastructure at Ontario colleges in order to generate economic activity while benefiting from their amortization schedules and accounting treatment.

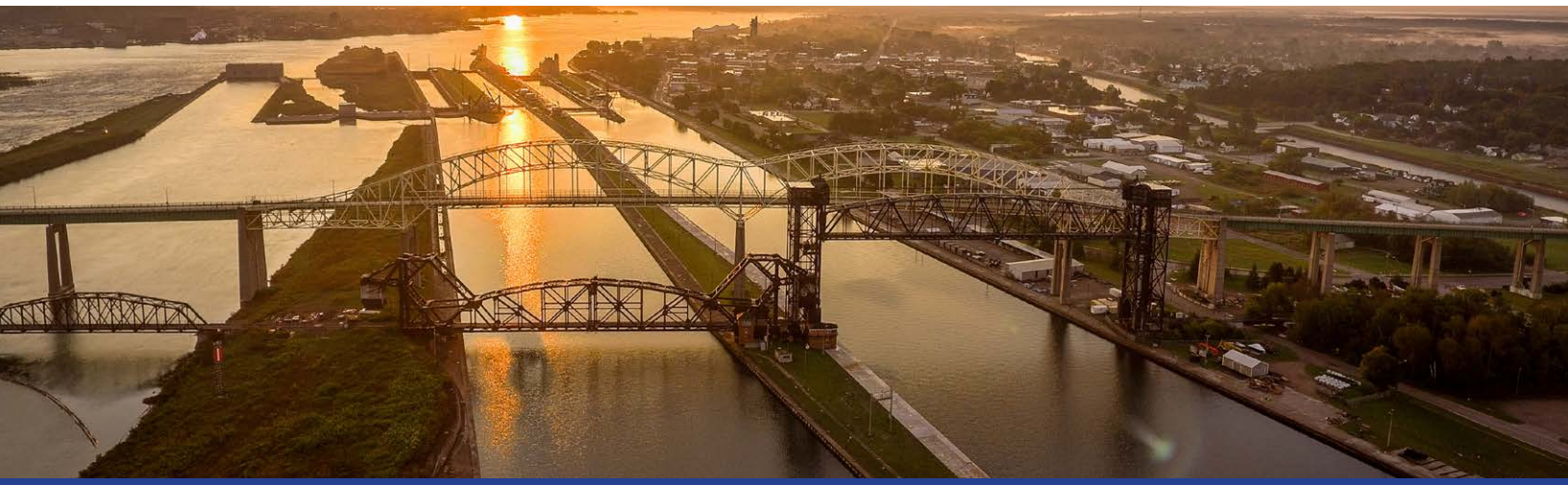
Not only are satellite campuses important to train local students, they also serve as a resource hub for residents. In fact, most college campuses have facilities that improve community services and can be used by local groups when not in use for college programming. For example, many colleges offer free dentistry to seniors or free hairdressing services to residents. The Ontario government should view college campuses, satellite or otherwise, as local community hubs.

During traditional moments of employment loss, like a manufacturing plant closure, the province can deploy a Rapid Re-Employment and Training Service team to the affected area to offer connections to other job opportunities or to re-training programs. For example, the government most recently used this team to respond to the impact of General Motors layoffs in the Oshawa area. Given many re-training programs like microcredentials will be housed in Ontario colleges anyway, the province should consider housing these teams on local college campuses when an employment shock occurs in a community – be it from COVID-19 related measures or in the future.

Recommendation 15: When the Ontario government deploys their Rapid Re-Employment and Training Service teams to an affected community, they should house those teams in the local college or satellite college campus to allow a seamless transition to re-training programs and local employer connections.

When the province shifts its attention to deficit reduction measures, it will want to ensure that every dollar spent delivers the maximum value possible. One way to ensure dollars are spent appropriately is to force institutions that are directly or indirectly receiving government funds to be transparent and accountable. Private Career Colleges can receive government funding indirectly through tuition assistance programs. However, these institutions are not subject to the same financial accountability measures that other post-secondary institutions are subject to. This can and should be rectified.

Recommendation 16: Private Career Colleges should be added to Ontario's Public Sector Salary Disclosure List (commonly known as the 'sunshine list') to increase transparency and financial accountability at these institutions.



Connecting Ontario Secondary Schools and Colleges

After the COVID-19 recession is behind us, there will be an opportunity to look at the long-standing relationship between Ontario's secondary and post-secondary systems. Canada has, "the highest proportion of work-age adults with post-secondary education (55 per cent) in the Organisation for Economic Co-operation and Development (OECD),"[189] meaning that the system is properly encouraging students to pursue further education. However, that does not mean the system is encouraging students to pursue college or university education equally. For example, a recent Ontario government advertising campaign was launched to target the stigma associated with pursuing a trade instead of a university degree. It is in the best interest of students, the government, the overall economy, and employers if students pursue the level of education that is best suited for them.

In order to become a guidance counselor in an Ontario secondary school, one must complete a graduate level Bachelor of Education degree that is only offered at universities. Before that, they must obtain a post-secondary degree that is either a three-year or four-year degree.[190] Ontario colleges cannot offer 3-year degrees currently and four-year degrees are limited to only five per cent of the total credential offerings at most Ontario colleges (15 per cent of offerings can be four-year degrees for some larger colleges). Therefore, every guidance counsellor is guaranteed to be a university graduate with a vast majority attending only university throughout their post-secondary careers. This experience may create a bias towards advising students to pursue university programming.

Additionally, the nomenclature used in the secondary school system also leads to an inherent bias. In the first two years of secondary school, the two streams of classes available to students are called "academic" and "applied" classes. But, when the student moves to their final two years of secondary school, those class nomenclatures change to "university" and "college" classes.[191] These differing levels of classes generally reflect the differing levels of education needed for programs in the university or college system.

Most college programs only require college level classes, but they also accept university level classes as prerequisites as well. Meanwhile, many university programs, especially in the liberal arts, will accept a transcript with college level classes so long as the student has completed university level grade 12 English or a small number of grade 12 university level classes. Despite this level of interconnectivity, the nomenclature of the programming misleads students to believe that colleges are second tier to universities and that their choices during grade 10 class selection must pre-determine their post-secondary institution.

Recommendation 17: The Ontario government should ensure that the secondary school system does not disproportionately encourage university enrolment over other forms of post-secondary education. This should be accomplished in part by mandating that secondary school guidance counsellors receive adequate information about the benefits of college programming, as well as by reviewing post-secondary nomenclature used in Grade 11 and 12 classes to ensure that any curricular or institutional bias against college education is removed.

Conclusion

Throughout the paper a variety of important themes and trends have been identified and explored. Those trends include the growth of the skills gap, the potential impact of automation and COVID-19 on the economy, the diminishing opportunities for lesser educated workers, or the explanation of the rural-urban divide in Ontario. Those trends present multi-faceted problems for policy makers and politicians to fix.

For instance, how does Ontario recover from the COVID-19 recession? Does the province recover from COVID-19 in an unequal fashion? How do we ensure regional stability in recovery efforts? What will the labour force look like post COVID-19? What will employers need to compete in the new economy? How prescient will automation be in Ontario's future?

These questions do not have straightforward answers. However, luckily, they do not have to. If we approach each of these questions with an understanding that change is occurring and will continue to occur, we can begin to prepare our institutions for that change, adjusting policy decisions at the margins to accommodate for the pace and scope of that change. The key will be to identify and remove barriers to recovery and re-training in real time, rather than months or years in arrears.

Ultimately, this paper has shown how critical Ontario's college system will be to answer these questions and provide a quicker and much needed economic recovery across the province. A strong Ontario college sector means stronger students, employers, communities, and even governments. All told, that leads to a stronger economy.

However, Ontario's colleges need to be empowered to achieve these results. The status quo cannot be a permanent option. Colleges and governments need to work together to implement microcredentials, embrace online learning, address issues with international student enrolment, rethink traditional program offerings, adjust to post COVID-19 financial realities, and fix long-standing issues with the educational journey through the secondary school system.

These solutions vary in scope and detail. Much work needs to be done to chart the exact path forward in a cost-effective and responsible manner. However, the solutions all centre around the need to adapt to COVID-19 and the automation that will follow by embracing quicker, short-term re-training programs. The shift to embracing microcredentials and upskilling will be a significant one.

Policy makers do not have to look far to find a useful example of these types of programs. The Canadian military has embraced this method of learning for generations. The military recruits people with varying skill levels, including semi-skilled and low-skilled individuals. All military personnel complete basic aptitude testing and training to gain a generalized set of foundational skills – much like secondary school or introductory level post-secondary programming. These skills are inherently stackable. For example, officer training can only be completed if the foundational skills of basic training are achieved. The next promotion is only ascertainable if the previous level has been mastered.

These military members then perform regular upskilling to gain additional skills or change career paths if a new skill is desperately in need within the military. They enter as semi-skilled or low-skilled individuals and leave trained military personnel with specializations in everything from culinary arts to media relations and aircraft maintenance to medical surgery. The training programs are consistently updated to respect and utilize the latest technology available. Essentially, the Canadian Armed Forces have created an entire "culture built on upskilling."[192] Ontario's policy makers and college administrative teams can learn much from the military's approach to re-training as they embark on creating a similar culture of rapid re-skilling.

Even though most of the recommended changes in this paper would take place at Ontario's 24 colleges, they would be enabled by decisions made at the Legislative Assembly of Ontario. It was noted in the introduction to the paper that the Legislative Assembly of Ontario notably overlooks the physical intersection of College Street and University Avenue. This, of course, can serve as a metaphorical reminder of the intersection of Ontario's post-secondary institutions. However, it is also worth noting the lesson told by how these streets got their names.

When College Street was being planned and built, the land that abutted the road belonged to King's College, thus the name College Street. On the other hand, the perpendicular University Avenue was originally named College Avenue for the same reason. However, College Avenue was renamed to University Avenue because, by the time it was expanded, the post-secondary institution it led to had changed its name from King's College to the University of Toronto.[193]

The history of these street names should not be a sign that Ontario's colleges should change into universities. In fact, this paper has shown time and again the unique benefits of the more flexible and nimble college system. For any Ontario public servants, politicians, or political staff that work in the surrounding area of that intersection, the street names should rather serve as a physical reminder that Ontario's post-secondary institutions have always evolved. Regardless of whether the changes are caused by automation, COVID-19, or a combination of pre-existing trends, one constant is clear: Ontario's post-secondary institutions, specifically its colleges, need to be allowed to evolve once again.

Notes

1 Afroz and Lewis, Ontario's Job Market During the COVID-19 Pandemic, 1.
2 Afroz and Lewis, 4.
3 Afroz and Lewis, 2.
4 Afroz and Lewis, 4.
5 Afroz and Lewis, 4.
6 Crawford Urban and Johal, Understanding the Future of Skills: Trends and Global Policy Responses, 1.
7 Crawford Urban and Johal, 1.
8 Policy Horizons Canada, The Future of Work: Five Game Changers, 5.
9 Goldstein, Janesville: An American Story, 169.
10 Colleges Ontario, 2019 Environmental Scan: Student and Graduate Profiles, 1.
11 Colleges Ontario, 2019 Environmental Scan: Student and Graduate Profiles, 1.
12 Illanes et al., "Retraining and reskilling workers in the age of automation," 1.
13 Manyika et al., Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation, 3.
14 Advisory Council on Economic Growth, Learning Nation: Equipping Canada's Workforce with Skills for the Future, 3.
15 Poloz, "Today's Labour Market and the Future of Work," 6.
16 Manyika et al., 9.
17 D2L, The Future of Work and Learning, 9.
18 Statistics Canada, Table 14-10-0355-02 Employment by industry, monthly, seasonally adjusted (x 1,000), table.
19 "Labour market report, January 2020," Labour market, Ministry of Labour, Training and Skills Development.
20 D2L, 5.
21 D2L, 5.
22 Stuckey and Munro, The Need to Make Skills Word: The Cost of Ontario's Skills Gap, 10.
23 Statistics Canada, "Table 14-10-0108-01 Employment by class of worker and industry, annual, population centres and rural areas (x 1,000)", table.
24 Statistics Canada, "Table 14-10-0108-01," table.
25 Stuckey and Munro, "A Looming Skills Gap Threatens Ontario's Future," Conference Board of Canada.
26 Employment and Social Development Canada via Job Bank (ESDC), "Trend Analysis: Electrician in Canada," table.
27 ESDC, "Trend analysis: Welder in Canada," table.
28 ESDC, "Trend analysis: Automobile Mechanic in Canada," table.
29 ESDC, "Trend analysis: Millwright in Canada," table.
30 ESDC, "Trend analysis: Power Line Maintenance Workers Front Line Supervisor in Canada," table.
31 Statistics Canada, "Table 14-10-0327-01 Labour force characteristics by sex and detailed age group, annual," table.
32 Stuart et al., Age of Disruption: Are Canadian firms prepared?, 3.
33 Manyika et al., 40.
34 D2L, 6.
35 Advisory Council on Economic Growth, 14.
36 Poloz, 6.
37 D2L, 4.
38 "100 Years of the Moving Assembly Line: Exploring a transformative innovation's history," Innovation, Ford Motor Company.
39 Manyika et al., 6.
40 CBC News, Canadian Broadcasting Corporation, November 26, 2018.
41 Sirkin et al., The Robotics Revolution: The Next Great Leap in Manufacturing, 7.
42 Sirkin et al., 8.
43 Crawford Urban and Johal, vi.
44 Advisory Council on Economic Growth, 1.
45 "Online tax software," Do It Yourself, H&R Block.
46 Leopold Alexander et al., Insight Report: The Future of Jobs Reports 2018, viii.
47 Leopold Alexander et al., viii.
48 Manyika et al., 21.
49 Manyika et al., 21.
50 Birnbaum and Farrow, The Impact of Technological Change on Ontario's Workforce: Robot Talks Final Engagement Survey, March 2018.
51 Semuels, "Robots Will Transform Fast Food: That might not be a bad thing," January/February 2018.
52 Semuels, January/February 2018.
53 D2L, 10.
54 Miner, People Without Jobs, Jobs Without People: Canada's Labour Market Future, 10.
55 Restaurants Canada, "The COVID-19 Effect on the Foodservice Industry" (infographic), March 2020.
56 Muro et al., "The robots are ready as the COVID-19 recession spreads," March 24, 2020.
57 Sigelman, The Future of Work and Preparing Students for the Workforce, July 2019.
58 Miner, 11.
59 Statistics Canada catalogue no. 11-001-x, "Labour Force Survey, April 2020," May 8, 2020.
60 Statistics Canada catalogue no. 11-001-x, May 8, 2020.
61 Statistics Canada catalogue no. 11-001-x, May 8, 2020.
62 Statistics Canada catalogue no. 11-001-x, May 8, 2020.
63 Advisory Council on Economic Growth, 1.

64 Steeve et al., “Teaching for Tomorrow: Building the necessary skills today,” 15.
65 Muro et al., March 24, 2020.
66 Poloz, 3.
67 Statistics Canada, “Table 14-10-0327-01,” table.
68 Stackhouse et al., Humans Wanted: How Canadian youth can thrive in the age of disruption, 34.
69 Stackhouse et al., 34.
70 Speer et al., “To fight regional economic disparity, Ontario needs Opportunity Zones,” November 14, 2019.
71 Speer, “Premiers should rally behind struggling rural Canada,” November 19, 2019.
72 Speer et al., November 14, 2019.
73 Statistics Canada, “Table 14-10-0108-01 Employment by class of worker and industry, annual, population centres and rural areas (x 1,000),” table.
74 Contact North, Collectively Building the Future for Digital Learning in Ontario: A Contact North Perspective, 2
75 Statistics Canada, “Table 14-10-0096-01 Labour Force Characteristics by census metropolitan area, annual,” table.
76 Statistics Canada, “Table 14-10-0106-01 Employment and unemployment rate, annual, population centres and rural areas,” table.
77 Eaton et al., Workforce Development in Rural Ontario, 8.
78 Stuart et al., 13.
79 Policy Horizons Canada, 15.
80 Policy Horizons Canada, 15.
81 Advisory Council on Economic Growth, 1.
82 Higher Education Strategy Associates, “Microcredentials,” June 6, 2019.
83 Ontario Department of Education Information Division, Basic Documents Relating to Colleges of Applied Arts and Technology, 8.
84 Ontario Department of Education Information Division, 6.
85 Ontario Department of Education Information Division, 6.
86 Statistics Canada, “Table 37-10-0011-01 Postsecondary enrolment, by field of study, registration status, program type, credential type and gender,” table.
87 Organisation for Economic Co-operation and Development (OECD), “Canada Shows Highest Level of Tertiary Education Attainment, Says OECD,” September 9, 2014.
88 Organisation for Economic Co-operation and Development (OECD), “Adult education level: Below upper secondary/Tertiary/Upper Secondary, % of 25-64 year-olds, 2018,” table.
89 Colleges Ontario, “The Future of Work in Ontario: Ontario colleges’ submission for the 2020 Ontario Budget,” 2.
90 Ministry of Municipal Affairs and Housing, “List of Ontario municipalities,” January 24, 2020.
91 Colleges Ontario, “The Future of Work in Ontario: Ontario colleges’ submission for the 2020 Ontario Budget,” 2, 4, 11.
92 Colleges Ontario, “The Future of Work in Ontario: Ontario colleges’ submission for the 2020 Ontario Budget,” 6.
93 D2L, 10.
94 Ouellet, “40% of Ontario full-time post-secondary students granted free tuition, CBC analysis shows.” February 4, 2019.
95 Steeve et al., 4.
96 Steeve et al., 33.
97 Steeve et al., 32.
98 Trick, College-to-University Transfer Arrangements and Undergraduate Education: Ontario in a National and International Context, 19.
99 St. Lawrence College, “Fact Sheet: Demonstrating the Value of St. Lawrence College of Applied Arts and Technology,” 1 – 2.
100 Contact North, 7.
101 Steeve et al., 34.
102 Steeve et al., 35.
103 Steeve et al., 34.
104 Taking Action for Canada: Jobs and Skills for the 21st Century, Preliminary survey report: the skill needs of major Canadian employers, 8.
105 Sattler and Peters, Work-Integrated Learning in Ontario’s Postsecondary Sector: The Experience of Ontario Graduates, 8.
106 Taking Action for Canada: Jobs and Skills for the 21st Century, 8.
107 Colleges Ontario, “2018-19 key performance indicators,” 2.
108 CUSC-CCREU, 2018 Graduating Student Survey Master Report, 22.
109 CUSC-CCREU, 22.
110 Steeve et al., 14.
111 Steeve et al., 14.
112 Colleges Ontario “2019 Environmental Scan – Student and Graduate Profiles,” 3.
113 Colleges Ontario “2019 Environmental Scan – Student and Graduate Profiles,” 3.
114 Galea, “Ontario Colleges and the Introduction of Degrees: Mission Drift or Sustaining Mission?”, 41.
115 Colleges Ontario “2019 Environmental Scan – Student and Graduate Profiles,” 16.
116 Colleges Ontario “2019 Environmental Scan – Student and Graduate Profiles,” 14 – 18.
117 Data provided by Colleges Ontario.
118 Colleges Ontario “2019 Environmental Scan – Student and Graduate Profiles,” 17.
119 Galea, 133.
120 Data provided by Colleges Ontario.
121 Colleges Ontario “2019 Environmental Scan – Student and Graduate Profiles,” 15.
122 ¬Chiose, “Declining enrolment has Ontario colleges facing an uphill battle: PwC report,” January 26, 2017.
123 Data provided by Colleges Ontario.
124 Data provided by Colleges Ontario.
125 Deckock et al., International students at Ontario Colleges: a profile, 7.
126 Zuccato, Sault College Annual Report: 2017-2018 Fiscal Year, 23.

127 Township of Oro-Medonte, “Simcoe County Economic Development Map,” accessed May 2020.
128 Chiose, January 26, 2017.
129 Zuccato, 3.
130 St. Lawrence College, 2.
131 St. Lawrence College, 2.
132 Ministry of Colleges and Universities, “Key Performance Indicators, Colleges and Other Public Institutions,” November 26, 2018.
133 Ministry of Colleges and Universities, “Key Performance Indicators, Colleges and Other Public Institutions,” November 26, 2018.
134 Steeve et al., 13.
135 Advisory Council on Economic Growth, 14.
136 D2L, 11.
137 Franklin, “Real-world research at colleges drives innovation in Canada,” October 15, 2019.
138 Munro and Haimowitz, “Innovation Catalysts and Accelerators: The Impact of Ontario Colleges’ Applied Research,” 3.
139 Munro and Haimowitz, 3.
140 Franklin, “Supporting colleges’ applies research will keep Ontario competitive,” August 8, 2015.
141 Franklin, “Supporting colleges’ applies research will keep Ontario competitive,” August 8, 2015.
142 Franklin, “Real-world research at colleges drives innovation in Canada,” October 15, 2019.
143 Franklin, “Real-world research at colleges drives innovation in Canada,” October 15, 2019.
144 Frenette, “Access to College and University: Does Distance Matter?”, 427-443.
145 Statistics Canada, “Distance as a postsecondary access issue,” December 1, 2018.
146 Beckstead et al., Cities and Growth: Earnings Levels Across Urban and Rural Areas: The Role of Human Capital, January 2010.
147 Miner, 1.
148 Ahmed and Speer, Measuring Ontario’s Urban-Rural Divide, 12.
149 D2L, 11.
150 D2L, 11.
151 Academic Employees Collective Agreement, 75 – 76.
152 Academic Employees Collective Agreement, 75 – 76.
153 Galea, 41.
154 Resei et al., Micro-Credentials in EU and Global, 6.
155 eCampus Ontario, “Building a connected micro-certification ecosystem,” accessed May 2020.
156 eCampus Ontario, accessed May 2020.
157 Advisory Council on Economic Growth, 13.
158 Advisory Council on Economic Growth, 14.
159 Colleges of Applied Arts and Technology Policy Framework, “Prior Learning Assessment and Recognition: Resource Document for Discretionary Use,” April 1, 2003.
160 Stackhouse et al., 13.
161 Advisory Council on Economic Growth, 9.
162 Muro et al., March 24, 2020.
163 Steeve et al., 35.
164 Advisory Council on Economic Growth, 9.
165 Ngo and West, Assessing Ontario Government Employment and Wage Expense, July 25. 2018.
166 Employment and Social Development Canada, “Versions of the National Occupational Classification,” January 13, 2020.
167 Ministry of Children, Community and Social Services, “As an Ontario Works client: Your rights and responsibilities,” March 8, 2018.
168 Auditor, Chapter 3 VFM Section 3.04: Employment Ontario, 263.
169 Ministry of Children, Community and Social Services, March 8, 2018.
170 Fedeli, 2019 Ontario Budget: Protecting What Matters Most, 187.
171 Sarkaria, Better for People, Smarter for Business, 19.
172 Stuart et al., 35.
173 Resei et al., 11.
174 Stuart et al., 35.
175 D2L, 16.
176 Academic Coordinating Committee and Executive Dean Academic Demonstration, “Essential Employability Skills Procedure,” 1.
177 Colleges Ontario, “The Future of Work in Ontario: Ontario colleges’ submission for the 2020 Ontario Budget,” 16.
178 Vandermeer, “Ontario colleges can now offer 4-year nursing degrees,” February 14, 2020.
179 Contact North, 6.
180 Contact North, 6.
181 Contact North, 6.
182 Robson, “Online learning: how to acquire new skills during lockdown,” April 19, 2020.
183 DeClerq, “Ontario distributing free iPads to kids who cannot access province’s online learning tools,” April 17, 2020.
184 Immigration, Refugees and Citizenship, “Coronavirus disease (COVID-19): Visitors, foreign workers and students,” June 11, 2020.
185 Department of Education, Skills and Employment, VET International Engagement Strategy 2025, December 5, 2019.
186 Global Affairs Canada, Building on Success: International Education Strategy 2019-2024, 4.
187 Northern Ontario Heritage Fund Corporation. “Strategic Economic Infrastructure Program,” 2020.
188 Advisory Council on Economic Growth, 1.
189 Ontario College of Teachers, “Thinking About Teaching?”, 2.
190 Stackhouse et al., 37.
191 University of Toronto Libraries, “U of T Chronology,” accessed May 2020.

Bibliography

Academic Coordinating Committee and Executive Dean Academic Demonstration. "Essential Employability Skills Procedure." Kitchener: Conestoga College, May 2014. https://cms.conestogac.on.ca/sites/corporate-websites/policies/PDF-Documents/Academic/Essential%20Employability%20Skills%20Procedure.pdf.

Academic Employees Collective Agreement, between College Employer Council (the Council) for the Colleges of Applied Arts and Technology and Ontario Public Service Employees Union (for Academic Employees), effective from October 1, 2017 to September 30, 2021. http://www.opseu110.ca/wp/wp-content/uploads/2015/05/2017-2021-Academic-CollectiveAgreement_FINAL_ENG_Signed_Website.pdf.

Advisory Council on Economic Growth. *Learning Nation: Equipping Canada's Workforce with Skills for the Future. Ottawa: Government of Canada (Ministry of Finance), December 2017.* https://www.budget.gc.ca/aceg-ccce/pdf/learning-nation-eng.pdf.

Afroz, Sabrina, and Paul Lewis. *Ontario's Job Market During the COVID-19 Pandemic*. Toronto: Financial Accountability Office of Ontario, April 2020. https://www.fao-on.org/web/default/files/publications/EC2004%20Labour%20Market%20Commentary%20-%20April/2020LabourMarket-April-EN.pdf.

Ahmed, Weseem, and Sean Speer. *Measuring Ontario's Urban-Rural Divide*. Toronto: University of Toronto Munk School of Global Affairs and Public Policy (Ontario 360), November 13, 2019. https://on360.ca/policy-papers/measuring-ontarios-urban-rural-divide/.

Auditor. *Chapter 3 VFM Section 3.04: Employment Ontario*. Toronto: Ministry of Advanced Education and Skills Development, 2016.

Beckstead, Desmond, W. Mark Brown, Yusu Guo, and K. Bruce Newbold. *Cities and Growth: Earnings Levels Across Urban and Rural Areas: The Role of Human Capital*. Ottawa: Statistics Canada (The Canadian Economy in Transition Series, Economic Analysis Division), January 2010. https://www150.statcan.gc.ca/n1/en/pub/11-622-m/11-622-m2010020-eng.pdf?st=9fuTAB4M.

Birnbaum, Leah, and Jane Farrow. *The Impact of Technological Change on Ontario's Workforce: Robot Talks Final Engagement Survey*. Toronto: Brookfield Institute for Innovation + Entrepreneurship, March 2018. https://brookfieldinstitute.ca/wp-content/uploads/RPT-RobotTalks-Summary-1.pdf.

CBC News. "GM's Oshawa plant is closing: Here's what you need to know." *Canadian Broadcasting Corporation, November 26, 2018.* https://www.cbc.ca/news/canada/gm-oshawa-closure-1.4921660.

Chiose, Simona. "Declining enrolment has Ontario colleges facing an uphill battle: PwC report." *The Globe and Mail*, January 26, 2017. https://www.theglobeandmail.com/news/national/declining-enrolment-has-ontario-colleges-facing-an-uphill-battle-pwc-report/article33770081/.

Colleges of Applied Arts and Technology Policy Framework. "Prior Learning Assessment and Recognition: Resource Document for Discretionary Use." Toronto: Ministry of Training, Colleges and Universities, April 1, 2003. https://www.ecampusontario.ca/micro-certifications/.

Colleges Ontario. "2018-19 key performance indicators." Toronto: Colleges Ontario, September 25, 2019. https://cdn.agilitycms.com/colleges-ontario/documents-library/document-files/2018-19%20KPI%20results_20190920202722_0.pdf.

Colleges Ontario. “2019 Environmental Scan – Student and Graduate Profiles.” Toronto: Colleges Ontario, June 20, 2019. https://cdn.agilitycms.com/colleges-ontario/documents-library/document-files/2019%20ES%20-%20Student%20and%20Graduate%20Profiles_20190716151048_0.pdf.

Colleges Ontario. “The Future of Work in Ontario: Ontario colleges’ submission for the 2020 Ontario Budget.” Toronto: Colleges Ontario, January 2020. https://cdn.agilitycms.com/colleges-ontario/documents-library/document-files/2020%20pre-budget%20submission_20200127145829_0.pdf.

Colleges Ontario. *2019 Environmental Scan. Toronto: Colleges Ontario, 2019.* https://cdn.agilitycms.com/colleges-ontario/documents-library/document-files/2019%20ES%20-%20College%20Resources.pdf.

Crawford Urban, Michael, and Sunil Johal. *Understanding the Future of Skills: Trends and Global Policy Responses. Toronto: Skills Next; The Public Policy Forum; Future Skills Centre; Ted Roger’s School of Management’s Diversity Institute, January 2020.* https://ppforum.ca/wp-content/uploads/2020/01/UnderstandingTheFutureOfSkills-PPF-JAN2020-EN.pdf.

CUSC-CCREU. *2018 Graduating Student Survey Master Report*. Ottawa: Canadian University Survey Consortium, June 2018. https://cusc-ccreu.ca/?page_id=32&lang=en.

D2L. *The Future of Work and Learning in the Age of the* 4th Industrial Revolution: Canadian Edition. Kitchener: D2L Corporation; Colleges and Institutes Canada, 2018. https://www.d2l.com/wp-content/uploads/2018/11/Future-of-Work-and-Learning-Canada.pdf.

Deckock, Henry, Ursula McCloy, Mitchell Steffler, and Julien Dicaire. International students at Ontario Colleges: a profile. Ottawa: Canadian Bureau for International Education, October 2016. https://cbie.ca/wp-content/uploads/2016/11/FINAL-CBIE-Research-in-Brief-N6.pdf.

DeClerq, Katherine. “Ontario distributing free iPads to kids who cannot access province’s online learning tools.” CTV News Toronto, April 17, 2020. https://www.theguardian.com/education/2020/apr/19/online-learning-how-to-acquire-new-skills-during-lockdown.

Department of Education, Skills and Employment. VET International Engagement Strategy 2025. Canberra: Australian Government, December 5, 2019. https://docs.employment.gov.au/documents/vet-international-engagement-strategy-2025.

Eaton, Don, John C. Hogenbirk, Joyce McLean, Dwayne Nashkawa, Carol Simpson, Mark Skinner, Amanjit Garcha, and Hilary Hagar. *Workforce Development in Rural Ontario*. Guelph: Rural Ontario Institute, 2019. https://www.northernpolicy.ca/upload/documents/publications/reports-new/roi-paper6-workforce.pdf.

eCampus Ontario. “Building a connected micro-certification ecosystem” (web page). Micro-Certifications. Accessed May 2020. https://www.ecampusontario.ca/micro-certifications/.

Employment and Social Development Canada, Job Bank. No date. “Trend analysis: Electrician in Canada” (table). Canadian Occupation Projections System (database). Updated April 2020. NOC 7241.

Employment and Social Development Canada, Job Bank. No date. “Trend analysis: Welder in Canada” (table). Canadian Occupation Projections System (database). Updated April 2020. NOC 7237.

Employment and Social Development Canada, Job Bank. No date. “Trend analysis: Automobile Mechanic in Canada” (table). Canadian Occupation Projections System (database). Updated April 2020. NOC 7321.

Employment and Social Development Canada, Job Bank. No date. “Trend analysis: Millwright in Canada” (table). Canadian Occupation Projections System (database). Last updated April 2020. NOC 7311.

Employment and Social Development Canada, Job Bank. No date. “Trend analysis: Power Line Maintenance Workers Front Line Supervisor in Canada” (table). Canadian Occupation Projections System (database). Updated April 2020. NOC 7202.

Employment and Social Development Canada. “Versions of the National Occupational Classification” (web page). National Occupational Classification (NOC). Updated January 13, 2020. https://noc.esdc.gc.ca/Versions/VersionsWelcome/381f46da99ae49679894c73271e02903.

Fedeli, Victor. *2019 Ontario Budget: Protecting What Matters Most*. Toronto: Ministry of Finance, 2019. https://budget.ontario.ca/pdf/2019/2019-ontario-budget-en.pdf.

Ford Motor Company. “100 Years of the Moving Assembly Line: Exploring a transformative innovation’s industry” (web page). Innovation. Updated 2019. https://corporate.ford.com/articles/history/100-years-moving-assembly-line.html.

Franklin, Linda. “Real-world research at colleges drives innovation in Canada.” *Colleges Ontario*, October 15, 2019. http://www.tcu.gov.on.ca/pepg/audiences/colleges/colindicator.html.

Franklin, Linda. “Supporting colleges’ applied research will keep Ontario competitive.” *Colleges Ontario*, August 8, 2015. https://www.collegesontario.org/en/blog/supporting-colleges-applied-research-will-keep-ontario-competitive.

Frenette, Marc. “Access to College and University: Does Distance Matter?” *Canadian Public Policy/Analyse de Politiques* 30, no. 4 (December 2004): 427-443. DOI: 10.2307/3552523.

Global Affairs Canada. *Building on Success: International Education Strategy 2019*-2024. Ottawa: Global Affairs Canada, February 3, 2020. https://www.international.gc.ca/education/assets/pdfs/ies-sei/Building-on-Success-International-Education-Strategy-2019-2024.pdf.

Goldstein, Amy. *Janesville: An American Story. New York: Simon & Schuster, April 2017.*
H&R Block Canada. “Online tax software” (web page). Do It Yourself Tax Software. Accessed May 2020. https://www.hrblock.ca/online-tax-software/.

Higher Education Strategy Associates. “Microcredentials” (web page). PSE Outcomes, Teaching & Learning. Updated June 6, 2019. http://higheredstrategy.com/microcredentials/.

Illanes, Pablo, Susan Lund, Mona Mourshed, Scott Rutherford, and Magnus Tyreman. “Retraining and reskilling workers in the age of automation.” Washington, D.C.: McKinsey Global Institute, January 2018. https://www.mckinsey.com/featured-insights/future-of-work/retraining-and-reskilling-workers-in-the-age-of-automation.

Immigration, Refugees and Citizenship. “Coronavirus disease (COVID-19): Visitors, foreign workers and students” (web page). How COVID-19 is affecting IRCC. Updated June 11, 2020. https://www.canada.ca/en/immigration-refugees-citizenship/services/coronavirus-covid19/visitors-foreign-workers-students.html.

Jason. “Ontario Colleges and the Introduction of Degrees: Mission Drift or Sustaining the Mission?” PhD diss., Department of Leadership, Higher, and Adult Education, Ontario Institute for Studies in Education, University of Toronto, 2015. https://tspace.library.utoronto.ca/bitstream/1807/70792/3/Galea_Jason_201511_PhD_thesis.pdf.

Leopold Alexander, Till, Vesselina Ratcheva, and Saadia Zahidi. *Insight Report: The Future of Jobs Reports 2018*. Geneva: Centre for the New Economy and Society, World Economic Forum, 2018. http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf.

Manyika, James, Michael Chui, Mehdi Miremadi, Jacques Bughin, Katy George, Paul Willmott, and Martin Dewhurst. *A Future That Works: Automation, Employment, and Productivity. Washington, D.C.: McKinsey Global Institute, January 2017.* https://www.mckinsey.com/~/media/mckinsey/featured%20insights/Digital%20Disruption/Harnessing%20automation%20for%20a%20future%20that%20works/MGI-A-future-that-works-Full-report.ashx.

Manyika, James, Susan Lund, Michael Chui, Jacques Bughin, Jonathan Woetzel, Parul Batra, Ryan Ko, and Saurabh Sanghvi. *Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation. Washington, D.C.: McKinsey Global Institute, December 2017.* https://www.mckinsey.com/~/media/mckinsey/featured%20insights/Future%20of%20Organizations/What%20the%20future%20of%20work%20will%20mean%20for%20jobs%20skills%20and%20wages/MGI-Jobs-Lost-Jobs-Gained-Report-December-6-2017.ashx.

Miner, Rick. *People Without Jobs, Jobs Without People: Canada's Labour Market Future*. Toronto: Miner Management Consultants, March 2010. http://www.minerandminer.ca/data/CO_PWJ_Brochure_CAN_2010_v4.pdf.

Ministry of Children, Community and Social Services. "As an Ontario Works client: Your rights and responsibilities" (web page). Social Assistance. Updated March 8, 2018. https://www.mcss.gov.on.ca/en/mcss/programs/social/ow/client/responsibilities.aspx.

Ministry of Colleges and Universities. "Key Performance Indicators, Colleges and Other Public Institutions" (web page/database). Postsecondary Education Partners' Gateway, Colleges. Updated November 26, 2018. http://www.tcu.gov.on.ca/pepg/audiences/colleges/colindicator.html.

Ministry of Labour, Training and Skills Development. "Labour market report, January 2020" (web page). Labour market. Updated March 3, 2020. https://www.ontario.ca/page/labour-market-report-january-2020.

Ministry of Municipal Affairs and Housing. "List of Ontario municipalities" (web page). Home and community, Municipalities and communities. Updated January 24, 2020. https://www.ontario.ca/page/list-ontario-municipalities.

Munro, Daniel, and Joseph Haimowitz. "Innovation Catalysts and Accelerators: The Impact of Ontario Colleges' Applied Research." Ottawa: The Conference Board of Canada, November 2010. https://www.conferenceboard.ca/temp/4a452159-815d-4a86-90d6-76d10bd5108e/11-131_Innovation%20Catalysts%20and%20Acc-ES_WEB.PDF.

Muro, Mark, Robert Maxim, and Jacob Whiton. "The robots are ready as the COVID-19 recession spreads." Washington, D.C.: The Avenue, The Brookings Institution, March 24, 2020. https://www.brookings.edu/blog/the-avenue/2020/03/24/the-robots-are-ready-as-the-covid-19-recession-spreads/.

Ngo, Luan, and David West. *Assessing Ontario Government Employment and Wage Expense*. Toronto: Financial Accountability Office, July 25, 2018. https://www.fao-on.org/en/Blog/Publications/Gov-Employment-and-Wage-Expense.

Northern Ontario Heritage Fund Corporation. "Strategic Economic Infrastructure Program" (web page). Programs. Updated 2020. https://nohfc.ca/en/pages/programs/strategic-economic-infrastructure-program.

Ontario College of Teachers. "Thinking About Teaching?" Toronto: Ontario College of Teachers. https://www.oct.ca/~/media/D14950CF1D3648BA8772445A89046FF3.ashx.

Ontario Department of Education, Information Division. (June 1967). *Basic Documents Relating to Colleges of Applied Arts and Technology*. Toronto: William G. Davis.
Organisation for Economic Co-operation and Development (OECD). "Canada Shows Highest Level of Tertiary Education Attainment, Says OECD" (web page). OECD Home, Canada. Updated September 9, 2014. https://www.oecd.org/canada/eag2014ca.htm.

Organisation for Economic Co-operation and Development (OECD). No date. "Adult education level: Below upper secondary/Tertiary/Upper Secondary, % of 25-64 year-olds, 2018" (table). OECD Data (database). Last updated 2020. OECD (2020), Adult education level (indicator). doi:10.1787/36bce3fe-en.

Ouellet, Valérie. "40% of Ontario full-time post-secondary students granted free tuition, CBC analysis shows." *Canadian Broadcasting Corporation*, February 4, 2019. https://www.cbc.ca/news/canada/toronto/ontario-schools-tuition-data-1.5003005.

Policy Horizons Canada (Horizons). *The Future of Work: Five Game Changers. Ottawa: Her Majesty the Queen in Right of Canada, June 2019.* https://horizons.gc.ca/en/2019/06/20/the-future-of-work-five-game-changers/.

Poloz, Stephen S. "Today's Labour Market and the Future of Work." Remarks given at the Chancellor David Dodge Lecture in Public Finance 2018, Kingston, ON, March 2018. https://www.bankofcanada.ca/2018/03/todays-labour-market-future-work/.

Resei, Christoph, Christian Friedl, Thomas Staubitz, Hasso Plattner, and Tobias Rohloff. *Micro-Credentials in EU and Global*. Graz: Corship corporate edupreneurship; Erasmus+ Programme of the European Union; Key Action 2; Knowledge Alliance, July 17, 2019. https://www.corship.eu/wp-content/uploads/2019/07/Corship-R1.1c_micro-credentials.pdf.

Restaurants Canada. "The COVID-19 Effect on the Foodservice Industry" (infographic). Toronto: Restaurants Canada, March 2020. http://www.restaurantscanada.org/wp-content/uploads/2020/04/Restaurants-Canada-COVID-19-Infographic-scaled.jpg.

Robson, David. "Online learning: how to acquire new skills during lockdown." *The Guardian*, April 19, 2020. https://www.theguardian.com/education/2020/apr/19/online-learning-how-to-acquire-new-skills-during-lockdown.

Sarkaria, Prabmeet Singh. *Better for People, Smarter for Business*. Toronto: Open for Business (Government of Ontario), October 28, 2019. https://files.ontario.ca/books/bpbb2019-eng-final-web_final-s.pdf.

Sattler, Peggy, and Julie Peters. *Work-Integrated Learning in Ontario's Postsecondary Sector: The Experience of Ontario Graduates*. Toronto: Higher Education Quality Council of Ontario, 2013. http://www.heqco.ca/SiteCollectionDocuments/WIL_Experience_ON_Graduates_ENG.pdf.

Semuels, Alana. "Robots Will Transform Fast Food: That might not be a bad thing." *The Atlantic*, January/February 2018. https://www.theatlantic.com/magazine/archive/2018/01/iron-chefs/546581/.

Sigelman, Matt. *The Future of Work and Preparing Students for the Workforce*. Boston: Burning Glass Technologies, July 2019.

Sirkin, Harold L., Michael Zinser, and Justin Ryan Rose. *The Robotics Revolution: The Next Great Leap in Manufacturing. Boston: The Boston Consulting Group (BCG), September 2015.* https://image-src.bcg.com/Images/BCG_The_Robotics_Revolution_Sep_2015_tcm74-59492.pdf.

Speer, Sean, Weseem Ahmed, and Lorenzo Gonzalez. "To fight regional economic disparity, Ontario needs Opportunity Zones." *The Globe and Mail*, November 14, 2019. https://www.theglobeandmail.com/opinion/article-to-fight-regional-economic-disparity-ontario-needs-opportunity-zones/.

St. Lawrence College. "Fact Sheet: Demonstrating the Value of St. Lawrence College of Applied Arts and Technology." Moscow, ID: Economic Modeling Specialists Intl., May 2014. https://www.stlawrencecollege.ca/about/college-reports-and-policies/economic-impact-study/.

Stackhouse, John, Jill Borra, Anna Klimbovskaia, and Andrew Aulthouse. *Humans Wanted: How Canadian youth can thrive in the age of disruption*. Toronto: Royal Bank of Canada (RBC), March 2019. https://www.rbc.com/dms/enterprise/futurelaunch/_assets-custom/pdf/RBC-Future-Skills-Report-FINAL-Singles.pdf.

Statistics Canada catalogue no. 11-001-x. "Labour Force Survey, April 2020." Ottawa: Statistics Canada, May 8, 2020.

Statistics Canada. "Distance as a postsecondary access issue" (web page). Education Matters. Updated December 1, 2018. https://www150.statcan.gc.ca/n1/pub/81-004-x/200404/6854-eng.htm.

Statistics Canada. No date. "Table 14-10-0106-01 Employment and unemployment rate, annual, population centres and rural areas" (tables). CANSIM (database). Updated 2019. https://doi.org/10.25318/1410010601-eng.

Statistics Canada. No date. "Table 14-10-0108-01 Employment by class of worker and industry, annual, population centres and rural areas (x 1,000)" (table). CANSIM (database). Updated 2019. https://doi.org/10.25318/1410010801-eng.

Statistics Canada. No date. "Table 14-10-0108-01 Employment by class of worker and industry, annual, population centres and rural areas (x 1,000)" (table). CANSIM (database). Updated 2019. https://doi.org/10.25318/1410010801-eng.

Statistics Canada. No date. "Table 14-10-0327-01 Labour force characteristics by sex and detailed age group, annual" (table). CANSIM (database). Updated 2019. https://doi.org/10.25318/1410032701-eng.

Statistics Canada. No date. "Table 14-10-0355-02 Employment by industry, monthly, seasonally adjusted (x 1,000)" (table). CANSIM (database). Updated April 2020. https://doi.org/10.25318/1410035501-eng.

Statistics Canada. No date. "Table 37-10-0011-01 Postsecondary enrolment, by field of study, registration status, program type, credential type and gender" (table). CANSIM (database). Updated 2019. https://doi.org/10.25318/3710001101-eng.

Steeve, Jamison, Dorinda So, Christopher Mack, Margaret Campbell, Jacob Greenspon, and Weseem Ahmend. "Teaching for Tomorrow: Building the necessary skills today." Working Paper 33, Institute for Competitiveness & Prosperity, Toronto, ON, September 2018. https://www.competeprosper.ca/uploads/2018_WP33_Teaching_for_tomorrow.pdf.

Stuart, Terry, Bill Currie, Jonathan Goodman, and Glenn Ives. *Age of Disruption: Are Canadian firms prepared?. Toronto: Deloitte (Future of Canada Series), April 2015.* https://www.corpgov.deloitte.ca/en-ca/Documents/StrategyAndRisk/AgeOfDisruption_042015.pdf.

Stuckey, James, and Daniel Munro. "A Looming Skills Gap Threatens Ontario's Future" (infographic). Ottawa: The Conference Board of Canada, June 2013. https://www.conferenceboard.ca/infographics/skills-gap-info.aspx.

Stuckey, James, and Daniel Munro. *The Need to Make Skills Work: The Cost of Ontario's Skills Gap*. Ottawa: The Conference Board of Canada, June 2013. https://www.otec.org/Files/pdf/Need_to_Make_Skills_Work_Report_June_2013.aspx.

Taking Action for Canada: Jobs and Skills for the 21st Century. *Preliminary survey report: the skill needs of major Canadian employers*. Ottawa: Canadian Council of Chief Executives (CCCE), January 2014. http://www.ceocouncil.ca/wp-content/uploads/2014/01/Preliminary-report-on-skills-survey-Jan-20-2014-2.pdf.

Township of Oro-Medonte. "Simcoe County Economic Development Map" (web page). Business, Business Resources, Local Business Community, Major Employer. Accessed May 2020. https://www.oro-medonte.ca/business/business-resources/local-business-community/major-employers.

Trick, David. *College-to-University Transfer Arrangements and Undergraduate Education: Ontario in a National and International Context*. Toronto: Higher Education Quality Council of Ontario, 2013. http://www.heqco.ca/SiteCollection-Documents/Transfer%20Arrangements%20Trick%20ENG.pdf.

University of Toronto Libraries. "U of T Chronology" (web page). Heritage U of T. Accessed May 2020. https://heritage.utoronto.ca/exhibits/chronology.

Vandermeer, Nate. "Ontario colleges can now offer 4-year nursing degrees." *CTV News Ottawa*, February 14, 2020. https://ottawa.ctvnews.ca/ontario-colleges-can-now-offer-4-year-nursing-degrees-1.4812014.

Zuccato, David. *Sault College Annual Report: 2017-2018 Fiscal Year*. Sault Ste. Marie: Sault College, 2018. https://www.saultcollege.ca/AboutUs/PDF/Reports/2017-2018%20Annual%20Report.pdf.

The StrategyCorp Institute of Public Policy and Economy is StrategyCorp's think tank on innovation in public policy and economics.

strategycorp.com/institute

Toronto Office

145 King Street East,
2nd Floor, Toronto, ON M5C 2Y7
(T) 416-864-7112
(F) 416-864-7117

Ottawa Office

100 rue Queen Street Suite 850
Ottawa, ONK1P 1J9
(T) 613-231-2630
(F) 613-231-4113