Finding Jobs for People, and People for Jobs: Building a Labour Market Information System to Facilitate Job Matching

by

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Abstract

This study explores ways to support job matching in Canada. Many individuals experience difficulty in finding work related to their skills and training; likewise many Canadian employers are experiencing difficulty finding skilled workers. This mismatch is attributed to an inadequate labour market information system. An examination of three jurisdictions is used to identify the specific inadequacies that hinder job matching in Canada. To address these inadequacies, three policy options are assessed on their ability to meet four criteria. Results indicate that a comprehensive survey on job vacancies and career information seminars in secondary schools can help mitigate the mismatch in the labour market. I recommend immediately implementing a new job vacancy survey and career information seminars in secondary schools. The government should also give future consideration for establishing an independent agency responsible for labour market information.

Keywords: labour market; mismatch; information; job matching

Dedication

To everyone who has helped me along the way.

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Executive Summary

Canada has one of the highest educational attainment rates among OECD countries. However, many educated individuals experience difficulty finding work. Unfortunately, for these individuals there is low demand for their skill set. Likewise, many employers and industries are experiencing a worker shortage. This shortage is expected to persist in many occupational fields. As a result, there is a mismatch in the Canadian labour market. This mismatch exists despite multiple sources that collect data to understand labour market conditions.

Despite numerous information sources, the information system in Canada is inadequate to match labour supply with labour demand. This study investigates how Canada can better facilitate job matching and avoid labour market mismatches. To find solutions, three cases are examined to identify practices that best support job matching: Australia, Germany, and Switzerland. My analysis first examines the labour data collected in each country, and then the key features of the respective labour market information systems. The analysis revealed that all three cases obtain detailed information about job vacancies. Additionally, to support job matching, the case countries devote considerable resources towards counselling students. Germany and Switzerland also have organizations that are responsible for providing reliable information about the labour market.

The findings from the case study analysis motivated the following policy options:

1. *Job Vacancy Survey*

   Current information on job vacancies is limited and unreliable. Canada must develop a job vacancy survey to collect comprehensive data about labour demand. A new job vacancy survey will complement the labour force survey to help identify causes of structural unemployment and other labour market issues. More importantly, reliable information about job vacancies will support job matching.

2. *Career Information Seminars and Sessions in Secondary Schools*

Canada needs to devote more resources towards counselling students. This policy option proposes that secondary schools offer students career information seminars and one-on-one sessions. The seminars can provide students with information about the economy and labour market; projected growth of major occupations and industries; careers and employment prospects associated with different fields of study; and wage expectations. In the one-on-one sessions, students can inquire about specific career and education paths and get support for career exploration.

3. *Independent Agency Responsible for Labour Market Information*

The labour market information system in Canada is inefficient with multiple providers. This option proposes to establish an independent agency responsible for collecting, analyzing, and disseminating information about the labour market. This can create a more efficient system that provides quality information. Above all, this agency can be a source of comprehensive and reliable information for schools and provincial employment service offices.

An analysis of these three policy options helped determine recommendations to address the problem. The options are assessed on the following criteria: development, equity, administrative complexity, and budgetary impact. Given my policy analysis, I recommend to implement a new job vacancy survey and career information seminars and sessions in secondary schools. These policies are simple and inexpensive to implement. I also suggest future consideration for developing an independent agency responsible for labour market information. My analysis indicates that a new agency would be effective, but also costly and complex. Overall, these recommendations will improve Canada's ability to support job matching. Moreover, they provide a foundation to build a system to better align supply and demand in the labour market.

1. Introduction

The economy, especially job creation, is a constant priority for Canadian governments. Creating a robust economy that provides stable well-paying jobs, and decreases unemployment levels seems challenging in an increasingly competitive global economy. Despite the difficulty of creating jobs many industries in Canada are currently having trouble filling vacant positions. Federal Government projections indicate that skill shortages will persist, if not increase, in many occupational fields. In addition to unfilled jobs, many Canadians – especially youth – find it difficult finding employment because they received training and skills that have low employment prospects. Unfortunately, many people only learn about their employment prospects once entering the labour market. This suggests governments should not only be concerned with creating jobs, but also address the mismatch in the labour market.

Every market requires information to operate efficiently. However, the labour market mismatch suggests the Canadian labour market information system does not support job matching. This is despite multiple providers of information in Canada. This is likely a consequence of not assigning any formal responsibility for labour market information. As a result, the Canadian system is fragmented and uncoordinated between provincial and federal government departments. Canada must invest in building a stronger information system to create a more efficient labour market.

This study identifies the specific inadequacies of the Canadian labour market information system that prevent job matching. The research is based on the analysis of case studies. The case studies examine the information system in three jurisdictions: Australia, Germany, and Switzerland. The analysis reveals best practices that are not used in Canada.

This study is organized as follows: Section 2 discusses the importance of labour market information, and why countries need a quality labour market information system. Section 3 describes the divided responsibilities and multiple sources of information in Canada. From there section 4 discusses the concerns in the labour market, and defines the policy problem that must be address. The features of an optimal system are explained in section 5. Section 6 explains the methodology employed in this study. Section 7 analyses the cases, while section 8 summarizes the analysis results. Next, section 9 establishes policy objectives, and criteria used to assess policy options. The policy options are presented and analyzed in section 10. Section 11 provides concluding remarks.

2. Labour Market Information

Information is vital for any market to operate efficiently. A common problem in many markets is the lack of information, which in turn generates inefficient behaviours. This section first discusses the important role labour information plays in creating a well-functioning labour market and economy. From there I discuss why countries need a quality labour market information system. There is no formal definition of labour market information. Given that, this study considers Labour Market Information to be the knowledge, facts, data, and relevant institutional information on the labour supply and labour demand (Advisory Panel on Labour Market Information, 2009).

2.1. The Role of Labour Market Information

For job seekers information lowers the possibility of unemployment, and thus lost earnings. Employers can experience fewer skill shortages and lower turnover rates. Job mismatches can also result in underutilized skills if a person winds up working in a field unrelated to his or her studies. The mismatches may vary across industries and occupations, but nonetheless they are a hindrance to economic development because firms cannot grow, and job seekers experience lost income. Producing and sharing labour information with all participants in the labour market can reduce skills mismatches (OECD, 2012a).

Job matching theory (Heijke, 1996) argues that the productivity of workers depends on the skills and abilities required for their occupation. This means the productive value of a person's education depends on the occupation. Workers can utilize their comparative advantage by applying their skills and knowledge where they are most applicable. According to the job matching theory this match is difficult to achieve due to inadequate information about skills required by employers, and those possessed by workers. Moreover, timely and quality labour market information can facilitate labour

market adjustments (Sharpe and Qiao 2006). Facilitating an efficient allocation can enhance a country's productivity, competitiveness, and economic growth (Sharpe and Qiao, 2006). High quality information made available can also help people navigate more efficiently through the education system. Given the diversity of education options, good information helps students make the optimal choice. This means students can base their choices on future labour market situations, opposed to current labour market conditions.

In summary, labour market information can generate more efficient allocation of workers in the economy because inadequate information can create higher costs for job seekers and employers. The potential for a more efficient labour market highlights the importance of quality information on the demand for labour, and employment prospects as well as knowledge and skills of the workforce.

2.2. The Need for a Labour Market Information System

An effective labour market information system can bring widespread benefits. Good information helps young people effectively career plan, which can save them time and money. An effective labour market information system can also give a competitive advantage (Miner, 2012) by helping employers anticipate future recruitment problems, adjust human resource policies, and adjust expansion and investment plans (Brisbois et. al., 2008). Not to mention good information can help governments be responsive to employers labour concerns. All these benefits for employers' means an effective labour market information system is conducive to economic growth.

As the economy changes, new jobs will be created and many current jobs will have new skill requirements. The emerging knowledge based economy places a premium on advanced education and skills (Miner 2012). Miner (2012) assumes that approximately 80% of the Canadian workforce needs to be skilled (have some form of post-secondary education) by 2031. This means Canada must further increase education levels despite its already high education attainment rates. In 2011, 51% of the Canadian adult population possessed a college or university education, highest among OECD countries (OECD, 2013). However, simply increasing educational attainment

rates is insufficient; Canada must also better match the skills of job seekers with the needs of employers. According to Miner (2012) Canada does not have a labour market information system necessary to help align labour supply and demand. To effectively match supply and demand in the labour market will require significant reforms to education system. For schools to provide students the skills that match economic needs requires good labour market tracking.

Income inequality and the situation of disadvantaged populations is a growing concern in many countries. Given the rising demand for higher skilled labour, financial security will become increasingly difficult for people without a post-secondary education. This is supported by federal government projections that suggest employment prospects for individuals with only high-school diploma will decrease (HRSDC, 2011). Miner (2012) argues Canada must increase the participation and skill level of groups under-represented in the labour market; otherwise Canada will have a large number of unskilled workers with bleak employment prospects. Unfortunately, many people still do not understand that higher education will be a necessity (Miner, 2012). Providing individuals with labour market information may help them appreciate the importance of education to find employment.

Overall a quality labour market information system can help young people move quickly through the education system and save time and money. Furthermore, it will reduce their likelihood of experiencing lost wages due to unemployment and underemployment. Most importantly, a quality system informs everyone on the skills required to compete in an increasingly competitive economy. Firms can also make more informed decisions for business development, and governments can gain an accurate picture of labour problems.

In Canada, inadequate information makes it difficult for governments to effectively address the skills problem facing many industries. For example, in 2013 the federal government proposed The Canada Job Grant Program to address the current skills shortage. However, there is no evidence of a skills shortage that requires the type of training the program supports (Mendelson and Zon, 2013). The lack of quality labour information has resulted in a program that The Mowat Centre for Public Policy describes as “deeply flawed public policy” (Mendelson and Zon, 2013).

3. Labour Market Information Sources

This section provides an overview of the current labour market information system in Canada. I first discuss the different contributors of labour information the federal government, provincial governments, and private sector entities. Then, I derive what labour information is available for the employers and workers in Canada.

3.1. Shared Responsibility

In Canada, no level of government is responsible for providing labour market information.[1] As a result, three entities, the federal government, provincial governments, and private sector firms and associations, provide various forms of information. The federal government has a significant role in the production and dissemination of labour market information and is responsible for national labour market development. This includes interprovincial labour mobility, industry councils, and labour exchange systems to match job seekers and vacancies. Four federal government departments provide labour market information: Statistics Canada, Employment and Social Development Canada (ESDC; formerly Human Resources and Skills Development Canada, HRSDC), Citizenship and Immigration Canada, and Industry Canada.

In 1996, the federal government signed labour market development agreements with the provinces, which gave them responsibility for active labour programs. However, these agreement and subsequent ones do not address the jurisdictional responsibility for labour market information. Provincial governments mainly use labour market information to develop their labour policies and programs. Canadian provinces and territories agree on specific aspects of labour market information that need improvement:

[1] Information for this section is from Advisory Panel on Labour Market Information (2009)-unless otherwise indicated.

* First, labour market information to support labour supply and demand analysis to identify shortage and surplus. This includes data on postsecondary students and graduates by program, data on interprovincial migration by education and occupation, and inter-occupational mobility.

* Second, reliable information on what employers need from current and potential employees to identify skills gaps.

* Third, employer information on job vacancies, current and emerging education and skills requirements, turnovers, and retirement trends.

* Fourth, information on transitions (school-to-work, work-to-school, full-time to partial retirement, re-skilling) to identify supports needed and transition effects on the labour market.

Some provinces coordinate with the federal government for labour market information, but the level of coordination varies significantly. Atlantic Canadian provinces (New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland and Labrador) have the strongest partnership with the federal government. These provinces lack the capacity to collect and analyze labour shortages or conduct labour imbalance estimations for every occupation. Given Atlantic provinces also experience significant outward migration, they need information on inter-provincial migration to western Canada. The remaining Canadian provinces rely less on the federal government for labour market information. This leads to significant heterogeneity of the type of information collected across the provinces. For instance, information on occupational employment forecasts vary with respect to timeliness, number of occupations, time horizon, sub-provincial breakdowns, quantity and quality of background information, and descriptor of occupational prospects. The most detailed forecasts are provided by Alberta, Quebec, and New Brunswick. In contrast Atlantic Provinces lack the data and capacity to conduct labour supply-demand imbalance estimates for all occupations.

A number of private sector entities also provide labour market information. Business and trade associations compile industry-specific data for their member to inform policy advocacy efforts. Associations primarily survey employers for qualitative forecasts but certain large associations also provide quantitative forecasts. Organized

labour unions provide labour market information from a worker-based perspective, used primarily for collective bargaining purposes and job matching assistance for laid-off workers. Private employment websites that provide job openings also provide labour market information. A few online employment websites have sufficient scales of job postings to give a rough estimate of market demand. However, private-sector entities cannot produce information at a scale that gives a complete picture of labour demand. Furthermore, the inability to profit from providing labour market information creates no incentive for the private sector to produce comprehensive labour information.

The Canadian labour market information system has multiple contributors with little coordination. The current labour market information system in Canada can lead to inefficiencies and limited effectiveness. Inefficiencies stem from different sources obtaining the same necessary information; this creates potential overlap and duplication of information. Job seekers and employers have to search for labour market information from numerous sources. Also, if multiple contributors are using different standards and methodologies, that can create inconsistencies and unequal levels of quality. This can result in inaccurate information for certain regions or industries. Furthermore, having numerous providers can also create contradictory information. For instance, ESDC labour projections suggest a shortage of dentists that will persist into the next decade. However The Canadian Dental Association contends there is no shortage of dentists in Canada (House of Commons Committee, 2012).

3.2. Labour Demand Information Sources

As indicated earlier, the federal government has a number of different sources to evaluate labour demand in Canada. Statistics Canada conducts a number of monthly surveys: Labour Force Survey (LFS), Business Payroll Survey (BPS), Survey of Employment, Payrolls and Hours (SEPH). The Labour Force Survey is a monthly nationwide survey of people aged 15 and over and excludes persons living on aboriginal reserves, full-time members of Canadian Forces, and institutionalized people (approximately 2% of population). The purpose of the survey is to provide standard labour data including unemployment rate, employment rate, and participation rate. In terms of labour demand information, the labour force survey provides information on

employment trends across industries and firm size information is collected from employees.

The Business Payroll Survey collects information on job vacancies, payroll employment, paid hours and earnings. The Survey of Employment, Payrolls and Hours (SEPH) provides information on the amount of earnings and occupied positions, vacant positions, and hours worked by industry. SEPH is based on the Business Payroll Survey and a census of payroll deductions. The census of payroll deductions is provided by the Canada Revenue Agency. The federal government also eliminated other labour data sources such as the long form census and the Workplace and Employer Survey. The Conservative government discontinued the mandatory long form census citing privacy concerns (IRPP, 2010); it was replaced with a voluntary National Household Survey. The long form census collected data on education and detailed labour market characteristics. Information from The Workplace and Employer Survey included employer investment in training, labour mobility within firms, and employee turnover and vacancy rates.

Table 1: Labour market information provided by federal government agencies

Federal Agency	Name(s)	Description
Statistics Canada	- Labour Force Survey (LFS) - Business Payroll Survey (BPS) - Survey of Employment, Payrolls and Hours (SEPH) - Employment Insurance Statistics (EIS) - Job Vacancy Statistics - National Household Survey	Nation-wide surveys produced monthly.
ESDC	Canadian Occupation Projections System	Labour supply and demand projections over a 10-year span by skill level and occupation.
Citizenship & Immigration Canada	Working in Canada (website)	- Canadian employers post job vacancies. - Produced jointly with ESDC Canada
Industry Canada	Canadian Industry Statistics (CIS)	Measures labour productivity by Industry

Statistics Canada uses the BPS and SEPH to produce job vacancy statistics that provide trends in job demand. Job vacancy statistics comprise of two measures: the unemployment-to-job vacancy ratio and job vacancy rate. The unemployment-to-job vacancy ratio measures the number of unemployed people available for each job vacancy, and is therefore a measure of shortage of labour. This means the higher the unemployment-to-job vacancy ratio, the more competitive the job market is in that industry. The job vacancy rate is the number of job vacancies as a percentage of labour demand (occupied positions and vacant positions). In other words the job vacancy rate measures the percent of the labour demand that is unmet. Table 2 shows the unemployment-to-job vacancy ratio and job vacancy rate for Canada in June 2013. For illustrative purposes only figures for Canada are discussed, and figures for provinces and territories are not. An industry with a high unemployment-to-job vacancy ratio and low job vacancy rate should be experiencing a surplus of workers. This suggests, according to table 2, there is an oversupply of workers in educational services (row 15), construction (row 4) and manufacturing (row 5) sectors. Likewise an industry with a low unemployment-to-job vacancy ratio and high job vacancy rate is likely experiencing a shortage of workers. For example, the professional, scientific and technical services sector (row 12) seems to have the greatest demand for – and shortage of workers.

Table 2: Unemployment-to-job vacancy ratio and job vacancy rate by industry (June 2013)

Industry	unemployment-to-job vacancy ratio	job vacancy rate
1. Forestry, logging and support	F	F
2. Mining, quarrying, and oil and gas extraction	F	F
3. Utilities	F	F
4. Construction	8.2[D]	1.4[D]
5. Manufacturing	5.7[C]	1.1[C]
6. Wholesale trade	4.4[D]	1[D]
7. Retail trade	3.9[C]	1.4[C]
8. Transportation and warehousing	3.4[D]	1.4[D]
9. Information and cultural industries	3.1[E]	2.1[E]
10.Finance and insurance	2.4[E]	0.9[D]
11.Real estate and rental and leasing	3[E]	1.4[E]
12.Professional, scientific and technical services	2.7[D]	2.4[D]
13.Management of companies and enterprises	F	F
14.Administrative and support, waste management and remediation services	5.1[D]	1.7[D]
15.Educational services	5.5[E]	0.5[D]
16.Health care and social assistance	1.3[C]	1.9[C]
17.Arts, entertainment and recreation	7.3[E]	1.9[E]
18.Accommodation and food services	2.8[C]	2.3[C]
19.Other services	3.3[D]	1.9[D]
20.Public administration	1.5[D]	1.1[C]

Source: Statistics Canada (2013), CANSIM Tables 284-0001 and 284-0003
Note: Letter are data quality indicators: A - Excellent; B Very good; C - Good; D – Acceptable; E - Use with caution; F - Too unreliable to publish

ESDC makes labour projections with their model The Canadian Occupational Projection System (COPS) (ESDC, 2011). The purpose of the COPS model is to identify occupations that may face a shortage or surplus of workers. The model measures trends in labour supply and demand over a 10-year span by skill level and occupation. Skill levels are defined in terms of education level: Skill level A (university education), skill

level B (college education or apprenticeship training), skill level C (high school education), and skill level D (on the job training). Occupations in skill levels A and B that require post-secondary education are classified as high-skill occupations and skill levels C and D, low-skill occupations (ESDC, 2014). According to the COPS 2011 projections, in the next decade, two-third of job openings will require skill level A or B (post-secondary education) or be management occupations; the remaining one-third will only require skill level C or D (HRSDC, 2011).

Occupations in the Canadian economy are classified according to the National Occupational Code (NOC; HRSDC, 2013). The NOC code is a four-digit code, and each digit specifies the occupation. At the three digit level, occupations are divided into 140 minor groups (for detailed explanation see appendix B). The COPS model found among the minor groups, occupations expecting a labour surplus represent 25% of 2010 employment and are predominantly low-skill (skill C and D). Occupations with an expected shortage represent 15% of 2010 employment and are predominantly high-skill (skill A and B) occupations. For example, managers in health care and human resource professionals are expected to experience a shortage, whereas there is an expected surplus of carpenters and sawmill machine operators (HRSDC, 2011).

In 2013, Citizenship and Immigration Canada and ESDC developed Working in Canada that serves as an online job bank for individuals and employers (Rai, 2013). Employers can advertise job vacancies and individuals can search for jobs by region and occupation. Working in Canada also provides job match services where they match respective job ads and job profiles. Employers can receive a list of qualified candidates and job-seekers received a list of matching job vacancies. The website also provides job market trends at the provincial and sub-provincial levels. In addition, Aboriginal Affairs Northern Development Canada provides career and labour market information to First Nation and Inuit students. This information is provided under their initiatives to promote the benefits of education and increase First Nation and Inuit representation in the workforce.

In short, a number of sources provide information about labour demand in Canada. Statistics Canada conducts a few surveys to obtain standard labour data. ESDC provides 10-year labour market projections at the national level. The Working In

Canada website does provide information on job vacancies at sub-provincial levels and tries to support job matching. There is no information on the skill sets and knowledge that are in greatest demand in the economy. Despite all the information available better information is required to support individuals, especially young people, in career planning.

3.3. Labour Supply Information Sources

Compared to labour demand in Canada, information on labour supply is limited. The major source of information on the workforce is Statistics Canada's Labour Force Survey (LFS). The survey collects information on the characteristics of the working-age population including age, sex, marital status, educational attainment, and family characteristics. For employed individuals the survey provides information on demographic characteristics, industry and occupation, job tenure, and hours worked. ESDC uses Labour Force Survey data to determine eligibility, level, and duration of insurance benefits for individuals in a particular region (Statistics Canada, 2013b). Other levels of government use Labour Force Survey data to evaluate and develop employment programs (Statistics Canada, 2013b). Statistics Canada also conducts Employment Insurance Statistics (EIS), and Employment Insurance Coverage Survey (EICS). Employment Insurance Statistics reports on the operation of the employment insurance programs. The Employment Insurance Coverage Survey (EICS) provides information on who is receiving employment insurance and individuals experiencing underemployment.

To estimate future labour supply in Canada, the ESDC Canadian Occupational Projection System (COPS) provides medium-term labour supply projections. COPS does not provide any projections at provincial level, only national projections. The projections are for occupations and the broad skill (education) level in the workforce. The two components of labour supply projections are anticipated school leavers (graduates) and new immigrants (ESDC, 2011).

Employers can receive information on skilled immigrants from non-profit organizations. Service Provider Organizations (SPOs) are non-profit organizations that

provide a number of services to help immigrants integrate into the labour market. Certain SPOs also maintain a database of qualified immigrants for Canadian employers. An example of an SPO facilitating job matching is Skills International, an online database of screened and internationally qualified immigrants living in Ontario. The database includes candidate resumes seeking employment in specific professions and occupations. The resumes are collected and screened by SPOs and industry associations across Ontario. Skills International also allows employers to post job openings.

Compared to information collected on labour demand, information on labour supply in Canada is very limited. The information is collected to support the development of employment programs and employment insurance benefits, but it is insufficient to support job matching. Some non-profit organizations have taken effective measures to provide information to employers on the education and training of skilled immigrants. However, employers do not have the same level of information for the general labour force. The next section will discuss the concerns from both sides of the labour market due to inadequate information.

4. Labour Concerns in Canada

Given the limited available labour information in Canada many employers experience difficulty in finding workers, and many job seekers in finding employment. This section discusses the concerns from the demand side of the labour market (employers) and the supply side (job seekers).

4.1. Demand Side Perspective

The labour information currently available does not help address many of the employer concerns. First, it is important to distinguish between a labour shortage and skills shortage. Labour shortage refers to an insufficient number of people available to satisfy employer demand in a given occupation. A skill shortage refers to the skill or work experience of job seekers that do not match employers' demand (Certified General Accountants Association of Canada, 2012). Industries that are not facing a labour shortage may be facing a skills shortage, and vice versa. For instance, the ICT sector anticipates a severe shortage of workers who possess business skills accompanied with their specialized training (O'Grady, 2011). On June 2012, The Canadian Chamber of Commerce held consultations with their members concerning the labour skills shortage (Canadian Chamber of Commerce, (2012). Four key issues emerged. First, the relationship between educational institutions and the private sector must be stronger to balance supply and demand for particular skilled trades and high skill occupations. Second, Canada must upgrade the skills of the labour force and underutilized groups. Third, the federal government should align immigration policy with local labour market needs. Fourth, there should be an emphasis on education and workforce development for aboriginal people (Canadian Chamber of Commerce, 2012).

A House of Commons Committee report discussed the worker shortage in four major occupational groups: science, technology, engineering, and mathematics (STEM);

Information and Communication technologies (ICT), healthcare, and skilled trades (House of Commons Committee, 2012). The report based its findings on industry reports, testimony from industry representatives (see Appendix A for detailed explanation), and the ESDC Canadian Occupational Projection System (COPS) projections. According to the report, a majority of the occupational groups expect a skills and worker shortage due to skilled workers retiring and new entrants lacking experience.

Although Canada provides information on demand in the labour market, many employers' needs are not met. The information gives an overall sense of the demand for particular labour but is inadequate for job seekers. More important than the occupational demands in the economy are the skills in demand. Certain skills are required among several industries and occupations. However, the information available assesses the level of education in demand, but not the specific skills.

4.2. Supply Side Perspective

Canada has a very well educated workforce. Among OECD countries, Canada ranks first in the proportion of adults with a college education, and eighth in proportion of adults with a university education. It also ranks third in both proportion of public expenditure on higher education and spending per post-secondary student (OECD, 2012a). Although higher education is associated with higher paying jobs, it does not necessarily increase the probability of obtaining employment. In Canada, with a very well educated youth population, the 2012 youth unemployment rate was almost 15%, more than double the national average of about 7% (Statistics Canada, 2014a). Table 3 shows youth unemployment rates by level of education. The figures highlight the importance of post-secondary school since the highest unemployment rates are among individuals with no post-secondary education. Notably, youth unemployment rate is slightly higher for people with a university degree compared to those with a post-secondary certificate or diploma. This underlines the need to understand employment prospects associated with different types of education. It is also important to recognize that many employed youth are working part-time. In 2013, approximately 48% of all employed youth worked part-time, and for those with a university degree it was approximately 29% (Statistics

Canada, 2014a; 2014b). Furthermore, the unemployment rate does not account for people with jobs that do not match their education and training.

Table 3: 2013 youth (age 15 to 24) unemployment rate by educational attainment

Educational attainment	Unemployment rate
Some high school	22.5%
High school graduate	12.6%
Postsecondary certificate or diploma	7.8%
University degree	9.1%

Source: Statistics Canada (2014b), CANSIM Tables 284-0004

This mismatch can result in overqualified employees. In fact, a 2001 Statistics Canada study found one out of every five employees with a university education worked in a job that only required a high school education (Duval et. al., 2001). This phenomenon means dissatisfaction for the employee, and underutilized human capital for the country (Duval et. al., 2001).

A Statistics Canada study analyzed the number of non- student young adults (aged 16 to 29) experiencing employment instability between 2007 and 2009 (Larochelle-Côté, 2013). Employment instability is defined as an individual employed in 2007, but with part-time, temporary employment, or no job in 2009. The study found approximately 23% of 451,000 youth in this age interval working in 2007 experienced employment instability in 2009. Individuals with only high school education experienced an employment instability rate of 32%, and university graduates, 20%.[2] Educational attainment is not significantly associated with employment instability. The strongest factors for employment stability are work experience and occupation type. Occupations in management, business, finance, and administrative and natural science had a significantly negative relationship with employment instability. Of note, 2007-09 is the

[2] The difference is not statistical significant

onset of the post-2008 recession which also contributed to high employment instability among young adults.

A major factor for the difficulty of new entrants integrating into the labour market is the lack of demand for their skill set. How employment prospects vary by education type is important information for job seekers. In fact, a deliberative dialogue held by Canadian Policy Research Networks found many young people are concerned about the transition from school to the labour market (de Broucker, 2006). Youth participants also expressed the need for more and better information on education and career options, including vocational, trades, and entrepreneurial paths (de Broucker, 2006). Many post-secondary institutions do provide work experience opportunities. However, many students are unaware of their employment prospects for a given field of study after graduation. In addition, young people are not provided information on education and career options beyond a university degree.

The 2008 economic downturn also weakened the demand for youth labour. During the recession young people accounted for half of all job losses, but comprised only 16% of the labour market (O'Rourke, 2012). The economic downturn makes it increasingly difficult for graduates to obtain employment that matches their education. This means many young people settle for part-time, temporary, or low skill occupations unrelated to their education. In fact, one out of three 25 to 29 year olds with a post-secondary diploma has taken low-skilled occupations after graduation (O'Rourke, 2012). According to COPS projections among all school leavers with a post-secondary education only approximately 59% are expected to work in occupations that require post-secondary education (HRSDC, 2011).

Connecting Canadians with Available Jobs is a 2013 federal government initiative to help the skilled unemployed find work. The program specifically assists unemployed Canadians receiving Employment Insurance (EI) connect with jobs that match their skills in their local area. The program will also provide additional support necessary to return to work. Employment Insurance recipients' receive job postings and the federal government determines what is suitable employment and a reasonable job search effort.

As a conclusion, Canada has an educated and skilled labour force, but needs to better utilize this skilled labour force. Canadians have high educational attainment but too many experience unemployment. In fact, many young graduates find it increasingly difficult to obtain jobs where they can utilize their education and training. In addition to keep a job, the most important factors seem to be the occupation type and the level of experience, not necessarily education.

4.3. Policy Problem

This research addresses the following policy problem: An inadequate labour market information system contributes to the mismatch between labour supply and demand in the Canadian labour market.

Inadequate labour information is creating adverse effects on job seekers, employers, and the economy as a whole. Job seekers experience difficulty integrating into the labour market because they are unaware of the occupations and skills in demand. Many employers are spending resources to find skilled workers, resources that could be spent on business development. All this is a hindrance to economic growth and suggests Canada's unemployment rate could be lower than currently experience..

Canada has multiple sources of labour market information that include the federal government, provincial governments, and the private–sector. However, this information has been ineffective in improving the matching of labour supply and demand. Much of the information is used to develop employment programs, evaluate insurance benefits, and research, but not job matching. This study aims to determine what labour information should be collected, and how it can create a more efficient labour market.

The key interest groups with a stake in a labour market information system can be divided into providers (federal and provincial governments) and end users (job seekers and employers). Currently, both governments provide some form of labour market information, which means reforms will impact federal and provincial governments.

Post-secondary educational institutions are an important intermediary because they are responsible for providing individuals with skills and knowledge. These institutions need labour information to design their programs and help meet the labour demand in Canadian economy. The next section presents literature on optimal labour market information systems.

5. Features of an Optimal Labour Market Information System

This section outlines important features for an optimal labour market information system to create an efficient labour market which are going to be used as an analytical framework. The features are based on the findings of two organizations: W.E. Upjohn Institute for Employment Research and The National Skill Development Corporation (NSDC) India. The W.E. Upjohn Institute for Employment Research provides a framework for an optimal labour market information system for ESDC to improve existing labour market information practices (O'Leary and Woods, J., 2006). India is also looking to develop an effective labour market information system to effectively utilize their growing population and workforce. Recognizing this challenge, the NSDC India did a study to conceptualize a Labour Market Information system (NSDC India, 2011). Their study identifies leading practices around the globe for labour market information collection. The findings from these two organizations are used to define an optimal labour market information system. This section first discusses the data set of a labour market information system, followed by a discussion of the optimal structural features.

5.1. Data Elements

Obtaining labour market data is a fundamental requirement in achieving an efficient labour market (O'Leary and Woods, 2006). This sub-section discusses the different categories of labour information necessary as developed by the W.E. Upjohn Institute for Employment Research.

5.1.1. Standard Labour Market Data

Labour market data track labour market trends and overall labour supply and demand. The data in this category overlap with information in certain categories discussed below. Typically, this is aggregate data used for national and provincial analysis.

5.1.2. Demand Data

Labour demand data should provide information on the current and expected demand, occupational distribution across industries, and expected earnings. Data concerning labour demand identify job vacancies and industries experiencing significant layoffs. This information helps government uncover the causes of worker dislocation. Occupational projections can help anticipate structural problems in the labour market. How occupations are distributed across industries and occupational employed within industries is also important information for career planning and workforce development. Occupational wages and industry earnings are important information for job seekers on the expected standard of living. This information can be used directly by career practitioners to assist people in finding works.

5.1.3. Occupational Characteristics

Occupational characteristics provide job seekers with information that describes the work environment. This includes information on skills, abilities, knowledge, responsibilities, and work activities. This information is important because many occupations evolve with new technologies and practices. This means the skill set required for occupations will change. In addition, this helps job seekers determine if they are well suited for a specific occupation or industry.

5.1.4. Occupational Supply

Occupational supply data can help identify structural problems in the labour market. Tracking unemployment by occupation helps determine changes in the labour supply, and which industries are experiencing an oversupply of workers. Additional information to understand the labour supply mix includes data on labour force entrants, people of out the labour force, number of enrollees in education and training, completers of education and training, and outcome of graduates.

5.1.5. Education and Training

Information on education and training required for an occupation is important for career planning. Key information on the length of time and cost to be qualified helps individuals determine whether they should pursue the job. Information on financial assistance available for education and employment training programs is also important because it can positively impact job matching.

5.1.6. Crosswalks and Linkages Across Data Sets

A labour market information system should allow information to be compared and not be a standalone data item. Classification systems that group's similar information together helps ensure comparability. Moreover, crosswalks can connect data on industry, occupations, education, and skills.

5.2. Structural Features

W.E. Upjohn Institute for Employment Research (2007) provides seven key features of an optimal labour market information system. NSDC India (2011) also identifies leading practices in the dissemination of labour market information. The findings of both organizations are in Appendix C. For this study I amalgamate their findings into four key categories: governance, data quality, analysis and interpretation, and data dissemination. This sub-section details the importance of each category.

5.2.1. Governance

Given the number of providers and users of labour information, a good governance model is necessary to facilitate effective job matching. Given the complexity of the labour market, a shared and systematic approach is required. Therefore coordination and collaboration between different providers of labour information for comprehensive system must exist. Good governance means efficient data management. A lack of partnership among providers is likely to create duplication of development, analysis, and ineffective dissemination. Due to the importance of collaboration, governments must have an active role in developing and disseminating labour market information (NSDC India, 2011). In examining any labour market information system it is important to consider how it is coordinated among agencies and different levels of government.

5.2.2. Data Quality

The data set is the most important aspect of a labour market information system. Data quality alone does not ensure job matching, but it is a necessary component. Critical issues to consider in collecting labour market data include time period coverage; geographical coverage; and data classification. There must also be a standardization classification of data for occupations, industries to facilitate data development, presentation, comparison, and interrelationships (NSDC India, 2011).

5.2.3. Analysis and Interpretation

An effective labour market information system must provide reliable analysis. Labour information can be analyzed at different levels including national, regional, local, and by industry. Analysis should be conducted at different levels to serve the diverse labour information users. The different needs include support for job matching, labour policies, learning and educational policies. Another important consideration is the role of labour market intermediaries, such as institutions and individuals involved in the employer-worker relationship. The services of intermediaries can include informing and facilitating matching between job-seekers and employers, how work is accomplished, and possibly resolve conflicts. This study focuses on the role of labour market

intermediaries to facilitate job matching. Labour market intermediaries are vital in helping job seekers understand labour market conditions, and employers understand the workforce availability.

5.2.4. Data Dissemination

A labour market information system should assist job seekers, firms, youth, education institutions, and any user to make labour market-related decisions. For this reason the information must be easily accessible and effectively disseminated. The internet is the primary method to share labour market information. Career practitioners are also a fundamental channel to share information to facilitate career planning, job search, and career transition.

To summarize, an optimal labour market information system must provide comprehensive data covering both the demand and supply side of the labour market. For a labour market information system to support job matching governance must be well co-ordinate, have data quality, be able to support analysis and interpretation, and be effectively disseminated.

6. Methodology

This section explains the primary and secondary methodology being used to develop policy options. The primary methodology is a case study analysis of jurisdictions to identify best practices based on the components described in section 6. The case study assesses how each jurisdiction aligns their labour supply and demand. First, the analysis identifies the type of data collected within the categories. Second, the analysis identifies the structural features of each country's system. The cases examined are Australia, Germany, and Switzerland. The secondary methodology examines academic literature to determine whether the identified practices are effective in aligning labour supply and demand. A potential drawback of this methodology is that certain best practices may not be captured by the model. Overlooking a key practice means an important feature that supports job matching could be neglected.

6.1. Case Study Selection

To select case studies the following criteria are applied: OECD members; total and youth unemployment rate below Canada's; and higher public expenditure on active labour market programs. Table 4 provides a comparison of these characteristics.

Table 4: Case study selection criteria

	Unemployment rate (2012)	Youth Unemployment rate 15 to 24 (2012)	Public Expenditure on active labour market programs as % of GDP (2011)
Switzerland	4.3	8.4	0.59
Germany	5.5	8.1	0.79
Australia	5.4	11.7	0.29
Canada	**7.3**	**14.3**	**0.26**

Sources: OECD (2013)

Switzerland has the lowest unemployment rate at 4.3% and ranks second among OECD countries[3], Australia and Germany have similar rates. There is a great difference in youth unemployment rates between Canada and the case study countries. Switzerland and Germany have the lowest youth unemployment rate that is almost half of Canada's. In fact, Germany and Switzerland are just behind Japan for lowest youth unemployment rate. Australia's youth unemployment rate is higher but still well below Canada's. For public expenditure, active labour market programs refer to government programs that support unemployed individuals to integrate them into the labour market.[4] Compared to Canada, the two European countries spend a much greater proportion of their GDP in supporting unemployed individuals to find work. Australian statistics are closer to Canadian respective to Germany and Switzerland. However, Australia is an important country to investigate because of its similar size and population to Canada. Altogether, the statistics in Table 3 suggest that the case countries have a labour market information system that is more effective in job matching.

My case study focuses on the type of labour market data collected and highlights key features of the respective labour market information systems. This study does not conduct an in-depth analysis of the distinguishing features of each case.

6.2. Evaluation Framework

The case study analysis has two parts. The first part considers labour data collected by each country based on the categories discussed in section 6.1. Table 5 presents the measures for each category. The standard labour market data category includes employment rate, unemployment rate, labour force participation and characteristics, and individuals receiving employment insurance.

Demand data covers a range of information with the most crucial being job vacancies; occupational estimates and projections; number of business establishments and size; occupational wages; and occupational distribution across industries. This data is indispensible because it provides direct information about occupations with high

[3] Norway and Korea have the lowest unemployment rate at 3.3%

[4] This number may not include expenses on gathering and distributing labour market information

employment prospects. Other helpful demand data includes business labour costs; employment within industries; business births and deaths; industry staffing patterns; and layoff data. *Occupational Characteristics* includes vital information about the skills, abilities, knowledge, work activities, and education and training requirements for jobs. Tracking this information can help identify the changing needs of the labour market. Additional useful data is tools and technology required, interests, work styles, descriptions of occupations, and licensing and certification requirements.

Vital *Occupational supply* information includes employment and unemployment by occupation; number of enrollees and completers of education programs; activity of people out of labour force; and educational outcomes of graduates. This data provides a breakdown of the workforce and complements *demand data* to help identify potential causes of structural unemployment. Additional helpful data is new entrants to the labour force; people transferring occupations; geographical migration; and labour force separations. Finally, education and training programs covers information about post-secondary institutions. This includes schools, programs and courses, and financial assistance.

The measures for this assessment are modified from the original model by W.E. Upjohn Institute for Employment Research (original model in appendix D). First, my modified version eliminates similar data elements. Second, the crosswalk category is eliminated. Crosswalks are important to compare information across data sets. However, they are unnecessary for job matching since I consider the importance of analyzing and sharing data with end users.

The second part considers the features of respective information systems related to governance, data quality, analysis and interpretation, and data dissemination. The governance category describes what public agencies are responsible for labour market information. The data quality category is concerned with what is the time-period and geographic detail for information collection. For the analysis and interpretation category I consider the role of labour market intermediaries. Finally, the data dissemination category considers whether there is an easily accessible source for information, and how the information is disseminated to target population groups. Examining cases on these key features will identify how each country supports job matching.

Table 5: Data elements of an optional LMI system

	Data Category	Data Element
Supply and demand side	Standard labour market data	Population/demographics Employment Labour force participation Unemployment rate Labour force characteristics Insured unemployed
Demand side	Demand data	Job vacancies Occupational employment estimates Occupational projections short term - 5 years or less Occupational projections long term – 10 years Occupational distribution across industries Occupational wages Number of business establishments and size Industry employment estimates Industry employment projections Industry Staffing patterns Mass layoff data Business births/deaths Industry average earnings Labour costs
	Occupational characteristics	Skills including essential skills Abilities Knowledge Work activities Education and training requirements Tools and Technology Interests Work styles Narrative descriptions of occupations Licensing and certification requirements

Note: LMI = Labour Market Information

Table 5 continued

	Data Category	Data Element
Supply side	Occupational supply	Occupational employment
		Unemployment by occupation
		Enrollees and completers of education and training programs
		Educational outcomes
		Activity of persons out of LF
		New entrants to labour force
		Occupational transfers
		Geographical migration
		Labour force separation
		Estimates of supply
	Education and Training	Education and training institutions/programs
		Program & course descriptions
		Educational attainment of adults
		Financial assistance sources, particularly public sources for education or employment training programs.

Table 6: Key components of an optimal LMI System

Key Component	Measurement
Governance	What agencies or organizations are responsible for labour market information?
Data quality	What is the time period coverage and geographic detail of labour market information?
Analysis and interpretation	What role do intermediaries have in the labour market information system?
Data dissemination	Is their one easily accessible LMI source for all users?
	How is LMI disseminated to target populations?

Note: LMI = Labour Market Information

7. Analysis

This section determines what data elements and features present in the three cases do not exist in Canada. . Each case study includes first a description of the labour data collected by the country. Then, the case study analysis describes the features and structure of respective labour market information systems. The results of the analysis are summarized in Tables 7 and 8 at the end of section.

7.1. Case Study 1: Australia

Australia's population is approximately 24 million in 2014, with a per capita GDP of US $67, 556 (World Bank, 2014). Information for this case study analysis is obtained from the Australian government website and reports.

7.1.1. Data Elements

Standard Labour Market Data.

In Australia, information concerning the population is obtained from a Monthly Population Survey. One of its components, the labour force survey, provides detailed information on employment, unemployment, and unemployment benefits. As a result, all data elements listed under the core labour market data category are provided by Australia.

Demand Data.

Australia uses a number of sources to gain an accurate picture of the labour demand. Among them, there is a survey to obtain job vacancy estimates. The Australian Department of Employment also releases monthly vacancy reports which provide the Internet Vacancy Index (IVI). This Index tallies job vacancies from four websites: SEEK, My Career, CareerOne, and Australian Job Search. The IVI provides detailed data for

approximately 350 occupations at all skill levels and all states, territories, and the 38 regions (Australian Department of Employment, 2014).

In addition to vacancy data, Australia has a Business Indicators Survey to gauge private sector health. This survey collects information pertaining to the sales, profit, size, and labor costs of firms. Australia's Survey of Employers who Have Recently Advertised (SERA) collects data not covered by my model. It includes information concerning major occupations and employers' recruitment experiences. This is used to conduct research on skill shortages and understand employers' recruitment experiences.

To support career planning The Department of Employment provides information on weekly earnings for many careers and five-year employment projections. The five year projections are broken down by industry, occupation, and region. There are no long-term 10 year occupational projections. Short-term projections are likely more useful for career planning, given it is more likely to be accurate, and people are more inclined to make career decisions late in their school-age. In addition, the Department provides data on occupations employed within an industry and how occupations are distributed across major industries. This level of detail helps individuals to learn about occupations with the greatest employment prospects. Furthermore, the government can anticipate potential occupational shortages and determine workforce development strategies. Unfortunately, I could not verify whether Australia provides any information concerning business births and closures, mass layoff data, or industry employment estimates.

Occupational Characteristics.

The Australian governments' Job Outlook website provides very detailed information on the characteristics of different occupations. These characteristics include skills, knowledge, activities, abilities, interests, job environment, work values, and work tasks. The website provides almost all the data elements – except for tools and technology – in this category. This information is very useful in informing young people's expectations and identifying careers that fit their interests. This also informs people of the changing requirements for occupations.

Occupational Supply.

The labour force survey provides general information about the workforce. In addition to the information covered in the core labour market data category there are characteristics of persons unemployed or not in the labour force; such as duration of unemployment, methods for job search, and reason for not being in the labour force. Collecting data about people who are unemployed or not in the labour force can identify structural unemployment issues such as workers lacking required skills; unwilling to move to new location; or unwilling to work at existing wages. In addition to the labour force survey, Australia conducts a Labour Mobility Survey to collect information about modifications in employment situation. This includes individuals changing employers, a change in work with current employer, and employed people who were previously unemployed or out of the labour force. Tracking the movement of labour identifies which industries or major occupations experience the greatest turnover or are the most dynamic.

Australia also places importance on understanding the labour force make-up and impact of education. For instance, Australia tracks the enrollment and completion of education programs by age, sex, institutions, level of education, and type of education. The Australian Graduate Survey (AGS) surveys new graduates from all universities, colleges, and other higher education institutes. The AGS consists of a few questionnaires that ask about graduates' employment and salary outcomes, and educational experience. The survey allows students to understand employment prospects associated with different fields of study. It also helps educational institutions identify issues with people transitioning from academics to professional careers. Australia does not provide any estimate of the total labour supply. This analysis also cannot verify whether Australia collects information on labour force separations.

Education and Training.

Universities Australia represents the university sector in the country and provides prospective students with information about university programs and courses. The Federal Department of Education also provides information to students about government assistance for financing tertiary education. Students can go online and learn about their eligibility for government assistance programs.

7.1.2. Key Components

Governance.

Australia divides responsibilities for labour market information between the federal government and the six states plus two territories (Qiao and Sharpe, 2006). The private sector also has a greater role in providing information than most countries. At the federal level, The Australian Bureau of Statistics (ABS) is responsible for the labour force survey. The Department of Employment and the Department of Education are the main agencies that provide labour market information. Labour market information produced by the federal government is regionalized at the state level, and state governments provide labour market information at regional or sub-state levels. State education and training authorities and sub-ministries provide local information. State Training authorities are specifically responsible for labour market information regarding vocational education and training. The Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA), identifies national standards and priorities in the labour market and in the education system (Qiao and Sharpe, 2006).

Australia also relies on the private sector to provide labour market information. Private companies provide information that is funded on a competitive basis (NSDC India, 2011). For instance, The Department of Education contracts out labour market information research and production to publishing companies or research organizations (Qiao and Sharpe, 2006). Professional associations receive funding to provide information about their sector. Further, some universities partner with professional associations and industry to produce labour market information.

Data Quality.

Australia takes significant measures to ensure labour data has good geographical coverage and is timely. Given its large size, Australia is quite advanced in collecting local area data through their small area estimation techniques (Advisory Panel for Labour Market Information, 2009). Labour market information is collected at three geographic regions: Employment Service Area (ESA), Labour Force Region (LFR), and Small Area Labour Market (SALM). Employment Service Area data concerns recipients of Centrelink benefits and individuals engaged with Job Services Australia. Labour Force Region data provides labour information on the basis of boundaries used by the Labour Force Survey. Small area data includes unemployment rates and labour force figures for approximately 1,300 statistical local area regions (Advisory Panel on Labour Market Information, 2009).

Despite this level of detail for their major surveys, Australia has a problem with uneven production and provision of information at the state level (Qiao and Sharpe, 2006). For instance, some states invest more in providing localized occupational profiles and labour market information, while other states provide considerable resource material for their aboriginal population. Australia also needs an improvement in information from the private sector (NSDC, 2011).

To ensure timely information Australia conducts surveys on a frequent basis. The Labour Force Survey and online job vacancy report is produced monthly, while the Business Indicators Survey is published quarterly using data for three consecutive months. This survey is based on a random sample of approximately 16,000 firms stratified by industry, state/territory, and number of employees. Both the Australian Graduate Survey and SERA is conducted annually. The Australian Graduate Survey response rate ranges from 60 to 65 percent (Graduate Careers Australia, 2014). SERA is conducted at the national and regional level and covers approximately 80 occupations.

Analysis and Interpretation.

In Australia, online sources are a very important intermediary in supporting career decision making. Websites provide labour market information analyze and interpret the data to make it understandable for end users. For instance, the Job Outlook website explains employment prospects for each occupation. In addition, the website also explains earnings and hours of work for each occupation compared to the national average.

The country is placing increasing importance in career guidance counsellors. The Career Industry Council of Australia (CICA) is the national body for the career development industry, and many CICA members focus on delivery of career development within schools. The Council receives government funding to deliver national activities to advance and build a career development culture in Australia. CICA is working towards regulation of career development profession and establishing professional standards.

Data Dissemination.

Australia's Labour Market Information Portal (LMIP) is an online resource that provides updated labour market information. The LMIP serves as one online source to obtain a breadth of information that includes unemployment rates, employment by industry, and employment projections. Job search sites within the labour market information portal are accessible to all users, easy to navigate, do not require login or password, and have many features free of charge.

Australia also provides labour market information through the education system. The provision of information is supposed to begin in year 7 of education; but policies concerning the provision of information vary across states (Qiao and Sharpe, 2006). In school, students learn how to use the different online sources and participate in events for career planning. Notably, Australia is using their labour market information system to increase participation in vocational education and training, and reduce school drop outs (Qiao and Sharpe, 2006).

In summary, Australia's labour market information system is a collaborative effort between the federal government, state governments, education institutes, and the private sector. To understand labour market conditions, Australia employs multiple surveys of employers and the workforce. The most noteworthy feature is the use of online sources to disseminate information. Australia does a good job of ensuring their online information is easily accessible and comprehensible for end users. One minor issue in Australia is unequal information being provided across the states.

7.2. Case Study 2: Germany

As noted in Section 7, Germany's has the second lowest youth unemployment rate among OECD countries. Compared to Canada, Germany is a more populous country (approximately 80 million in 2013), and a per capita GDP of US $41,863 (World Bank, 2014). Information for the German case study is obtained from the Federal Employment Agency and reports.

7.2.1. Data Elements

Standard Labour Market Data.

Germany provides all the standard labour market information in this category. This information is obtained from the labour force survey, an integral component of the national Microcensus. The Microcensus has a high response rate of approximately 90% since most questions require compulsory response (Federal Statistical Office of Germany, 2014).

Demand Data.

Germany conducts two surveys to understand labour market conditions: The Job Vacancy Survey and the Establishment History Panel. Their Job Vacancy Survey measures unmet labour demand and identifies how sectors have been affected by changing economic situations. This survey also asks businesses if they experience difficulty recruiting workers and to identify those difficulties. The Establishment History Panel (BHP) tracks business births, closures, and sizes. The Job Vacancy survey

provides information about job market conditions, while the BHP informs government about private sector conditions. Germany also provides both short-term (5 years) and long-term (10 year) occupational projections.

Germany also provides information on the employed occupations within an industry and average gross wages for different occupations. This study cannot verify whether Germany collects information on how occupations are distributed across industries, occupational transfers, or industry employment estimates.

Occupational Characteristics.

The Federal Employment Agency provides information about occupations through their Berufet website. The website provides a short description of the job, work activities, interests, and required skills. Occupational information covers 16 professional fields and 123 sub-professional fields.

Occupational Supply.

The labour force survey collects the standard information on the workforce concerning employment, unemployment, and people out of the labour force. Germany also constructs ratios of new entrants and graduates of higher education. The ratio of new entrants describes the proportion of an age cohort that is new entrants to higher education. The ratio of graduates describes how many people of one age cohort are graduates. These ratios help determine the educational attainment level of the labour force. This may be important to track given the increasing importance in ensuring an educated and skilled workforce.

The German Student Survey covers 25 universities and universities of applied sciences and covers a range of topics. With respect to employment, the survey is concerned with graduates job prospects and transition into the labour market. Germany does not provide information on new labour force entrants, occupational transfers, and estimates of the labour force supply. Given Germany's already low unemployment rate suggests this information is not vital for job matching.

Education and Training.

The Higher Education Compass is a website that gives a comprehensive overview of the university landscape. From this website individuals can obtain information on and links to all German higher education institutes. Prospective students are also provided information on student finance including semester and tuition fees, scholarships, student loans, and federal financial aid. Higher Education Compass is hosted by the Association of Higher Education Institutes.

7.2.2. Key Components

Governance.

Germany has a centralized system where the Federal Employment Agency is responsible for collecting, analyzing, and disseminating labour market information. The Federal Employment Agency is comprised of 10 regional directorates and 156 employment agencies. The 156 employment agencies collaborate with local authorities to operate 304 job centres. The Federal Employment Agency also includes The Institute for Employment Research (IAB) which is an independent research institute of the Federal Employment Agency.

In Germany, educational institutes and private firms play an important role in the labour market information system. German schools have strong partnerships with the Federal Employment Agency and local businesses to provide labour market information in secondary schools. Obtaining reliable information for secondary schools is important to support curriculums because students learn about vocational career opportunities and can begin apprenticeship training in senior secondary. The Agency also partners with higher education (post-secondary) institutions to inform applicants and students about labour market opportunities and conditions. Private firms have a limited role in delivering information that is concentrated on placement opportunities and counselling services. These companies typically charge fees to employers but not individuals seeking job placement assistance (Qiao and Sharpe, 2006).

Data Quality.

Given Germany's relatively small land size, geographic coverage is not a major challenge. To ensure geographic coverage local employment offices are responsible for collecting and publishing regional labour market information. Germany does make efforts towards ensuring labour market information is timely. Their Microcensus is a continuous survey distributed over all calendar weeks of the year. The results are provided annually and quarterly. Firms receive the job vacancy survey in the beginning of the fourth quarter of the year. In the first, second, and third quarter telephone interviews are conducted with firms to update developments in the demand for labour.

Analysis and Interpretation.

In Germany, the most important labour market intermediaries are career guidance counsellors in schools and local employment agencies. Career guidance counsellors must receive training from the Federal Employment Agency to ensure they can help individuals understand labour market conditions. In addition, the German Association for Career Counselling established a Career Counsellor Register system, where all counsellors or institutions can voluntarily register into the system. The Association also developed prerequisites to ensure counsellors are qualified to serve job placement clients. Local employment agencies provide adults with access to the services of placement officers and work counsellors. Placement officers develop profiles of unemployed adults to estimate their chances of obtaining employment and to determine the type of assistance they require. Work Counsellors assist the unemployed with job search. Private companies providing placement and counselling must obtain a permit from the Federal Employment Agency and submit data on job and training placements.

The Federal Employment Agency is responsible for supporting job matching (Qiao and Sharpe, 2006). Therefore, The Agency provides analysis of their labour market information available online. Through their website the public can learn about occupation and regions experiencing professional bottlenecks, and the workers in greatest demand.

Data Dissemination.

The Federal Employment Agency, being the largest service provider for the labour market, is the primary source of information. The Federal Employment Agency website provides brochures, online publications, annual reports, and publications by the Institute for Employment Research (IAB). However, schools are the most important channel to provide labour information to young people. German schools are responsible for incorporating labour market information in curriculums. The Agency also provides the services of career counsellors and career information sessions in schools. For high school drop outs, schools in partnership with sector chambers provide information and vocational education.

Most higher education institutes are also responsible for providing labour market information. Students can obtain information such as labour market trends and occupational requirements from academic staff. However, the quality of these services depends on the efforts and capacity of academic staff (Qiao and Sharpe, 2006). These institutes are also responsible for informing applicants and students about labour market opportunities and conditions. The Agency also has higher education teams that focus on obtaining labour market information for higher education students and graduates.

To summarize, Germany has a centralized system with the Federal Employment Agency responsible for labour market information. The Agency is also responsible for ensuring career guidance counsellors, working in schools and employment offices are well-informed and qualified to provide services. These counsellors are vital for helping individuals understand labour market conditions and find work. Germany also makes it a priority to provide career information in secondary and post-secondary schools. They also use multiple sources to gain a reliable understanding of labour market conditions.

7.3. Case Study 3: Switzerland

As discussed in section 7, Switzerland has the third lowest youth unemployment rate among OECD countries.[5] Switzerland is a relatively small country with a population of approximately 8 million in 2013, but it has a high GDP per capita of US $78,925 (World Bank, 2014). Information for this case study analysis is obtained from Switzerland's Federal Statistical Office and reports.

7.3.1. Data Elements

Standard Labour Market Data.

The Swiss labour force survey provides all the standard labour data in this category. This includes demographic and labour-related characteristics concerning employment, unemployment, and receipt of unemployment benefits.

Demand Data.

Switzerland uses multiple questionnaires to understand the demand side of the labour market. The Statistic on Enterprise Structure collects business data concerning firm size, sector, region, number of workplaces, and employed persons. JOBSTAT surveys secondary and tertiary sector businesses about job vacancies. This survey also asks questions concerning labour recruitment challenges firms are experiencing. Canton governments (e.g., state or province governments) are responsible for surveys to measure supply and demand in the local apprenticeship market. The Federal Statistical Office also makes available labour costs of employees and the rate of business births and closures. Obtaining comprehensive information about employers is important in Switzerland because the government takes responsibility for job matching.

[5] Case study for Switzerland discusses information provided in English. As a result certain components may be missing because not all the publicly available data descriptions on the website are available in other languages than the national languages, e.g., French, German and Italian.

In addition, salarium is an interactive application that provides salary information for specific jobs. With respect to projections, Switzerland provides projections on the labour force size, but not occupational projections. This may be because Switzerland doesn't feel it is necessary to have projections to support job matching.

Occupational Characteristics.

Switzerland does not provide any information describing occupational characteristics. This information is not available online but may be provided to job-seekers in person by career guidance counsellors.

Occupational Supply.

The Swiss Labour Force Survey provides all the standard information concerning the workforce. This includes employment and unemployment by occupation, migration, and activities of persons out of the labour force. Switzerland also collects occupational mobility data that tracks occupational transfers in the labour market. This helps identify occupations and sectors that provide the greatest stability, and likewise have the greatest turnover. This is useful for job seekers in career planning and the government in understanding labour market and unemployment issues. In addition, The Swiss Graduate Survey obtains information on the employment and educational situation of higher education graduates, one and five years after graduation. Graduate survey results are used to inform higher education institutes, guidelines for education and employment authorities, and career counselling services (FSO, 2014).

Data elements not provided include entrants to the labour force, enrollees and completers of education and training programs, and estimates of the labour supply. Switzerland does provide estimates of economically active persons (employed and unemployed) broken down by age and education levels, but not at the occupational level. Moreover, no case examined tracks estimates of potential labour supply. This is likely because it is difficult to provide an estimate that includes adding employment estimates, unemployment estimates, completers of education, and people outside the labour force. However, given the low unemployment rates in Germany and Switzerland, this measure seems unnecessary to support job matching.

Education and Training.

The Swiss university website is a promotional internet portal for the 12 Swiss public universities and federal institutes of technology. The website provides information and promotes study and research opportunities offered by these higher education institutes. Individuals can search by university or discipline to find all university programs offered in that discipline. In fact, all cases examined have an online source for prospective students to learn about post-secondary schools and programs. Students in Switzerland requiring financial aid can apply for financial support from cantonal governments or universities. Information on financial assistance is not provided from a central source; instead information must be obtained from each university or cantonal government.

7.3.2. Key Components

Governance.

In Switzerland, labour policy decision making is fairly decentralized. The federal government through the Secretariat for Economic Affairs (SECO) sets the parameters for labour policy. Cantons are the level of government mainly responsible for public employment services and administration of active labour market policies. Cantonal labour offices establish and supervise logistical centres for labour market measures and local employment offices. These local employment service offices conduct job placements, refer clients to active labour market programs, and monitor job-search requirements. The federal government benchmarks the performance of local public employment services.

In Switzerland, the education system has a vital role for creating an efficient labour market. Vocational and professional education and training (VET) is integrated into the Swiss education system. VET programs (offered in upper secondary level) are provided in dual track learning, which combines vocational studies and part-time apprenticeships. Cantons are responsible for identifying mismatches in the local apprenticeship market. In case of mismatches, the federal office for Professional Education and Technology (OPET) intervenes to alleviate labour market mismatches (Field et. al., 2009).

Data Quality.

Given the Swiss education system is designed to meet labour needs, it is crucial to have reliable labour market information. Data collection at cantonal levels helps ensure data are reliable. Cantons conduct monthly surveys to determine supply and demand in the apprenticeship market for their VET programs (Field et. al., 2009). At the Cantonal level, regional placement offices collect information about the unemployed on a monthly basis. These data at the cantonal level are pooled together at the national level. This Swiss Graduate Survey is also conducted every two years and has a response rate between 60 and 65 percent (FSO, 2014). Unlike monthly labour force and business surveys in Australia and Germany, the Swiss labour force survey and JOBSTAT survey are conducted quarterly. Being a relatively smaller country, Switzerland may require this information less frequently.

Analysis and Interpretation.

Switzerland places relatively little importance on online sources to help job seekers, but places significant importance on their career guidance system. The Swiss have a system of career guidance and counselling that helps students at various points in their education and professional career. An important institution is The Centre for Occupational Information, which provides advice about career opportunities. The Centre offers generalist counsellors or specialists with knowledge of specific institutions and labour markets. These counsellors receive training to ensure they are informed about vocational education and training courses and the associated labour markets. Secondary school teachers also receive training to make them knowledgeable about general labour market conditions.

Data Dissemination.

The primary providers of labour market information are career counsellors. Career counsellors are made accessible to every population group to help align labour supply and demand. Career guidance counsellors work closely with schools to provide services to students. In fact, career guidance and information sessions are mandatory for students in secondary education. Students also have access to the Centres for Occupational Information to learn about career opportunities. Working age adults

seeking assistance have access to the counselling services from their local placement offices.

In summary, Switzerland has a decentralized system where cantonal governments have significant authority in collecting data and providing employment services. Switzerland also ensures career guidance counsellors are well-informed to provide their services in schools and employment offices. Moreover, Centres for Occupational Information are responsible for providing general and specific labour market information in schools. In addition, Switzerland uses multiple surveys to understand labour market conditions.

Table 7: Summary of case study analysis: data elements

	Data Category	Data Element	Australia	Germany	Switzerland
Demand & Supply	Standard Labour Market Data	Population/demographics	✓	✓	✓
		Employment	✓	✓	✓
		Labour force participation	✓	✓	✓
		Unemployment estimates & rates	✓	✓	✓
		labour force characteristics	✓	✓	✓
		Insured unemployed	✓	✓	✓
Demand Side	Labour Demand	Job vacancies	✓	✓	✓
		Occupational employment est.	✓	✓	✓
		Occupational projections: Short term-- 5 years or less	✓	✓	
		Occupation projections Long-term – 10 years		✓	
		Occupational wages	✓	✓	✓
		Occupational distribution across industries	✓		
		Number of business establishments & size	✓	✓	✓
		Industry employment estimates	✓	✓	✓
		Industry employment projections	✓		✓
		Industry staffing patterns	✓	✓	
		Mass layoff data		✓	
		Business births and deaths		✓	✓
		Industry average earnings			
		Labour costs	✓		✓
	Occupational Characteristics	Skills	✓	✓	
		Abilities	✓		
		Knowledge	✓		
		Work activities	✓	✓	
		Education & training requirements	✓		

Table 7 continued

	Data Category	Data Element	Australia	Germany	Switzerland
Demand Side	Occupational Characteristics	Tools and Technology			
		interests	✓	✓	
		Work styles	✓		
		Descriptions of occupations	✓	✓	
		Licensing & certification requirements	✓	✓	
Supply Side	Occupational Supply	Employment by occupation	✓	✓	✓
		Unemployment by occupation	✓	✓	✓
		Enrollees and completers of education and training	✓	✓	
		Educational outcomes	✓	✓	✓
		Activity of persons out of LF	✓	✓	✓
		New entrants to labour force	✓		
		Occupational transfers	✓		✓
		Geographic migration		✓	✓
		Labour force separations			
		Estimates of supply			
	Education and Training	Education & training institutes/programs	✓	✓	✓
		Program description	✓	✓	✓
		Educational attainment of adults	✓	✓	✓
		Financial assistance sources	✓	✓	

Table 8: Summary of case study analysis: key components

Criteria	Australia	Germany	Switzerland
Governance	LMI responsibilities divided between federal and regional governments. Private sector also has significant role in LMI provision.	Federal Employment Agency is responsible for labour market information.	Federal government sets parameters for labour policy. Cantonal (regional) governments responsible for labour market measures employment services.
Data Quality	Employ small area estimation techniques for local area coverage. Information is unequal across States.	Local area data collected by employment offices. Also employ multiple surveys	Cantons conduct monthly surveys. Also employ multiple surveys.
Analysis & Interpretation	The Career Industry Council of Australia (CICA) responsible for regulating and establishing standards for career counsellors.	The Federal Employment Agency provides training and information to career guidance counsellors.	Career guidance counsellors receive training and information to learn about labour market conditions. Counsellors are either generalists or specialize in certain labour markets.
Data Dissemination	Labour Market Information Portal serves as online resource for LMI. Also provide information through the education system.	Federal Employment Agency provides information to schools. Regional employment offices provide information to unemployed individuals.	Centres for Occupational Information provide labour market information through the education system. Employment service offices provide information to unemployed individuals.

8. Summary of Analysis

This section provides a summary of the case study analysis. First, I compare the jurisdictions examined to identify commonalities and key differences. From there I discuss best practices observed in cases but missing in Canada.

8.1. Comparison of Cases

To summarize, among three cases Australia collects the most labour data in the model. Australia also does the best job of internet delivery of information. Yet, Australia has the highest unemployment rates among all the cases examined. There are likely multiple factors that contribute towards the lower unemployment rates in Germany and Switzerland. This study finds one contributing factor is their respective agencies that are responsible for providing labour market information to support job matching. In Germany there is the Federal Employment Agency that is responsible for labour market information and supporting job matching. In Switzerland, there is The Centre for Occupational Information which is an office that provides career information and counselling services. These organizations are also responsible for ensuring career guidance counsellors are well informed so they can support individuals in finding work.

Furthermore, educational institutes are an important channel for providing information in the cases examined. All three countries provide career information to students in higher education and secondary school. They particularly focus on providing information about vocational and trades career opportunities to secondary students, particularly school drop-outs. The strongest partnerships between the education and labour market information systems are in Switzerland and Germany. Both countries have a dual track education system where students can begin vocational training in secondary school. In fact, Switzerland and Germany do not seem to have difficulty integrating school graduates into the labour market. The European Expert Network on Economics of

Education (EENEE) looked at the ratio of youth unemployment to adult unemployment among European countries. The 2010 youth-adult unemployment ratio was lowest in Switzerland and Germany at 1.8 and 1.47 respectively (Ryan and Piopiunik, 2012). Switzerland and Germany also have among the lowest youth Not in Employment nor Education or Training (NEET) rates in the OECD (see Appendix E).

A noticeable difference among the cases is the degree of centralization of their respective systems. Germany has a centralized system with the Federal Employment Agency responsible for labour market information. In contrast, Switzerland has a decentralized system that delegates significant responsibilities to regional governments. In Australia, responsibility for labour market information is divided responsibility between the federal government and regional governments. This study finds there is no optimal governance model to support job matching.

8.2. What is Missing in Canada

Canada already collects most data obtained by the other countries examined. However, Canada does not obtain detailed information about the issues concerning job vacancies. These issues are identified in all the jurisdictions examined. Germany asks employers to explain their difficulties in recruiting workers through their job vacancy survey. Australia conducts their Survey of Employers who have Recently Advertised (SERA) which is used to research skill shortages. SERA identifies issues concerning the labour market for major occupations and employers' recruitment experiences. Switzerland's JOBSTAT survey asks firms about their labour recruitment challenges. Learning about employers' difficulty in recruiting workers informs policy makers in finding solutions. In Canada, the only data on job vacancies is collected by Statistics Canada's Business Payrolls Survey (BPS). This survey only asks two questions about vacant positions: (1) whether there are any vacant positions (2) the number of vacant positions.

Another significant difference is the effort to obtain reliable information. The cases use multiple sources to get information about employers and the workforce. This helps policy makers gain an accurate picture of the conditions and specific problems in the labour market. In Canada, information about labour market conditions is derived from

only two sources: the Labour Force Survey and Business Payrolls Survey. Another key difference is that the jurisdictions examined include a bottom up approach to data collection. In Australia, state training authorities are responsible for local information concerning vocational occupations. In Germany and Switzerland, local employment offices are responsible for collecting information on the unemployed and job vacancies. This helps them identify local mismatches to support their job matching services. In contrast, Canada only uses a top down approach where all information is collected by the federal government, mainly Statistics Canada. This makes it difficult to obtain quality information on local regions.

Compared to the other case countries, Canada devotes fewer resources to counselling students, particularly upper secondary school students. Canadian career counsellors do not receive the same degree of information as their counterparts in the other cases, particularly Germany and Switzerland. Career counsellors can play a vital role in helping job seekers enter the labour market and employers find suitable workers. A review by Arseneau et.al. (2005) finds that labour market information has more impact if provided with counselling. The ESDC also found that their labour market information is more effective when job seekers receive counselling (HRSDC, 2005). In terms of assisting disadvantage workers, intermediaries also help low-wage workers access regional employment opportunities (Benner et. al., 2001).

All the jurisdictions examined also prioritize the provision of information in secondary schools. However, Canadian secondary schools are not required to provide students with information about career opportunities. Even more, Germany and Switzerland design their education system to match labour market needs. In particular, both countries provide apprenticeship education at the secondary level, and large apprenticeship systems are associated with lower youth unemployment (Ryan and Piopiunik, 2012). Germany and Swiss students receive vocational education under a dual system. In this dual system theory is taught in school and practical skills acquired from workplace. Designing education programs to match employer needs requires good tracking of labour market conditions. This requires a level of investment that ensures data of sufficient quality. The fact that the other case countries invest more on collecting and sharing labour market information reflects the responsibility the governments assume to support job matching.

So, there are three major shortcomings in Canada: (1) lack of detailed information on job vacancies, (2) little importance placed on career advisors and counselling, (3) not providing students with information about career opportunities. These issues motivate my policy options.

9. Policy Objectives, Criteria, and Measures

This section explains the policy objectives, criteria and measures to assess policy options. First, I define the long and short term objectives to achieve. Then, I describe the criteria and measures that will assess the options.

More efficient job matching should reduce Canada's unemployment rate. Fortin (2000) finds Canada's natural rate of unemployment to be as low as 6%. Canada reached a 6% unemployment rate – the lowest ever – in 2007 (Statistics Canada, 2014a). Given this, the long-term objective (10 years) is to have an unemployment rate below 6%. To ensure Canada is on track to accomplishing this goal, a short-term objective must be met. The short-term (5 years) objective is to match the lowest unemployment and youth unemployment rate in Canadian history. This is an unemployment rate of 6% and a youth unemployment rate of 11.2% in 2007 (Statistics Canada, 2014a).

9.1. Criteria and Measures

The policy options are assessed on four criteria: development, equity, administrative complexity, and budgetary impact. For each criterion there is a specific measure. Each measure has an index which is used to rank each option. The ranking system consists of high, medium, and low with numerical values 3, 2, 1 for three criteria. The development criterion receives a higher numerical value (explanation below). The scores for all measures are summed and the policy option with the highest score is considered the most favourable. Table 8 summarizes the criteria and measures used to assess the policy options.

Table 9: Criteria and measures for policy analysis

Criteria	Definition	Measure	Value
Development	Ability to improve the capacity of individuals to make the optimal career decision.	Information is: - Personalized - Accompanied with guidance - General - Specific High ≥ 3-4 Medium = 2 Low ≤ 1	High = 6 Medium = 4 Low = 2
Equity	The ability to provide information to the entire population.	Proportion of population that have access to LMI. population ≥ 50% 25% ≤population < 50% population < 25%	High = 3 Medium = 2 Low=1
Administrative Complexity	Levels of government involved	High = 1 level Medium = 2 levels Low ≥ 3 levels	High = 3 Medium = 2 Low=1
	Number of public/private agencies involved	High = 1 agency Medium = 2-3 agencies Low > 3 agencies	High = 3 Medium = 2 Low=1
Budgetary Impact	The increase in responsible organizations budget	How much will the budget increase (BI)? BI ≤ 5% 5% < BI < 10% BI ≥10%	High = 3 Medium = 2 Low=1

Development: This criterion is concerned with the ability to realize full human potential by transforming personal capacities. It assesses whether an option improves the ability of individuals to make an optimal career decision. According to behavioural economics, individuals make flawed (sub-optimal) career decisions (Babcock et al, 2012) because they are limited in their capacity to deal with complex problems (Lyensew and Lepper, 2000). The discipline does provide insights on how to address these barriers to support career decision making and job matching. First, simply providing labour market information is insufficient given individuals' biases and misperceptions. It is also important to consider how information will be understood by recipients (Babcock et al., 2012). This means information is more effective when accompanied with guidance (Diamond et al., 2012). Therefore, simply describing economic and labour market conditions is insufficient. Individuals also need to understand their potential experience given their skills and abilities. This means information and career advice is more effective if it is simplified and personalized (Babcock et al, 2012).

Given these considerations the criterion involves four measures: measures 1. and 2. concern personalized information, and provision of guidance; measures 3. and 4. concern the level of information detail: general and specific. If the policy option can provide information at the major occupational group level (two digit NOC level), then it is general. Likewise, if the option can provide information at the minor occupational group level (three or four digit NOC level), then it is specific. In all, the four characteristics specify whether the information is personalized, accompanied with guidance, general, or specific. As such, an alternative that meets three or more of the characteristics receives a ranking of high; if it only meets two characteristics it receives a ranking of medium; and if it provides only one or none of the characteristics it receives a ranking of low. Also, the numerical weight for this criterion is double (H=6, M=4, L=2) given the importance of helping individuals make well informed decisions.

Equity: This criterion concerns the ability of an alternative to provide labour market information to the entire working-age population (ages 15 to 65). Ideally, every working-age adult should be well informed about the labour market. The greatest need for information is in young adult life because the likelihood of career change decreases with age. To account for this I place a fairly low threshold to receive a high ranking. An alternative that provides information to more than 50% of the working-age public is

ranked high; if it can only inform 25% to 50% of the public, it is ranked as medium; and if it only informs less than 25% of the working-age population, it receives a low ranking.

Administrative Complexity: Since both the federal and provincial governments are responsible for the labour market there can be significant administrative challenges to implementing policies. To not understate this barrier, and ensure a feasible recommendation, I include two measures for the administrative complexity criterion. First, this criterion considers how many levels of government are involved. In Canada, provinces are given substantial responsibilities and there are few examples of coordinated federal-provincial policy making. Moreover, the level of coordination required will vary across provinces. This is because some provinces and territories produce considerable information while smaller provinces produce little or none. Even regions within provinces and territories have different labour market concerns. Thus, a policy becomes more complicated the more levels of government involved. As such, an option that can be implemented by one level of government is ranked as high; an option that requires coordination between the federal government and provincial governments is ranked as medium; and an option that requires coordination among the federal, provincial, and a sub-provincial authority is ranked as low.

Second, this criterion assesses the level of difficulty to implement an alternative. The assessment is based on the amount of coordination required between public and private agencies. An option that requires coordination among numerous organizations is more difficult to implement because of the time required to determine the responsibilities of various organizations. Therefore, an option that involves one agency is ranked as high; an option that requires coordination among two or three agencies is ranked medium; and an option that requires coordination among more than three agencies is ranked as low.

Budgetary Impact: This criterion assesses the budgetary impact of implementing a policy option. Since policy options are to be permanent, the interest is in ongoing expenses incurred, not the startup (one-time) cost. Hence, budgetary impact considers how an option impacts the responsible organizations' operating expenses. Also, in 2011 the federal government announced a deficit reduction plan to reduce ongoing government expenditures by at least $4 billion by 2014/15 (OIC, 2014). The plan

requires government departments to identify savings of 5% and 10% in their operating budget (OIC, 2014). Therefore, an option that increases the budget by only five percent or less is ranked as high; an option that increases cost by six to ten percent is ranked as medium; and an option that increases the budget by greater than ten percent is ranked as low.

Of note, there are financial benefits derived from options that can enhance job matching and reduce unemployment and underemployment. For instance, increase income and consumptions tax revenue due to higher employment; increase in business tax revenue because more efficient job matching supports business development; decrease in number of people that rely on government income assistance. However, these future benefits are difficult to measure because I cannot ascertain by how much an option will reduce unemployment.

10. Policy Options and Analysis

The proposed policy options are intended to improve the current labour market information system to better facilitate job matching. These options are analyzed independently to determine which ones are optimal. Although policies are analyzed independently, they are not mutually exclusive.

10.1. Policy Option 1: Job Vacancy Survey

Current information on job vacancies is inadequate. Statistics Canada's Business Payrolls Survey (BPS) only asks two questions about vacant positions. The Working in Canada website lists current job vacancies but no detailed information about vacancy problems. This option proposes to develop a new comprehensive survey to obtain reliable and detailed information about job vacancies. This survey should be a random sample of businesses by industry, size, and region. The 2009 Advisory Panel for Labour Market Information also recommended a quarterly national job vacancy survey to provide policy makers with reliable data on labour market tightness (Advisory Panel for Labour Market Information, 2009). A job vacancy survey will also complement the labour force survey by providing insight on whether the labour supply matches by region and sector the labour demand (Advisory Panel for Labour Market Information, 2009). A new job vacancy survey should obtain the following information about vacancies:

- The specific occupational vacancy
- The number of job vacancies
- The type of job (e.g. full-time or part-time)
- The duration of the job vacancy
- The skills, training, and experience requirements for the vacant position
- An explanation from employers' on their labour recruitment issues.
- Expectations about future job demand

Development: This new survey asks questions to obtain more detailed information on job vacancies than is currently available. Obtaining such data means it will provide general and specific occupational information. However, this information will not necessarily be accompanied with guidance or be personalized for job seekers. In all, this alternative provides two measures and receives a rank of medium (4 points).

Equity: Statistics Canada publishes all their results online but it is not meant for the general public. It is typically used by government agencies and researchers (Statistics Canada, 2013b). For this reason I expect the same users to utilize information from this survey. To determine what proportion of the working-age population will access this information I consider the number of individuals employed in the federal general government, provincial and territorial general governments, and universities/colleges/ vocational and trade institutions. This gives an estimate of the proportion of the working-age public that will likely access the information. These institutes employ approximately 1.2 million people (Statistics Canada, 2012b), which is approximately 5% of the working-age population. Given this alternative will reach less than 25% of the working-age population it receives a ranking of low (1 point).

Administrative Complexity: This alternative will be the responsibility of Statistics Canada so it only involves one level of government, the federal government. It receives a ranking of high (3 points). Moreover, this survey only needs to be conducted by one government agency, Statistics Canada. Since this alternative only requires one organization it again receives a ranking of high (3 points).

Budgetary Impact: The 2009 Advisory Panel estimated the cost of a national job vacancy survey to be $8 million (Advisory Panel for Labour Market Information, 2009). In fiscal year 2011/12 Statistics Canada expenditures were approximately $740 million (TBS, 2011). According to the Bank of Canada Inflation Calculator, $ 8 million in 2009 dollars is approximately $8.5 million in 2012 dollars (Bank of Canada, 2014). This means policy option one will increase Statistics Canada's budget by approximately 1%. Therefore it receives a ranking of high (3 points).

10.2. Policy Option 2: Career Information Seminars in Secondary Schools

Secondary students have access to career services but they are not provided information on career opportunities. This option proposes to offer secondary school students career information seminars and one-on-one sessions. There should be two types of seminars, one for students who plan to attend university; and another for students not planning to attend university. The first seminar should provide students with information on the economy and major industries; description of major occupations; careers and outcomes associated with respective degrees; description and projections of major occupational groups; projected growth of major industries; and wage expectations. The second seminar should provide information on careers that do not require an undergraduate degree; description of careers; outcomes of schools drop outs; wage expectations.

These seminars should be followed with one-on-one sessions between students and career counsellors. In these sessions, students can inquire about potential career and education paths of interest. Counsellors can also assist students on career exploration activities. These sessions allow advisers to be more specific in the information they provide according a students' preferences and performance. Most importantly, career counsellors can emphasize the importance of education to potential school drop-outs.

Attendance at least one of the seminars and a one-on-one session should be mandatory to fulfill graduation requirements. Career information seminars will help students understand the economy, major industries, and occupational groups. The one-on-one sessions can encourage students to seriously consider education paths and explore possible career options.

Development: Given the quality of labour market information currently available these seminars should only provide information at the major occupational group level (two digit NOC). This can help students identify promising fields of academic study and career paths. Seminars are not suitable to provide information on specific occupations (3 or 4 digit NOC level) considering the lack of reliability at that detail. As noted earlier,

different sources sometimes provide contradictory results about projections for specific occupations. These seminars do provide students with guidance to understand the information and labour market conditions. Furthermore, the one-on-one sessions can provide students with personalized information. Overall, this alternative provides three out of the four measures: general information and guidance with information; therefore this alternative receives a rank of high (6 points).

Equity: This alternative is very specific since it targets secondary school students. In 2011/12 there were approximately 1.9 million secondary school (grade 8 to 12) students in Canada (Statistics Canada, 2013c). Since this represents approximately 8% of the working-age population this policy option receives a ranking of low (1 point).

Administrative Complexity: This policy requires co-ordination between the provincial government and school districts. School districts being a sub-provincial authority are treated as a level of government. Since this option involves two levels of government, it receives a ranking of medium (2 points).

This alternative also requires co-ordination between the provincial agency responsible for the labour market, post-secondary schools, and local schools boards. Agencies are required to develop information packages; post-secondary institutes would provide information about programs and outcome of graduates, and school boards are responsible for ensuring seminars are delivered in schools. Co-ordination is required to ensure information is comprehensible and consist across the province. Given this option requires co-ordination among three organizations; it receives a ranking of medium (2 points).

Budgetary Impact: Since provinces are responsible for education, I estimate the cost for BC as an example. Given BC already provides labour market information (mainly internet delivery) they are only required to use the same information to create seminar packages for schools. The cost for delivering seminars is incurred by school districts. These seminars can be delivered in a classroom setting with resources available in schools; therefore, the only cost is for labour and no additional administrative costs.

At least one employee is required in each school to learn and deliver information to students. Schools with large student populations can be accommodated by having multiple seminars. In BC the average weekly earnings of an employee in the education sector is $966 (BC Statistics, 2014), which is an annual salary of approximately $46,000. There are 446 BC public secondary schools (BCTF, 2012). This policy generates a cost of approximately $21 million. For fiscal year 2013/14 the operating expenditures for BC school districts totalled about $5 billion. Career programs, at $36 million, only account for 0.7% of total expenditures (BCMEd, 2014). Although this option will increase spending on career programs by approximately 60%, it will increase operating expenditures by only 0.4%. Therefore, this alternative receives a ranking of high (3 points).

10.3. Policy Option 3: Independent Agency for Labour Market Information

This option proposes to create an independent agency responsible for labour market information. This agency should receive all labour market information that is collected from the various public and private entities to be synthesized, analyzed, and disseminated to target population groups. Having a single organization responsible for labour market information can create a more efficient system because it can identify collection tools that should be enhanced or information collection that is unnecessary. This will address the problem of duplicated information gathering and contradictory information. The Forum for Labour Market Ministers is likely the appropriate body to oversee this agency. The Forum is an organization that includes all ministers in Canada responsible for labour market issues including information.

This policy option also creates a single source of quality and reliable information for career practitioners. For this reason, policy option three can complement and enhance policy option two. More valuable information will increase the quality of the career information seminars and the ability of counsellors to advise students in the one-on-one sessions. Even more, this option can be an information source for advisors in post-secondary institutions and counsellors that help the unemployed. Overall, a new agency can build partnerships with schools and employment service offices to ensure job seekers have quality labour market information.

In fact, The 2009 Advisory Panel discussed the possibility of an independent agency, modeled after the Canadian Institute for Health Information (CIHI), to improve the labour market information system. CIHI was established by the federal and provincial, and territorial governments to serve as an independent, non-profit organization to provide data and analysis on the Canadian healthcare system and the populations' health. CIHI collects information from governments, medical practitioners, regional health authorities, and hospitals. The institute also provides guidance and advice to Statistics Canada's Health Statistics Division, Conference of Deputy Ministers of Health, and the Chief Statistician of Canada (Advisory Panel for Labour Market Information, 2009).

Development: This organization is responsible for analyzing labour market information from various sources to help end users understand of labour market conditions. Also, an equivalent organization in Switzerland is able to provide general and specific labour market information. For this reason, a similar agency in Canada should also be able to provide general and specific information. In terms of providing guidance, the office is expected to interpret data and make it understandable to end users. More importantly, this office is meant to be the source for labour market information for career counsellors in schools, universities, and employment services. For this reason the information will be accompanied with guidance. Since three measures are met this alternative receives a ranking of high (6 points).

Equity: This alternative will provide information to people likely to use the services of career and academic advisors: students, unemployed individuals, and underemployed individuals. For the student population I consider secondary students and post-secondary students; and for the unemployed and underemployed population I consider people unemployed, not in labour force, and part-time employed. Given many students work part-time I consider part-time employment at age 25 and over to avoid double counting. In 2012 these five groups accounted for approximately 12.5 million (Statistics Canada 2013d; 2014), which is approximately 53% of the working-age population. Therefore, this alternative receives a ranking of high (3 points).

Administrative Complexity: The purpose of this agency is to provide reliable and comprehensive information that supports job matching. The federal government, being the largest provider of information, will take the lead responsibility. The provinces also collect information and are responsible for employment services. This means the federal government will have to partner with provinces to provide job seekers with reliable information. Further, providing students with information require partnership with school boards and universities, which are sub-provincial authorities. Therefore, in terms of levels of government involved, this policy receives a ranking of low (1 point).

This agency will also have to co-ordinate with every public and private agency that collects information related to the labour market. At the federal level this includes Statistics Canada and ESDC; provincial agencies responsible for labour and education; and industry associations. Given this alternative requires co-ordinate with at least five agencies; it receives a ranking of low (1 point).

Budgetary Impact: Since ESDC is the department responsible for labour market issues, I assign funding for this alternative to their budget. In fiscal year 2012/13 ESDC net operating expenses totalled approximately $1 billion (HRSDC, 2013b). The 2009 Advisory Panel noted Canadian Institute for Health Information (CIHI) as a possible model for this option (Advisory Panel for Labour Market Information, 2009). For fiscal year 2012/13 CIHI's budget was approximately $114 million (CIHI, 2012). Using CIHI as a reference means this alternative increases the operating expenses by about 11%. Since it increases the budget by more than 10%, it receives a ranking of low (1 point).

Table 10: Summary of policy analysis

		Option 1	Option 2	Option 3
		Job Vacancy Survey	**Career Information Seminars and Sessions**	**Independent Agency**
Development		Medium (4)	High (6)	High (6)
Equity		Low (1)	Low (1)	High (3)
Administrative complexity	Levels of government	High (3)	Medium (2)	Low (1)
	Number of agencies	High (3)	Medium (2)	Low (1)
Budgetary impact		High (3)	High (3)	Low (1)
Total		**14**	**14**	**12**

10.4. Policy Recommendation

My analysis shows option 1 and option 2 tied for the highest ranking, but all three options are fairly close in their scores. Among the three policy options only option 3 receives a high ranking for the equity criterion, reaching more than 50% of the working-age population. Whereas, both option 1 and 2 reach a relatively small proportion of the working-age population.

The rankings vary for administrative complexity. Since option 1 is only the responsibility of Statistics Canada, it is the least complex and receives the only high ranking. Both option 2 and 3 require coordination, with option 3 being the most complex to coordinate, and thus receiving the lowest ranking. Even though the costs of the options vary considerably, both options 1 and 2 have a budgetary impact of less than five percent. The most expensive policy is option 3 at an estimated $114 million and the only option with a budgetary impact greater than 10%. Overall, policy options 1 and 2 are relatively less effective but inexpensive and simple to implement. Likewise option 3 can be considered the most effective but also very difficult and expensive to implement. Although the total score for the policy options are fairly close together, the scores vary significantly among the criteria.

Given my results, policy option 1 and option 2 should be implemented immediately. This option is easy to adopt given it received the highest ranking for administrative complexity and budgetary impact. However, the option 1 survey only collects vital information; it does not disseminate information to support job matching. So, policy option 2 is also important to implement. Career information seminars and sessions support job matching by providing students with valuable information and assisting them with career planning. Since this option requires planning it should be adopted within 2-3 years. These two options can help reach the short-term goal of reaching the unemployment and youth unemployment rate experienced before the 2008 economic downturn.

Policy option 3, an independent agency responsible for labour market information should have future consideration. The drawbacks of creating such an agency are long start up time (Advisory Panel for Labour Market Information, 2009), the operating cost, and number of stakeholders that must coordinate. However, my analysis indicates that this option is the most effective in supporting job matching. In fact, the case countries with the lowest unemployment rates have independent organizations responsible for analyzing and providing information to target population groups. These organizations partner with education institutes and employment service offices to support career counsellors in providing job matching services. Further, the Canadian Institute for Health Information already shows precedent for such an agency. Although this policy is expensive it should be considered when the fiscal situation is favourable and stakeholders are consulted.

These recommendations address the major gaps in Canada's system that contributes towards a labour market mismatch. More importantly, these policy recommendations provide a foundation to build a more sophisticated system to effectively facilitate job matching. For instance, Germany and Switzerland tailor their education system to meet labour market needs and ease the transition for students from school to work. Also, their respective organizations responsible for labour market information support the ability of career counsellors in finding work opportunities for the unemployed.

11. Conclusion

Currently young people are not provided quality labour market information to make career decisions. As a result, many young people select fields of study associated with low employment prospects. In addition, employers are experiencing difficulty in finding workers. Government training programs meant to address this problem (e.g. Canada Job Grant) are being developed with inadequate information. These issues exist despite the multiple sources of labour market information available in Canada. So, the policy problem to address is the inadequate labour market information system that is contributing towards inefficiency in the labour market.

This study conducts a case study analysis to determine how to construct a system that can align labour supply and demand. My examination of case studies identified gaps in Canada that are resulting in a labour market mismatch. The countries examined invest more in obtaining information about labour market conditions; they place considerable importance on the role of career practitioners; and their education system is an important channel to provide information to support career planning.

Three policy options are derived from my case study findings: a new job vacancy survey; career information seminars and one-on-one sessions in secondary schools; and a new independent agency solely responsible for analyzing and sharing labour market information. These options are assessed using four criteria to determine which options to adopt in Canada. A new job vacancy survey and career information seminars and sessions ranked the highest. These two options ranked high due to being the most simple and inexpensive to implement. A new information agency is found to be the most effective but also the most difficult administratively and costly.

My policy recommendations are to first implement a new job vacancy survey and career information seminars and sessions in secondary schools. These policies are simple and inexpensive to implement. Then in long term the federal government should

consider establishing a new agency responsible for labour market information. Important consideration for a new agency is the cost and collaboration required to be successful.

Much attention is given to the skills mismatch in the labour market. Despite the challenge in addressing this problem, solutions exist. The 2009 Advisory Panel conducted a comprehensive assessment on how to enhance Canada's labour market information. The Panel provided 14 recommendations with as estimated cost of $49.4 million (Advisory Panel for Labour Market Information, 2009). This study provides insight into how to develop a system that facilitates job matching. Ultimately, if governments are willing to make the investment and effort they can help find jobs for people, and people for jobs.

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Appendix A: Witness testimony to the House of Commons Standing Committee

Major occupational group	Industry association	Labour concerns
STEM	Mining industry Human Resources Council	Need an additional 3990 STEM professionals by 2021
	The Canadian Association of Petroleum Producers	Need an additional 9500 employees by 2015 and 50,000 to 130,000 by 2020.
	Engineers Canada	Between 2012 and 2018 civil ranked 4 out of 5, indicating a shortage
ICT	ICT Council	Shortage of computer and information systems managers, Telecommunications, information systems Analysis, and broadcast technicians.
		Surplus of Computer Programmers, computer network technicians, and use support technicians.
Healthcare	Canadian Federation of Medical Students	Oversupply of family doctors in Ontario
	Canadian Dental Association	No shortage
	Dieticians of Canada	experiencing shortages especially in rural, remote, and northern communities
	Canadian Association of Occupational Therapists	Flawed measure of need for occupational therapists
	Canadian Nurses Association	Currently shortage of 11,000 FTEs, and expected to reach 60,000 FTEs by 2022.
	Canadian Society of Medical Laboratory Science	Insufficient number of candidates to replace retiring workers
Skilled Trades	Canadian Automotive Repair and Service Council	29% of employers have one or more unfilled positions
	Canadian Electricity Association	Need to recruit 45,000 new employees between 2011 and 2016.
	Mining Industry Human Resources Council	Ernst and Young ranked labour shortage as the industry's highest risk.

Source: House of Commons Committee (2012)

Appendix B: Canadian National Occupation System

The *National Occupational Classification* (NOC) is a system for classifying the Canadian occupations by skill level and type. The NOC code is a four-digit code, and each digit helps specify an occupation and reflects its traits. The first digit designates an occupation into one of the 10 skill types. The second digit represents the four skill levels from A to D. Where A is university education, B is college or apprenticeship training, C is high school, and D is on the job training. The first two digits give the major occupational groups the third digit divides the major occupational groups in 140 minor groups. The minor group level pinpoints the domain of an occupation. The fourth digit gives the unit group and identifies the actual occupational group. At the four-digit level the system is expanded into 500 occupational groups or unit groups.

Appendix C: Findings from W.E. Upjohn Institute and NSDC India

Features of an optimal labour market information system according to W.E. Upjohn Institute for Employment Research (O'Leary and Woods, 2006):

1. Governance and cost effectiveness.
2. Timely, accurate, and relevant data.
3. Analysis and interpretation add value to data.
4. Labour market analysts are integral to an optimal LMI system.
5. Information must be easily accessible.
6. Intermediaries should be regarded as part of an LMI system.
7. Job seekers, businesses, and institutions public and private are likely to make many labour market related choices and decisions over their lifetime—an optimal LMI system should educate users to increase the impact of labour market intelligence.

Leading practices for labour market information systems according to The National Skill Development Corporation India (NSDC) India (NSDC India, 2011):

1. Government ownership
2. One-stop shop for all users
3. User friendly features
4. Efficient data management
5. Easy accessibility

Appendix D: Optimal labour market information system

	Data Category	Data Element
Supply and demand side	Labour force and market data	population/demographics Population estimates Employment Labour Force Participation Unemployment rate labour force characteristics Detailed labour force characteristics Insured unemployed
Demand side	Demand data	job openings Job vacancies Labour costs Occupational employment estimates Occupational projections short term - 10 years Occupational projections long term - 5 years or less Industry employment estimates Industry employment projections Industry Staffing patterns Occupational distribution across industries Mass layoff data Business births/deaths Number of business establishments and size Industry average earnings Occupational wages
	Occupational characteristics	Tasks Tools and Technology Knowledge skills including essential skills abilities work activities

	Data Category	Data Element
Demand Side	Occupational characteristics	work content Education and training requirements Interests work styles Narrative descriptions of occupations Licensing and certification requirements
Supply side	Occupational supply	Occupational employment Unemployment by occupation Enrollees and completers of education and training programs New entrants to labour force Occupational transfers Geographical migration Labour force separation Primary activity of persons out of LF Educational outcomes Estimate of supply
	Education and Training	Education and training institutions/programs Education and training programs Program & course descriptions Course descriptions Educational attainment of adults Financial assistance sources, particularly public sources for education or employment training programs.
Supply and demand side	Crosswalks and linkages across different data sets	Industry Occupation Education Program Military classification Skill to occupation crosswalks

Source: O'Leary and Woods (2006)

Appendix E: NEET rates among the OECD, aged 15/16-24,all persons (%)

Country	Total	Unemployed	Inactive
Greece	27.4	14.7	12.6
Turkey	26.7	4.5	22.2
Italy	21.4	9.8	11.5
Mexico	21.1	3.6	17.5
Spain	19.6	13.2	6.4
Slovak Republic	18.5	10.8	7.7
Ireland	16.7	9.2	7.5
Portugal	15.3	10.4	4.9
Hungary	15.1	7.3	7.8
United States	15.0	5.7	9.3
Belgium	13.9	6.4	7.5
New Zealand	13.7	5.7	8.0
United Kingdom	13.5	7.1	6.4
France	13.2	8.9	4.4
OECD average	12.6	5.9	6.7
Poland	12.2	6.9	5.4
Australia	12.2	5.0	7.1
Estonia	11.2	4.2	7.0
Luxembourg	10.5	4.5	5.9
Slovenia	10.0	6.3	3.7
Canada	9.6	4.5	5.1
Czech Republic	9.1	5.7	3.4
Finland	8.4	3.5	4.9
Germany	7.6	3.0	4.6
Sweden	7.2	3.7	3.5
Japan	6.9	2.7	4.2
Norway	6.7	2.2	4.5
Austria	6.2	3.1	3.1
Switzerland	6.0	2.5	3.5
Iceland	5.9	3.6	2.3
Denmark	5.9	1.9	3.9
Netherlands	4.6	1.7	2.8

Source: OECD (2014)