Building Labour Force Resilience in British Columbia

by

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Abstract

With the rapid growth of automation and technological advancement, the skills and competencies required across British Columbia's economic development regions are evolving. As the province shifts towards a more digital, knowledge-based economy, it is important to consider the development of BC's labour force. While there are a number of initiatives targeting the next generation of workers, few supports sufficiently address the needs of mid-career workers in medium-skill occupations, who are more likely to experience challenges in adapting to changing job requirements. The purpose of this study is to determine the role the provincial government can play in building labour market resilience among this group. Using a case-study analysis as the primary research methodology, this study evaluates public employment supports in Ontario, Québec and Australia to identify policy options that may aid in streamlining job-transitions in BC.

Keywords: automation; technological displacement; adult learning; structural unemployment; skills training

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Preface

Research for this project was undertaken prior to the advent of the shut-down of the provincial economy due to the COVID-19 pandemic. The analysis and recommendations in this project thus do not consider the short to medium term impacts the pandemic has had and will have on the provincial labour market. Rather, it pertains to a labour market that has returned to the more normal challenges facing workers.

Executive Summary

This study explores the impact of automation – the use of technology to replace, change or assist physical or mental tasks traditionally performed by people – on labour market outcomes for mid-career workers in medium-skill occupations in British Columbia. This population is significantly impacted by automation due to the routine, and codifiable nature of the tasks associated with medium-skill occupations, and the informational and motivational barriers to reskilling they face having been in the workforce for several years.

Using a case-study analysis as the primary research methodology, the study evaluates public employment supports in Ontario, Québec and Australia to identify policy options that could aid in streamlining job-transitions for impacted workers in BC and build greater resiliency among the labour force. Each case is analyzed through an evaluation framework informed by academic and industry literature on adult learning, labour market policies and programs, and worker displacement. Four components of effective policy measures to improve outcomes for the target demographic are identified, including: employer involvement in training; accessible, and current labour market information; targeted initiatives; and a range of active labour market policies (ALMPs).

Based on the results of this study, an incremental and multi-pronged policy approach is deemed the most effective method of streamlining job-transitions for impacted workers and building a more resilient labour force. These recommendations can be acted on relatively quickly; address the needs of mid-career workers in medium-skill occupations, while benefiting all members of the labour force over the long-term.

1. In the immediate term, it is recommended that the Ministry of Advanced Education, Skills and Training (AEST) enhance the delivery of its labour market information through an interactive, user-friendly tool for identifying job transitions and reskilling pathways.

With simple, strategic and tailored labour market information, all users, and medium-skilled users in particular, will be better equipped to respond to labour market disruptions.

2. Over the medium-term, it is recommended that the Ministry also expand the eligibility criteria for the Employer Transition Training and Impacted Worker programs to include any unemployed, underemployed or precariously employed worker regardless of their region or sector.

This is likely to take more time to prepare, but once implemented, it is more likely to produce tangible outcomes for medium-skilled workers.

3. Finally, over the medium to longer-term, it is recommended that the Ministry analyze the impacts of legislating employer involvement in workforce skills training.

Chapter 1.   Introduction

This study explores the impact of automation – the use of technology to replace, change or assist physical or mental tasks traditionally performed by people – on labour market outcomes for mid-career workers in medium-skill occupations in British Columbia (Advanced Education, Skills and Training, 2018). This population is significantly impacted by automation due to the routine, and codifiable nature of the tasks associated with medium-skill occupations, and the informational and motivational barriers to reskilling they face having been in the workforce for several years.[1]

While each of the province's economic development regions have unique labour market conditions influencing the pace of automation, the gradual shift towards a more digital, knowledge-based economy is common to all. To date, job growth in the professional, scientific and technical services industry has been relatively concentrated in the province's most diversified regional economies – the Lower Mainland/Southwest and Vancouver Island/Coast. However, technology-based employment in BC is expected to grow across various sectors, including transportation and warehousing, mining and oil and gas extraction, and healthcare and social assistance (Advanced Education, Skills and Training, 2019a).

As a result, the job requirements, skills and competencies required for the emerging labour market are evolving, as is employer demand. Over the next 10 years, it is estimated that 77 percent of job openings will require higher-skilled workers with at least some post-secondary education or training (Advanced Education, Skills and Training, 2019a). While there is ample evidence of the disruptive nature of automation and technological change on labour markets, there appears to be a lack of sufficient urgency on the part of the provincial government to ensure members of the existing labour force are able to adapt, transfer, or upgrade their skills in response. The purpose of this study is to determine the role the provincial government can play in this regard, with a particular focus on mid-career, medium-skilled workers as there are few training and employment services that sufficiently address the needs of this group.

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[1] While some individuals may have engaged in ongoing training, the literature indicates that medium-skilled workers have a low willingness to seek job training or reskill (OECD, 2019).

Chapter 2 begins by defining automation and examining its impacts on the labour force with a focus on medium-skill occupations. It also identifies the most common motivations for business process automation through a review of academic literature and publicly available business-sector surveys and reporting. Chapter 3 offers an overview of provincial and federal supports for the impacted group, and Chapter 4 provides a summary of the policy problem and relevant stakeholders. Chapter 5 introduces the methodology that is presented in Chapter 6 – a case-study analysis of employment and training programs in Ontario, Québec, and Australia. Each case is analyzed through an evaluation framework informed by academic and industry literature on adult learning, labour market policies and programs, and worker displacement. Chapters 7 and 8 discuss policy objectives and options to address the policy problem, along with an evaluation of each policy option and final recommendations. Finally, Chapter 9 concludes with a discussion of research limitations and areas for further research.

Chapter 2.   The Automation Impact

Automation is defined as the use of technology to replace, change or assist physical or mental tasks traditionally performed by people (Ministry of Advanced Education, Skills Training, 2018). In understanding the impact of automation on BC's labour force, it is first important to distinguish between tasks and skills as they relate to certain occupations. As defined by Acemoglu and Autor (2011), a task is a unit of work activity that produces output (goods and services). The job-task content model, developed by Autor, Levy, & Murnane (2003), and subsequently built upon by Ingram and Neumann (2006), Goos and Manning (2007), Autor and Dorn (2013), and Frey and Osborne (2016), studies the changes in the task composition of jobs spurred by technological change and determines job susceptibility to automation based on the tasks they require to be performed; either routine, or non-routine.

Historically, the tasks most susceptible to automation have been those considered routine. The core tasks of these occupations follow precise, well-understood procedures, and as such, can be (and increasingly are) codified in computer software and performed by machines (Acemoglu & Autor, 2011). Non-routine tasks are those that require greater cognitive abilities, such as making tacit judgments, or driving a car. Recent technological advancements in Artificial Intelligence (AI) and machine learning (ML), make it so that many non-routine tasks have also become susceptible to automation (Frey & Osborne, 2016; Manyika et al., 2017).

In contrast, a skill is a worker's endowment of capabilities for performing various tasks. Essentially, individuals "apply their skill endowments to tasks…and skills applied to tasks produce output (Acemoglu & Autor, 2011)." Skills are categorized as either low, medium or high, and each have a pattern of comparative advantage such that tasks are ranked in order of ease, and medium skill workers are deemed more productive than low skill workers, and less productive than high skill workers in more complex tasks (Acemoglu & Autor, 2011). As highlighted in Table 1 below, routine tasks are characteristic of many medium-skill cognitive and manual occupations.

Table 1 – Job classification by tasks and associated skill-level

	Routine Tasks	**Non-Routine Tasks**
Cognitive	Medium-Skill (NOC Code C) Office support workers; Production and logistics coordinators; Payroll clerks	High-Skill (NOC Code A-B) Professional occupations in medicine, engineering etc.; Social workers; Police officers
Manual	Low-Skill (NOC Code C/D) Service occupations and other manual occupations: Food and beverage servers; Tour guides; Labourers;	Medium-Skill (NOC Code C) Longshore workers; Underground mine service and support workers; Chainsaw and skidder operators; Silviculture and forestry workers

Source: Adapted from Autor and Dorn (2013).

In the context of this study, low, medium, and high skill occupations are discussed within Canada's National Occupational Classification Code (NOC Code). As displayed in Table 2 below, the target population of this study, those working in medium-skill occupations, are classified as skill level C of the NOC Code. These occupations generally require secondary school and/or occupation-specific training.[2] NOC Codes A-B are considered high-skill, and those in NOC Code D are considered low-skill.

Table 2 – Share of BC's total employment by NOC Code

	NOC CODE	SHARE OF EMPLOYMENT (2019)
A	Occupations usually require university education	35.1%
B	Occupations usually require college education, specialized training or apprenticeship training	35.4%
C	**Occupations usually require high-school and/or occupation-specific training**	**25.3%**
D	On-the-job training is usually provided for occupations	10.5%

Source: Statistics Canada Table 14-10-0312-01; Author's calculations.

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[2] As Braham and Tobin (2020) note, while the NOC groups occupations according to "skill level" and "skill type," these criteria do not refer to actual skills but to educational attainment and the type of work typically performed, respectively.

As seen in Figures 1 and 2 below, the proportion of medium-skill jobs in BC has steadily declined over the past 5 years (currently 25.3 percent), while the proportion of higher skill jobs continues to grow, and lower skill jobs remains relatively stable (Statistics Canada, 2020). These trends are consistent with recent literature on job polarization in advanced economies which suggests that technological change is biased towards replacing labour in routine tasks, thereby decreasing the demand for medium-skill occupations relative to high or low-skill occupations (Autor & Dorn, 2013; Goos & Manning, 2007; Goos, Manning, & Salomons, 2014).

Those working in non-routine, cognitive jobs tend to be higher skilled. As such, they are generally more able to adapt the set of tasks that they perform in response to technological changes or other labour market conditions, due to their typically higher levels of training and formal education (Acemoglu & Autor, 2011). While those in lower skilled occupations tend to have lower levels of training and formal education, they are relatively less impacted by automation, since they tend to work in manual jobs where higher levels of physical and manual dexterity are required (Frey & Osborne, 2016).[3] Frey and Osborne (2016) have predicted that most workers in medium-skill occupations in transportation and logistics, office and administrative support workers, and labour in production are at risk of being affected by automation. In the local context, the BC government has estimated that 71 percent of medium-skill workers have a high chance of seeing their roles change or be replaced by technology (Advanced Education, Skills and Training, 2018). This is compared to 57 percent of lower-skilled workers, and 56 percent of higher-skilled workers.

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[3] See Frey and Osborne (2016) for a detailed discussion on the impediments, or "bottlenecks" to automation as they relate to low and high-skilled work.

Figure 1 – Employment Trends by Skill Level, British Columbia, 2015-19

Share of Total Employment by NOC Code
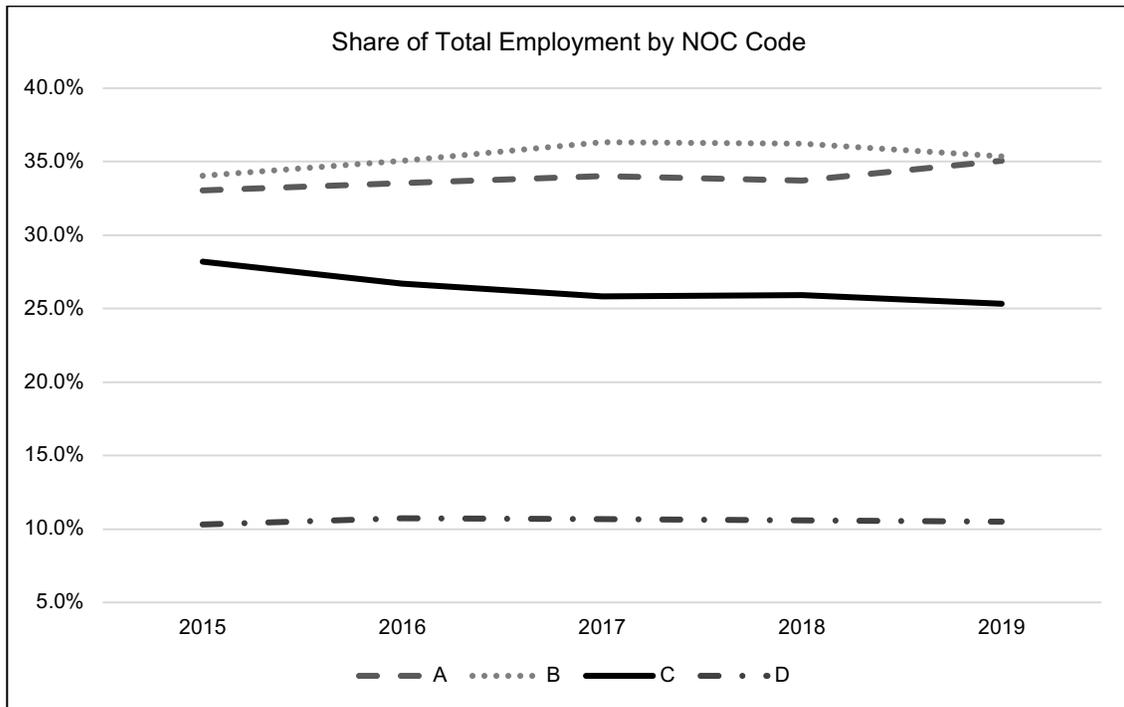
Source: Statistics Canada Table 14-10-0311-01; Author's calculations.

Figure 2 – Medium Skill (C) Employment Trends in British Columbia, 2015-19

Share of Medium-Skill Employment

Source: Statistics Canada Table 14-10-0311-01; Author's calculations.

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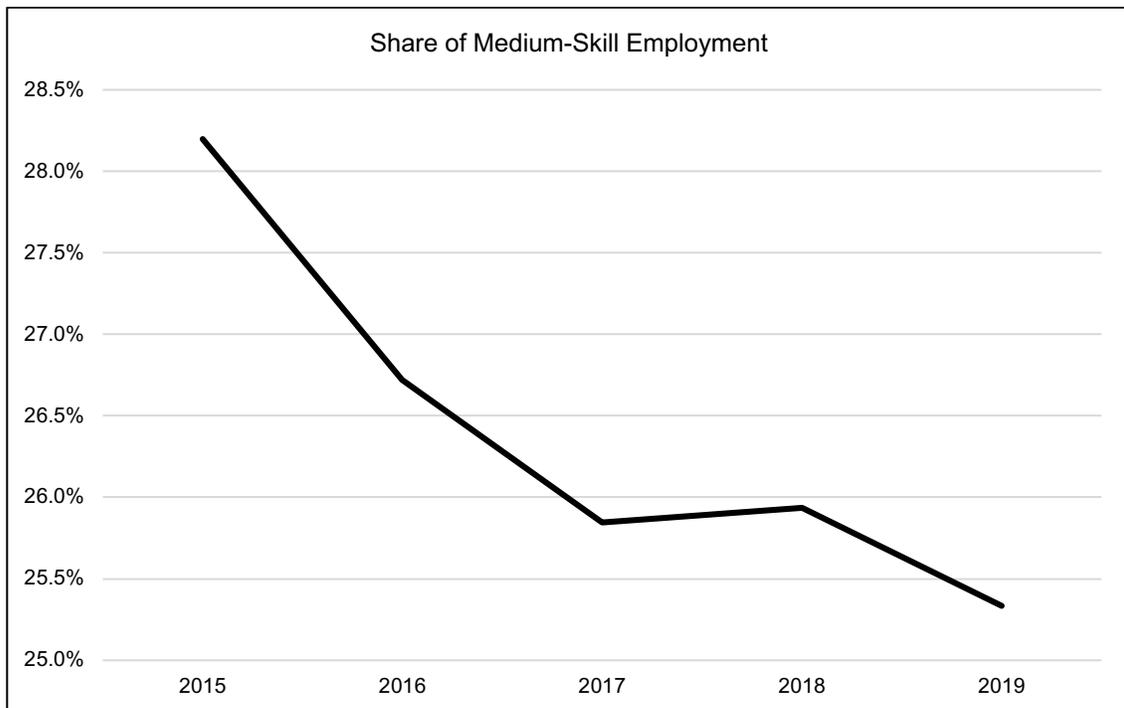
2.1. Mid-Career Workers in Medium-Skill Occupations

Given that 77 percent of job openings over the next 10 years will require individuals with some post-secondary education or training (Advanced Education, Skills and Training, 2019a), the impact of automation is likely to have significant consequences for mid-career workers in medium-skill occupations as research indicates that adults with low levels of formal education face significant informational and motivational barriers to reskilling (Hees, Rottinghaus, Briddick, & Conrath, 2012; World Economic Forum, 2018) and tend to have low willingness to seek job training or reskill (OECD, 2019).[4]

There may also be a tendency among this group to stick to the status quo out of a fear of change or job loss (OECD, 2019). The accelerating pace of automation in BC's port sector, for instance, was a key issue in labour negotiations for workers represented by the International Longshore and Warehouse Union Canada in Summer 2019. Workers at the Port of Vancouver voiced their concerns over automation of the workplace and its "potential devastation to [...] communities" and demanded "fair language" around automation to ensure their jobs would be protected (CBC, 2019; International Longshore and Warehouse Union Canada, 2019; Prism Economics and Analysis, 2019). Birnbaum and Farrow (2018) have also noted that skilled tradespeople in Ontario, for example, report feeling resentful or disappointed by automation reducing their opportunities to use their trade-related skills.

The United Steelworkers Local 7619, which represents approximately 1,000 workers at the Teck Highland Valley Copper mine, has also discussed the negative impact of automation on employee morale, citing truck drivers and other employees consistently asking, "am I going to have a job in the future (Wolff, 2019)?"

To date, the impacts of automation in other sectors has been relatively gradual, so some workers may not feel a sense of urgency to acquire new skills, especially if they are approaching retirement (OECD, 2019; Weaver 2017). Even for those that have been laid-off, Ci, Frenette, and Morissette (2016) found that workers who were aged 45 to 54 are just between 1 and 1.6 percentage points more likely than other workers to transition to post-secondary education, from a baseline rate of about 3%. Further, in terms of job

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[4] These themes are further explored in Chapter 6.

search assistance, one study found that older displaced blue-collar workers simply preferred replacement jobs with comparable wages to maintain their homes, families, and lifestyles (Hironimus-Wendt, 2008).

However, as the availability of comparable employment options declines and the average retirement age continues to grow in Canada (currently 64 years), mid-career workers in medium-skill occupations are at risk of experiencing structural unemployment (Hazel, 2018). As previously mentioned, the severity of impact on the labour force will depend on the pace of employer adoption. As such, the following section considers the motivations and labour market conditions that influence an employer's decision to automate processes or adopt labour-augmenting technologies in the workplace.

2.2. Key Factors Driving Workplace Automation

A review of the academic literature and business-sector surveys and reporting establishes three core factors likely to drive workplace automation in BC: addressing labour shortages, improving labour productivity and operational efficiencies, and increasing economic growth (Birnbaum & Farrow, 2018; Chartered Professional Accountants of British Columbia, 2018; Frey & Osborne, 2016; Hays Canada, 2020; Langevin, 2018; RELX, 2018; World Economic Forum, 2018).

Addressing Labour Shortages

The job vacancy rate is defined as the number of vacant positions, expressed as a percentage of labour demand (Statistics Canada, 2013).[5] As of the third quarter of 2019, the job vacancy rate in BC is 4.5 percent, the highest rate among the provinces and territories, with the exception of Yukon (5.5 percent) (Statistics Canada, 2020a). BC is also the only province with a job vacancy rate above the national average (3.3 percent). Combined with a low unemployment rate (4.7 percent), and in spite of young people starting out in the workforce, in-migration and immigration (Advanced Education, Skills and Training, 2018), BC is experiencing the tightest labour market conditions in the country (see Figure 3).

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[5] A job is vacant if it meets the following conditions: a specific position exists; work could start within 30 days; and the employer is actively seeking workers from outside the organization to fill the position (Statistics Canada, 2013).

Figure 3 – Job Vacancy and Unemployment Rate Trends, British Columbia

Job Vacancy and Unemployment, 2015-19, BC

Source: Statistics Canada Tables 14-10-0287-01 and 14-10-0325-02.

Labour and skills shortages were recurring themes in the provincial government's 2020 budget consultation (Select Standing Committee on Finance and Government Services, 2019). These concerns have also been quantified in business sector survey results, which report that at least 86 percent of BC employers are affected by the skills shortage (Chartered Professional Accountants of British Columbia, 2018; Hays Canada, 2020). Further, based on Statistics Canada's Job Vacancy and Wage Survey, the top 16 occupations with high a chance of being affected by automation all rank above average in terms of vacancies and are either low or medium skilled (Advanced Education, Skills and Training, 2018).

In 2016, Canadian employers were willing to pay $23.61 per hour on average to fill long-term vacancies compared with $19.63 for positions vacant for less than 90 days (Langevin, 2018).This amounts to a difference of about 20 percent. Such salary gaps are present regardless of sector, occupation, educational requirements or required work experience (Langevin, 2018). If the supply of labour continues to contract, businesses may face undue pressures in terms of increased labour compensation and a reduced or deteriorated quality of output.

The price decline in the real cost of computing (Frey & Osborne, 2016), along with a prime lending rate that held steady at 3.95 percent between October 2018 and February 2020 (Bank of Canada, 2020), make it so that firms dealing with long-term job vacancies, or those looking more generally to increase operational efficiencies may begin to consider automation as a way to augment its existing labour for greater output, or in some cases, to replace labour entirely. In fact, consistent with the literature (Birnbaum & Farrow, 2018), the BC government has suggested that the use of automation to address labour shortages could play a role in addressing this supply gap (Advanced Education, Skills and Training, 2019a).

Improving Labour Productivity and Operational Efficiencies

Improving BC's productivity growth has been a key point of discussion among government (Winter, 2018), as well as local business organizations, including the BC Tech Association (2020), BC Chamber of Commerce (2020), Greater Vancouver Board of Trade (2018), and Small Business BC (2020). In an increasingly digital and knowledge-based global economy, investments in intangible capital, such as information and communication technologies, are rapidly growing in value as a means of boosting productivity. In fact, a survey of 1,000 US senior executives found that 51 percent of respondents adopted AI and ML technologies for the very purpose of increasing efficiencies and/or worker productivity (RELX Group, 2018).

Employers in the natural resource industries have already begun automation processes specifically designed to increase operational efficiencies. For example, in 2018, Teck Resources launched a six-vehicle autonomous haul truck pilot project at its Highland Valley Copper (HVC) Mine, citing automation as "a natural progression for a mining fleet (Williams, 2018)." Teck is also using shovel-mounted sensors that use x-rays to sort waste rock from valuable ore, and AI technologies to predict equipment failures. From the company's perspective, automation and technological change is making their operations "safer, more sustainable and more productive (Teck Resources Limited, 2019)." The Vancouver Port Authority has also put forward a proposal to build a new semi-automated marine container terminal at Roberts Bank in Delta to respond to increases in trade demand (Prism Economics & Analysis, 2019).

Economic Growth

The adoption of technology is also linked to significant business growth (World Economic Forum, 2018). For instance, companies in the United States that increased their use of technology substantially between 2016 and 2019, specifically digital technology and apps, were nearly twice as likely (25 percent versus 13 percent) as other companies to say that their business has had strong growth (Salesforce, 2019).

Even more familiar tools of business process automation – such as *Microsoft Office 365* for managing documents; *Quickbooks Online* for invoicing and expense reports; and *MailChimp* to assist with emails and messaging – can significantly boost productivity for smaller businesses (Esperat, 2020). When employees can reduce the amount of manual and repetitive tasks that make up their day to day tasks, they also free up time for higher-valued creative or strategic tasks and innovation (Birnbaum & Farrow, 2018). The indirect costs of labour shortages, such as the opportunity cost when senior staff have to step away from their typical role to fill another, also disproportionately affects the productivity and growth potential of small and medium sized businesses. In fact, in a survey of over 1200 SMEs, the Business Development Bank of Canada found that firms affected by labour shortages are 65 percent more likely to be low-growth companies (Cocolakis-Wormstall, 2018).

While it is difficult to predict the pace of wide-scale automation, this chapter concludes that current labour market conditions may incent businesses to accelerate their adoption of digital technologies. In fact, BC's Innovation Commissioner has encouraged greater technology adoption among businesses (Winter, 2018).

This warrants a review of current employment and training services in BC to assess supports and resources available to the labour force, and mid-career workers in medium-skill occupations in particular, to adapt, upgrade, or transfer their skills to comparable employment.

Chapter 3.

Labour Force Development in British Columbia

With the exception of Québec, the development of employment programs and services in all Canadian provinces are supported through Workforce (WDA) and Labour Market Development Agreements (LMDA) with the Government of Canada. The most recent Agreement between BC and Canada was negotiated in 2018 and replaces the Canada-BC Job Fund Agreement (in place between 2014 and 2018). This section provides an overview of relevant provincial and federal employment and training programs and services. These include the BC Employer Training Grant (ETG), the Skills Training for Employment (STE) Program, and the Interior Forestry Support Program.

3.1. BC Employer Training Grant

The ETG is a cost-sharing program between an employer and the BC government. It is designed to help workers access skills training to adapt to changing job requirements while encouraging employer involvement in the training of their employees (WorkBC, 2020c). Employers are eligible to receive up to $300,000 per fiscal year in grants to cover full or partial costs of workforce skills training.

At the time of this writing, the Ministry responsible for administering this program, Advanced Education, Skills and Training (AEST), has not published the program's annual report for the 2018-19 fiscal year. Therefore, this section draws its analysis from the 2017-18 fiscal year reporting of the predecessor of the ETG the Canada-BC Job Grant (CJG). The main difference between the two grant programs is their streams of focus. Through the CJG, funding was available for five streams: priority sectors; refugees; underrepresented groups; the unemployed; and rural. The ETG offers four broader streams of training: foundational training; technical training; workforce training; and employment transition training. A summary of each ETG training stream, as presented on WorkBC.ca (BC's online source for labour market information), follows (WorkBC, 2020c).

Foundational Training

The Foundational Training stream is for low-skilled employees (high school education or less, working in occupations classified as NOC Code C or D), who are seeking training for improved job-related skills. Eligible training includes accredited essential skills training; trade training certified by the Industry Training Authority (ITA); occupational certification; and industry or sector-recognized certification. Each applicant receives 100 percent of eligible training costs up to $10,000 per participant.

Technical Training stream

The Technical Training stream supports technical skills development in response to automation and other technological advancements. Technical training is defined as training to develop new skills required to operate machinery, equipment or use software, an application or program. This includes computer programming and training needed for the successful adoption of new technological systems, including new manufacturing, production and construction methods. Applications approved under this stream receive 80 percent of eligible training costs, up to a maximum of $10,000 per participant.

Workforce Training Stream

The Workforce Training Stream is designed to support any training that aligns with an employer's business needs, including the development of management, business and soft skills. This stream is generally applicable to higher-skilled workers. Applications approved under this stream receive 60 percent of eligible training costs, up to a maximum of $5,000 per participant, per fiscal year.

Employment Transition Training

The Employment Transition Training stream was created in October 2019 to support forestry workers impacted by mill closures or curtailments. Applicants must be from an "impacted community," i.e. one that has experienced a significant shift in labour market needs and each employer receives 100 percent of eligible training costs up to $20,000 per participant, per fiscal year.[6]

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[6] The Transition Training stream was announced as part of the Interior Forestry Workers Support Program discussed in section 3.3.

Insights from the Canada-BC Job Grant

At this time, there does not appear to have been widespread uptake of the ETG. As previously stated, the program results from the last fiscal year are not publicly available. However, results from the Chartered Professional Accountants of BC's annual Business Outlook Survey (2018) found that only 15 percent of its members, who employ or work for companies that employ workers across skill-level and sector, used the ETG for their clients or organizations. Moreover, they noted that the difficulty, or perceived complexity, of the application process either deterred them from applying for the grant or led them to hire an external consultant to assist them in navigating the application process, which increased business costs. Others were unaware of the program entirely.

The eligibility criteria for the ETG remains the same as the eligibility criteria for the CJG, namely that all private and non-profit employers operating in BC (including the self-employed, unions, and Indigenous governments) must have a job for the participant at their company once training is completed. Therefore, the outcomes of the CJG are reviewed for insight into the potential success of the ETG, with the caveat that the broader scope of program streams may have attracted more applications in the last fiscal year (WorkBC, 2018, 2020c).

In the 2017-18 fiscal year, there were about 11,671 CJG participants. Like the ETG, the CJG was designed to upskill current or new staff (WorkBC, 2018). As a result, the majority of CJG participants were employed prior to training (87 percent), and a total of 96 percent of participants were employed within a year of their training. Interestingly, about 67 percent of participants either had a university degree (40 percent) or some post-secondary or a trades certificate or diploma (27 percent), suggesting that higher educated staff are more likely to benefit from employer-sponsored training. Additionally, a majority of participants were situated in the lower mainland (65 percent), where the rate of educational attainment is highest and labour markets are most diversified, followed by the Vancouver Island/Coast (14 percent), and Thompson-Okanagan (11 percent) regions (WorkBC, 2018). Moreover, only 8 percent of employers applied for CJG funding in order to hire and train new staff, and only 25 percent to train their current staff to fill other positions (WorkBC, 2018).

3.2. Skills Training for Employment: Impacted Workers

The Skills Training for Employment (STE) program provides skills training and employment supports to vulnerable and under-represented groups. It also addresses barriers to participation in skills training and employment. Examples may include counselling, mentoring, childcare, transportation, disability supports, work experience, wage subsidies and equipment. The program has a total of six streams of funding, however, only the Impacted Workers stream is relevant to this study. Like the ETG's Transition Training stream, the Impacted Workers stream is also a component of the BC government's Interior Forestry Worker Support Program, discussed below.

3.3. Interior Forestry Worker Support Program

The Interior Forestry Worker Support Program was announced in Fall 2019 in response to a series of mill curtailments, shift reductions, and closures in the BC interior, driven by a combination of declining beetle harvests, low United States lumber prices, and the 2017 and 2018 wildfire seasons impacting timber supply.

In addition to dedicated supports added to the ETG and STE programs, there are two programs relevant to this study: the Retirement Bridging Program and the Job Placement Program. Neither of these programs promote or facilitate workforce skills development but are discussed here to provide a more fulsome view of the BC government's policy tools dealing with structural shifts in the labour market.

The Retirement Bridging Program offers financial support to full-time mill workers who are 55 years or over with two years of consecutive experience in a mill to voluntarily transition to retirement (Government of British Columbia, 2020a). In 2018, at least 33 percent of medium-skilled forestry workers across the province were 55 years or over (WorkBC, 2020a). Depending on the uptake of this program, it may generate vacancies that could be filled by impacted mid-career workers. It is worth noting, however, that workers who are approved for this program are not permitted to work as an employee for 18 months. This may impact program uptake, considering the trend of older workers in Canada choosing to work longer (Hazel, 2018).

The Job Placement Program is designed to match up forestry workers with new jobs. Participants are required to submit a Job Matching Form (including information about their formal education; past experience; equipment training or certifications; experience in particular type of work environment; type of driving training completed; and hobbies and interests that can be transferred to a new job (Government of British Columbia, 2020b). While this process is likely to result in more tangible employment outcomes (i.e. a job placement), it does not promote skills development or adaptability.

3.4. Labour Market Information

The BC government publishes all labour market information online at WorkBC.ca. The website provides practical information about job opportunities, career options, and education and training options. WorkBC also publishes an annual Labour Market Outlook which includes a 10-year forecast on BC's labour market, the number of expected job openings for the province; regional and industry level demand for workers; a list of 500 high opportunity occupations; and information regarding the education and training required for the predicted job openings (Advanced Education, Skills and Training, 2018). This information is based on the BC Labour Market Scenario Model, which is based on historical data, including population by age, employment by industry and occupation, information on major projects, and assumptions about the future, including retirement rates, economic growth, and migration trends.

3.5. Canada Training Benefit

Finally, Budget 2019 proposed the Canada Training Benefit – which works within the existing Employment Insurance (EI) system to offer up to four weeks of support job protection and income support for workers to access training. Whereas the ETG provides support to employers, the federal Training Benefit is offered to individuals (Department of Finance Canada, 2019).

Chapter 4.   Policy Problem & Stakeholders

This chapter summarizes the policy problem, study objectives and relevant stakeholders.

4.1. Policy Problem

The rapid growth of automation and technology-based employment in BC has a significant impact on labour market outcomes for mid-career workers in medium-skill occupations. While there is ample evidence of the disruptive nature of automation and technological change on labour markets, there appears to be a lack of sufficient urgency on the part of the provincial government to better prepare the labour force to adapt, transfer, or upgrade their skills in response. The purpose of this study is to determine the role the provincial government can play in this regard, with a particular focus on mid-career, medium-skilled workers as there are few training and employment services that address the particular needs of this group.

4.2. Stakeholders

The main stakeholders identified in this study are mid-career workers in medium-skill occupations, employers, and industries that make up BC's labour market. While ensuring all age and skill groups within the labour force have programs and policies that address their needs, the policy options I examine are prioritized on their ability to improve labour market outcomes for older workers in medium-skilled occupations (those listed as skill level "C" in the NOC code). A detailed list of these occupations can be found in the Appendix. The success of businesses and industries will also depend on a steady supply of skilled workers that are able to adapt to changing job requirements and fill the technical positions arising out of automation. Organizations representing the business community, such as the Business Council of British Columbia, local boards of trade and chambers of commerce are also considered.

Chapter 5. Research Methodology

The primary research methodology used is a case study analysis consisting of three comparable jurisdictions: Ontario, Québec, and Australia. The research examines how these jurisdictions are responding to the impacts of automation and technological change on local labour markets. Each case identifies the most relevant strategies, policy tools and programs that have the potential to directly, or indirectly, improve labour market outcomes for older, medium-skilled workers.

The main labour force development strategies, policy tools and programs identified are analyzed through an evaluation framework informed by a review of academic and industry literature on adult learning, labour market policies and programs, and worker displacement. Four components of effective policy are identified: employer involvement in training; accessible, and current labour market information; targeted initiatives; active labour market policies.

Chapter 6.   Case-Study Analysis

This chapter begins with a brief overview of the labour market conditions in Ontario, Québec, and Australia to identify how they compare to BC. It then discusses how each government is responding to the impacts of automation on the local labour force, along with an analysis of the effectiveness of their response guided by an evaluation framework informed by academic and industry literature on adult learning, labour market policies and programs, and worker displacement.

6.1. Ontario

The first case-study examines Ontario, which follows a similar occupational growth pattern as BC, in that medium-skill occupations have been experiencing decline or stagnation, while job growth has dominated in both lower and higher skilled occupations (Lamb, Munro, & Vu, 2018). The proportion of Ontarians employed in medium-skill occupations is currently 25.5 percent, just 0.2 percentage points higher than BC (see Figure 4) and has fallen by 1.5 percent compared to about 2.9 percent in BC in the past five years (Statistics Canada, 2020).

Figure 4 – Medium-Skill (C) Employment Trends in Ontario v BC, 2015-19
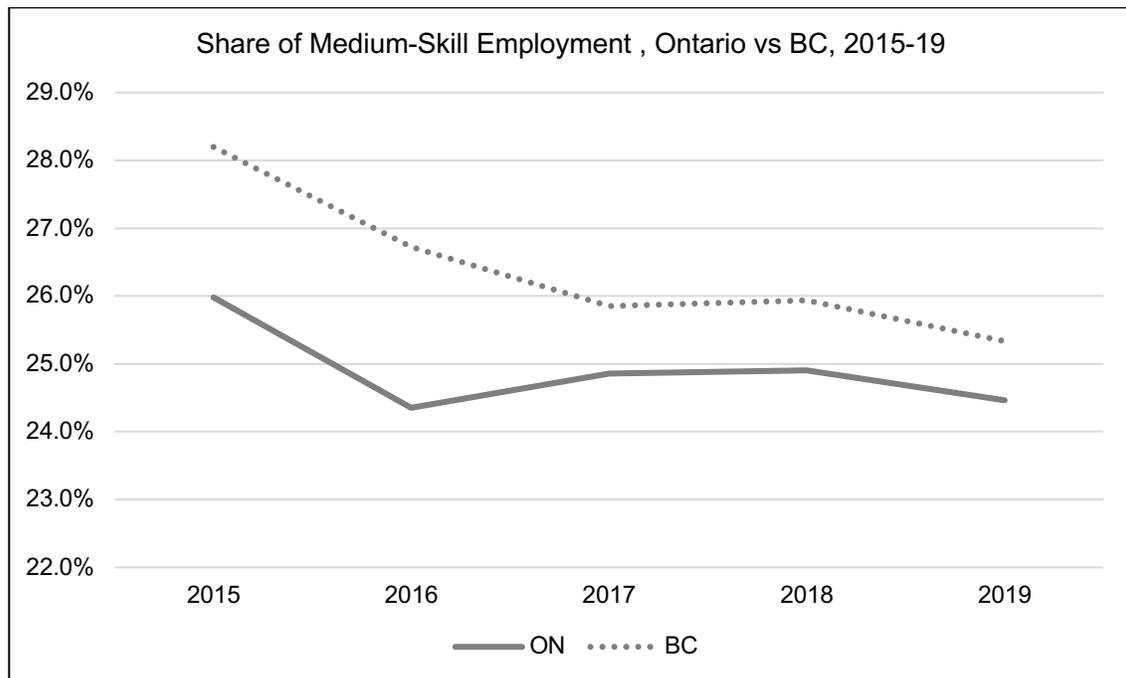
Source: Statistics Canada Table 14-10-0311-01; Author's calculations.

Past research has suggested that the impacts of automation may be muted in Ontario given the low rate of technology adoption among Ontario firms (Lamb et. Al, 2018). Over the past few years, however, advanced technologies such as AI and industrial robotics have become key tools in the Government of Ontario's strategy to revive the manufacturing sector, and the automotive industry in particular, where production has fallen 25% since 2000 (Invest in Ontario, 2020; Ministry of Economic Development Job Creation and Trade, 2019).

In early 2019, the government introduced *Driving Prosperity: The Future of Ontario's Automotive Secto*r, a plan to strengthen the auto sector's competitiveness. The plan aims to position Ontario as a leader in the development, commercialization and adoption of advanced manufacturing and mobility technologies over the next 10 years (Ministry of Economic Development Job Creation and Trade, 2019). In response to the disruption caused to workers by technological change, the plan proposes two areas for immediate action: developing a talent roadmap and skills inventory to identify current and future skills needs, and launching a micro-credentials pilot to test the ability of short, employer and industry recognized credentials to help unemployed Ontarians and at-risk workers gain relevant skills quickly (Ministry of Economic Development Job Creation and Trade, 2019).

In addition to the auto industry, the recently launched SkillsAdvance Ontario (SAO) program provides dedicated sector-specific training for jobs in steel and aluminum, manufacturing, logistics, tourism and hospitality, and forestry (Ministry of Labour, Training and Skills Development, 2020). The program supports sector-focused workforce development by funding partnerships that connect employers with the employment and training services required to recruit and advance workers with essential, technical, and employability skills. Participants are usually unemployed and are provided with instruction on how to develop transferable skills as well as technical skills for a career in a specific sector. After successful training, participants are matched with employers with vacancies. During the last fiscal year, SAO supported partnerships between 104 employers and 15 training providers and assisted 1,547 clients (Ministry of Colleges and Universities, 2019).

This program is essentially a combination of BC's Job Placement Program and STE for Impacted Workers programs in that participants are guaranteed to find

employment and receive relevant skills training. However, the BC programs are only available to forestry workers in the interior, whereas SAO provides support multiple sectors. The combination of these two measures, as demonstrated by the SAO program is significant, as research indicates that older displaced blue-collar workers tend to prefer replacement jobs with comparable wages to maintain their homes, families, and lifestyles, rather than job-search assistance (Hironimus-Wendt, 2008). Card, Kluve, and Weber (2018) also find that the impacts of "work first" style programs that offer assistance or incentives to enter work quickly are generally more stable than training programs focused exclusively on skills development. This reinforces the idea that a combination of relevant skills training and job matching may be an effective method for supporting mid-career workers across BC industries enter into comparable or better employment.

For workers that have been laid-off, the Government of Ontario offers the Adjustment Advisory and Second Career programs. The Adjustment Advisory program provides specific supports to residents who have lost their job due to layoffs or closures from an employer with 50 or more employees. Participants meet with an Advisor at their local Employment Ontario office, where they can access general job-search assistance, career, financial and personal counselling, skills training, and information about starting a business. The advisor also helps participants find and join a group with other employees, managers, employers and union staff who have gone through similar layoffs or business closures.

The Second Career Program is a back-to-school option which provides qualifying residents financial support (up to $28,000) to pursue relevant skills-training for a transition to a new career.[7] Candidates work with their local employment services agency to complete an application requiring the candidate's employment and skills history, and evidence of employment prospects within the province to demonstrate that the career they want to train for is in demand.

In its early assessments, the program appeared to show success. A survey conducted 2 years after implementation (2010) showed that 93 percent of participants completed training and 61 percent of Second Career graduates found new jobs (Ministry

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[7] Laid-off workers can apply for up to $28,000 to cover tuition, books, transportation, basic living costs, and child care (Government of Ontario, 2016).

of Colleges and Universities, 2010).[8] However, a 2016 assessment of the program conducted by the Office of the Auditor General of Ontario found that the program was largely ineffective in helping participants find and keep full-time jobs, or jobs in a field relevant to their training (Office of the Auditor General of Ontario, 2016).

In the 2015/16 fiscal year, 8,600 people began skills training for high-demand occupations. Of those who completed the training, only 35 percent of participants reported being employed at the time of completion (17 percent employed full-time), and only 10 percent had found employment in professional occupations, more suitable jobs, or jobs in their field. Outcomes for 2014/15 were similar, but when service providers followed up with participants 12 months after they completed the program, employment results had improved. That is, 81 percent of contacted participants reported being employed, 44 percent reported being employed full-time, and 22 percent reported being employed in a field relevant to their training. This is consistent with Card et al.'s (2018) analysis that "human capital" style programs have small (or in some cases even negative) short term impacts, coupled with larger impacts in the medium or longer term. As the Office of the Auditor General of Ontario (2016) notes, however, given that people are getting trained in high-demand occupations, one would expect that a higher percentage would find employment in a field relevant to their training.

The Auditor General's report also found that most of the employment and training programs were ineffective in helping Ontarians find full-time employment. A 2018 update found little improvement (Office of the Auditor General of Ontario, 2018). The Government of Ontario acknowledged the inefficiencies of its employment and training system in its 2019 budget. In fact, the micro-credentials pilot discussed above was introduced in the 2019 budget as a preliminary step to redesigning the Second Career and other skills training programs (Ministry of Economic Development, Job Creation and Trade, 2019).

Although back-to-school options are commonly accepted as an effective, active labour market measure, the outcomes of the Second Career Program suggest that such measures must be tailored to the target group's specific needs and learning abilities.

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[8] It is important to note that this government release does not include data on the type of jobs found, for example, whether they were full or part-time, in their field of study, professional occupations, more suitable jobs, or jobs in their field.

Research indicates that adults with low levels of formal education face significant informational and motivational barriers to reskilling (Hees et al., 2012; World Economic Forum, 2018) and tend to have low willingness to seek job training or reskill (OECD, 2019). Even for workers that have been laid-off, Ci et al. (2016) found that Canadian workers aged 45 to 54 are just between 1 and 1.6 percentage points more likely than other workers to transition to post-secondary education, from a baseline rate of about 3 percent. Moreover, as Ci et al. (2016) suggest, "if firms selectively lay off workers who have lower-than-average productivity, and if productivity and learning ability are positively correlated, laid-off workers might have a relatively low ability to learn new concepts."

Kato, Galán-Muros, & Weko (2020) find that alternative credentials, such as micro-credentials, that can be geared towards medium-skilled workers, or those that have completed secondary education could be particularly useful for upgrading skills of mid-career workers for new technologies. [9] Micro-credentials can target mid-career workers, who may not have the time, learning, or financial capacity of enrolling in a full degree. These programs can be offered online, or face-to-face and provide more flexibility to individuals, and in many cases, there are usually related credentials of greater scope should the individual prefer (Kato et al., 2020). Consistent with findings from Australia, there appears to be significant interest from employers and industry representatives in training staff in micro-credentials as an alternative to full qualifications (Joyce, 2019). Ontario's micro-credentials pilot, therefore, appears to be aligned with industry trends.

Employer-sponsored training can also address the motivational barriers to adult reskilling (World Economic Forum, 2018). Like BC's Employer Training Grant (ETG), the Canada-Ontario Jobs Grant (COJG) is a cost-sharing agreement between an employer and the provincial Government. It provides financial support for employers looking to provide training for their workforce via three broad streams; training requests for up to 25 participants; training requests for more than 25 participants; and training requests for a group of two or more employers. In this sense, the program streams are less tailored than those available in BC.

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[9] Other examples of alternative credentials include academic certificates, professional/industrial certificates, and digital badges.

Funding eligibility also differs. In Ontario, funding amounts are tied to the size of an employer. This is generally supported by the literature as larger firms are more likely to offer their staff training support (Hui & Smith, 2003; Wi et al., 2015). Larger employers in Ontario (100 or more employees) are required to pay at least half of direct training costs, whereas smaller employers (fewer than 100) contribute 1/6 of eligible training costs. Each are eligible for funding up to $10,000 and $15,000 respectively, per trainee. "New hire" trainees are automatically assessed for 100 percent funding (Ministry of Colleges and Universities, 2020).

In terms of the participants, few employers access the grant to train unemployed workers they intend to hire. Only 6 percent of COJG funding is dedicated to training unemployed workers (Pichette, Tamburri, Mckeown, Blair, & Mackay, 2019) compared to 8 percent in BC. Additionally, managers, supervisors, and professional, technical, and scientific personnel account for about 70 percent of the average training budget and receive more intensive training than employees with lower qualifications, indicating that employers are more likely to spend training dollars on their most highly educated staff (Hui & Smith, 2003; Munro, 2019; Pichette et al., 2019).

There are also several examples in the literature (in and outside of Canada) that demonstrate how upskilling existing staff can benefit an employer by avoiding costs and pressures of recruiting new employees or hiring temporary contractors who may not have the experience with customers and culture, or loyalty of those with many years of experience with the organization (Manyika et al., 2017). In its transition from assembly operations to parts manufacturing and autonomous and advanced technology vehicle testing, General Motors (GM) Oshawa, is supporting the transitions of 300 jobs that can be retained (Cukier, 2020). GM is also offering financial aid to employees whose jobs will not be retained (Cukier, 2020) and has partnered with Unifor, the union representing these workers, and the Government of Ontario to launch a Job Action Centre to assist workers in their job-search efforts and access reskilling. Not only do these actions support labour force development, but they can have immediate and reputational benefits to the employer (Taylor, Carrigan, Noura, van Halder, & Dandona, 2019).

Finally, the Government of Ontario is also working on addressing the lack of timely and accessible labour market information, which can contribute to the informational barriers faced by mid-career learners. Like BC, the Government of Ontario

offers job profiles to help job seekers explore potential careers and access to provincial job postings, however, the level of forecasting in Ontario is limited to a 5-year outlook and does not factor in immigration trends. Without accurate data on current and future opportunities, individuals may not achieve the training and employment outcomes they intended.

6.2. Québec

Québec also follows a similar occupational growth pattern as BC and Ontario, in that medium-skill occupations have been experiencing steady decline or stagnation, while job growth for higher skilled occupations has been positive. The proportion of Quebecers employed in medium-skill occupations is currently 23.0 percent, just 0.5 percentage points lower than BC (Statistics Canada, 2020). The percentage change over 5 years is relatively lower, but is still comparable to BC, with total medium-skill employment falling by 2.6 percent compared to 2.9 percent in BC (see Figure 5).

Figure 5 – Medium-Skill (C) Employment Trends in Québec v BC, 2015-19
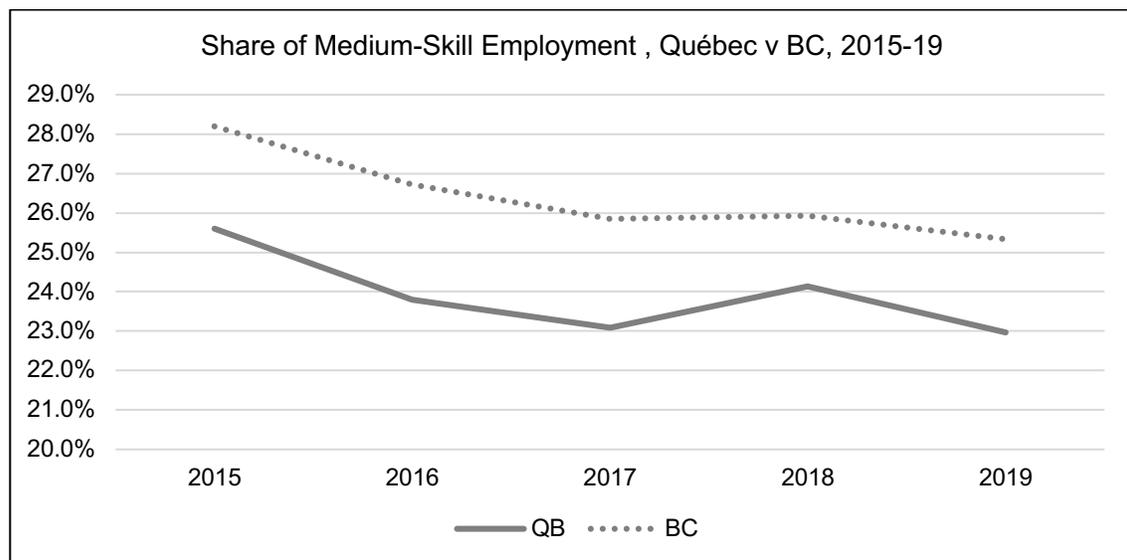
Source: Statistics Canada Table 14-10-0311-01; Author's calculations.

Like BC, Québec has also experienced tight labour market conditions. In 2017, for example, it was estimated that the number of long-term job vacancies resulted in an economic loss of more than $400 million in employment income, or 0.1% of the gross domestic product (GDP) of Québec (Ensemble on fait avancer le Quebec, 2018). The unemployment rate is also expected to decrease further over the next few years,

reaching full employment (Ensemble on fait avancer le Quebec, 2018). In the province's latest provincial budget, the Government noted how the issue of labour shortages is leading businesses to increase their technology investments to maintain productivity levels (Gouvernement du Québec, 2020).

In response to increased technology adoption in the local labour market the Government recently announced an expansion of its investments in the Ministère du Travail, de l'Emploi et de la Solidarité sociale's Mesure de formation de la main-d'œuvre, which provides individuals with financial assistance to participate in employment or educational training activities (Services Québec, 2020). The expansion of this measure is meant to support businesses as they transition towards greater technology-based employment, by enabling workers to develop their digital skills and qualifications (Gouvernement du Québec, 2020).

The Government of Québec also offers complementary measures that encourage employer involvement in skills training. For example, small and medium sized enterprises (SMEs) are eligible for a 30 percent refundable tax credit to encourage their workers to take skills training. The tax credit applies to the wages that SMEs pay to their employees for the hours during which they are released from their regular duties for skills training.

SMEs can also seek human resource (HR) management support from Emploi-Québec to structure or improve their human resource management practices. This is particularly helpful for small businesses who are less likely to have dedicated HR staff (Emploi-Québec, 2020). SMEs access an online questionnaire – the Portrait des pratiques en gestion des ressources humaines – for an "HR Portrait" or informational supports in terms of workforce challenges, such as skills development. Businesses can also request the services of a human resources professional who will work with the business to analyze specific business needs and support the implementation of new efforts (Emploi-Québec, 2020).

Initiatives targeting labour market development are generally developed by the Commission des partenaires du marché du travail (CPMT), a provincial commission for consultation involving employers, the workforce, the education community, and community and government organizations. The CPMT plays a strategic role in the

development of government policies, guidelines and actions that promote labour market development. It relies on a partnership network of regional, sectoral and advisory committees who are responsible for defining the needs and supporting the development of the workforce in their region, sector, or particular demographic.

The CPMT operates under the *Act to Promote Workforce Skills Development and Recognition* (hereafter 'the Act') (2007). The Act essentially forms the basis of Québec's training system. The purpose of the Act is to improve the qualifications and skills of the present and future workforce through legislated employer investment in training, concerted action between management, unions and community partners and the education sector, and the development of training modes and recognition of employed workers' skills.

The Act requires businesses with an annual payroll over $2 million to participate in workforce skills development for the year by allotting an amount representing at least 1 percent of their total payroll to training expenditures.[10] Employers who do not participate are required to make a contribution equal to the difference between 1 percent of the business's total payroll and the amount of their eligible training expenditures to the Workforce Skills Development and Recognition Fund ("the Development Fund"). The Development Fund is dedicated to funding initiatives promoting labour market development, including financial or technical support for skills acquisition and knowledge about the skills needs of the labour market.

The stakeholder consultation and cooperation facilitated by the Act has led to a strong culture of workforce skills development and life-long learning in Québec. The proportion of businesses who declare having offered training for their staff in 2016 was 84.2 percent (Commission des partenaires du marché du travail, 2020). Public opinion research also suggests that most Quebecers believe skills development is a personal responsibility, and most are not concerned with the impacts of automation (Commission des partenaires du marché du travail, 2020).

There is also an emphasis on labour market information and access. As the National Workforce Strategy (2018) report notes "developing the workforce of today and tomorrow requires a good understanding of current and future needs in this area. Good

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[10] Eligible training expenditures are determined by the CMPT.

labour market information contributes to informed decision-making by individuals, businesses and institutional decision-makers." The Government is currently working on improving its labour market information by creating a new online Employment and Training Hub for better integration of information on occupations, training, job opportunities and employment measures to promote informed decision-making by individuals, employers, post-secondary institutions, unions and other stakeholders.

6.3. Australia

The final case-study examines employment and training trends in Australia. The proportion of Australians employed in medium-skill occupations is not directly comparable to BC given the difference in the Canadian and Australian occupation classification methods. However, trends in the Australia Labour Market, especially in the state of New South Wales, are generally similar to the trends noted in BC, Ontario, and Quebec's economies (Department of Jobs and Small Business, 2019; OECD, 2012)

In Australia, the federal government is responsible for developing employment programs and services. Services are run under the national employment services system, jobactive, and delivered by a network of 1700 jobactive providers across Australia. Jobactive providers are made up government-funded non-government organizations and private businesses.

To determine the level of support a job seeker will need to find work, individuals who register for employment assistance with Services Australia are required to complete a questionnaire known as the Job Seeker Classification Instrument (JSCI). Specifically, the JSCI is used to: measure a job seeker's relative difficulty in gaining and maintaining employment; help identify what level of support the job seeker will need to help them find work; and identify those job seekers who have complex or multiple barriers to employment that need further assessment (Employment, Skills, Small and Family Business, 2020; OECD, 2012) The questions relate to factors that correlate with disadvantage in the labour market, and job seekers are assigned 'points' according to their answers. Job seekers are placed into one of three streams (Stream A, B or C) based on their relative level of disadvantage in gaining and maintaining employment (Employment, Skills, Small and Family Business, 2020). Stream A is for the most competitive job seekers, who require minimal assistance to find work. Stream B is for job

seekers who have vocational issues and need assistance to become work ready. Stream C is for the most disadvantaged job seekers, who may have a combination of vocational and non-vocational barriers to employment.

In addition to the standard set of supports available to Australians through jobactive, the Government of Australia offers a number of targeted initiatives that support workers through structural change. Workers under the Structural Adjustment programs, for example have immediate access to the Relocation Assistance to Take Up a Job Programme. The Stronger Transitions Package, too, is available for laid-off workers in regions affected by large-scale lay-offs. The package assists workers who are being laid-off by partnering with companies to transition workers into new jobs. Workers are also able to access intensive case management employment support through jobactive, assistance to relocate for work, and support to explore running their own business.

Examples of industry Structural Adjustment Programs include the Auto Industry Structural Adjustment Programme for workers affected by the transition of the car manufacturing industry, and Intensive employment assistance for workers and their partners affected by lay-offs from ASC Shipbuilding Pty Ltd in Adelaide. These include pre-layoff career advice training, labour market information and employment services to help workers transition to new jobs.

Unique to Australia is a targeted effort encouraging life-long learning and increased labour market engagement. For example, the More Choices for a Longer Life Package was introduced in the 2018-2019 budget to support mature-age Australians (45 years and over). A summary of the most relevant measures to mid-career and medium-skilled workers is provided below. These measures include: The Skills and Training Incentive, Skills Checkpoint for Older Workers program; Career Transition Assistance Program; and launching Skills Match, an online interactive tool to assess job transitions and reskilling pathways (Department of Finance, 2018).

Through the Restart Wage Subsidy, employers who hire employment services participants aged 50 or over can receive up to $10,000. Employment services providers determine if a wage subsidy is offered and will enter into an agreement with the employer to make payments over six months (Department of Jobs and Small Business, 2020). The subsidy is intended to overcome the discrimination older workers may face

when looking for work by offsetting the costs of hiring or initial training. However, there is mixed evidence on the success of wage subsidies (Taylor et al., 2019). A time-series study of 31 advanced countries and their labour market programs found that training is the preferred tool of governments to address labour market problems, but employment incentives and direct-job-creation measures have become more prominent (Escudero, 2018). It is unclear what factors are influencing this trend.

As noted by Weaver and Habibov (2017), training opportunities are generally highly skewed toward younger adults, suggesting that relatively older individuals aged 35-44 and 45-54 years have fewer opportunities for training in order to get a new job or remain competitive at their current job. To reduce the risk that they will leave the workforce, the Government introduced the Skills and Training Incentive, which assists mature age Australians (45 years and over) to invest in training and adopt a lifelong approach to skills development. The Incentive provides eligible participants (who are working in industries and regions vulnerable to changing labour market requirements and lay-offs) with government funding of up to $2,200 for reskilling or upskilling opportunities. This is a co-investment in training, with either the participant or their current employer matching the government contribution. While it is too early to assess the outcomes of the Incentive, to date, 368 participants have accessed the incentive, which was launched in January 2019 indicating there is demand (Department of Employment Skills Small and Family Business, 2018).

These participants can also access the Skills Checkpoint for Older Workers Program, which helps them identify relevant training linked to their current job (such as upgrading skills), a future job opportunity or an industry, occupation or skill in demand that the Skills and Training Incentive can be used for. Employees are entitled to receive customized career advice on transitioning into new roles, or their pathways to a new career, including referrals to relevant training options.

The Career Transition Assistance (CTA) program also provides practical assistance to help mature-age job seekers registered with a jobactive provider to increase their employability through identifying skills transferability and opportunities to reskill, tailoring job applications to the local labour market and improving digital literacy skills. In contrast to the Skills Checkpoint Program, the CTA is a 6-week program designed to help mature-age job seekers (aged 45 years or over) build their skills and

confidence to become more competitive in their local labour market. Before starting the program, individuals meet with a CTA provider to identify their transferable skills and overall job readiness. The program offers two streams of support; Tailored Career Assistance (TCA) and Functional Digital Literacy (FDL) (Department of Employment Skills Small and Family Business, 2018). TCA includes resume and cover letter writing support, interview coaching, and career coaching. FDL participants receive online training in software programs and other workplace technologies. They also receive access to JobReady Live – an online portal for job seekers.

In terms of labour market information, one of Australia's most effective labour tools is the interactive pathway tool called Skills Match, which allows users to identify jobs based on existing skills and experience from previous employment. When a user starts the Skills Match Tool, they are first prompted to enter and select their past or current job title(s) from an autocomplete search bar. Users are then presented with a guide to the skills and expertise typically developed in those roles. Each skill is defined briefly and ranked from basic to expert level competency. After reviewing their skills, users can move to the next section, which offers a list of jobs that require a similar set of skills, abilities, education and knowledge. Information about weekly pay and future growth is also listed. Users can also further refine their results with a list of filters, including training pathway, industry, job-type, workstyle, and level of physical demand.

SkillsMatch is made available through Job Outlook, an initiative of the Department of Education, Skills and Employment. Like WorkBC, Job Outlook provides information about Australian careers, labour market trends and employment projections. The webpage also offers multiple career quizzes which jobactive providers use with job seekers as an impetus for discussion (Department of Employment, Skills, Small and Family Business, 2018).

6.4. Summary of Key Findings

The case-study analysis above identifies four broad components of effective policy measures to improve outcomes for the target demographic. This includes employer involvement in training; accessible, and current labour market information; targeted initiatives; and a range of active labour market policies. While each of the jurisdictions reviewed include these components, as Escudero, (2018) notes, "different policies can produce different effects depending on their objective, design and population targeted." A summary of findings is provided in Table 3 below, followed by a brief discussion.

Table 3 – Summary of Case-Study Analysis

Summary of Results		BC	ON	QB	AUS
Employer Involvement		✓	✓	✓	✓
Labour Market Information	Skills / Competencies[11]	✓	-	-	✓
	Career Transitions / Reskilling Pathways	x	x	x	✓
Targeted Initiatives	Regional	✓	✓	✓	✓
	Sectoral	✓	✓	✓	✓
	Older/Mid-Career	x	x	x	✓
Active Labour Market Programs	Job-Search Assistance	✓	✓	✓	✓
	Education/Training Supports	✓	✓	✓	✓
	Job Placement / Matching	✓	✓	✓	✓
	Financial Incentives: (wage-subsidies; grants; cost-sharing agreements etc.)	✓	✓	✓	✓
	Other policies: relocation assistance; travel reimbursements; child-care subsidies etc.	✓	✓	✓	✓

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[11] Both Ontario and Quebec are in the process of developing and improving information on workforce skills and competencies.

Employer Involvement

In their study of adult education and training in Canada, Hui and Smith (2001) find that while there are few studies "that directly address the distinction between employer-sponsored and government-sponsored programs, the evidence suggests that the former yields positive and significant effects while one observes zero or negative effects for the latter for both wages and employment." However, with the exception of Québec, Canadian employers invest relatively little in training compared to OECD peers.[12] This may be, in part, due to Québec being the only Canadian jurisdiction to mandate it.

Moreover, as Ci et al., (2015) note, "employer-sponsored training increases significantly with the level of formal schooling, which is consistent with the idea that existing human capital constitutes a valuable input to the production of new human capital (Lillard & Tan, 1992 as cited in Ci et al., 2015)." This may explain, in part, the low levels of low and medium-skilled workers participating in BC's ETG and Ontario's COJG training programs. However, when considering the effectiveness of this funding allocation Ci et al., (2015) found that high-skilled workers showed "negligible and statistically insignificant training impacts" relative to lower-skilled workers, or those with low levels of formal education.

Accessible, and Current Labour Market Information

As Braham and Tobin (2020) note, "the value of labour market information is ultimately derived from the extent to which it helps make [economic, individual, and social] outcomes better for Canadians." A recent survey conducted by the Labour Market Information Council showed skills requirements as the second single piece of information most wanted by Canadians after wages (Johal & Crawford Urban, 2020). While each of the Canadian jurisdictions reviewed (BC, Ontario, and Québec) provide traditional labour market information on job-related skills and competencies, this information may not be particularly useful for the target demographic, given the structural shifts in the labour market, such as fewer job opportunities in their skill-level or industry (Weaver & Habibov, 2017). Moreover, as Siekmann and Fowler (2017) note, traditional

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[12] On average, Canadian employers spent $889 CAD per employee on learning an development from 2016-2017 (Cukier, 2020; Hall & Cotsman, 2018).

labour market information comes with its own set of challenges, including "the high cost of data collection; the data lag behind real-time developments in the labour market; and, occasionally, insufficiently detailed information to understand skills gaps."

In contrast, real-time labour market information uses big-data analysis from online job postings and resumes to overcome the challenges noted above (Siekmann & Fowler, 2017). Among the jurisdictions reviewed, only Australia, through its Skills Match tool, provides users real-time labour market information to make informed choices about their decision to reskill or transfer their skills to another job.

Targeted Initiatives

Moreover, Australia is the only jurisdiction that offers a package of labour market programs specifically designed for older workers (which are also equally applicable to mid-career adults). While none of the jurisdictions reviewed target medium-skill workers exclusively, there appears to be a shift towards better understanding the determinants of adult learning. For example, Ontario's introduction of alternative credentials for reskilling addresses issues related to time-constraints and personal and family responsibilities that often prevent mid-career adults from seeking further training. Both Ontario and Québec' also offers a number of sector-specific supports.

Active Labour Market Programs

Each of the jurisdictions also have a wide range of active labour market programs (ALMPs), encouraging continued labour market engagement and skills development. ALMPs are generally "activation strategies," described by the OECD as the policies used "to bring more people into the effective labour force, to counteract the potentially negative effects of unemployment and related benefits on work incentives by enforcing their conditionality on active job search and participation in measures to improve employability, and to manage employment services and other labour market measures so that they effectively promote and assist the return to work." In contrast, passive measures are those that do not directly help individuals find jobs and include unemployment insurance and bridge to retirement programs (Martin, 2015; Nie & Struby, 2011). The literature suggests that ALMPs are particularly effective in improving labour market outcomes of lower-skilled workers (Escudero, 2018).

Chapter 7.   Policy Objectives, Criteria & Measures

A total of four social and government objectives were considered in the development of policy options: effectiveness, development, administrative ease, and stakeholder acceptability. For applicable criteria, policy options are assigned a score of either low, medium, or high depending on their likelihood of meeting that particular objective. Scoring is based on findings from the cases examined in Chapter 6 as well as the active labour market policy, adult-learning, and technological displacement literature consulted throughout this study.

Effectiveness

The rapid growth of automation and technology-based employment in BC significantly impacts labour market outcomes for mid-career workers in medium-skilled occupations due to the routine, and codifiable nature of tasks associated with such occupations, as well as the limited training programs and employment services that sufficiently address the needs of this group.

Effectiveness evaluates the likelihood that the policy option assists these workers in adapting, upgrading or transferring their skills. This is measured in two ways. First, in the increase in medium-skill workers accessing skills training. This is measured by the likelihood of the option increasing the proportion of medium-skill workers participating in the BC Employer Training Grant (ETG) or Skills Training for Employment (STE) Program. Where applicable, this objective also considers potential increases the quality and accessibility of labour market information on skills, competencies, and/or job-transitions. Options are given a low (1), medium (2), or high score (3), such that low scores are less likely to assist this group upgrade or transfer their skills to comparable employment, and higher scores are more likely.

Development

As Johal and Thirgood (2016) note "long-term skills development [often] take[s] a back seat to nimble training and support programs that get people back into the labour market with the understanding that they may need to be retrained again in the near future." The Development objective, therefore, evaluates whether the policy contributes to a culture of life-long learning and promotes labour-market resiliency among the target population.

There are two main measures for this criterion; the annual number of visits to WorkBC.ca, and labour market attachment, which is measured via official and supplementary unemployment rates. An increase in visits to the website will result in a high score (3) and decrease in visits will result in a low (1) score. In terms of labour market attachment, an increase in the unemployment rate will score low (1), and a decrease in the employment rate will score high (3).

Administrative Ease

Administrative ease evaluates the degree to which the policy option aligns with government and/or ministry goals and objectives as outlined in the 2019/2020 Service Plan; costs of implementation; and institutional capacity. Each of these are considered holistically. Essentially, options that align with government and/or ministry objectives, have minimum implementation costs, and require little institutional change or external consultation score high (3).

Stakeholder Acceptability

The main stakeholders identified in this study are mid-career workers in medium-skill occupations, employers, and the industry organizations that make up BC's labour market. This will be measured by the degree to which the policy imposes (potential or actual) direct and/or indirect costs on each of these groups. If costs are imposed, the option will score low (1) for this criterion, if costs are not imposed, the option is given a high (3) score.

Table 4 provides a summary of the specific criteria and measures applied to each.

Table 4 – Summary of Evaluation Criteria, Measures and Scoring

Objective	Criteria	Measure	Scoring
Effectiveness	The likelihood of the policy option assisting mid-career, medium-skilled workers upgrade or transfer their skills	Actual/potential increase in the proportion of medium-skill workers accessing the BC Employer Training Grant OR Actual/potential increase in the number of medium-skill workers accessing the Skills Training for Employment Program	Increase = HIGH No change = MEDIUM Decrease = LOW
Development	Whether the policy contributes to a culture of life-long learning and promotes labour-market resiliency among the target population	Annual number of visits to WorkBC.ca	Increase = HIGH No change = MEDIUM Decrease = LOW
		Labour market attachment (via official and supplementary unemployment rates)	Increase = LOW No change= MEDIUM Decrease = HIGH
Administrative Ease	Alignment with government and ministry goals/objectives	Meets objectives outlined in the Ministry of Advanced Education, Skills and Training 2019/2020 Service Plan	If yes = HIGH If no = LOW
	Cost	Additional staffing required	If no = HIGH If yes = LOW
		Significant change in ministry or government operating expenses	>5% = HIGH < 5%= LOW
	Institutional Capacity	Creation of new programs, departments, or other institutional changes	No institutional changes and/or collaboration/consultation required= HIGH Minimal change and/or collaboration/consultation required = MEDIUM Significant change and/or collaboration/consultation required = LOW
		Degree of intra or inter-ministry, and public collaboration/consultation required	
Stakeholder Acceptability	Anticipated opposition from the labour force	Direct or indirect monetary cost to individuals	Costs not imposed = HIGH Costs imposed = LOW
	Anticipated opposition from employers/ industry	Direct or indirect monetary cost to employers	

Chapter 8.   Policy Options & Evaluation

This chapter presents three policy options designed to meet the criteria set out in Chapter 8 and ultimately improve labour force resilience in BC. The options presented in this section are those that can be acted on relatively quickly; and address the needs of older, medium-skill workers, while also benefiting all members of the labour force over the long-term.

8.1.   Option 1: Create an Interactive Tool for Identifying Job Transitions and Reskilling Pathways

The Ministry of Advanced Education, Skills and Training (AEST) should immediately consider enhancing the delivery of its labour market information through an interactive, user-friendly tool for identifying job transitions and reskilling pathways. This proposal is based on the World Economic Forum's (WEF) (2018) report, *Towards a Reskilling Revolutions: A Future of Jobs for All*, which uses data from the O*Net Database[13], the US Bureau of Labour Statistics (BLS), and real-time data from Burning Glass Technologies to assess reskilling pathways and job transition opportunities in the US. The report's methodology is outlined in detail and can be modified to address the needs of other jurisdictions. The Government of Australia's Skills Match Tool discussed in section 6.3 is designed using the methodologies outlined in the report.

Currently, the most comparable tool available in BC is WorkBC's High Opportunity Occupations (HOCs) webpage, where users can search for occupations by region, education and occupational interest. While users are able to select an occupation and learn more about its earning and growth potential, work-related skills, career paths etc., the tool offers users little support in identifying clear job transitions, reskilling pathways, and detailed skills and competency information, compared to Australia's Skills Match Tool. The onus is on the user to determine whether their past experience and skills would facilitate a viable, or desirable transition into the role. As previously discussed, older workers, and those with lower levels of educational attainment, often experience greater informational and motivational barriers to reskilling. Redesigning the

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[13] The O*Net Database is a skills information system developed by the US Department of Labor and offers a common taxonomy on occupational attributes, such as skills, knowledge, and abilities.

HOCs webpage and interactive tool to provide British Columbians immediate insights into their labour market adaptability has the potential to improve labour force resilience and facilitate continued labour market engagement.

Depending on institutional capacity, the tool can be further developed to meet urgent labour force needs. For instance, with minor modifications, users in need of employment services and support could be provided the option to submit their results to their closest WorkBC Employment Services Centre. This option benefits both users and WorkBC Centre staff. Users receive immediate insights into their skills and job prospects so they can begin to decide whether they would like to upskill, reskill, or find work; and WorkBC Centre staff save time in assessing participant options by reviewing the client's pre-submitted results.

8.1.1. Evaluation of Policy Option 1

Effectiveness

Older workers tend to face significant informational and motivational barriers to reskilling. By providing simple, yet strategic and tailored labour market information, the policy addresses these barriers. However, this group is still less likely to be eligible for targeted employment services and receive employer-sponsored training. While this group is likely to be the main beneficiary of this policy, the policy itself does not explicitly facilitate greater training. Therefore, this policy option ranks low (1) on effectiveness.

Development

As discussed in section 2.2, the likelihood of older displaced workers with low levels of formal education going back to school after job loss is low, but this option does address the informational barriers to reskilling. While there is limited evidence that users of such tools actually do access training as a result, this option provides users the ability to make an informed decision whether to re-skill, upgrade their existing skills, or simply transfer their skills to comparable employment. Moreover, the user is taking an active and informed approach to their labour market participation and the modification to allow users to submit their results to their closest WorkBC Employment Services Centre also exposes users to various WorkBC employment services, including the Skills Training for

Employment program, and other job search assistance. Therefore, this option ranks a medium high (2.5) in terms of development.

Administrative Ease

This policy options also ranks high (3) in terms of administrative ease given the World Economic Forum's published methodologies of establishing a job-transitions and reskilling pathway tool. The design and implementation of this tool can take place with no significant changes to AEST's service plan and it does not require inter-ministry collaboration or consultation. The Ministry already sources data on skills and competencies from the O*NET Content Model to categorize occupational interests and also conduct its annual labour market outlook reporting based on similar models. As such, the main budgetary consideration for this option will be in retaining the services of a real-time labour market analytics company for data.

The policy option also directly aligns with Objective 3.2 of AEST's 2019/20 – 2021/22 Service Plan (Advanced Education, Skills and Training, 2019b), which is to ensure high quality labour market information that connects British Columbians to current and emerging career opportunities, and the information they need to adapt in a dynamic labour market. Further, the online tool could potentially relieve WorkBC Centre caseloads.

Stakeholder Acceptability

This policy option also ranks high (3) in stakeholder acceptability as it does not impose any direct or indirect costs on the target group in the labour force, other workers, or employers/industry.

8.2. Option 2: Expand the Eligibility Criteria of Existing Supports

In a dynamic labour market where the impacts of automation and technological change are expected to affect British Columbians across sectors, the Ministry of Advanced Education, Skills and Training should consider expanding the eligibility of the Employer Training Grant's (ETG) new Employment Transition Training Stream and the Skills Training For Employment's (STE) new Impacted Workers Stream to support any unemployed, underemployed or precariously employed British Columbian to obtain training that aligns with the applicant's ability to provide them with similar or different employment, regardless of their region or sector.

This would require either amending the definition of an "impacted worker" which is currently linked to an "impacted community." An "impacted community" is one which has experienced or will experience a significant shift in labour needs due to events such as a natural disaster or the closure or curtailment of operations of a major employer (WorkBC, 2020b). Currently, only applications from individuals or businesses impacted by mill closures or curtailments are accepted. By expanding the eligibility criteria of these two streams of support, the BC government can support workers that are dealing with unemployment, underemployment, or precarious employment from the result of the closure of a major employer, technological displacement, or other economic developments. Applications from individuals or businesses experiencing a mill closure or curtailment can continue and priority consideration can be given to those applications requiring the most urgency.

8.2.1. Evaluation of Policy Option 2

Effectiveness

In terms of effectiveness, this policy option ranks high (3) in that it is poised to improve labour market outcomes for those accessing the training. Under the Employment Transition Training stream, employers may receive 100 percent of eligible training costs per participant, which is likely to incent small businesses, who employ nearly 1.1 million people, to see an ROI in upskilling their employees amidst a skills shortage. The Impacted Workers stream, too, assists applicants with a number of training and employment supports designed to help participants obtain sustainable employment.

Should these programs be extended to all unemployed, underemployed or precariously employed British Columbians, it is likely that the proportion of medium-skill workers participating in these programs will increase. Medium-skilled workers are less likely than their lower and higher-skilled counterparts to be eligible for employment support or chosen for employer-sponsored training. Given the wide range of funding and employment services available to impacted forestry workers, extending these two programs to other unemployed, underemployed, or precariously employed British Columbians could significantly address the gaps in support for medium-skilled workers in sectors impacted by technological change or other economic trends.

Development

The policy ranks high (2.75) in its potential for labour market development, in that with greater access and experience with skills training and employment supports, participants continue to engage in the labour market and exposed to emerging trends. Employer-sponsored training can especially promote a culture of on-the-job and life-long learning.

Administrative Ease

This policy option ranks a low (1) in administrative ease, mainly due to budgetary constraints. This update would have large-scale implications for the department administering them. With the eligibility criteria expanded, the government is highly likely to experience an increase in applications. Depending on the department's capacity, this might require hiring more staff to process applications or requests to increase the total funding amount allotted to each stream. Without data on the current uptake of each stream, it is difficult to estimate whether the Implementation of this policy is financially feasible at this time, or for the remaining intakes this fiscal year, and will likely cost more than the option 1.

Stakeholder Acceptability

This policy also ranks high (3) in stakeholder acceptability. Members of the labour force, employers, and industry associations are not likely to oppose support for others in need. While pushback from the forestry sector was considered, this policy option does call for prioritizing those in most need. It is also expected that the Government will continue its Community Support stream to allows for the urgent and wide-scale response required for impacted forestry workers, businesses, and communities in the northern interior.

8.3. Option 3: Legislate Employer Investment in Training

To prepare the labour force for the opportunities and challenges of dynamic labour market, the Ministry of Advanced Education, Skills and Training, should begin developing and drafting a legislative proposal to promote a culture of life-long learning by legislating employer investment in workforce training. This is a longer-term option, requiring. Planning and consultation with industry, unions, and training providers. Inspired by the Québec model, employers with total BC renumeration exceeding an amount fixed by government regulation should be required by law to participate in workforce skills development for the year by allotting a fixed percentage representing a proportion of their total annual payroll to training expenditures. Employers who choose not to participate would be required to pay to the government a tax equal to a fixed percentage (as established by regulation) of the total renumeration paid by the employer during the calendar year, which will be allocated to enhance and continuously update the Ministry's employment and training services to meet labour market needs. Following consultations, any legislation should have sufficient lead time before coming into force to give employers affected by the law time for budget planning and/or in developing in-house training programs or workshops.

8.3.1. Policy Evaluation

Effectiveness

As illustrated in section 6.2, legislating employer investment in workforce development and training has had positive impacts on labour market outcomes for Québec's labour force. While legislation to this effect in BC will not immediately or directly address the needs of mid-career, medium-skilled workers, there is still merit in this policy's ability to improve overall labour market outcomes for all members of the BC labour force in the future. As such, it is considered as a proactive measure, and this warrants a medium (2.5) score.

Development

Again, while this policy does not immediately or directly address the needs of the impacted group, it does facilitate steady funding for employment and training services in BC. For these reasons, this option ranks medium (2.75).

Administrative Ease

As with any legislative process, this process will require sufficient government resources to develop the legislation and support the policy. As this policy proposal includes an annual tax, coordination between the Ministry of Finance, Treasury Board, and other ministries is required. This creates a significant administrative burden for the drafting team. Moreover, many ministries have a 3-year legislative agenda, which could mean that implementation of this act could take a number of years. Therefore, this option ranks low (1) on administrative ease due to its relatively high complexity and hence, costs, and that it is not part of the agenda of the current government.

Stakeholder Acceptability

Finally, this option is ranked a low (1) in terms of stakeholder acceptability. Although no opposition is expected from the target labour force, employers and industry are expected to resist any measures that increase their costs of business. As a frame of reference, BC's Employer Health Tax (EHT) requires employers where total renumeration paid is greater than $500,000 to pay to the government a tax equal to 1.95 percent of the total renumeration paid by the employer during the calendar year. Given the considerable backlash the government received in response to the introduction and implementation of the EHT, without complementary measures to reduce the economic burden for BC employers, the government will be challenged to build business-sector support (Hemingway, 2018; Ken & Finlayson, 2018)

8.4. Recommendation

Based on the evaluation of policy options above, the options that are most likely to improve labour-market outcomes for medium-skilled workers in BC in the near and medium term are options 1 and 2. These option received the highest scores in terms of stakeholder acceptability and were generally comparable across objectives. The most significant difference in their ranking was administrative ease. While option 1 is more feasible than policy option 2, it falls short in addressing the limited number of supports available that target the needs of mid-career, medium-skilled workers.

Option 3, legislating employer investment in training, ranked significantly lower than options 1 and 2, primarily because it is more of a longer-term approach. This option

only received a high score for the development objective, as it promotes a culture of life-long learning. However, it does little to address the immediate needs of medium-skilled workers, and the presumed opposition from employers due to the costs it imposes on them will make this a difficult option to consider for government. A summary of the scoring of each option is in Table 5 below.

Table 5 – Policy Option Evaluation Summary

Objective	Option 1	Option 2	Option 3
Effectiveness	LOW (1)	HIGH (3)	MEDIUM (2.5)
Development	MEDIUM (2.5)	HIGH (2.75)	HIGH (2.75)
Administrative Ease	HIGH (3)	LOW (1)	Low (1)
Stakeholder Acceptability	HIGH (3)	HIGH (3)	LOW (1)
TOTAL SCORE	9.5	9.75	7.25

Based on the results of this study, an incremental and multi-pronged policy approach is deemed the most effective method of building labour force resilience in BC. These recommendations can be acted on relatively quickly; address the needs of older, middle-skill workers, and benefit all members of the labour force over the long-term.

1. In the immediate term, due to the relative ease of implementation, it is recommended that the Ministry of Advanced Education, Skills and Training take action on policy option 1 and enhance the delivery of its labour market information through an interactive, user-friendly tool for identifying job transitions and reskilling pathways. With simple, strategic and tailored labour market information, all users, and medium-skilled users in particular, will be better equipped to respond to labour market disruptions.

2. Over the medium-term, it is recommended that the Ministry also expand the eligibility criteria for the Employer Transition Training and Impacted Worker programs. This is likely to take more time to prepare, but once implemented, it is more likely to produce tangible outcomes for medium-skilled workers.

3. Finally, over the medium to longer-term, the Ministry should further analyze the impacts of a legislated training tax/requirement. While the cost to employers remains a barrier to implementation, studying the lessons learned from the rollout of the Employer Health Tax could help ease opposition. Providing advanced notice and transparency regarding the legislation will give employers affected by the law the time required for budget planning and/or in developing in-house training programs or workshops.

Chapter 9.   Conclusion

While the impact of automation appears to have been relatively gradual to date, this study has highlighted the historically disruptive nature of automation and technological change on labour markets in BC and around the world. Moreover, structural trends, such as the mill closures and shift curtailments in the forestry sector, and global shocks like the COVID-19 pandemic have had significant impacts on the local labour market. This illustrates that despite BC's strong economic record, the local economy is not immune to emerging trends and global shocks.

In this context, it is important that the labour force is supported in their efforts to transfer their skills to comparable employment, or upgrade their skills for evolving job requirements, skills and competencies required for the future of work. Therefore, the recommendations in this study are designed to address the gap in public supports available for mid-career workers in medium-skill occupations, while also building overall labour force resilience and adaptability.

Addressing the gap in public supports for the target demographic, however, is only a start. A notable limitation of this study has been the lack of adequate outcome-based evaluations of BC employment and training programs. Building on the theme of improved labour market information, the BC government will also need to ensure that the employment and training programs targeting members of the current labour force are better evaluated on outcomes and overall effectiveness.

Moreover, while governments can encourage businesses to support reskilling and upskilling their current staff, ultimately, the decision is up to each employer. Further research should consider also consider the outcomes of public training supports from the employer's perspective. As Cukier (2020) has recently noted, the "ROI and intended and unintended consequences […] need to be better measured in order to understand the extent to which reskilling reduces the needs for layoffs." This data could also be used to increase uptake of existing programs in promotional material.

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