

The Impact of Technological Change on Ontario's Workforce

March 2018

Robot Talks
Final Engagement Summary



This public engagement initiative is being delivered by the Department of Words & Deeds as part of a larger research project led by the Brookfield Institute. This work is supported by the Government of Ontario.

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The [Department of Words & Deeds](#), led by writer and consultant Jane Farrow, does public consultation and engagement work for municipalities, government ministries and institutions. Its approach to engagement emphasizes broad participation in transparent processes that heighten mutual understanding while identifying common ground and supported recommendations.

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ENGAGEMENT OBJECTIVES

The Department of Words & Deeds, led by engagement specialist Jane Farrow, was tasked with gathering public input through stakeholder interviews, roundtables, public workshops, written remarks and an [online public survey](#) over two phases of consultation running from November 2017 to March 2018.

The final results of the consultation process are captured in this report, made publicly available on the project website at brookfieldinstitute.ca/robot-talks/.

SUBMIT YOUR FEEDBACK

Additional written feedback can be submitted by email at:

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ABOUT THESE INSIGHTS

This final summary synthesizes what we heard from Ontario workers through Phase 1 and 2 public engagement activities.

Views expressed are those of public engagement participants and do not necessarily reflect those of the authors.

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EXECUTIVE SUMMARY

The Impact of Technological Change on Ontario's Workforce is a two-phased research and public engagement initiative by the Brookfield Institute for Innovation + Entrepreneurship (BII+E). This report summarizes what we heard about automation in the workplace from 318 stakeholders and participants in interviews and public engagement events as well as online survey responses. Taken together, these responses reveal a range of impacts brought on by automation: a variety of challenges that workers, businesses, educators and communities are facing; as well as a series of interventions that may alleviate the negative impacts tied to automation and maximize the benefits that this workplace shift can bring. Stakeholders recognize that automation is here whether people like it or not. Moreover, they said it is not a matter of accepting it or rejecting it – it is a matter of mitigating its negative impacts and extracting its benefits. Because automation means very different things in different industries – from robots building cars to software analyzing consumer data – and because different communities, employers and people will have different approaches and tools for responding, the impacts of automation will be varied. There will not, therefore, be a one-size-fits all solution to help workers adjust to the changes brought by automation.

AWARENESS OF WORKPLACE AUTOMATION :

People's knowledge or awareness of workplace automation is mixed. We heard that:

- + Some are hopeful and embrace the changes; others are fearful or cautious.
- + Different sectors adopt automation for different reasons and to different degrees.
- + Automation has transformed the way some sectors like manufacturing operate although general knowledge about those changes is low.
- + People speculate about the broader societal impacts of widespread joblessness due to automation and how the government might need to respond with measures such as training supports and guaranteed basic incomes.
- + There is a desire for government to play a role in raising awareness and sharing up-to-date data about workplace automation.

DRIVERS OF WORKPLACE AUTOMATION:

Stakeholders told us that companies choose to automate for different reasons:

- + To save money on labour (because labour is getting more expensive) and to increase profits;
- + To reduce dependence on labour because labour is unreliable, unavailable, or difficult to access;
- + To respond to a need to innovate and compete globally;
- + To respond to consumer desire for innovative technologies and services;
- + To improve health and safety; and
- + To improve and standardize the quality of the output.

IMPACTS OF WORKPLACE AUTOMATION:

Stakeholders reported that the impact of automation on people and on workplaces is not necessarily predictable. Impacts are variable and can be contradictory in different settings. We heard that:

- + Automation may result in jobs lost through replacement of human workers by machines.
- + It may also result in jobs gained through increased productivity within a workplace.
- + Automation can reduce the amount of time employees spend on repetitive tasks and make parts of their jobs easier.
- + The shift to automation can create new, higher-skilled, higher paying jobs – but fewer of them.
- + Building rather than buying new technologies or machines can capture the jobs that are created by designing, building and maintaining new technology.
- + Stakeholders reported that automation can result in jobs being broken apart into tasks.
- + Automation can reduce the need for certain trade-related skills and can devalue artistic skills. When workers don't get to use their specialized skills they can feel demoralized.

- + While the experience of working within an automated workplace can be boring, automation can also be liberating by freeing people up for more complex tasks or by giving data clerks, service workers or farmers a break.

CHALLENGES ASSOCIATED WITH WORKPLACE AUTOMATION :

Participants in the engagement sessions reported many different challenges associated with technological change in the workplace. We heard that:

- + In some places employers struggle to fill jobs because people don't have the new technological skills they're looking for.
- + Certain skills are missing in the workforce – hybrid skills in technology, engineering, mechanics.
- + Soft skills are weak and employers report a need for critical thinking and problem solving skills in the workforce.
- + Employers think that colleges aren't training people for the right kinds of jobs although others report that employers may be too demanding in their expectations for new workers and need to embrace more on-site training.
- + The nature of networked businesses means that it is difficult for businesses to automate unless everyone in their networks do too.
- + Automation can augment some of the challenges women have always faced in the workplace and can reduce job opportunities for people facing multiple barriers to employment.
- + As business models change, there are challenges with retaining small and medium-sized businesses that contribute to community vitality.

ON TRAINING:

The topic of training was widely discussed in our engagement sessions. We heard that:

- + There is a tension between education providers and employers over what skills each should be responsible for instilling in graduates or workers.
- + Training workers presents challenges for employers: it costs money and takes time, trained workers may leave for other companies, and not all training is effective.

- + Employees learn new skills by self-teaching or participating in informal on-the-job learning.
- + Employers can be encouraged to invest in training through the provision of training grants.
- + Training needs can be met by fostering strong links between colleges, unions, government, and industry through consortium models.
- + There is demand for innovative and flexible training and skill recognition options such as badging to more closely meet workers' and industry's needs.
- + The government can play a role in recognizing the skills and credentials of newcomers to Canada who can help fill the skills gaps.

KEY CONSIDERATIONS FOR RESPONSES TO WORKPLACE CHANGE :

Several key considerations can be drawn from this public engagement initiative that may be useful for those influencing and developing responses to workplace change. We heard that:

- + Publicly funded programs are good but they can be better. Programs funded by the Ontario government including Second Career, the Canada-Ontario Job Grant, and Skills Advance Ontario are effective but could be even better if expanded and/or made more flexible.
- + On-the-job training works best. In-house training or mentoring is one of the most effective means of developing or enhancing workers' skills.
- + Training should be approached collaboratively. A collaborative approach to change management maximizes the effectiveness of technological change in the workplace.
- + There are innovative training models that can be further explored. Training consortiums and other models that allows for small, self-contained training modules to be deployed where and when they are needed may offer solutions to some of the challenges associated with traditional training programs.
- + Ontarians are looking for more information on automation and its impacts. There appears to be broad interest in engaging in further conversations with government and across sectors about the implications of automation.

INTRODUCTION TO FINAL ENGAGEMENT SUMMARY

The Impact of Technological Change on Ontario's Workforce is a two-phased research and public engagement initiative by the Brookfield Institute for Innovation + Entrepreneurship (BII+E). The study deepens our understanding of the impacts of automation and technological advances on the labour force of Ontario and provides a robust, stakeholder-informed evidence base for policies, programs and services aimed at supporting workers as they adjust, adapt and take advantage of new opportunities presented by technological disruption. *The Impact of Technological Change on Ontario's Workforce* is sponsored by the Government of Ontario. It builds on a series of recent BII+E publications dedicated to studying Canada's innovation economy, including *Automation Across the Nation*, *The Talented Mr. Robot* and *The State of Canada's Tech Sector*, 2016.

BII+E research has highlighted shifts and disruptions in a variety of Ontario regions and job sectors due to automation and technological change. An earlier study revealed that just over 40 percent of Ontario jobs are likely to be affected in some way by automation over the next 20 years.¹ While another study suggest that only one percent of jobs are fully automatable globally, nearly 50 percent of job tasks could be automated based on existing technology and nearly 18 percent of occupations could have 70 percent or more of their tasks automated in the coming years.² This doesn't mean that all of these jobs will disappear but it is very likely that jobs will change and will require new skills. This study digs deeper to understand how people, regions and sectors are reacting to, adapting to, anticipating and preparing for automation in Ontario workplaces.

STUDY + ENGAGEMENT OBJECTIVES

The Department of Words & Deeds, led by engagement specialist Jane Farrow, was tasked with gathering public input through stakeholder interviews, roundtables, public workshops, written remarks and an [online public survey](#) over two phases of consultation running from November 2017 to March 2018. This report summarizes the results from all the consultation activities that were carried out in both phases of the project. All reports related to this project are available at brookfieldinstitute.ca/robot-talks/.

STUDY SCOPE + METHODS

In Phase 1, from November to December, 2017, 120 stakeholders from 36 cities and towns across Ontario were engaged through roundtables and one-on-one interviews. In Phase 2, in January and February 2018, the study team hosted 12 public and stakeholder engagement workshops in six regions (Sudbury, Woodstock, Windsor, Chatham, London and Kingston), reaching 86 participants. A further 122 members of the public provided input via an online survey.

Interviews and workshops were led by Jane Farrow with Rochelle Basen, Jacob Stanescu and Kurt Mungal providing facilitation and note-taking support as the team travelled throughout Ontario.

Members of the public and stakeholders we interviewed represented or were drawn from the following sectors:

- + manufacturers + parts suppliers
- + economic development
- + transportation
- + warehousing + logistics
- + workforce planners
- + digital technology + development
- + community services
- + employment services
- + high school aged youth
- + pharmacy retailers
- + academic researchers
- + agriculture growers
- + food processing
- + greenhouse workers
- + insurance
- + finance + banking
- + college career + curriculum planners
- + high school teachers
- + municipal services
- + organized labour
- + newcomers to Canada
- + mining + exploration

Phase 1 and 2 consultations followed discussion guides that were circulated to participants in advance (see Appendices). The guide included a series of questions aimed at understanding the current state of workplace automation and how different sectors are responding to automation and technological change.

Stakeholders who participated in the Phase 1 consultations all have some experience and familiarity with the broad economic trends and government policy and programs that aim to address workforce disruption. The thoughts they share, therefore, are informed by their positions on the front lines of assessing, responding to, managing, and enacting workplace automation. Phase 2 included consultations with a broader group of stakeholders, including members of the public who were able to share more personal perspectives about the impacts of automation in the workplace, precarious work and training experiences.

This Final Engagement Summary was written by [Leah Birnbaum Consulting](#) with assistance from Jane Farrow, Kurt Mungal, Rochelle Basen and Jacob Stanesco. It offers insights from Ontarians in different sectors and communities but does not identify generalizable trends in stakeholder perspectives. This document is a summary of what we heard, and does not necessarily reflect the views of the authors. As agreed to by the participants, quotes and ideas are not attributed and participants are identified only by their sector and/or region.

PART 1: AWARENESS OF WORKPLACE AUTOMATION

Automation in the workplace is happening across all sectors at different speeds and with varying levels of impact. People’s knowledge or awareness of workplace automation is therefore mixed. While some are hopeful and embrace the changes that come with automation and new technologies, others are fearful or exhibit what some call the ‘ostrich response’ — putting their heads in the sand and hoping that the change will not impact them.

Among those we interviewed, there is a general sense that automation is here, that its scope is increasing, and that it will disrupt many sectors and change how Ontarians work. Many people we spoke with believe that current automation trends represent a fundamental social and economic shift; akin to the changes brought on by the steam engine, the loom, or the sewing machine in centuries past. While many believe this shift is unavoidable, reactions to it range from excitement and curiosity to denial and fear. People often shared a sense that they must ‘adapt or perish’; the realities of workplace disruption must be faced now in order to be better prepared for additional changes ahead.

In discussing automation with stakeholders and with the public, the issue of terminology was raised. Some stakeholders told us that terms like automation, robotics and artificial intelligence (AI) are sometimes used interchangeably when they have different meanings. Some stakeholders felt that these terms need to be clearly and distinctly defined in public discourse. This would foster better awareness of how different kinds of automation can impact workplaces and jobs in different ways.

“People are equally scared, hopeful, don’t know, or don’t care. They are hopeful that with automation work can become more interesting, less physical, less dangerous. But they also fear their own ability to adapt — and if they will even be given the opportunity to adapt. It sparks a lot of emotional reactions.”

— a university researcher in Kingston

UPTAKE BY SECTOR

Workplace automation is a broad term that captures a very wide range of changes taking place in all sectors including manufacturing, mining, agriculture, retail, logistics, warehousing and more. Each sector has a different story about how automation is or isn’t being adopted; why; and with what impacts.

Stakeholders told us that the manufacturing sector has largely undergone ‘big automation’ already. According to a researcher in Windsor, “Looking at the assembly plants, big automation already took place; big welding robots were the first things we saw. In an assembly plant now you have people putting in a wiring harness on the dashboard. Little stuff is still done by people; the fine work.”

Having undergone considerable transformation already, the manufacturing sector now looks very different than it once did. A stakeholder in Chatham pointed out that “fifteen years ago, manufacturing was

crowded and dirty. The same place now has a few people walking around the line and watching a computer. The rate of change is happening way faster than people think.” Echoing this observation, another stakeholder told us:

“The call centers are the factories you didn’t want to work in 50 years ago. People hate the environment, the stress, and being stuck in cubicles. The factories are way better now; they’re bright and clean. People’s thinking needs to catch up to this new reality.”

— a participant in London

In the mining and exploration sector, automation and robotics represent an opportunity to improve safety by removing humans from dangerous situations. As in all sectors we spoke with, automation may also present an opportunity to save money. A stakeholder in the mining sector noted that “mining is a potentially dangerous enterprise. If we can use remote controlled vehicles it takes people away from dangerous areas. You want to make things safer and you also want to make things less costly.”

In logistics and warehousing, tasks like picking and packing items are now being automated. This shift requires considerable capital investment and is transforming the whole industry and workforce. A participant in Windsor who researches this area described some of the changes that have taken place: “Warehousing is getting an update. Machines do the large picking but picking up small pieces is challenging for machines – humans still have to do this. Now a robot brings the bin so that a human picker can select the item. Warehouse or assembly line work is very physically demanding so as people get older it’s harder. Some people might not like sitting all day picking from a bin, but it is good for job longevity.”

In the agriculture and food processing sector companies are actively embracing robotics and automation, particularly for tasks that are routine, repetitive, unsafe or where working conditions are undesirable making it difficult to secure a stable supply of labour. We heard of an egg grading facility that automated the loading of egg boxes onto pallets. The change improved health and safety by eliminating the stress and injury associated with repeated lifting.

“Finding reliable, local labour is a massive problem, particularly in agriculture and farming. Automation has allowed for the work to proceed without delays due to labour shortages.”

— a stakeholder in the agricultural sector

The retail and service sector is using automation in the form of self-checkouts, self-serve machines, and chat-bots to handle routine customer service inquiries. A stakeholder in the insurance sector told us that “automated claims systems are being embraced by employees because clients have the expectation of being able to make a claim 24/7. With automated claims systems, employees don’t have to work late shifts,

increasing their quality of life.” The finance sector is proactively exploring and experimenting with automation and artificial intelligence. Participants told us that many banking jobs are becoming increasingly tech-oriented; blurring the lines between financial and tech sector jobs.

FUTURE SCENARIOS

As people discussed their awareness of workplace automation in the engagement sessions, many imagined future scenarios where work may be fully automated with few opportunities for humans to earn money. Citing an article he had read, one participant in Chatham said “In less than 30 years, there’ll be no job on planet Earth that a robot can’t do.” An online survey respondent had an opposing view: “we overhype the disruptive power of automation. I’m of the mind that advances in fields like AI will augment workers more than it will displace them.”

People speculated that the government may need to mitigate the impacts of widespread joblessness in the future. Guaranteed annual incomes or other forms of redistribution were discussed as measures that may be needed to support people’s basic needs and bolster their buying power: “I think there will have to be a basic guaranteed annual income. There may be high unemployment and people will need to have a living wage.” Another participant told us: “If you don’t employ anybody, nobody’s going to have any money to buy anything. A welfare state will have to be part of the solution.” One group discussed how this could be funded: “Taxing Robots may be a realistic outcome considering how deep the automation is going. Corporations can’t just make infinite money while nobody has jobs.”

One participant noted that while robots can replace people’s work, they cannot replace their consumer habits: “The robots don’t buy at McDonald’s, even if they can take your order. It’s like a snake eating its own tail not realizing it’s going to run out of stuff to eat.”

In an imagined future with very high unemployment or a guaranteed annual income, some participants speculated about the social repercussions of not having jobs to go to: “The lack of purpose and hope in life could lead to increased mental-health issues,” one person said. Some participants anticipated that the government would have to respond in some more concrete way, perhaps through creating work: “We’ve all been socialized to work, so when we find out that we don’t need to work we’re demoralized. We’re going to need to create ‘placebo jobs’ to create meaning and purpose in people’s lives.”

While clearly hypothetical in nature, these sentiments reveal something about people’s values surrounding work. For many of the people we spoke with, work has a value that goes beyond the pay cheque. Work keeps people feeling engaged in society. It provides them with a sense of self-worth. If work as we know it is changing, people are wondering where that leaves them. As one participant put it: “this could cause a lot of social unrest: masses of people without purpose in life. Without evolution there’s revolution.”

ROLE OF GOVERNMENT IN PROMOTING AWARENESS OF WORKPLACE CHANGE

Some participants felt that the government should play a more pro-active role in spreading awareness about workplace automation, either through education or by collecting and sharing data related to workplace change. One participant felt that there is an increased risk of companies leaving the province in

order to stay competitive, and that better communication can help incentivize companies not to move their business: “It doesn’t feel like there’s a cohesive larger strategy in place to deal with automation and demographic change. There are strategies in different areas— labour, population growth, and automation — but nothing overarching. There’s a lack of communication in how the government is dealing with this. Uncertainty and lack of knowledge is what drives people to make decisions to not invest or to leave the area.”

Stakeholders in workforce planning organizations felt that having access to better data would enable them to prepare for the changes that may arise through workplace automation. The types of data that they thought would be helpful include information about which industries are undergoing automation, how graduates in different fields are faring in finding work, and which college programs are in highest demand by students and employers.

PART 2: DRIVERS OF WORKPLACE AUTOMATION

Why do companies automate? What drives them to invest in automation and alter their way of doing business? While different stakeholders emphasized different motivations, no one factor adequately explains the move toward automation. Our interviews point to four main drivers: protecting profits as labour costs rise, responding to a shortage of appropriate labour, global competition, and responding to a consumer desire for automation in certain sectors.

REDUCE LABOUR COSTS AND INCREASE PROFITS

We heard from stakeholders in a range of sectors that the cost of labour – and its anticipated increase³ – are a key motivator to invest in automation. A participant from a chamber of commerce told us that “if employees are going to cost more, they need to produce more value. And the way to do that is through automation.” He gave the example of self-serve checkouts where there can now be one person checking out six customers at once: “using automation to create more value per employee justifies the additional labour costs.” A stakeholder in Sudbury put it more directly: “It’s not just about reducing labour cost; it’s about increasing profit. This needs to be named outright.”

“The biggest thing the government has done for automation is raising the minimum wage. We’ve been subsidizing business owners with below market labour and it’s been dis-incentivizing automation. Now that they’ll have to pay closer to market rates for labour there will be more incentive to automate.”

– a stakeholder in economic development

While companies may have a motivation to automate to reduce costs and increase profits, the process of automating is expensive. Participants in Chatham told us that the price of automation will go down as

increasingly affordable used robotics equipment becomes more available. A company near Chatham is reportedly doing brisk business in buying and selling used robotics.

LABOUR SHORTAGE

While saving on labour costs is a driver of automation for some, a lack of access to appropriately-skilled labour was also cited as a motivator to automate. A workforce planner reported that some businesses struggle to fill technology jobs: “It’s not a wage issue. There are incentives and the wages are competitive.”

For agricultural producers whose labour needs peak at particular times of the season or year, automation offers a solution. A stakeholder in agriculture spoke of the surge in labour that is needed at harvest time: “Growers need labour to grow, harvest and pack the produce and timing is critical but the dependability of that labour is a problem. And if people are being asked to work long days they will do it for a while but then they will call in sick creating a big problem at the farm or greenhouse.”

Access to stable, reliable labour varies across the province. Some areas are experiencing a shortage that is impacting businesses – requiring that franchise owners reduce their hours of operation, for example. It was pointed out that “automation can support retailers by easing their need for labour, especially if that labour doesn’t exist or is very unstable.”

When discussing a shortage of labour, participants began telling us about all the other factors that contribute to it. One workforce planner explained: “People have to consider things like transportation and child care before taking on a job. From the outside it looks like a lack of work ethic. People may be inhibited in finding suitable work by external factors — but that doesn’t get shared with the employer so they conclude that the employee has a poor work ethic.”

Automation reduces the dependency on human workers and is therefore appealing to businesses that experience or perceive a labour shortage. A participant in Woodstock told us that “in manufacturing every company is looking to automate. We have to manage an aging workforce, improve efficiency, reduce injuries, manage a sometimes complacent workforce, and manage productivity when you have workers calling in sick.”

A dairy farmer in Owen Sound told us that the prime motivator to put in a milking robot was lack of labour: “If you want someone decent with dairy herd experience it’s at least \$50,000 a year, plus extras, if you can find them. It’s very hard to find someone to work on a farm, every single day. There are no holidays.”

GLOBALIZATION

Economic globalization means that factories, producers, and other businesses in Ontario are competing with businesses around the world. According to the stakeholders we spoke with, global competition tends to drive down prices and wages making it more difficult for Ontario enterprises to compete. This provides an incentive to automate both to increase productivity and to reduce labour costs. In some sectors, globalization has also led people to worry that jobs could be lost to locations with access to cheaper labour.

A stakeholder in the auto sector pointed out how the automated weld shop in Ingersoll compares with another in Mexico: “They built the exact same weld shop in Mexico; paid the same money for the robots; so there’s only one other variable – in Mexico they’re not making \$35 an hour. Auto manufacturers don’t care where they build, they just want the robot. People understand why they are automating – it’s always about efficiency. If you don’t embrace it, you’ll be left behind.”

In the agriculture sector, we heard that globalization restricts the prices that producers can charge. Speaking about food processors and tight margins, one stakeholder told us: “a lot of them are producing for grocery store brands and there are very strict prices. The lowest price gets the contract. They can’t increase prices because they’re competing with U.S. and offshore companies.”

The inevitability of having to compete globally came up in several interviews. In the mining sector we heard that “if you want to thrive you need to move global. The growth in mining isn’t happening here; it’s happening elsewhere. We need to get into those markets.” One employer in Chatham told us: “If I take my factory to Michigan, it would be two million a year cheaper. Kentucky will even give me the land. As of now in Ontario the incremental costs year over year of labour are way too high. TPP [Trans-Pacific Partnership] will bring in more competition from China that will only exacerbate the difficulties of doing business in Ontario. All these things drive me to automate – to compete in a global market.”

CONSUMER DESIRE FOR AUTOMATION

Part of the motivation to pursue automation is that people expect it. Automation is present in many aspects of our lives — from bank machines to online shopping to self-serve checkouts. Some of the people we spoke with bemoaned the fact that people enjoy making use of automation as consumers of products and services but do not always embrace it in their own workplaces. A participant in municipal services told us that “people are moving to online shopping; they like the convenience of it for shopping, but they don’t want it to take away their jobs. We have contradictory responses to automation as consumers versus as workers.” Illustrating that consumer expectations have changed, a stakeholder in the banking sector said “If we don’t change with what our customers want, we won’t be in existence.”

HEALTH AND SAFETY

Making work safer for employees was mentioned as another reason firms decide to automate. In mining, we were told that innovations are designed to improve productivity, health and safety, or both. For instance, robotic loaders or scoop trams keep workers away from the rock face and prevent them from having to work under unsupported ground. The robotic arms also improve the workers' ability to test each drill hole resulting in cleaner, safer blasts and more stable production. Keeping workers out of potential harm's way frees the company from the risk of losses and frees workers and their families from the risks of injury or death. As one participant explained, "getting squishy things out of the mine is the goal." Increasing health and safety also saves money. One participant told us "there are fewer WSIB [Workplace Safety and Insurance Board] claims. And no need to pay compensations. You don't have to pay anything to a robot."

QUALITY CONTROL

Ensuring that products are produced to the same standard and quality over time and across locations is another driver of automation. Automated processes can produce consistency that, we heard, people have come to expect. In Sudbury, a participant noted: "The biggest drive to automate since 1900 has been quality improvement. It's about consistency in product and quality control. For example, Tim Horton's coffee brewing is automated because it needs to be a consistent product."

IMPACTS OF WORKPLACE AUTOMATION

As companies automate, what are the impacts? The prevailing view may be that as automation arrives, jobs are simply lost. However, in our consultations, we heard that the reality is more complicated. Jobs may be lost but other kinds of jobs may be gained. Jobs can be broken down into micro-tasks, outsourced and/or recombined into hybrid positions. New jobs may come with higher incomes; they may pay less. The impact of automation on people's quality of work life is also variable. People reported that working with robots can be liberating and inspiring; it can also be demoralizing. This section explores a range of impacts of automation upon Ontario workplaces, as reported in our interviews.

JOBS CAN BE LOST

The stakeholders we spoke with acknowledged that automation does lead to certain kinds of jobs being lost. We heard that automation replaces human labour in particular when that work is unsafe, when it involves repetitive, routine tasks and when the working conditions take place in difficult conditions making the jobs hard to reliably fill. The impact of these losses depends on the extent of the job loss within the community as well as the extent to which individual workers are trained – or can be trained – to take on different roles. Not surprisingly, the impact of job loss on a community depends on how extensive those losses are.

“One workplace automating won't hurt a community too badly. But automating in all sectors could lead to loss of buying power and then the whole community hurts.”

— a stakeholder in the auto sector

A participant from the auto industry described the job loss due to automation that happened in the past: “35 years ago, you would have had 1000 people in the weld shop. Now we have 100 and we produce more than we ever have.” A participant in London noted that jobs will be lost but others may be created: “There will be some job losses where the automation replaces the manual, low skilled labour. But you're going to have higher skilled labour working with the automation and overseeing the controls and the inevitable troubleshooting.”

In a public engagement workshop in Sudbury, we heard from one participant who reported having to switch careers several times because of automation and globalization. First, he lost his job making fur coats when the work was outsourced to China. He was later downsized from a call centre where they rely on automated services to do more, and has now lost his job in office administration where computers are doing an increasing amount of tasks such as letter dictation and data entry. He is now accessing training programs with an eye to avoiding work that is likely to automate in the near future.

JOBS CAN CHANGE

Automation can result in a change in the type of work that a job entails. Stakeholders told us that jobs can change in skill level and they can also be broken into different segments or micro-tasks so that humans and machines perform different parts of a job, or parts of different jobs. This disaggregating of jobs into tasks or units can also facilitate the outsourcing of parts of the job. These changes in work do not always result in job loss but it can lead to upheaval if the new skills that are required are not held by the workers already in place.

In the online survey, most respondents noted that technology has reduced the amount of time they spend on repetitive tasks, changing the daily tasks associated with their jobs. A strong majority of survey participants also noted that this has made their jobs easier.

“I’m excited. I want to get rid of more routine tasks at work and engage in more creative tasks that usually get less time than they deserve.”

— online survey response

Jobs can change in skill level

Automation can bring with it new, higher skilled jobs. Stakeholders in a few different sectors told us that a new hybrid type of job is being created: one that requires combined skills in technology, mechanics, and engineering. A representative of the mining sector told us that the kind of worker they will need is “not an engineer, and not a mechanic – it’s somewhere in between. The person underground will be asked to work on all machines. He’ll [sic] need to know more engineering than a regular mechanic.”

As new jobs are created, the same workers may not qualify for them. Training new workers for appropriate skills and retraining existing workers to adapt to change is a key challenge that some stakeholders are rising to. A representative in the education sector from Hanover told us that automation is “encouraging young people to look at jobs in technology – in building and maintaining the robots that will be in charge of that [manufacturing] process. People know that’s going to happen so they’re encouraging robotic skills.”

In the mining sector, participants told us that following the substantial job shedding of the 1990s and 2000s the number of jobs has remained relatively constant but the work has changed. With automation, mines need workers who can both operate and maintain the machinery that replaces the manual labour. “The level of sophistication or education that miners need to work in a digital world – in an automated world – increases. The nature of work has been transforming to more service jobs such as maintenance and sophisticated operator training. Workers are needed to make sure these automated vehicles and automated systems can produce efficiently and safely.”

As jobs change, the skills that employers look for change as well. We heard about a robotics firm in Sudbury that has grown to be a global company. “Just 18 months ago, the company was hiring people with mining experience. What they want now are digital savvy people who understand where the company is

trying to go from an automation perspective. Adaptability is key. One of their electricians was now using Adobe software to make pamphlets. That's the kind of flexibility the company needed and he had the skills." Online survey respondents reported having to learn new skills to adapt to technological changes and most reported being self-taught, or having learned the new skills informally at work.

Jobs can be reduced to tasks

As companies automate, in response to a variety of pressures, the impact on jobs can be that they are disassembled and reassembled in different forms. This can sometimes take the form of micro-tasking, where parts of jobs can be outsourced or recombined. One participant noted that his administrative work involving transcribing interviews had been re-assigned to an external transcription service. We also heard about a company in Sudbury that had trouble filling a particular position. In the end the position was largely automated and the rest of the tasks were transferred to Toronto. The job was broken apart into tasks that could be completed by the available actors, be they human or machine.

Stakeholders told us that Loyalist College is working on a project of granting badges for people who have acquired specific skills for specific tasks. If people acquire badges qualifying them to do certain tasks, their work may evolve into a more task-oriented on-demand format. Participants noticed that automation could take away parts of jobs, rather than whole jobs, at least in the short term.

JOB NUMBERS CAN BE STABLE OR INCREASE WITH PRODUCTIVITY

Stakeholders across sectors told us that automation often increases productivity because the machines can work longer hours in all conditions. As productivity increases, the workplace may grow, creating new jobs. Additional opportunities exist for automation to create new jobs if we begin to build the technology used in automation rather than buying it from elsewhere.

In the agricultural sector, we heard that robots are better than humans at sorting and grading products like eggs, soybeans and seeds. If products are sorted very accurately and consistently it can lead to increases in profits and margins. Automation can also lead to the same number of workers generating more output.

A baker in Toronto told us “at the beginning everything was handmade. The productivity has improved ten times since it was automated. The company has been growing from 50 to 100 percent each year. So there’s a net creation of jobs but the output per person has increased tenfold.”

The predictability that automation offers can lead to more certainty and predictability for the human workforce that complements it. An economic development advisor explained: “When you have a machine that has a fixed capacity and can deliver that capacity on an ongoing basis, you have people tending that machine on a full time basis as well. With hand labour, productivity is more variable because there is a constant churn; you always have people who are not as productive. So when productivity is unstable, work is unstable. When productivity is fixed, work is more fixed.”

Because the prevailing public opinion may be that automation takes jobs away, it can be difficult for employees to embrace change when it arrives. The impacts of automation can vary so widely, however, that sometimes there are surprises. A participant in ice cream production illustrated: “We bought a liquid filling machine for filling milk. People were hesitant; they thought it would replace someone. But actually it was so fast, it created more labour. We needed more people. The jobs may change, but they won’t be gone. Before we had a filling machine, someone would stand and fill the bag and seal it and the put it in a box, then someone would take the box away. It was a two-person job. Now the machine fills ten bags a minute and we need three people handling the boxes.”

Build, don’t buy

When it comes to workplace automation, we were told, we tend to buy; not build. This means that Ontario and Canada are generally not producing the robotics and technology that is being adopted in our workplaces. Instead, we are buying and adapting existing technologies from others. Stakeholders told us this represents a missed opportunity: we are not sufficiently capturing the new jobs that are involved in creating technology.

**“We are buying labour-saving devices but we are not developing them here.”
Not fully embracing automation and getting involved in creating new
technology means that “we will continue to have low educational attainment
and a low skilled workforce. Then we’re really vulnerable because we will not
capture the new jobs created by this process. I’m concerned for the future here
because we are not embracing the opportunities of automation.”**

— a stakeholder in the technology sector in Windsor

In the mining sector, we heard that people have embraced the development of equipment and technology. A stakeholder noted: “We’ve had mining here for over 100 years which has helped us develop a good knowledge of the industry and know what’s needed and to develop the next generation of equipment and technology.” Embracing the development of technology makes the community more resilient to future changes. “Even after the mines have disappeared you will still have an industry here that will service the rest of the world. There are supply services here that export their products and services to Mexico, Chile, Peru.”

A technology provider spoke of how automation can create new jobs when we build it rather than buy it. “New jobs will be created. We have over 100 people and the jobs have been created because of technology. But not all the jobs are in technology. It takes all kinds of people – human resources, marketing, purchasing – to run a company.”

INCOMES CAN GO DOWN

Stakeholders reported that the impact of automation on people's incomes is often negative: people whose jobs are partially or fully automated may face options that pay less. According to one economic development worker, the lower-paid jobs are looked upon with disdain by workers who lost higher-paying jobs. "People say I'm not getting out of bed for that money. Fifty hours a week or more doing back-breaking work. Why would someone do that for a dollar over minimum wage?"

Some towns like London, Ontario, are finding that even when full-time work is available, workforce participation is low. Stakeholders attribute this to people's unwillingness to accept low-paid, insecure work after losing a job to automation: "A person in manufacturing can get a job again but not at the same income."

SOME JOBS AND SKILLS CAN BE DEVALUED

Automation affects not only job numbers and wages; it impacts workers in subtler ways as well. Skilled tradespeople have reported feeling resentful or disappointed that automation is reducing opportunities to use their trade-related skills; devaluing the artistic side of their skills in designing, building, and fixing things.

Reflecting on his career in Sudbury, a participant fondly remembered the time before automation when he was able to hone and exercise his skills: "The best part of my career was working in the mechanic shop in the 80s and 90s. We did everything by hand and had to make our own drawings and models to solve problems. We kept one locomotive going for over a hundred years – the U.S. manufacturer came to our mine to witness it because they couldn't believe we kept it in active service that long. Now you're mostly pushing buttons."

A baker in Toronto observed that after the bakery was automated, the specialized skill level for workers went down: "It's a little counterintuitive but the skill level has been reduced. Shaping bread by hand is a fairly skilled position. Now that it's automated you've got someone pushing buttons."

While tradespeople are still valued and needed, stakeholders told us that the way trades are used today doesn't draw on the same nuanced skills of the craft that it once did. A participant in the auto industry noted "an electrician today isn't the same as it was 20 years ago. Before you looked at a ton of wires; testing each one to find the problem. Now you use a touch screen interface to troubleshoot. The job has been depleted a bit with the ease of troubleshooting."

People spoke about the creativity being stripped out of their jobs. The artistic part of their craft became standardized, de-personalizing their work. The consequences of this shift are being felt: "Pay isn't everything. People need to use their ingenuity and feel valued. If people don't feel valued, what's the sense of going to work to push a button?"

While automation may increase productivity and enhance standardization, people spoke about the decision-making power, artistry, and observation skills being taken out of work, including in manufacturing. “Now there’s a machine with a green light that shows if a part is good and a red light that shows it isn’t. It doesn’t take a lot to train a worker how to do this kind of job.”

We heard of one case where a task was automated and then that automation was reversed. A company brought in automated scheduling but ultimately abandoned it because it lacked the judgment that a human brings to the task: “we just know sometimes who the appropriate person for the shift is.”

AUTOMATION CAN BE LIBERATING

The impact of automation on workers and on workplace morale is not always negative. We also heard stories of automation being liberating. Farmers were freed from having to constantly tend to their livestock in person; service workers were able to devote more time to complex matters; and miners were able to avoid the most dangerous parts of the job, improving health and safety.

In the insurance industry we heard that they are automating some of the more routine or straightforward claims. This allows staff to focus on more complicated claims without needing to rush through them to respond to every individual call.

In agriculture, automation can take over some of the burden of monitoring crops and livestock. In dairy farming, we heard that robotic milking, accompanied by computerized testing and cameras in the barn not only increased productivity; it also allowed dairy farmers to enjoy a higher quality of life. “Instead of getting dressed and walking over to the barn at two in the morning, I can check the calving pen on my phone while lying in bed” explained one farmer.

PART 4: CHALLENGES ASSOCIATED WITH WORKPLACE AUTOMATION

The stakeholders we interviewed offered insights into why industries adopt automation and what impact this has on jobs, on workers, on which skills are sought after, on workplace morale and on lifestyle options. Stakeholders also shared their thoughts on some problems that are brought on by (or exacerbated by) automation. Some challenges are associated with labour including a gap between available jobs and available workers, training needs, and the connection of education opportunities with on-the-job skills. Other challenges are associated with the process of automation itself such as the need for automation to roll out uniformly across networked businesses and sectors for maximum benefit, and challenges faced by communities where businesses are closing. Finally, we heard that automation may exacerbate existing challenges to gender equity in the workplace and further limit the workplace options available to people who do low-skilled work.

PEOPLE WITHOUT JOBS AND JOBS WITHOUT PEOPLE

Stakeholders told us that employers are struggling to fill certain jobs and that students and young people are being encouraged to aspire to jobs that don't exist; hence there are people without jobs and jobs without people. While this challenge isn't strictly tied to automation, stakeholders felt that automation presented a solution for employers who cannot fill jobs and that a lack of knowledge about the technological sophistication of some workplaces discourages young people from pursuing them.

We heard from some stakeholders that young people are not being encouraged to seek out jobs in manufacturing. Those who offer career advice such as parents, guidance counselors and teachers have typically discouraged the younger generation from seeking employment in factories and trades despite the fact that this is where many jobs continue to be.

A stakeholder in Windsor told us that she was encouraged to go to university and get a government job while both her parents had worked in manufacturing. “My parents instilled in me that it’s not a secure job to work in auto manufacturing. Around the supper table there were talks about shutting down the plant unless the union makes concessions.”

We heard from workforce planners and community service delivery agencies that guidance counselors are steering students away from pursuing skilled trades and manufacturing jobs. Some stakeholders felt this was short sighted: “Guidance counselors only know the academic world. They don't have the lens to share all the opportunities.” Similarly, when a new high school was being planned near Windsor, workforce planners pushed to have a shop class included in the new school. They told us that parents didn't want their kids pursuing the trades and the young people didn't want those jobs. However, they felt that these views may be based on a misconception of what those jobs actually entail.

Misconceptions about agricultural work, we heard, mean that “people see agriculture as low-skill, high-labour jobs but it's actually high-skill, high-tech.” As a result, agricultural jobs can be hard to fill. A

participant in the agriculture industry told us that “there is a shortage in high skill, high tech workers in agriculture, especially in robotics and equipment repair. It’s not mechanics who are fixing agricultural equipment, it’s technologists. For every agriculture graduate there are four relatively high paying jobs available to them.”

In contrast, some participants told us that the attitudes about factory and manufacturing work are starting to shift. Some young people are starting to ‘buck the trend’ of going to university as their parents and advisors recommend and are getting into the skilled trades and technology training. These young people see this career path as a way to avoid accumulating student debt and reducing the risk of being faced with few job prospects upon graduation.

SKILLS GAP

We heard throughout our interviews that automation has brought to light gaps in the skills of the workforce. Employers told us that some workers are eager to learn new skills and adapt to changes in the workplace while others are not. This applies across all age groups although mid-career workers who have not been working in offices and have few computer skills may have the hardest time adapting or finding new employment. Further, when existing workers are not willing or able to learn new skills, the company loses valuable institutional knowledge:

“Some people are learners, and want a challenge. There are some 55 year olds who are like that. Others say ‘I’m out of here, I can’t learn that’, and they leave. Then we lose process knowledge, product knowledge, and company knowledge.”

— a stakeholder in the manufacturing sector

Employers and workforce planners we spoke with highlighted two major gaps in the workforce that present challenges. First, many workers lack basic computer skills. While traditional manufacturing and trades jobs may not have needed computer literacy or proficiency, most jobs now do. Second, stakeholders told us that soft skills are lacking. These include an openness to learning new skills, team-building skills, reliability, and communication skills. When soft skills are lacking or are undeveloped, adapting to workplace change becomes more difficult.

One local business owner in Chatham explained that they have had to hire two people to do one job because there aren’t enough workers with the hybrid skills required for the position. However, a participant in Woodstock pointed out that the concerns over a skills gap are nothing new. “The conversation about the shortage in skilled trades has been going on for 25 years. It used to be tool and die makers in short supply, and now it’s millwrights.”

Computer skills are now needed at every level

Many stakeholders told us that computer skills are needed in nearly all jobs in all sectors. This can become an issue for those attempting to find new employment after working where those skills weren't needed. Even if a job itself requires no computer or technology skills, employers are increasingly using on-line application and screening processes that require applicants to have basic computer literacy. From a workforce planner we heard: "In our older demographic, they're out of the loop technologically. I see a lot of them in the resource centre and they're calling on our staff all the time for simple things like attaching a document to an email. One of the biggest problems for people is applying online; we do a workshop on how to apply online because people don't know."

Stakeholders in employment services told us that "people need to use technology for point-of-sale, inventory, plant automation; also getting schedules from online portals. It's another barrier in the workplace for people who are not comfortable with technology." A researcher in Windsor echoed these concerns: "You need to be literate; have basic computing skills. Those basic skills are kind of missing."

Some stakeholders told us not to assume that younger people all have computer or technology skills: "not all kids who are into phones can use tech." People also pointed out that the lack of computer skills can be linked to poverty: "a surprising number of young people don't have computer skills, likely because poverty caused a lack of access. This is an example of the digital divide."

Soft skills are lacking

Stakeholders across sectors also told us that although soft skills are highly desirable in the workplace, employers report they are hard to find in new recruits. A stakeholder in the manufacturing sector told us that while technological skill is important, "it also needs to be tied to soft skills; learning one but not the other is still creating issues for employers." Finding potential workers with what he terms "essential employability" is a challenge.

"We have manufacturers saying give me somebody who wants to show up for work and wants to learn and I will pay them to become a millwright. That's a big commitment to make to somebody over three years of training."

— a stakeholder in the manufacturing sector

A municipal worker speculated that finding people with soft skills may be more difficult in rural areas: "Employers are having trouble finding the labour force to fill the positions needed. Even soft skills are hard to find. People entering the workforce aren't accountable to a schedule, they don't have team-building, customer service skills. We're a rural community so those higher skilled people don't know about the opportunities in our small community. They take their skills to the city."

The importance of critical thinking and decision-making skills came up several times as participants discussed the importance of soft skills. One person in Sudbury mentioned that young people are not acquiring robust problem solving skills because they “just Google it.”

Youth and job skills

A further challenge that people spoke of was that young people who are entering the workforce have unrealistic expectations of what awaits them. Some stakeholders attributed this to an education system that doesn't fully understand (and therefore doesn't teach about) the current realities of work. Others speculated that the young people themselves are not adequately preparing themselves with the variety of skills and adaptive capacities they will need to succeed.

The information that students are getting about careers is, according to one stakeholder, “old, out of date, and incorrect. They are getting it in grade 10, which is too late. The careers class should not be about aspirational career choices but based on labour market realities. The career class is unicorn generating. Kids who get into co-op classes do better.”

A stakeholder in Leamington told us that “the youth are thinking only of one job. They're not seeing the range of skills they need to enhance and grow. They're putting on blinders and heading for one job they think they will get. They're not seeing that they may have five different careers.” This sentiment was contradicted by another participant who observed that young people do change jobs frequently as this is the only way they feel they can get ahead: “a lot of people leave so quickly – especially millennials – because it's the best way to jump up the ladder. Companies don't offer pensions or offer new training, so now the best way to grow is to switch jobs and get a raise, not grow a pension.

The question of loyalty was discussed by several stakeholder groups. Some people felt that young workers are not loyal to companies the way that earlier generations were. Others shared this observation while offering explanations about why that might be the case: “Technology companies change so much; employees aren't even convinced they'll be around in 20 years. Companies come and go so there's no point in being loyal necessarily.” Another participant wondered: “Is loyalty even a value that's required anymore? I think that adaptability and flexible are more desirable values.”

As the world of work changes, generational attitudes towards work and towards employers are bound to change as well. One participant summed it up:

Millennials are loyal to their own entrepreneurial work, but not necessarily to companies. It's hard to blame them in the local context of companies that just dropped their parents after decades of stable employment. Maybe employers now have to be more dedicated to their workers if they expect the same in return.

— a public roundtable participant in Sudbury

SLOW OR UNEVEN ADOPTION OF TECHNOLOGY

Companies that want to embrace automation may face obstacles associated with the pace and scale at which innovations are being implemented. The rate of technological change, we were told, is limited by the rate of adoption. One challenge that we heard about in interviews is that even where technological improvements are available, businesses may not be able to adopt them if others in their networks don't do the same.

An entrepreneur in Toronto told us: "We can't innovate without our suppliers, their customers, their staff, and everyone being on board with the new way. For example, we wanted to switch to a fully automated bookkeeping system but no accounting firm uses it. They're all QuickBooks customers so that's what we have to use. It's hard to innovate because people cling to the established way of doing things." Similarly, in the food industry, technological innovations in one aspect of the industry necessarily influences the others. "Everything is becoming digital. Our products that we sell to grocery and food distributors have to be input into a virtual catalogue system. It's a database with all the nutritional information and everything and the big chains use it for their ordering."

AUTOMATION AND GENDER IN THE WORKPLACE

Workplace automation does not impact everyone in the same way. Throughout our interviews, we heard stories of how changes to the workplace will impact or have impacted women differently than men. First, women are less likely to be trained in the skilled trades or engineering and may therefore have less access to some of the jobs that may be generated by a shift to automation. Second, women are more likely to experience periods of unpaid labour while they are caring for others. Re-entering the workforce after a gap in employment is a challenge that women have always faced; with job losses or job changes due to automation, they now compete with many others when looking to re-enter the workforce. Lastly, some stakeholders told us that women might be well positioned to take on roles that are likely to grow in importance if routine work is automated: for example, those requiring people-skills and customer service experience.

Fewer women pursue skilled trades and technology jobs

Stakeholders spoke of inherent gender biases against women looking to enter skilled-trade apprenticeship and training programs. A representative of a college said: "the percentage of women enrolled in apprenticeships in skilled trades is very small. Early exposure determines a lot about whether a young woman will have the confidence to explore the skilled trades." Participants told us of several barriers for women in pursuing the skilled trades. They may not be exposed to the option; particularly if their high school doesn't have a shop class. Even if it does, young women may not feel comfortable taking it. Women are also less likely to be exposed to shop skills or tools by family members at home. An employment counselor told us that in six years they have only successfully placed two women into trades roles: "I don't see a lot of women asking about working in trades because they're not given enough support."

One participant spoke of regional differences with respect to women in the trades: "In Alberta more women do construction and explosives, but this is much rarer in Ontario. Societal norms vary from region

to region and employers in Ontario are much further behind in terms of hiring women in the workplace.”

“There are way more males than females in new tech jobs. Most of these new jobs are in engineering and it’s mostly males. There’s also very low retention of females in these areas. Women run into a lot of issues in these industries – harassment, glass ceilings etc.”

– a workforce planner in Windsor

Re-entering the workforce

Some stakeholders suggested that women re-entering the workforce after a pause in paid employment may be disproportionately affected by the increasing requirements for job-seekers to be up-to-date on computer skills and technological innovations. If a workplace is losing jobs due to automation, stakeholders reported that women who have been on leave or people who are working part-time may find that their jobs are the first to be eliminated if the workplace is under pressure to find labour efficiencies.

Several people noted that if jobs can be flexible in terms of working hours and days, more people will be able to consider them. This is particularly important in places experiencing labour shortage. Depending on the nature of the work, we were told that technology may lend itself to more opportunities for working remotely, shortened days or alternate hours and these opportunities would benefit people who are not in a position to commit to full-time work at a prescribed location. A workforce planner told us that, in some cases, “highly educated women who have family responsibilities can’t take full time work even if they want it. So they have to take part time work.”

Where particular employment opportunities are extended, they may be enthusiastically taken up. One example we heard involved mining projects and an Impact Benefit Agreement with a First Nation where women were responding proactively to the opportunities presented. One mining stakeholder told us: “We’re seeing tremendous efforts from these women. We’ll put on multi-month training sessions and when they’re done, the employment rate is 90 percent within 60 days.”

JOB OPTIONS FOR PEOPLE FACING BARRIERS TO EMPLOYMENT

Jobs that are simple, repetitive, and predictable are the most at risk to being lost to automation. However, several stakeholders pointed out that these are also the kinds of jobs that may be most suitable for people with lower levels of education, or people who face other barriers to employment. A community service worker in Alexandria told us about a laundry service and noted that “some of the easier tasks were what people excelled at. With automation those people have to go up a level of skill.”

“The impact of automation on people who rely on routine, simple tasks will be negative. They may be able to manage more complicated work but it will be a challenge.”

— a community service worker in Alexandria

These concerns were echoed by another community service worker who told us that the people they work with are looking for low skill, repetitive tasks, and those are the ones that are most easily automated. He shared his concern that the few opportunities that exist for these workers will become even fewer. Pointing to the agricultural sector, he said “it used to soak up a certain amount of low skill and seasonal employment and now that’s been automated.” One participant who works at an employment agency for people with disabilities said “we see the demand for digital literacy is going up. This means some people are struggling to keep up. Workers looking for repetitive task based jobs are finding it hard to get work.”

LOSS OF SMALL BUSINESSES

Stakeholders, particularly in small towns, shared concerns about how to retain businesses for the benefit of the community. Because transitioning to automation may involve considerable investment, it is not always a viable choice for small and medium-sized businesses. These businesses then risk closure.

“Businesses are shuttering because they don’t want to pay to automate and no one wants to buy the business because it’s so out of date. Any new owner needs to make a significant investment in technology in order to compete.”

— a stakeholder in Kingston

Some business owners, we heard, may choose to ‘ride it out’ and finish their careers quite successfully but without investing in automation or technology. A stakeholder in Sudbury told us about hardware stores, and tourism operations that followed this model. They worried about the impacts of these closures on the community. “They may never need to use technology. And when they’re ready to retire they’ll liquidate their business. But what about the community effects? When businesses close, we lose the jobs, we lose the people, we lose the tax base.” Loss of community vitality is one concern; fiscal health is another: “we’re all going to have to pay the taxes to replace all the businesses that are closing in our downtown.”

PART 5: TRAINING

The topic of training was widely discussed in our engagement sessions. Stakeholders spoke about training as an area where some existing, promising models could be scaled up and new approaches could be developed to help workers adjust to the impacts of automation. People shared their thoughts about our education system and how well it is or isn't preparing people for today's workplace realities. People also discussed on-the-job training, up-skilling and other forms of training designed to develop or retain workers. Stakeholders spoke about barriers to offering training and discussed ways that training programs can be improved or made more relevant.

EDUCATION

In discussions about the skills gap and the need for soft skills in contemporary workplaces, stakeholders shared their thoughts on our early and post-secondary education system. Some felt that education should focus on instilling soft skills such as communication skills, critical thinking and problem solving while others felt that there should be stronger links between educators and employers so that people emerge from school trained in the specific technical skills that employers are seeking. One participant described this as the "training dilemma." He posed the question "are we going to teach students the latest technology knowing that it'll be out of date shortly, or do we concentrate on the basics and let the employer do the training with the cutting edge technology? It's a hard decision to make with a limited amount of money."

The role of high school education

In some interviews and at a public engagement event we heard that schools should be delivering specialized courses in technology, coding, robotics and artificial intelligence but that they are not equipped with the right staff or materials to do so. "The education system does not currently understand exactly what they need to be doing for students." Another stakeholder cautioned, however, that trying to predict which skills students will need is risky: "There's a danger in trying to pick what people are going to need to know in 15 years. For example, what if coding isn't necessary in 15 years but gets added to education curriculum?"

High school curriculum aside, some stakeholders felt that students were being discouraged from pursuing skilled trades by their guidance counselors: "guidance counselors are still directing kids to university after their internships even though they're practically guaranteed a job after with the company. The counselors' thinking is old and backwards — why would they direct students away from guaranteed skilled trade work?"

Offering an alternative point of view on the role of guidance counselors, one participant in Kingston pointed out: "guidance counselors are caught up in trauma, drama, mental health, and suicide prevention, and so it's just not realistic to expect them to have the time or resources to guide career paths."

College-employer tension

In our interviews, we heard that there is a tension between what employers say they need in terms of trained workers and what they believe the colleges are producing in graduates. At the same time, we heard that employers' expectations for the availability of job-ready college graduates may be unrealistic and that they may need to offer on-the-job training for skills specific to their needs. As the world of automation and technological innovations is changing rapidly, it may be impossible for even the nimblest training institution to continually adapt and train people to meet ever-changing needs and standards. We did also hear of some success stories – innovative college programs that are successfully training people for in-demand skills.

Some of the employers and workforce analysts we interviewed feel that colleges could do a better job of preparing students for the jobs available. There is some sense that colleges are motivated to admit and graduate as many people as possible with inadequate concern for which skills are most needed in the job market. While this impression may not bear out, we did hear that training programs for the jobs of, for example, paramedics, teachers, vet technicians, and police officers generate too many people who are trained for jobs that are not available. A participant in Kingston summarized the challenge with a hockey metaphor: “We need a little more of the Wayne Gretzky effect with education systems. We need to be going towards where the puck is going, not where the puck is now. So many people are going into teaching and police colleges where there aren't actually jobs.”

Opportunities may also exist for better education, not only of workers, but of the general public so they can understand the reality of automated workplaces which may differ considerably from prevailing impressions.

While we were told that there is considerable tension between what colleges produce and what some employers say they want, we did also hear some success stories. Two programs were mentioned: Fanshawe College's program for solar power technicians and St Lawrence College's wind turbine certificate program. Both programs were praised for looking to future workforce needs and developing programs to train for them.

“St. Lawrence [College] took a leap of faith when they introduced a wind turbine technician program. At the time there weren't too many wind turbines but now the world is their oyster. They did their research to know it was going to be in demand. That is leadership.”

– a workforce planner in Kingston

This issue will be difficult to resolve. Workforce planners and educators told us that even if colleges wanted to offer courses for jobs that are consistently seeking recruits, the fields are moving and changing so quickly that it is difficult to find qualified teachers. As one participant told us: “85 percent of jobs that are coming in ten years don't exist yet.” Curriculum development also takes time and resources. One stakeholder pointed out: “There was a shortage of HVAC techs in 2008, but by the time the college

program got up and running, and graduating, the need was gone.” Another spoke of the high cost of materials for education: “If employers aren’t happy with what’s being produced by post-secondary institutions, they should have to kick-in and donate equipment so people can be effective right away. The sheer cost of this technology is too much for most schools.”

The challenge of finding qualified instructors is not lost on workforce planners. A stakeholder in Sudbury raised the question of whether this is a responsibility that colleges need to address: “Colleges are having trouble recruiting skilled-trades people to teach. Who is going to teach people to do the work? Or is it the employers’ responsibility?” Some employers clearly think that the onus is on the colleges. One business owner told us: “I’ve told them my needs, at the college, several times, but nothing seems to come of it.”

One participant suggested that the province should consider options for supporting curriculum development in colleges. A workforce planner suggested that there should be a fund that colleges could access to do the research and create the curriculum that responds to the ever-changing job market.

Employers have high expectations of new recruits and job seekers. Stakeholders told us that while employers may have legitimate concerns about the types of skills that people are acquiring through their education, they also bear a responsibility for providing on-the-job training specific to their needs. A representative of a college noted that “Every workplace is very specific in what it’s doing. There are a thousand pieces of software and colleges can’t teach a thousand software programs so employers can’t expect grads to know the specific one they use. The onus is on employers for on-the-job training. There’s an unrealistically high expectation from employers for people to know specific software.” In a related concern, many spoke of employers’ unrealistic expectations for entry-level skills. “The employer is asking for the wrong things and asking for so much experience. I can’t get experience if I can’t get my first job.”

BARRIERS TO TRAINING

People who are in the workforce may need help learning and up-skilling to adapt to new workforce realities. However, we heard during our engagement events that the need to train or re-train workers for new or updated workplaces presents its own challenges. These include the cost of training for employers, either direct costs or in loss of labour time; the risk that newly trained workers will leave or be ‘poached’ by other employers; and the challenge of designing and delivering effective training programs. Another challenge we heard was that people may have uneven access to effective training programs based on their location or their employment status.

Training costs and time

Even where people are willing and able to learn and be re-trained, other challenges remain. An employer in the technology sector in Toronto told us that even if a company is willing to pay for an employee to be re-trained, the re-training takes time. “then do I just lose the employee for two years? I lose their work but pay the wage and pay for two years of school? It’s too much.” A robotics builder told us that the learning process for a new employee can take eight months to a year. Training new employees is a \$40,000 to \$50,000 investment, including the cost of having a trained and skilled employee reduce their workload to

act as a mentor for new staff. A participant in Chatham cited cost as a barrier to training, explaining that it's sometimes cheaper for companies to outsource specialized labour and tasks than to up-skill their workforce.

A stakeholder in manufacturing told us about a food production factory that partnered with a college to offer a class in food processing training. The class only lasted one year because the workers were so busy in production that they could not leave the facility in numbers that made it viable for the college to offer the course. Similarly, another facility turned down a training program with National Resources Canada "because they were too busy making stuff."

Accessing, funding, designing and implementing on-the-job training presents many challenges for both employers and employees. Failing to fully embrace training carries some business risks as well, we heard. A technology provider told us that some of their customers buy new technologies but then don't take full advantage of what they can do: "I remember putting a quality control system on the floor of a local pharmaceutical company. They trained them on the new system. They can only take the system to a certain level because they haven't continued to train the workforce. They should be able to customize and use the machine to its full potential but they don't have the confidence."

Training grants

Several stakeholders told us that grants to employers to provide training were effective, but that they needed more support. Government training grants like the Canada-Ontario Job Grant allow employers to offer more complete and more long-term training than they might otherwise. In the manufacturing sector we heard that "big companies will train whether they get the grants or not but the grants allow them to do more. When government grants are restrictive, it restricts the amount of training that happens."

Stakeholders across sectors reported that in-house training or mentoring is one of the most effective means of enhancing the skills of new workers. An economic development worker reported that "small industries struggle more with training. They're very focused on where the ball is going, but we need to focus on how that institutional knowledge is being transferred to the young people in the facility. To do this, a senior guy [sic] has to hold a young guy's [sic] hand which decreases productivity and is expensive. They need grants for that kind of training."

A labour market specialist also felt that existing training grants, while helpful, were too limited: "The funding goes to the employer to train their staff. That's working well for people that are already working. It helps employers keep their staff current with skills. We should elaborate on that model and have less restrictions. Under these rules companies can't do their own training – it has to be outsourced. That's a limitation."

Systemic disincentives

A few participants cited seniority rules in a unionized environment as a barrier to training for younger workers. It was noted that these rules can also make training too expensive for companies if they are only investing in employees who are close to retirement age. In one workplace, 48 percent of the workforce is

60 and over. Its owner told us: “If I see a young person who’s a good candidate to be a millwright, there’s a union rule that allows the 57-year-old to take that training and then retire. The old guard aren’t always interested in learning about automation. They’re automating the travelling system for how things move on the floor, but people still want to use paper. Meanwhile young people are eager to get on the floor but can’t because of the unionized structure.”

Poaching

Some stakeholders we spoke with allowed that there is a disincentive for employers to invest in training workers because they may then be more likely to leave the company for other opportunities. As a stakeholder in employment services told us, “A lot of employers are nervous about career development because they think people are going to leave. But the alternative is that they don’t get trained and they stay forever. We always try to tell employers that they need to train up all the employees or else the less skilled will stay and the more skilled will leave.”

The issue of poaching trained workers came up in several different sectors. In manufacturing, we heard that “the smaller manufacturers do the bulk of training, but they can’t pay as well as the larger ones, so they lose workers to the larger manufacturer when they’re done their training. Larger manufacturers benefit from smaller ones paying for the training.”

Similar issues arise in the mining sector. “Mining companies used to do their own training. Today they don’t – they will hire an apprentice or someone from another company who is already trained; poach them with better benefits and higher wages. You see that a lot in the mining supply and service area.”

Ineffective training and uneven access

Not all training works, participants told us. On-the-job training was seen by many stakeholders to be the most effective because it allows workers to actually experience the changes to the tasks they perform. Pre-recorded, non-interactive webinars or remote training techniques were not highly thought of. One participant in Toronto said: “Digital training needs to be paired with an in-person mentorship program where a small group learns together.”

A further challenge that many stakeholders talked about with respect to training is that not everyone can access it. Where grants are available for training, eligibility requirements exclude some people. One participant told us that “If you’re a sole proprietor, you’re not eligible for a job grant. They’re pushing entrepreneurship but if you start a business you’re on your own for access to funding.”

Re-training programs may only be available for certain topics and only to those who meet certain criteria: A municipal worker said: “from our perspective, it’s not working. There are lots of hoops to jump through. The training opportunities are fairly narrow and it’s questionable whether it is based on accurate labour supply info.”

Training needs to be designed to fit into workplace realities, we heard. Flexible training options are required so that they can be customized to suit employers, employees, and job seekers better. A

stakeholder in manufacturing told us: “We need flexible training options; stuff that’s either delivered online or in the plant or some combination of both. There could be a training professional on staff in the plant to jump in during unexpected slow times. Then instead of people sitting around doing nothing they could get training.”

The same sentiment was shared in Windsor where we heard that “training could be better incorporated on the job. Companies don’t want employees to take time away from the work. If training was built into the culture – where it’s part of the job to do retraining and professional development – it would work better.” We also heard that it can be hard in rural areas to find continuing education without giving up a job. People need to be able to continue to support their families while working to further their careers. Another participant told us that people tend to stay and find employment where they are trained and that this can put a strain on smaller communities that don’t have the educational facilities.

Flexibility with when and where training takes place would alleviate some of the disincentives to training that we heard about, such as inadvertently giving people too much work: “They are currently retraining on a whole new financial system and they’re plucking people out of the job to learn it and it increases everyone’s workload.”

In Chatham, a local company looked for a college program that could come into the shop to help train employees on the job. The institutions, we were told, declined to provide training on-site and asked that the workers come to class instead. Requiring the workers to leave their jobs to get training didn’t work for the company. “Colleges have to be more flexible,” we heard.

Manage change effectively

When thinking about how to make workplace transitions go more smoothly, participants told us that technological innovation and change work best when introduced in a collaborative manner. If people understand why the technology is being introduced, there is greater uptake, especially if they see that it will improve or augment their job as opposed to replacing them. Participants told us that when companies enlist the help of employees in rolling out new technologies it greatly increases the successful adoption of the technology.

In the agriculture sector, we heard of people undertaking early consultation: “We try to engage field workers early in the process and ask them how they think the problems can be fixed. Listen to them; they have good ideas. They’ve been doing the job for a long time and they know where the bottlenecks are.”

Some stakeholders spoke of change management in terms of risk mitigation. A stakeholder in the technology sector told us that, from their perspective, managing change when new technology is introduced is critical for business: “If a customer is not familiar with the technology then it’s a risk to the success of the project. We have to manage that risk in the project. We suggest that inclusive introduction is a best practice. This is how we’ve seen success in the past and we factor it in to our timelines on projects. We’ve seen poorly introduced systems where bad training leads people to make critical mistakes; and that breeds extreme resentment amongst workers.”

OPPORTUNITIES FOR MAKING TRAINING BETTER

While participants in this engagement process drew our attention to many challenges created by or highlighted by automation in the workplace, many also focused enthusiastically on potential solutions. There are opportunities for government, for businesses, for educators and for workers to make the best of the shift to workplace automation. Making training better – by providing adequate funding, by making it flexible to suit different needs, and by learning from successes – was raised by many stakeholders as a key factor in maximizing the benefits and minimizing the negative impacts associated with workplace automation.

Training successes

When discussing training needs, participants shared some success stories where they felt that training was particularly effective or well designed. These successes can offer some insights into what works well that may be applicable to other situations.

In response to losing engineers to a public infrastructure project, we heard that some factories in eastern Ontario began to focus more on training their own employees to fill gaps in the workforce and to encourage employee retention. “Companies were working with Loyalist College to double-train people. They train for millwrighting and electrical work. These are the jobs they need filled so they train from within. Even if the pay doesn’t go up from training, people still feel valued and stay at the company; especially millennials who want to continue learning.”

One participant shared the example of a manufacturing company in Almonte, Ontario, which was considering laying off several employees who did not have the digital skills to upgrade into new jobs. Instead, they partnered with a local service provider, the TR Leger School of Adult, Alternative and Continuing Education, to develop programs to train existing employees in basic computer skills. Job loss was avoided and the company retained experienced staff.

In Woodstock, we also heard about internal training centres that have successfully developed employees’ skills in a growing company. “Local companies are adopting technical training centres. An auto parts company started with 12 employees and now has 1100. They have an internal tech training centre. It used to take them three to nine months to produce the part but now with adaptive technology they’re producing a prototype within 24 hours.”

In Sudbury, we spoke with stakeholders who have established a sector-specific training centre that operates as a non-profit. “We are a training and development organization primarily for the mining industry, but also construction, oil and gas, other sectors nationally and internationally. We have a mine where we teach mining skills. We train workers on special processes in our mine. We train entry level up to supervisory and leadership. We’ve been around over 20 years and growing. There are other centres trying to get off the ground around the world and we’re helping to establish them. We partner with colleges, mining companies or other training organizations to help them build their own training facilities.”

A union representative in the automotive sector outlined the importance of building strong partnerships with unions as new technology is introduced. “We have a new technology committee between the union

and the company. The company shows our representatives what the new technology is and then the committee comes up with the training for the staff.”

Badging

Participants in our engagement workshops told us about innovative training packages that are allowing workers to acquire specific sought-after skills. One participant described it as “just in time learning.”

We heard about a program being developed at Loyalist College whereby people can work toward earning badges that demonstrate their acquisition of specific skills for specific tasks. This type of training option was described as being part of a customizable education approach that allows people to add to their set of qualified skills incrementally. The concept of stacking together different modular sets of recognized education packages was described as being more relevant for today’s skilled trades education needs.

Consortium training

Another training option that participants were eager to discuss is training consortiums. With this model, niche industry topics could be taught to groups of workers in related industries. For example, several small IT development employers could get together to run a training on very specific programs that are not being taught in colleges. Advantages of this training option are that it would reduce the incentive to poach trained employees from other firms since the firms would collaborate to offer the same training. A constraint is that intellectual property concerns in competitive industries can prevent firms from seeking opportunities to collaborate.

Who is responsible for training?

A key question that was raised when discussing training is who should be responsible for funding, developing, and delivering training and re-training programs. One participant asked: “who is responsible for this education and adaptation? It can’t all fall on the government. There are a lot of private institutions who will benefit and they should bear some responsibility.” In a public engagement session one participant told us that “we’ve let employers get away with downloading their responsibilities to their employees when they say that they can’t afford to do the training.” Another participant noted: “not all employers are equipped for training. They think that’s what the schools are for.” Also, “Employers know part of their taxes go to the institutions, so shouldn’t they do the training?”

While many stakeholders felt that the government ought to play a key role in funding and providing training, we also heard that employers must be the ones driving the content of the training itself. In Windsor we heard that effective workplace training should be designed by employers: “training programs that have been most effective are when the employer is allowed to drive the topics of training but they get government funding to do so. Educational institutions are very important and the connection to industry is very important. We tell them what kind of skills we’re going to need so they can develop programs and work on curriculum.”

As a caution, we heard from one participant that “The government has unintentionally created a dependence on stimulus. So instead of being proactive, you have companies waiting on funding to install new machines or to upgrade. It’s created a reliance on government support that isn’t guaranteed.”

Some stakeholders felt that the government has a responsibility to support businesses with automation and training because it is government policy in the form of labour law and trade deals that increases the cost of doing business in Ontario. “The punch bowl needs to be bigger,” one business owner told us.

KEY CONSIDERATIONS FOR RESPONSES TO WORKPLACE CHANGE

This report summarizes what we heard about automation in the workplace from over three hundred participants in interviews and public engagement events as well as online survey responses. Several key considerations can be drawn from this public engagement initiative that may be useful for those influencing and developing responses to workplace change.

PUBLICLY FUNDED PROGRAMS ARE GOOD BUT THEY CAN BE BETTER.

Over the course of this study, participants had positive things to say about programs funded by the Ontario government including Second Career, the Canada-Ontario Job Grant, and Skills Advance Ontario. More flexible options including expanded eligibility requirements would make these programs even better and would allow more people to benefit from them, we heard.

ON-THE-JOB TRAINING WORKS BEST.

Stakeholders in various sectors reported that in-house training or mentoring is one of the most effective means of developing or enhancing workers’ skills. On-the-job training was seen by many stakeholders to be the most effective because it allows workers to actually experience the changes to the tasks they perform. Employers also reported preferring on-the-job training options because they require staff to spend less time away from their work.

TRAINING SHOULD BE APPROACHED COLLABORATIVELY.

Participants told us that managing changes around technological innovation works best when it is introduced in a collaborative manner. If workers and unions are actively engaged in workplace change it not only increases the successful adoption of the technology; it also maximizes the opportunities for jobs to be augmented, made safer, or made more efficient rather than being eliminated.

THERE ARE INNOVATIVE TRAINING MODELS THAT CAN BE FURTHER EXPLORED.

Training consortiums allow for specialized skills to be taught to groups of workers in related industries. This model appealed to some stakeholders because it allows for small, self-contained training modules to

be deployed where and when they are needed, reducing the need for workers to leave work for extended periods and allowing for training content that may not be offered in public institutions. Further exploration may be needed to understand how this training model can overcome issues such as intellectual property concerns and be used to maximize the benefits that come with workplace automation.

ONTARIANS ARE LOOKING FOR MORE INFORMATION ON AUTOMATION AND ITS IMPACTS.

Awareness of workplace automation is uneven, and many stakeholders shared the concern that their communities are insufficiently prepared. Workers, service providers and others suggested that there is a need for more information – about automation trends, potential employment impacts, and opportunities for job transitions. There appears to be broad interest in engaging in further conversations with government and across sectors about the implications of automation.

ENDNOTES

1 Lamb, C. (2016). *The Talented Mr. Robot: The impact of automation on Canada's labour market*. Brookfield Institute for Innovation + Entrepreneurship.

2 Manyika, J., Chui, M., Miremadi, M., Bughin, J., George, K., Willmott, P., & Dewhurst, M. (2017). *A Future That Works: Automation, Employment and Productivity*. McKinsey Global Institute.

3 The Fair Workplaces, Better Jobs Act (Bill 148). (2017). This bill was passed by the Ontario legislature in October, 2017. It will increase minimum wage to \$15 per hour by January 2019, and requires employers to pay seasonal and part-time workers on par with full-time employees, as well as requires employers to pay people to be on call.