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Policy Responses to Automation In Canada

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Abstract

The impacts of automation and emerging technologies on federal, provincial, and local economies have direct implications for labour markets across the country and require a policy response. Taking into account the impacts of the global COVID-19 pandemic on economies and workforces across the country, this paper reviews the policy choices available to various levels of Canadian governments and businesses in response to the challenges posed by automation. It concludes that reskilling workers, closing economic gaps between rural and urban areas, and preparing for widespread automation are just some of the ways that policymakers, business leaders, and local employers can prepare for, and address, the effects of emerging technologies.

Keywords: automation; emerging technologies; rural work; Canadian policy; rural development

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1.0 Introduction

The proliferation of automated technologies such as artificial intelligence and machine learning across almost every industry worldwide is impacting each country, region, and local community in different ways (Manyika, Chui, Miremadi, Bughin, George, Willmott, & Dewhurst 2017a). From job creation to the rendering of certain

tasks or whole jobs obsolete, the impacts of automation will be felt far and wide across countries and economies. Factors such as economic diversification, population size and industry demographics, and implementation of training programs and level of digital literacy all influence how easily a local, regional or provincial economy can adapt to labour force changes resulting from automation (Vincent 2017; Pettinger 2019; Manyika, Lund, Chui, Bughin, Woetzel, Batra, Ko, & Sanghvi, 2017b). In particular, rural areas across Canada are not only more susceptible to the negative impacts of automation because of the concentrations of industry common in these places, but the scale of such impacts may also be greater. While the manufacturing sector has historically been the focus of automation discourse, cities and towns specializing in extractive industries, including oil and gas, may also be highly susceptible to automation. These cities and towns are primarily located in Alberta, Saskatchewan, and southern Ontario and Quebec (Lamb & Lo 2017).

Overall, the Canadian industries most susceptible to partial or full automation include accommodation and food services, manufacturing, transportation and warehousing, agriculture, forestry, fishing and hunting, mining, quarrying, and oil and gas extraction. These industries are equivalent to approximately 2.5 million jobs, or 24% of automatable jobs (Lamb and Lo 2017). However, certain industries are concentrated in different regions across the country. Research shows that provinces with more economic diversification and a concentration of workers in areas not very susceptible to automation are better positioned for technological change (Wyonch, 2018). Furthermore, CMAs and CAs (census metropolitan areas and census agglomerations, respectively) that are highly concentrated in resource extraction are much more susceptible to automation than others (Younglai, 2017; Lamb & Lo, 2017).

While it may not be possible, or desirable, to retain routine jobs that are phased out due to automation, there are steps that governments can take to aid businesses and employees through workplace changes, reskilling, job losses, and economic uncertainty. Helping businesses respond to automation and reskill their workers presents a significant challenge for policymakers, and yet is necessary to keep people working and economies growing. This became particularly salient as the global COVID-19 pandemic had significantly and rapidly altered the economy and ways in which people work. Collins, Landivar, Ruppanner, & Scarborough (2020, p. 1) contend that, "beyond the disastrous health consequences, the pandemic has also ravaged national economies with soaring unemployment and work, school and day care closures." The economic downturn led to the termination of many routine jobs, few of which are projected to return when the COVID-19 crisis is over (Blit, 2020). As a result, the COVID-19 pandemic provides a possible glimpse into the future of work and the necessary possibilities/consequences of automation on the horizon.

As a response, we offer a review of the existing literature on policy responses to automation technologies on national and local workforces. Based on both grey and academic literature, we inventory, analyze, and present a number of policy recommendations for federal, provincial and municipal governments to consider in response to the widespread adoption of automated technologies. Overall, we found that in order to minimize workplace disruption due to emerging technologies, policymakers must find ways to reskill workers, improve digital literacy, and fill education gaps, particularly for those who work low-skill, physically routine jobs (Manyika et al., 2017b; Miller, 2018). Additionally, local employers and business

leaders need to be prepared to integrate automation technologies into their operations with their current staff and skill sets in mind.

Specifically, the literature points to six overarching policy recommendations that Canadian governments should consider in response to automation and the changing reality of work.

- First, digital literacy and access to reliable and affordable broadband are necessary for the current and future workforce. Thus, policies must be put in place to address the existing digital divide between rural and urban centres.

- Second, federal policies must be changed to ensure a broad tax base is maintained and thus able to address growing economic inequality and labour disruptions caused by automation.

- Third, governments across jurisdictions need to collaborate to find ways to make education, training, and reskilling opportunities available to all workers who may need them.

- Fourth, as the nature of work changes, labour policies must adapt and provide social safety nets and worker protections to those working in part-time, self-employed, or contract positions.

- Fifth, technology has changed the shape of industries and profit generation. Thus, the federal government must monitor the capability of tech firms to form monopolies and amend competition policies if needed.

- Finally, all governments must address gaps in data policies. As a crucial and expanding part of the digital economy, increased data collection must happen alongside the development and improvement of data governance standards.

In conclusion, we argue that while the majority of these policy recommendations are directed at provincial and federal governments, all levels of government, including municipal governments, can and must be involved in advocating for policy change. Municipal governments, alongside local and rural political and business leaders, must play a role in advocating for policies that address urban/rural disparities and ensure rural people and communities are not left behind.

2.0 Context

In response to the widespread adoption of automation and emerging technologies across industries, the international Organization for Economic Co-operation and Development (OECD) states that policy makers must be involved in strengthening the resiliency and adaptability of labour markets so that workers can manage workplace and career transitions with the least possible disruption, while maximising the potential benefits (OECD, 2019). In Canada, the Public Policy Forum surveyed Canadians across the country in 2019 to understand citizens' views on automation and their related policy preferences. The authors of the resulting report found that overall, citizens want governments to take action on automation and are willing to support policy change as a result. In particular, citizens who risk losing their jobs due to automation have a greater appetite for policy action, in various and overlapping areas, including increasing government spending on reskilling programs and expanding unemployment benefits (Loewen & Stevens,

2019). The survey responses also indicate that citizens' concerns about automation are not limited to job loss, as:

> People are also concerned about social and economic mobility and inequality. Politicians should pursue policy solutions that recognize not only automation and AI's short-term disruptions, but also their potentially longer-term effects on social and economic dynamism. Politicians can recognize the transformative economic potential of automation and AI while also arguing that the gains from these technologies should be widely and reasonably shared" (Loewen & Stevens 2019, p. 27).

The authors of the Public Policy Forum report found that individuals regularly underestimate their exposure to job change or loss due to automation (Loewen & Stevens, 2019). The report suggests that "when the time for reskilling comes, it will be a shock to many, and a dislocating one at that. Policymakers will only be able to encourage people to take advantage of reskilling opportunities if those in the labour market understand their need for it" (Loewen & Stevens 2019, p. 6).

3.0 Methodology

We undertook a review of the available literature on the policy implications and options related to the impacts of automated technologies in Canada. Using a scoping review method (Arksey & O'Malley, 2005), we framed the research question, identified and selected relevant studies, organized the data, and summarised the results. This scoping review was part of a larger study funded by the University of Alberta, the Government of Alberta, and a rural municipality. The objective of the project was to understand the local preparation, perceptions, and potential impacts of automation on the community and surrounding area and the local economy. As a complement to the broader literature, interviews were conducted with local business owners and managers to assess responsive capacity to disruptions caused by the application of full or partial automation technologies. Our results overwhelmingly suggested that there is significant ambiguity and uncertainty as to how local businesses view the future, the role of their business in the implementation of new technologies, and the anticipated effects of those technologies.

Overall, we found that the local business community was not prepared for automation. They were largely oriented to the status quo, anticipating only modest changes to their businesses and potentially facing challenges when presented with the need to adapt quickly. Few businesses were actively looking to innovate and implement new technologies, with most responding reactively to the implementation of automation in the workplace. For example, while many business owners self-identified as early adopters of technology, the majority could not specifically describe *how* they were early adopters or what steps they were taking to address or implement new technologies within their workplace. Thus, businesses and employees may not be aware of the impact automation could have on their jobs and livelihoods.

This is a significant problem as local and small businesses contribute significantly to the Canadian economy and employ millions of Canadians. Across Canada, small businesses, employing between 1–99 employees, make up a significant proportion

of employers. As of 2018, "small businesses employed 8.4 million individuals in Canada, or 69.9 percent of the total private labour force" (Government of Canada, 2019a). Furthermore, between 2013 and 2018, "small businesses were responsible for the majority (56.8 percent) of net employment growth in the private sector, which increased by approximately 590, 800 jobs" (Government of Canada, 2019a).

The preparedness of small businesses for the introduction of emerging technologies and automation in the workforce, and forthcoming workplace disruptions, is very important. It is within this reality (made all the more clear by COVID-19) that we asked: "What policy options are available to Canadian policymakers and businesses on the best ways to prepare for the impacts of automation? How can policymakers and government support small businesses and their employees?" In order to answer these questions, we have parsed and adapted the scoping review results (for which we searched for policy papers and reports across academic sources, think tanks, government sources, and other relevant organizations) in order to identify key policy considerations, recommendations or successes. Key search terms included: automation and policy, economic development, Canadian policy, policy responses to emerging technologies, and policy and the Canadian workforce. The majority of the relevant literature collected came from think tanks and research institutes, while few sources could be found from academic journals and databases. After finding and collecting the relevant sources, we collated them into key policy recommendations, which are listed below.

4.0 Analysis

The majority of the recommendations are directed at federal and/or provincial governments in Canada; however, in many instances, all levels of government and the wider business community should be involved in either working towards, or advocating for, the policy options provided below.

The policy recommendations are listed in no particular order, as these policy changes are all significant and cannot necessarily be addressed simultaneously or in any specific order. Some of the changes address infrastructure needs, such as widening broadband access through satellites, towers, and fiber, while others require significant changes to federal laws such as the tax, monopoly/competition, and data laws. Widening the social-safety net and investing in education and reskilling are policy challenges that cross all jurisdictions and require significant political will from all levels of government. While one provincial government may agree to increased social security measures, others may adamantly oppose any such changes. Thus, while all of these policy recommendations are significant, it is important to recognize that they come with specific challenges.

4.1 Limiting the Digital Divide

Policies need to be put in place to address the digital divide between urban and rural Canada.

In addition to well-documented gaps between rural and urban broadband infrastructure, a 2018 Brookfield Institute report also stresses the importance of digital literacy to the current and future workforce. The report states:

> Digital literacy is a fundamental component of 21st-Century literacy and
>
> vital for civic and social participation, accessing public services, and

> succeeding in a digitizing economy…Consistent digital access (to hardware,
> software, wifi, and data) is a foundational requirement for building and
> maintaining digital literacy and confidence using technology—yet access
> remains a challenge for learners with low incomes and those living in remote
> communities (Huynh & Malli, 2018, p. 1).

Canadian provision of internet services to rural places is relatively poor, consisting of high prices and low levels of broadband subscription. Rural communities often lack infrastructural accessibility and face higher subscription costs, slower speeds, and delayed or deferred connectivity. Thus, rural populations unwittingly face a digital divide compared to more populated settings (Hallstrom & Heinrich, 2017). The literature is clear that policies must be put in place to address this divide and provide rural and remote communities with the internet services needed to adapt and respond to technological changes.

While the federal government must take a lead role in closing the connectivity gap, many stakeholders are involved in the provision of internet services and federal policies, and funds alone will not solve this problem. The federal government must partner with provincial and territorial governments, municipalities, Indigenous communities, and telecommunications companies, who provide the services needed. The Government of Canada's Connectivity Strategy (2019) is a good start. Addressing the "national connectivity gap," the Connectivity Strategy's goal is to "connect every Canadian to affordable, high-speed Internet no matter where they live" (Government of Canada 2019b, p. 4). However, there is a significant amount of work to do. In 2017, the report states that "only 37% of rural households had access to 50/10 Mbps, compared with 97% of urban homes," and "only about 24% of households in Indigenous communities have access to 50/10 Mbps" (Government of Canada 2019b, p. 5). Thus, despite the commitment of governments to this issue, and millions of dollars spent, the connectivity gap is so significant that it will take a sustained effort, led by the federal government, to bring partners to the table, fund initiatives, and overcome barriers (Government of Canada, 2019b).

4.2 Tax Policy Innovation

Federal policy changes, alongside international cooperation, are needed to maintain a broad national tax base.

A report from the Centre for International Governance Innovation (CIGI) argues that "the most pressing policy issue is securing a broad and sustainable tax base to ensure that governments maintain their ability to react to changes in the economy. Current taxation arrangements may be insufficient to achieve a broad and sustainable tax base" (Blit, Amand, & Wajda, 2018, p. 7). Since the 1990s, globalization has enabled multinational corporations to strategically avoid taxation. As automation displaces jobs, the collection of income and payroll tax will decrease, and taxes will need to be collected from other sources. Further, as the economy becomes digitized, intangible assets, like data and algorithms, are becoming important sources of profit generation. Because these assets can be located in multiple jurisdictions, they are disproportionately linked to offshore financial centres. In this new reality, effective taxation will require increased cross-national collaboration. While international tax policy cooperation has improved, current approaches have made little progress on

the issue. Thus, the authors conclude that "what is clear is that continued efforts toward finding a collaborative solution will require ingenuity in accounting and political cooperation. The urgency of finding the appropriate way to tax equitably and broadly will only grow with the increased concentration of wealth" (Blit, Amand, & Wajda 2018, p. 8).

At a national level, increased and progressive taxation measures have been considered to combat growing economic inequality and labour disruptions caused by automation and AI. If the labour market cannot keep up with the rate of technological change, unemployment will increase, and a broad tax base will be needed to support individuals who have lost their jobs. Further, an increased tax base is also needed if social protection and employee protection programs are expanded to part-time, self-employed, and contract workers (as described in depth below) (Miailhe, 2017). As the provider of national employment services and unemployment insurance, and the entity facilitating international agreements and policies with other countries, the federal government must take the lead on this issue.

4.3 Inter-Provincial/Governmental Collaboration

Federal and provincial governments need to collaborate to find ways to make education, training, and reskilling opportunities available to students and workers across the country.

One tool to ease the transition of a more automated work environment is to reskill workers. Reskilling workers means taking the skill sets they already possess and either adapting them or changing them completely to better fit the current job requirements (Miller, 2018). Job disruption and unemployment are more likely for workers who are unable to obtain the necessary skills to keep up with the demands of automation (Mullin & Lamb, 2018). Educational institutions thus play a significant role in reskilling efforts as workers are retrained or their skills updated. However, reskilling of any significance is a process that takes time and money. Workers need the time and money to access retraining opportunities, if they are available. In rural areas, the distance students have to travel to advanced education often presents a significant barrier to access. We know that fewer rural students attend post-secondary studies in comparison to their urban counterparts, putting them at a significant disadvantage (Zarifa, Seward, & Milian, 2019). While reskilling is both important and necessary, it is not a linear process, and accessibility is a significant challenge.

With the introduction of different automated technologies such as AI, reskilling is a popular tool used by companies to avoid having to hire more employees with different skill sets (Illanes, Lund, Mourshed, & Rutherford, 2018). A 2018 report on the reskilling of workers during the switch to automated industries discovered that by 2030, as many as 375 million workers may need to switch "occupational categories," and that the types of skills that will be newly required will largely require workers to be reskilled (Illanes et al., 2018). According to a 2017 study, roughly 66% of executives see "addressing potential skills gaps related to automation/digitization" as a "top ten priority" heading into the next decade (Illanes et al., 2018). Thirty percent of executives put it into the top five. Additionally, 62% of executives believe they will need to either retrain or replace more than twenty five percent of their current employees before 2023 to address the rapid automation they plan on introducing (Illanes et al., 2018).

Most jobs in the future will require interacting with machines, and thus, more post-secondary graduates should possess computer programming skills regardless of their program. In response to changing labour demands and the development of new technologies, on the job training will also become more important. "Self-directed and on-the-job learning and training will play an ever-more-important role, and for workers who get pushed out of the labour force, government retraining programs could be crucial" (Blit, Amand, & Wajda, 2018, p. 8). Rapid technological change requires education and training that is adaptive and responsive to the changing workplace. Educational systems must focus on adaptable skills such as problem-solving, critical reasoning, creative thinking, emotional intelligence, and flexibility. Primary and secondary school systems must teach students foundational technological skills.

Researchers also suggest that educational systems should be promoting entrepreneurial values and teaching entrepreneurial skills (Blit, Amand, & Wajda, 2018). A report from the Centre for International Governance Innovation (CIGI) states that entrepreneurial skills will be increasingly important in the future. The authors contend that:

> Entrepreneurial skills (the ability to recognize opportunities, think creatively, problem solve and execute) are not only skills that machines cannot replicate, they are skills that are highly complementary with machines and therefore likely to be well compensated… workers with an entrepreneurial mindset are also more resilient. When faced with unemployment, they are more likely to find or create new opportunities, perhaps leveraging the low fixed cost of digital platforms to offer a niche service" (Blit, Amand, & Wajda 2018, p. 9).

However, doing so is premised on ready access to broadband services – an on-going challenge for rural Canada (see above).

Federal and provincial governments can and must also establish incentives to encourage retraining and lifelong learning programs. "Governments need to make reskilling widely available, easily understood, easily accessible, and effectively matched to actual skill needs" (Loewen & Stevens, 2019, p. 27). While provincial governments are responsible for education, and can take a lead on reskilling initiatives, the federal government can play a key role in facilitating a broader national strategy towards reskilling priorities and setting national accreditation standards. This higher level of intervention may facilitate bridging some of the social and economic inequities that may result from employment change due to automation.

Prettner and Strulik (2019) clearly articulate why, despite the need and/or desire to seek more education or skills training, some individuals will not be able to manage to acquire higher education and will be left behind. They contend that "more sophisticated technology induces more education but only to a certain degree because, eventually, some individuals will be left behind who do not manage to obtain a college degree due to ability constraints" (Prettner & Strulik 2019, p. 264). In their conclusion, the authors contend that designing "redistribution policies that

circumvent the repercussions through adjustments of education and technology appears to be a serious challenge for the future" (Prettner & Strulik, 2019, p. 264).

Education pathways and systems have been created to help facilitate the reskilling of the labour force. The World Economic Forum advocates for a pathways approach to the mapping of job transition opportunities (World Economic Forum, 2018). One such pathway that has been developed in Canada is the Employment Pathway Platform created by MaRS as a "skills-based career guidance tool for the Canadian workforce" (MaRS Discovery District, 2018, p. 3). This approach requires that employment agencies, educational institutes, and policymakers work with employers and workers to ensure that everyone has access to the information and supports needed to build lifelong careers. An employment pathway maps a job transition, beginning at a starting job and flowing to various other job options, while taking note of any upskilling or retraining required along the way. Thus, "by detailing skills gaps, sharing training program information, and profiling each occupation, employment pathways provide workers with career options to choose from, along with the guidance they need to reach their targets" (MaRS Discovery District 2018, p. 11). The MaRS report concludes that the tool can be valuable to many groups:

> Educational institutions, governments and employment agencies will all have a role to play in mitigating the risks and effects of automation on the Canadian workforce. These groups may use the platform to better understand the contributing factors that put current occupations at risk of automation, increase awareness with regard to emerging occupations that leverage automation, and identify existing skill gaps in the labour force. For intermediaries, such as educational institutions and employment agencies, the tool could help guide the development of training programs and the career advice they provide. For policymakers, understanding future trends and labour market trajectories—as well as the underlying skills gaps—can help them to efficiently allocate resources to support individuals and organizations actively trying to overcome these gaps (MaRS Discovery District 2018, p. 15).

4.4 *Expanding Social Policy*

Federal and provincial governments need to adapt and expand the social safety net and worker protections.

As automation disrupts the labour market, some jobs will be lost as others are created. Researchers contend that as the labour market changes,

> "…if jobs are destroyed more quickly than they are created, as the nature of the technologies suggests will be the case, at least initially, a strong social safety net will be needed to support workers over the medium term (which,

as we have seen, could last several generations)" (Blit, Amand, & Wajda 2018, p. 9).

In this new reality, the authors of a Centre for International Governance Innovation (CIGI) report contend that, as a country, "we must consider whether our welfare systems would have the capacity to handle a massive increase in unemployment as the economy undergoes this transition" (Blit, Amand, & Wajda 2018, p. 9).

As the economy and labour demands have changed, so has the nature of employment. Today, employers and firms are relying more and more on part-time and contract workers. Increasingly, more workers are also engaging in the "gig" economy out of necessity or as a way to supplement their income. These types of work often lack the protection and benefits of traditional full-time, long-term work, such as employment security, a stable (and potentially increasing) income, paid vacation, and health and disability insurance. Furthermore, independent work may not be protected by labour laws such as minimum wage, minimum hours of work, or employer-employee dispute resolution processes (Blit, Amand, & Wajda, 2018).

In response to the changing nature of the workplace, the OECD (2019) suggests that countries should consider extending greater protections and rights to those working in part-time, self-employed, or contract positions. Social protection systems are often designed for full-time, permanent, dependent employees, leaving others at a disadvantage. For example, in many countries, including Canada, self-employed individuals are not entitled to unemployment insurance (OECD, 2019). The CIGI report cited above further argues that

> In this new labour market, workers may find less consistent employment or may experience more frequent gaps in their work history due to skills training and retraining. One way to adapt the social safety net to fit these new circumstances is to increase the flexibility of eligibility tests for employment insurance and retraining programs (Blit, Amand, & Wajda 2018, p. 10).

A number of policy reforms or interventions, primarily at the federal government level, could be implemented in this regard. For example, a portable social security system could be put in place that is attached to each individual worker (Hill, 2015). Another option would be the implementation of some form of universal basic income. Different types of basic income structures have been implemented in Europe and considered by the European Parliament (Csefalvay, 2019), and a pilot project was approved in Ontario in 2016 before being discontinued in 2019 (Segal, 2016). The OECD (2019) suggests that worker rights and protections could be extended to specific occupations and/or to those who are self-employed.

4.5 Ensure Competition

The federal government should monitor the potential and capability of technology firms to form monopolies and consider amending competition policies and laws if needed.

As technology changes the shape of industries and intangible assets become an increasing source of revenue and profit generation, there is a risk that these assets will become concentrated among a few major tech firms. High-tech sectors are "natural monopolies" because there are high barriers to entry in the form of data and knowledge requirements, the digital nature of many goods and service implies high fixed costs with negligible variable costs, and platforms exhibit network effects in which the biggest tend to get bigger (Blit, Amand, & Wajda, 2018). The federal government must work to limit the ability of technology firms to form monopolies and amend competition policies and laws if needed.

Another concern regarding tech monopolies involves employment. There is already a trend in which research in automation and AI is shifting away from university and governments to technology companies. Some scholars have flagged the possibility that this shift will damage the future quality of public research and education (Miailhe, 2017). In their conclusions, the authors of a Centre for International Governance Innovation (CIGI) report state:

> Monopolies not only tend to impose higher prices for consumers and generate deadweight losses for society, but they can also have adverse effects on the labour market…If monopolistic tech firms are becoming one of the largest employers worldwide, the implications of this industrial composition for the workforce need to be better identified. How much bargaining power will workers with sector-specific skills have if there is only one potential employer in their sector? Having competing firms at different stages of the lifecycle may also be necessary to encourage innovation and a dynamic labour market (Blit, Amand, & Wajda 2018, pp. 10-11).

4.6 Access, Transparency and Protection of Data

Federal and provincial governments must address gaps in data policies.

Data is an essential part of the digital economy, as it provides the information needed for firm decision-making and AI algorithms. However, expanding data collection must happen in tandem with the development and improvement of data governance standards, particularly in regard to the ownership of personal data and the rights of individuals in regard to those data. Data cannot only be used to fuel new sectors and support multinational corporations such as Facebook and Amazon; data can also be used as a tool for public good (Blit, Amand & Wajda, 2018). Thus,

> Governments around the world have a responsibility to ensure that public information, scientific information and public domain information are accessible and free. Fundamentally, because data is central to the digital economy and a human rights issue, governments must put in place the structures that ensure it is used fairly and for the benefit of all. In addition,

issues around privacy, ethics and security must all be addressed (Blit, Amand, & Wajda, 2018, p. 11).

Many government services depend on data-driven technologies that rely on mass amounts of data gathered from multiple sources. Citizens generate a huge amount of data daily—voluntarily or involuntary—through the consumption of services, fitness apps, driving and navigation, interactions on social media, internet shopping habits, and viewing preferences, among other activities. Scassa (2018) contends that:

> An insatiable corporate and government appetite for data combined with ubiquitous and unbounded collection drives innovation, yet also creates the potential for risk and harm, ranging from security breaches to discrimination, persecution, and loss of autonomy and dignity.

The production and accumulation of huge volumes of data that carry economic and societal importance reveal the need for a national data strategy (Medeiros, 2020; Medhora & Owen, 2020). However, a contemporary, cohesive approach to data is absent from Canadian law. Formed by the federal government, a national data strategy should address a number of core issues and be backed by federal, provincial, and municipal government cooperation and consensus (Scassa, 2018). Questions around data ownership, who owns personal data, and who can access it, should be central to a national data governance strategy. Existing laws are largely seen as failing to keep up with developments in data collection and use. Scassa (2018) identified five different challenges in this regards:

1) Litigation over the practice of scraping publicly available data from online platforms demonstrates that current copyright laws are inept at dealing with questions around data access. The Canadian government is also investing more and more in open data, in which data is shared with the public under open licences and accessed through portals. While this is an important aspect of the government's role in data creation and use, these activities are not part of a broader national strategy.

2) While Canada does have some protections in place which apply to the private sector's use and disclosure of personal information, Canada may have to revisit these protections as the risks, costs, and devastation associated with data breaches continue to grow and the use of algorithms multiplies. In this rapidly changing reality, robust data protections are needed to promote transparency and justice and ensure basic human dignity.

3) More needs to be done to protect data security. A growing number of public and private sector high-profile data breaches demonstrate the need for improved data security practices and recourses.

4) Any national strategy must pay attention to data sovereignty, including where Canadian data is stored, and address the calls of Indigenous peoples for ownership, control, and access to Indigenous data.

5) Data justice, the fairness, transparency, and equity of data, and what data is used in decision-making must be considered in a national strategy (Scassa, 2018).

5.0 Conclusion

The global COVID-19 pandemic has demonstrated just how important it is to support workers and businesses during economic upheaval.

Over the past year, we have seen how the COVID-19 pandemic has drastically impacted economies and workforces across the country. The global pandemic demonstrated just how quickly the nature of work can change. In response to the health crisis, self-imposed restrictions and closures led to economic downturn and rising unemployment, especially for workers in routine jobs and rural areas (Agyepong, Gibson, & Bollman, 2020). Governments stepped in to offer relief to those impacted and responded to the immediate needs of workers. Both federal and provincial governments provided supports to businesses, and the federal government offered broad financial support to Canadians through the Canadian Emergency Response Benefit (CERB) (Blit, 2020). The realities of work changed as stay-at-home orders incentivized many employers to allow employees to work from home, offering more flexibility and shortening, or eliminating, daily commutes for workers (Collins et al., 2020).

The impacts of the pandemic and resulting economic downturn were not universal. Job losses disproportionately affected those who are the most "financially vulnerable" including "low wage earners, part-time employees, the solo self-employed, youth, and recent immigrants" (Blit, 2020, p. 192). The COVID-19 impact on job loss in rural areas and small towns was greater than job loss experienced in larger urban centers (Agyepong, Gibson, & Bollman, 2020). School and day-care closures due to the pandemic increased caregiving responsibilities for working parents, many of whom have had to alter their working hours as a result. Working women, regardless of where they live, were also more impacted by pandemic related job loss due to the high proportion of women working in retail, food services and accommodation sectors, and additional child-care responsibilities (Agyepong, Gibson & Bollman, 2020). Utilizing population survey data, the authors of a study in the United States further found that school and day-care closures disproportionately affected women, as "mothers with young children have reduced their work hours four to five times more than fathers" (Collins et al., 2020, 1). The authors concluded that "overall, mothers have reduced work time significantly more than fathers" and thus, "the pandemic is exacerbating gender inequalities." (Collins et al., 2020, p. 10).

The pandemic has demonstrated the necessity for many of the policy changes recommended above. As schools and workplaces moved online, the global pandemic showed the necessity of a reliable broadband connection, widespread digital literacy, and basic technological skills. Having the skills and internet connection to adapt and respond to these changes was essential and education was, and continues to be, a crucial part of addressing the effects of the changing reality of work. Expanding worker protections and social safety nets at the national level has become increasingly important as the nature of work has changed with the pandemic, and more people are changing jobs, taking contract work and participating in the "gig" economy.

The changing nature of employment increasingly asks policymakers to support businesses as they maneuver global market realities, increase their adaptability, and find innovative ways to adopt automated technologies and maintain employment. While it is clear that some routine jobs will be lost to automation, industries and

locations will be impacted differently. To combat the disproportionate impact of automation on rural economies and workforces, policymakers and governments must keep in mind the effects of automation in *all* areas, not only urban areas. Business owners and policymakers must work together and openly communicate about how to best serve the industries and employers, as well as employees that are at the highest risk of job disruption from a mass adoption of automation technology.

While the majority of policy recommendations within the literature is directed to higher levels of government, and thus, federal and provincial policymakers as well as municipal and local governments also have a role to play in advocating for, designing, and implementing policies that address these challenges. All levels of government, including local governments, can and must be involved in education and the implementation of education pathways and systems. "Governments need to make reskilling widely available, easily understood, easily accessible, and effectively matched to actual skill needs" (Loewen & Stevens 2019, p. 27).

For example, municipalities can consider undertaking educational initiatives in partnership with the local business community. Similarly, and as described above, businesses and employees may not be aware of the impact automation could have on their jobs and livelihoods. Businesses and workers cannot make changes if they do not have the information to do so. Beyond this first step, local business communities can further consider implementing other educational and/or reskilling opportunities within the community. Municipal governments may need to consider how they can work with the business community to ensure that the regional economy is diversifying and supporting workers amidst economic upheavals, like the pandemic, international pressures, and the implementation of automation and emerging technologies.

Now may be the time for governments at all levels to take action, as research suggests that the COVID-19 crisis may have opened the door for the widespread public support of the policies recommended above. Blit (2020, p. 200) contends that:

> This crisis may in fact be an opportunity to reimagine Canada's social safety net. COVID has generated a sense of solidarity and a newfound conviction of the important role of government. It has therefore created an opportunity to build institutions that will help Canadians not just through this current crisis, but also through future ones. We could consider, for example, a guaranteed basic income that would replace not just the CERB, but other current benefits, simplifying programs and ensuring that all Canadians enjoy a minimum standard of living regardless of circumstances.

As governments move to policy action, attention will have to be made to the disproportionate impacts that automation and workforce changes have on different populations and vulnerable groups. For example, Power (2020, p. 71) draws attention to the gendered nature of the unpaid care burden, stating:

> It is clear that in order to prevent further deepening of gender inequality, it is necessary and possible to take account of the additional unpaid care burden placed on women and families during the COVID-19 pandemic.

> Given that a large proportion of people have reservations about going back to their pre-pandemic "normal" life, and are interested in making changes in their own lives and in wider society, this could be an opportunity for systemic changes that enable care work to be valued and accounted for in economic and social policies.

As workforces change and economies shift, the public will be calling on all levels of government to respond to current realities. Policy makers in all jurisdictions must seriously consider the strategies, tools, and evidence available to, as automation and emerging technologies will continue to (re)shape the future of Canada's workforce, employment, and strength of local, provincial, and national economies.

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