MAPPING THE INNOVATION ECOSYSTEM IN EASTERN ONTARIO

TOWARDS AN INCLUSIVE CANADIAN INNOVATION STRATEGY

March 31, 2016

TED ROGERS SCHOOL OF MANAGEMENT | Institute for Innovation & Technology Management

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ABOUT IITM

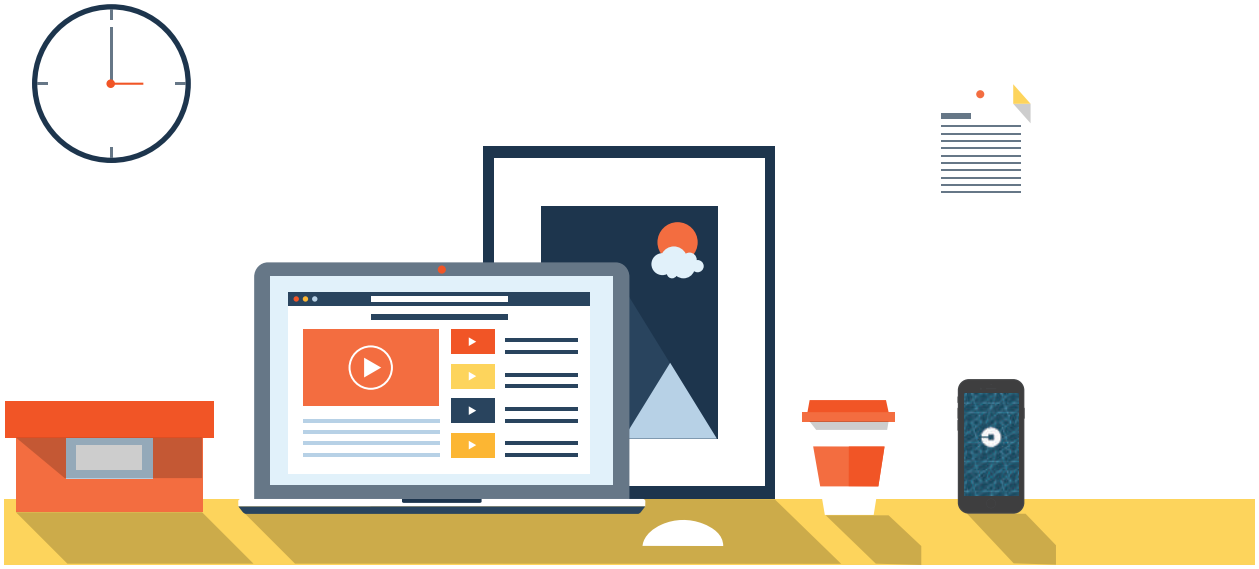
The strategic mission of Ted Rogers School of Management's Institute for Innovation and Technology Management (IITM) at Ryerson University is to find innovative solutions to real-world technology management problems. IITM takes an interdisciplinary, practice-oriented research and innovation that assists organizations and communities in maintaining agility and competitiveness. Presently, our research focuses on three broad themes:

1. Information technology management and organizational learning;
2. Developing organizational dynamic design capabilities; and
3. Information technologies, innovation and economic growth.

This report was commissioned and supported by:

EXECUTIVE SUMMARY

Overview



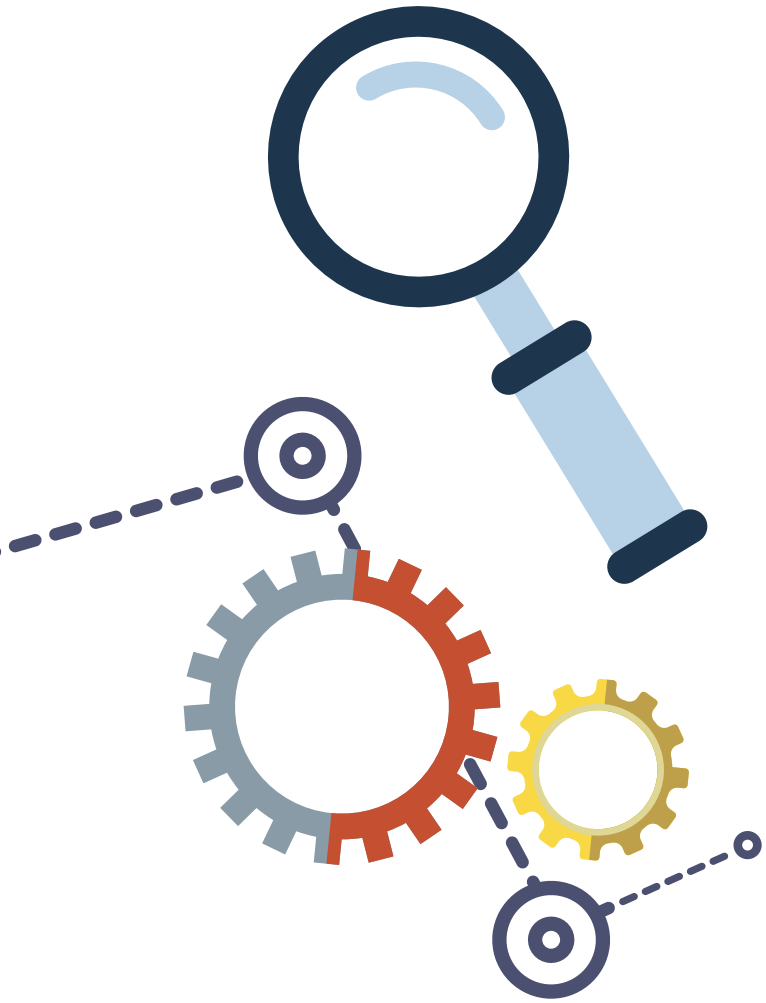
Innovation is "*a process through which economic or social value is extracted from knowledge—by creating, diffusing, and transforming ideas—to produce new or improved products, services, and processes.*" (Conference Board of Canada, 2016). While much of the attention in Canada has focused on disruptive innovation – often driven by breakthrough technologies (eg. 3D printing or genomics), new products (eg. smartphones) or services (eg. Uber), incremental innovation is just as important. Significant productivity gains can be achieved across sectors through the adoption and use (rather than creation) of new technologies or by imlementing improved processes or business models. (Conference Board of Canada, 2016). Moreover, while much attention has been focused on technology hubs, such as Silicon Valley in the USA or the Waterloo-Toronto nexus in Canada, innovation ecosystems in smaller communities and rural areas are also critical to driving economic growth (OECD, 2014). An inclusive strategy must also address opportunities for innovating in existing organizations across sectors including service industries, agriculture, natural resources, tourism and recreation, government and public services.

This study aims at understanding the innovation ecosystem in Eastern Ontario in order to better understand how services, supports and local assets contribute to the creation of new businesses and investments and the retention and expansion of existing business. The study uses models of innovation systems, data on features of Eastern Ontario and key stakeholders to identify the components of the innovation system including:

- Public and private sector research facilities and postsecondary institutions
- Startups which may emerge from the commercialization of research, new business models, products or processes
- Established businesses which develop and adopt new products, services and processes
- Funders, financial institutions and investors
- The talent pool including newcomers to the region and people moving between organizations and sectors
- Intermediaries such as incubators, accelerators, business advising services etc.
- Government agencies that have policies (including procurement) which may enable or constrain innovation
- "Culture" – including beliefs regarding entrepreneurship.

Findings

The critical assets identified in the Eastern Ontario innovation ecosystem are:



- Technology infrastructure – access to broadband
- Entrepreneurial culture - Higher percentage of self-employment (8.7%) than Ontario (7.6%) or Canada (8.1%)
- Strong concentration of postsecondary institutions per capita
- World class research capacity
- Pockets of wealth and access to capital
- Proximity to major markets
- Quality of life and recreational assets.

The challenges in the Eastern Ontario ecosystem include:

- Fragmentation of strategies, services and supports
- Fuzzy brand and differentiation
- Lack of population density and distances which impede networking
- Uneven use and adoption of technology
- Post-secondary institutions that are not perceived to be aligned with meeting the region's needs
- Fewer people with university education and more without a high school diploma
- Low attraction and retention of immigrants (5.9%) compared to Ontario (13.6%)
- Skills gaps: Misalignment of talent needed and talent available.

Within the region, there are unique approaches to driving innovation including public-private partnerships. For example the Eastern Ontario Regional Network which has helped strengthen the technology infrastructure and create new models. Rethinking the approach to innovation should leverage opportunities to:

- Promote innovation in existing for profit, nonprofit and government organizations
- Pilot innovation in smaller communities and then scale
- Leverage entrepreneurial culture and SMEs including farming
- Focus on expanding markets
- Exploit "RurBan" residents who move back and forth
- Focus on key sectors and SMEs across sectors
- Exploit technology to conquer the distance/density challenges and share resources

Recommendations

A number of recommendations have been provided within this exploratory study and report. These recommendations will inform an innovation strategy not only for the Eastern Ontario region, but for Canada as a whole.

1. Leverage technology infrastructure and create a coordinating mechanism or team to leverage network effects**.** The whole must be more than the sum of the parts.

2. Share best practices and assets for the benefit of the entire region. Access to financing, mentoring and above all, build the profile of entrepreneurship. Focus on evidence-based approaches and improve tracking and evaluation. Learn from successes and from failures. Encourage, reward and celebrate entrepreneurs.

3. Look beyond incubating ICT startups. Strengthen opportunities for sectors such as food processing and green technologies. Consider sectoral approaches and expanding access to specialized services such as shared maker spaces, manufacturing and processing.

4. Drive ICT-enabled innovation across sectors. Encourage existing organizations – businesses, nonprofits and government agencies – to leverage technology and other innovative processes.

5. Develop a strategy to leverage postsecondary assets to advance the region. Eastern Ontario has strong postsecondary institutions but there seems to be untapped potential. Harness the power of postsecondary institutions to drive innovation and provide the talent needed.

6. Succession planning and investment in family-based businesses is very important in a community where there are strong and stable businesses without obvious heirs. Attracting immigrant entrepreneurs to the region to take over existing businesses could complement efforts in generating new startups.

7. Align strategies to develop and retain talent and leverage diversity. There is little doubt that the talent strategy and innovation strategy need to be aligned to attract—and more importantly—retain highly skilled workers in the region.

8. Lobby for "made in Canada" innovation strategy beyond the Toronto-Waterloo corridor**.** Current discussions of innovation tend to focus on ICT startups without looking at the adoption of technology. They also tend to have a strong urban bias in spite of the strong evidence that smaller communities make important contributions. Work together to access resources and political will and ensure that all levels of government and related agencies support inclusive innovation.

9 Develop stronger regional brand identity and work together to promote access to larger markets – GTA, upstate NY, International. This is one of the largest challenges to coordinated activity – "Eastern Ontario" too often is thought of as a space between rather than a distinct region. Building a shared narrative and telling the story is critically important to building a coordinated strategy.

10 Improve information and resources sharing through coordinated access (eg. Innovation Portal). There are many services, programs and sources of funding available, as well as support for research and development but navigating the range of programs and services is a challenge. Leverage technology to support information exchange and coordination can compensate for the lack of density in the region.

Conclusions

The Eastern Ontario region possesses a handful of critical assets that can drive innovation within the region. Existing challenges could be addressed by rethinking an approach that leverages these assets and contributes to a more robust innovation strategy. Our exploratory study provides 10 recommendations for enhancing innovation within the region. Concepts from this study can also be applied more broadly to Canada as a whole.

In terms of processes to move some of these ideas forward, developing a commitment that links strategy to action is critical. "Strategic Doing" is emerging as a strategy protocol for designing and guiding strategy in open, loosely connected networks. By linking talent, innovation networks, and human capital with a compelling narrative, the region can ensure that the strategy is more than words on paper and is strongly linked to action. Finally, there is little doubt that the models being developed in the region have application across the country, so telling the story will benefit not only Eastern Ontario but Canada's innovation ecosystem. Creating scale through network effects is not just an issue in regions like Eastern Ontario, but it is also important to a large country like Canada, characterized by distance and diversity.

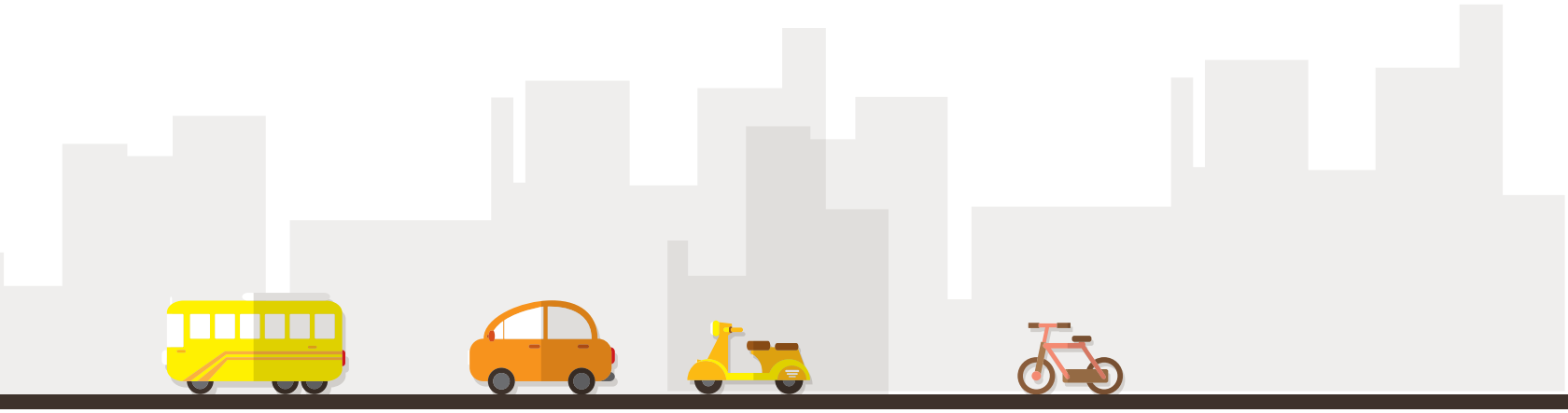
BACKGROUND

The Purpose of the Study

The Eastern Ontario Wardens' Caucus (EOWC) and their partners, Ontario East Economic Development Commission (OEEDC), Eastern Ontario Regional Network (EORN) and Eastern Ontario Mayors Committee (EOMC), have pulled together the communities in the region to develop an evidence-based economic strategy in order to move the region forward.

Eastern Ontario's Economic Development Strategy (June 2014), identified three strategic priorities: Workforce Development and Deployment; Technology Integration and Innovation and; Integrated and Intelligent Transportation Systems. One of the recommendations for the Technology Integration and Innovation strategy is:

> *"Map and profile Eastern Ontario's Innovation Ecosystem to better understand the breadth of innovation services (local, provincial and federal), collaborative supports and local assets that can contribute to establishing a competitive advantage for the attraction of businesses and investors, contribute to the retention and expansion of existing businesses and assist with stimulating business start-ups. Include network of innovation sites, incubators, research partnering between universities and businesses, investment capital networks, and relevant workforce development programs (p.29)."*



Our study responds specifically to this recommendation. Drawing on well established models of regional development and innovation, we collected information on activities and assets in the region to map the innovation ecosystem in order to inform the implementation of the economic development strategy for the region.

Our preliminary analysis showed that there are significant differences between the factors at play in Ottawa compared to the rest of the region. For the purposes of this study, Ottawa and the National Capital Region were excluded in order to more clearly understand the dynamics of innovation in smaller communities.

Research Questions

1 What are the elements of an innovation ecosystem?

2 How can we assess and map innovation ecosystems?

3 What is the current economic profile of the region and what is the state of established businesses and total entrepreneurial activity (TEA) across stages?

4 What are the economic trends?

5 How do we assess the framework conditions in the region (infrastructure, financing etc.)?

6 Who are the key stakeholders in eastern Ontario in the innovation ecosystem?

7 Is the whole more than the sum of the parts – i.e. are the assets coordinated and leveraged across the region?

8 What are the key linkages to other regional, national and international ecosystems?

9 From the perspective of potential entrepreneurs, startups and established businesses what are the drivers and impediments to growth?

10 How well is technology deployed by businesses in the region to achieve organizational objectives?

Methods

The study is based on an extensive review of documents, analysis of data and interviews with key stakeholders in order to better understand the components of the ecosystem and to assess current programs and needs. The study was conducted over the period of November 2015- April 2016. It included:

- Analysis of available Statistics Canada data, as well as economic development data from local entities to assess current levels and trends with respect to business activity (new and established businesses), jobs, talent updating and other sources
- Development of an inventory of key players and intermediaries in the ecosystem: investors, large employers, incubators, business service providers and government agencies (at all levels)
- Assessment of the innovation models and methods such as The Global Entrepreneurship Monitor (GEM) and enabling conditions, e.g., policies, infrastructure, capital, talent
- Sampling of GEM entrepreneurial readiness (attitudes)
- Consultations with key stakeholders to understand components in the system and their assessment of current programs and needs
- Use and expansion of Magnet's data analytics capacity on employment supply and demand.

INNOVATION ECOSYSTEMS

Innovation drives economic development and growth, as well as producing social value. Most of the available innovation measures are based on linear models of inputs and outputs. But increasingly, it is recognized that innovation systems are complex and non-linear. Innovation is now understood as a multidirectional, multifaceted process involving multiple actors and includes not only the development of new components and products but new services, technical standards, business models and processes. Moreover, it is increasingly recognized that innovation in the public and non-profit sector is foundational and fundamental, particularly in countries with heavy investments in infrastructure and public services such as education and healthcare.

While innovation has been typically focused on high growth sectors such as Information and Communications Technologies (ICTs) or Biotech, there is evidence that driving innovation in traditional sectors is just as important, including manufacturing, agriculture, services, transportation and infrastructure. ICT and green technologies are still significant as industry sectors, however, because of their capacity to transform other industries and to improve efficiency and productivity.

It is also important to understand the different trajectories innovation takes in different sectors, as well as the requirements and conditions for success. For example, it is possible to develop and take to market a new app that is wildly successful with minimal investments while commercializing biotech advances typically takes decades and many millions of dollars. Any innovation strategy or attempt to measure impacts must take into account these differences.

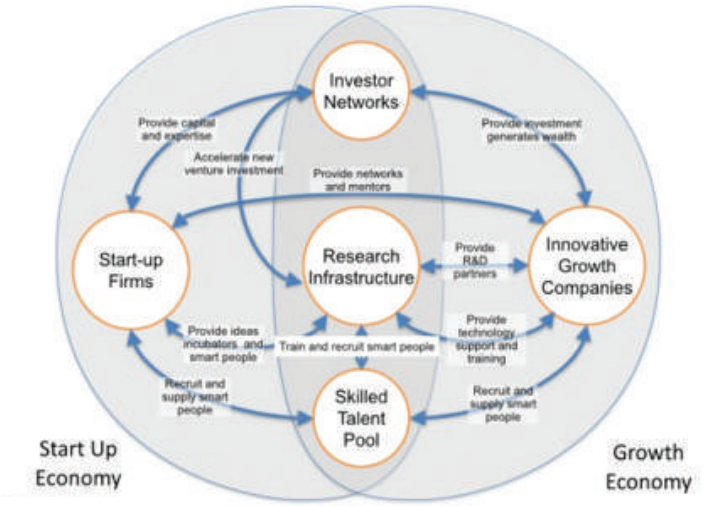
Although the innovation process is varied and non-linear by is its nature, there are some connecting elements. The innovation ecosystem in a particular region is a complex interplay of stakeholders, processes, and organizations in an enabling context. While models of innovation ecosystems vary in part depending on context, the key elements generally include:

- **Post Secondary Institutions** which are a source of intellectual property and talent for public and private sector organizations
- **Startups** which are created sometimes as a result of the commercialization of technologies developed in post-secondary institutions
- **Established businesses** which may adopt innovations and provide funding, investments or initial orders to startup firms
- **Financial institutions** and investors, who provide funding for startups and existing businesses
- **The talent pool** perhaps the most critical ingredient, may come from post-secondary institutions, from existing companies, or new residents
- **Intermediaries** which provide support that can include incubators, accelerators, business advising services etc. and may be tied to universities, public sector, private sector or a combination of both
- **Government agencies** which develop policies that may enable or constrain innovation, provide significant support to the innovation ecosystem and are also themselves targets for innovation
- **"Culture,"** which is broad and amorphous, refers to the beliefs and values in a society related to entrepreneurship and innovation and is also thought to be a critical issue.

A simplified diagram of an innovation ecosystem is below.

Figure 1: Innovation ecosystems

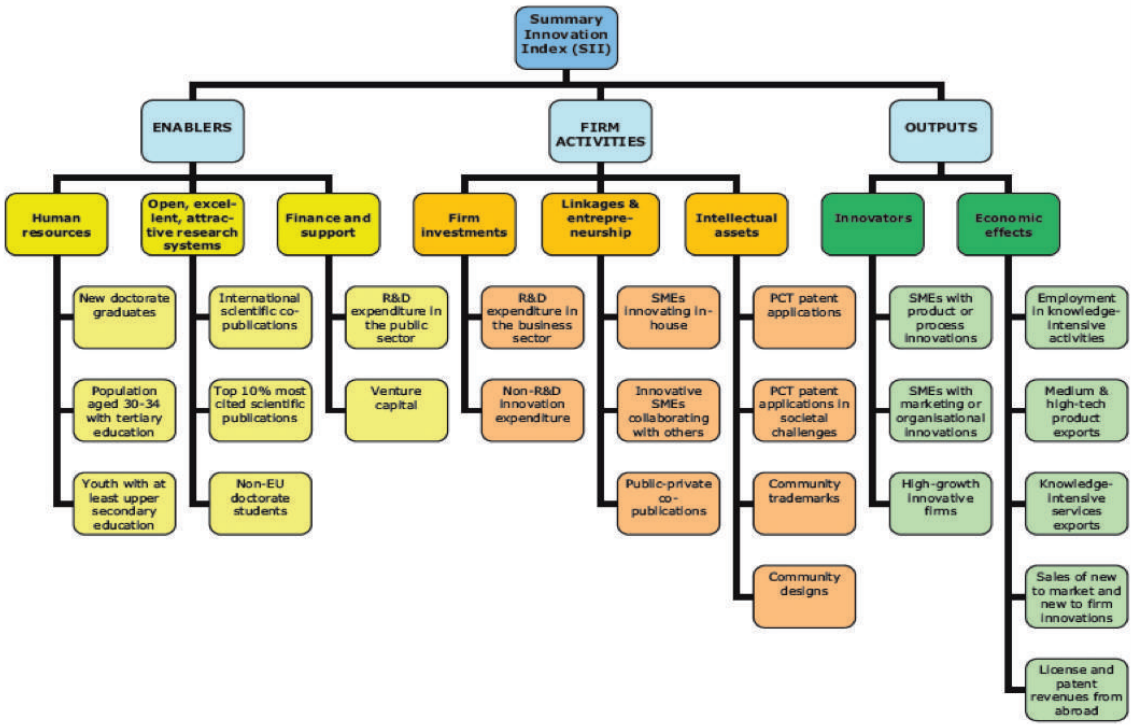
One view of a university's innovation ecosystem



Source: Morrison and Wunderlich (2016)

The European Union (EU) is at the forefront of developing innovation measures to allow cross country comparisons and has long used the Summary Innovation Index to assess enabling conditions, firm activities and outputs. More recently, however, the limitations of this approach have been flagged and work continues to develop more sophisticated approaches that include important dimensions like public service innovation, a measure used for example, in Australia.

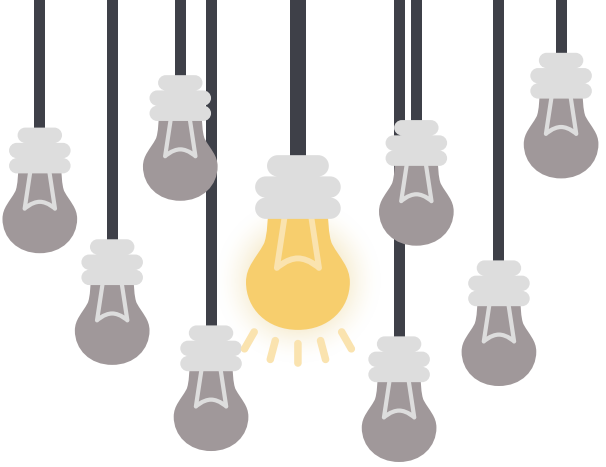
Figure 2: Diagram of EU Innovation Measures



Source: European Union, 2012

Using this model to compare innovation in the 28 EU member states as well as non-member European countries and other nations, Switzerland was ranked as the world's leader in innovation, followed by the United States, Japan, and South Korea. The United States and Japan are especially strong in business and public-private cooperation. Canada outperforms the EU across four indicators, most importantly in tertiary education and public-private co-publications. However, Canada lags in patent applications, medium and high-tech product exports, knowledge-intensive service exports, and license and patent revenues from abroad (European Union, 2012). The EU model focuses primarily on technology-driven innovation and puts significant emphasis on linkages, internationally and domestically, among SMEs, and between SMEs and Universities, while other models focus on other indicators.

According to the Organisation for Economic Co-operation and Development (OECD), one necessary role of increased innovation is to compensate for the effects of public spending cuts (OECD, 2012). Yet, despite world-class academic research in macroeconomics and structural policy settings, Canada has not seen this research pay off in terms of business innovation and productivity growth (OECD, 2012). The OECD has identified a number of reasons for Canada's poor performance in these areas. Canada's "disadvantages" include uneven (though relatively low) capital taxation, limited capital markets for funding innovation, insufficiently strong competitive pressures in certain sectors, and weak "connective tissues" that link research to commercialization.



Also, with relatively abundant labour and low relative labour costs, at least until recently, Canadian firms have been under less pressure to innovate than firms in other countries (OECD, 2012, p. 29). Agrawal (2008) attributes Canada's innovation deficit "chiefly to a weak commercialization culture at universities, along with an overly bureaucratic mindset among technology transfer offices (TTOs) when it comes to deal making" (as cited in OECD, 2012, p. 79). There has never been a more pressing need for Canada to develop a strong culture of innovation. According to the OECD (2012), while government support for business innovation in Canada is one of the highest among OECD countries, this money is made available primarily through R&D tax credits as opposed to the direct funding of business innovation through, which is identified as a weakness in Canadian policy. A comparison of the measures used to evaluate TTOs in the literature are listed below in Table 1 using the EU framework in an effort to distinguish enablers, activities and outcomes.

One of the most interesting studies in recent years provided by the OECD looks at innovation inputs and outputs. The analysis of Canada's overall innovation ecosystem suggests that in terms of investments or inputs, we are ranked highly – 10th in the world – but our output performance is much below that, suggesting that there are opportunities to improve the efficiency and performance of our innovation ecosystems through evidence-based strategies. It follows that even in regions where the level of inputs may be lower, there remain opportunities to improve performance by being more strategic, better coordinated, more efficient, more nimble or more creative in the use of those resources.

TABLE 1: Measures of Innovation - International Comparisons

Measures	Sources
ENABLERS	
Human Resources	
Graduate Students or percentage of population with tertiary education	EU 2012; Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010
Youth in population	EU 2012; Science, Technology and Innovation Council, 2010
Youth in Education academic achievement	EU 2012; Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010
Skills and training in the workforce	Tang et al., 2008
Proportion of university students enrolled in science, math and engineering	Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010
Gender	Minniti, 2005; Lopez-Claros & Mata, 2011
Education or knowledge of English	Lopez-Claros & Mata, 2011; OECD, 2010
Research Systems	
International co-publications	EU 2012; Science, Technology and Innovation Council, 2010
Citations	EU 2012; Science, Technology and Innovation Council, 2010
International Students	EU 2012

Measures	Sources
ENABLERS	
ICT penetration and quality of infrastructure	Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010
Creation and nurturing of startups	Hall, Jaffe, & Tratjenberg, 2005; Rossi, 2006; Bottazzi, Da Rin, & Hellman 2008; Kaplan, Sensoy, & ,Strömberg, 2009
Influence of innovation networks and clusters or sectoral factors or industry	Niosi & Bas, 2001; Arechavala-Vargas, Díaz-Pérez & Holbrook, 2009
FIRM ACTIVITIES	
Finance and Support	
R&D or ICT expenditures	EU EU 2012,; Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010; Canada 2011
Innovation expenditures (rather than on R&D expenditure)	OECD, 2010
Gross domestic expenditure on R&D (GERD) as a percentage share of GDP	Science, Technology and Innovation Council, 2010
Higher education performance of R&D, as a share of GDP	Science, Technology and Innovation Council, 2010
Venture Capital	EU 2012; Science, Technology and Innovation Council, 2010
Business expenditure on R&D (BERD) intensity by country	Science, Technology and Innovation Council, 2010
Public funding for long-term research	Lopez-Claros & Mata, 2011
Firm Investments	
Investments in R&D and ICT	EU, 2012, Minniti, 2005; Science, Technology and Innovation Council, 2010; OECD, 2010
Non R&D Investments	EU 2012
Linkages and Entrepreneurship	
Influence of culture and regulations on innovation	Minitti 2005
SMEs innovating in-house	EU 2012
Innovative SMEs collaborating with others	EU 2012; Science, Technology and Innovation Council, 2010
Industry relations, influence of innovation networks and clusters or sectoral factors or industry	Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010; Saetre, 2006; EU 2012; Levi & Autio, 2008; Beroggi, Levy & Cardinet, 2006Niosi & Bas, 2001; Arechavala-Vargas, Díaz-Pérez, & Holbrook, 2009
Intellectual Assets	
Creation and nurturing of startups	Hall, Jaffe, & Tratjenberg, 2005; Rossi, 2006; Bottazzi, Da Rin, & Hellman 2008; Kaplan, Sensoy, & Strömberg, 2009
Gross domestic expenditure on R&D (GERD) as a share of Gross Domestic Product (GDP)	Government of Canada, 2011
PCT Patent applications in societal challenges, share of all business financed R&D performed by higher education sector	EU 2012; Government of Canada, 2011
Community trademarks, number of trademark applications	EU 2012; Government of Canada, 2011
Community designs, number of licenses from universities to businesses	EU 2012; Government of Canada, 2011

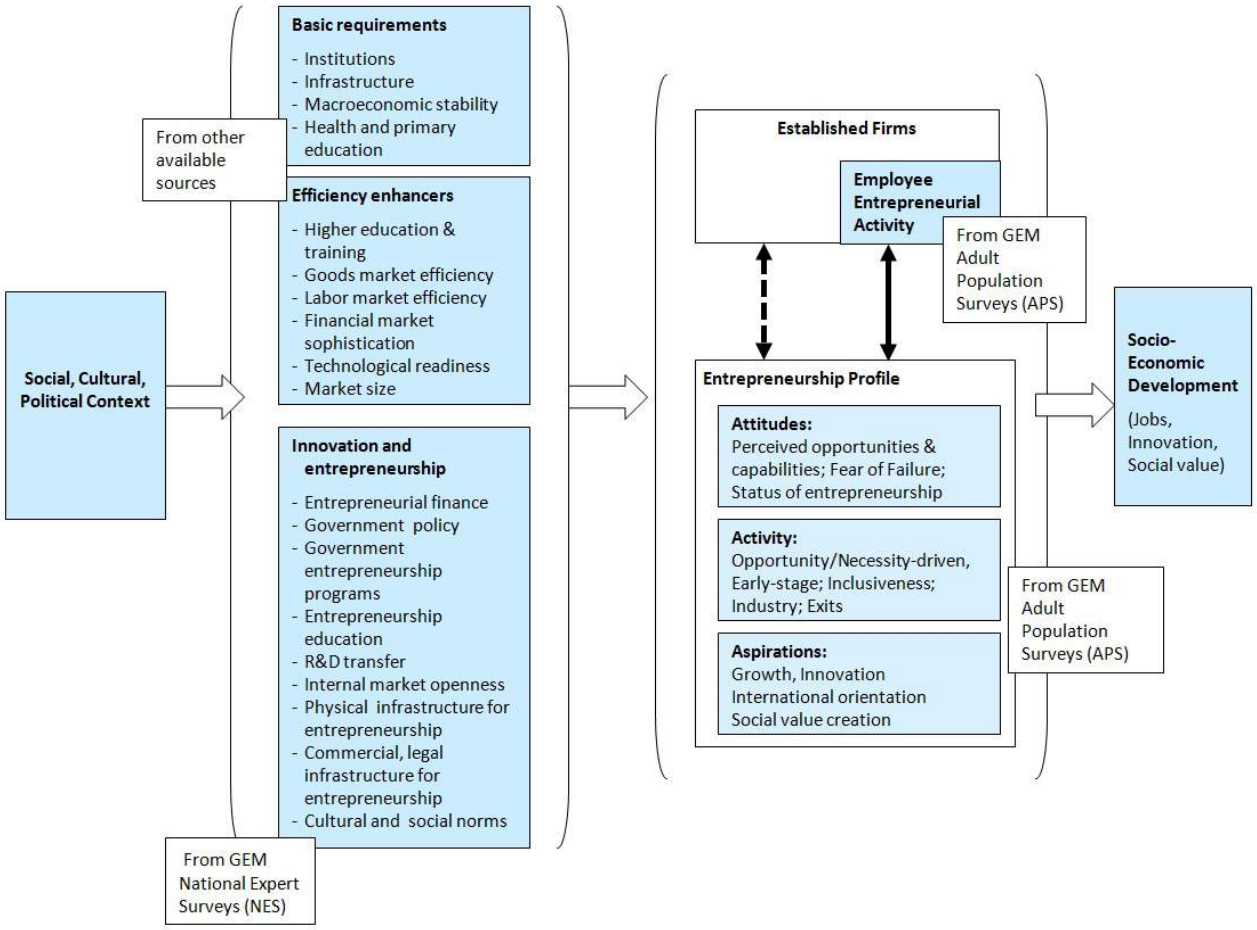
Measures	Sources
FIRM ACTIVITIES	
Number of firms collaborating in innovative activities with public or private partners, government, and higher education institutions by size	Government of Canada, 2011
Increased number of prototypes	Jenkins et al., 2011
Increased number of publications	Niosi & Bas, 2001; Arechavala-Vargas, Díaz-Pérez, & Holbrook, 2009; Jenkins et al., 2011
OUTPUTS	
Influence of innovation networks and clusters on sectoral factors or industry	
SMEs with product or process innovations	EU 2012
SMEs with marketing or organizations innovations	EU 2012
High growth innovative firms	EU 2012
Specialization in a particular scientific discipline	Science, Technology and Innovation Council, 2010
Relative impact and the level of international cooperation	Science, Technology and Innovation Council, 2010
Creation and nurturing of startups / Spin-off revenues	Hall, Jaffe, & Tratjenberg, 2005; Rossi, 2006; Bottazzi, Da Rin, & Hellman 2008; Kaplan, Sensoy, & Strömberg, 2009Jenkins et al., 2011
Government and its agencies	Saetre, 2006; Levi & Autio, 2008
Industry relations	Saetre, 2006; European Union, 2012; Levi & Autio, 2008; Beroggi, Levy & Cardinet, 2006
Economic Effects	
Employment in knowledge intensive activities	EU 2012
Medium and high tech product exports	EU 2012; Science, Technology and Innovation Council, 2010
Knowledge intensive services exports	EU 2012; Science, Technology and Innovation Council, 2010; , Collier, 2008
Patents and trademarks granted	Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010; OECD, 2010
Sales of new to market and new to firm innovations	EU 2012
New to market product innovators with and without R&D as a percentage of innovators	OECD, 2010
License and patent revenues from abroad	EU 2012
Increased number of prototypes	Jenkins et al., 2011
Increased number of publications	Science, Technology and Innovation Council, 2010; Jenkins et al., 2011
Spin-off revenues	Jenkins et al., 2011

Measures	Sources
OTHER	
Policies	
Tax policies or incentives	Minniti 2005;, Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010; Canada 2011
Influence of culture and regulations on innovation Research Systems	Minniti 2005, Levi & Autio, 2008; Lopez-Claros & Mata, 2011
Governments' financial programs or initiatives	Minniti, 2005; Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010
Countries' political regimes	Lopez-Claros & Mata, 2011
Legal basis for securing property and contract rights	Lopez-Claros & Mata, 2011
Strength of investor protection	Lopez-Claros & Mata, 2011
Structure and level of sophistication of financial sector	Lopez-Claros & Mata, 2011
Trade regime	Lopez-Claros & Mata, 2011
Proportion of women representation in decision making bodies, e.g., parliament	Lopez-Claros & Mata, 2011
Public procurement policies and systems	Lopez-Claros & Mata, 2011; Science, Technology and Innovation Council, 2010
Government immigration policies	Lopez-Claros & Mata, 2011

In recent years, considerable criticisms have been made, particularly at Canadian post-secondary institutions, about the innovation gap and the failure for large investments in research and development to translate into commercialization. Part of this reflects the reward systems in universities: If publications and Tri-Council grants are the measures of success for tenure, then there is little incentive to focus on impact of work outside the University. This has been the subject of much debate concerning the extent to which universities in particular should be seen as drivers of economic and social development and the value of basic versus applied research. The impediments to effective commercialization and industrial partnerships have been well documented and range from the current reward systems to training and culture.

Intellectual Property (e.g., publications, patents, etc.) may not measure innovation capacity if the linkages between the university and businesses are weak. Furthermore, in order to understand entrepreneurship and the innovation across multiple countries, the Global Entrepreneurship Monitor (GEM) collects data in more than 30 countries on entrepreneurial intent and performance innovation focuses on the entrepreneurs themselves and the conditions supporting entrepreneurship. Using expert interviews, GEM assesses "framework" conditions such as the availability of finance, government policies and programs, education, R&D transfer, commercial and physical infrastructure, and cultural and social norms. These themes are consistent with what is in the OECD model described above although the focus is more on the entrepreneur than on the context of policies and enabling factors. See figure 3 below.

Figure 3: Global Entrepreneurship: Monitor (GEM) Model



Source: GEM Consortium (2013)

Innovation In Smaller Communities

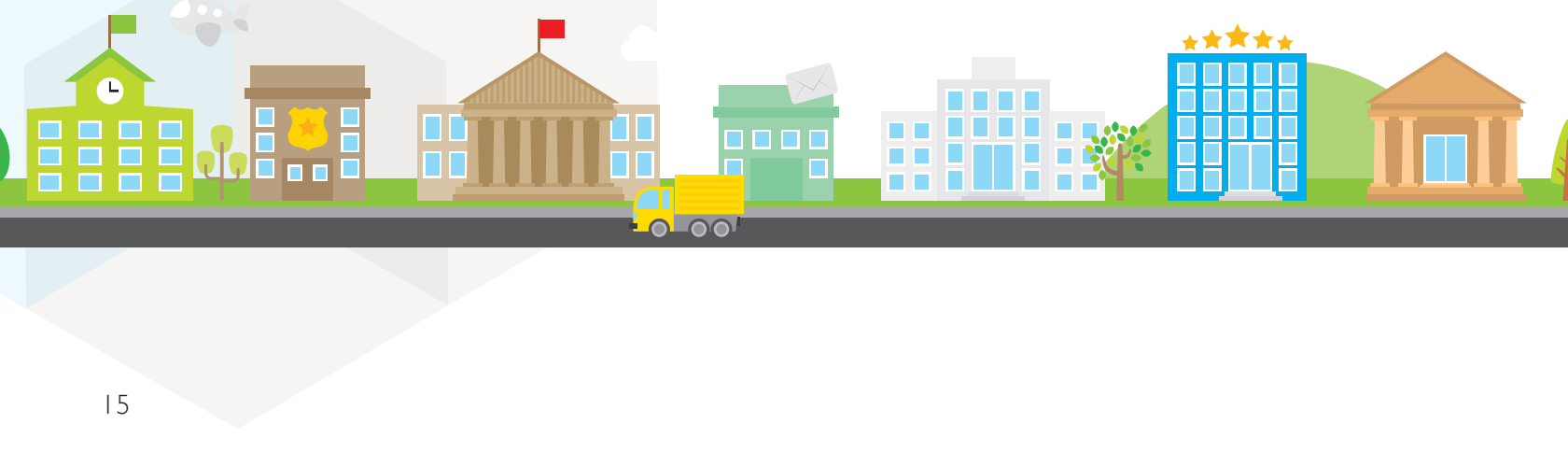
According to the OECD, a new approach is needed in order to think about innovation and modernization of the rural economy. Instead of focusing on the deficits in small and rural communities, there is a renewed interest in an asset-based approach which focuses on what the region has available. In addition to focusing on sectors that can boost local economic development–renewable energy, tourism, forestry, local foods, as well as services such as health care and home care–there is also an opportunity to facilitate greater collaboration across firms and use new non-traditional forms of service delivery.

Place-based approaches are particularly important as the key drivers of growth are likely to be more specific to the region. The potential of strategies based on investment in and promotion of the natural, cultural and recreational amenities to drive growth in rural areas and small communities requires a complex approach that includes an analysis of infrastructure, private sector development and environmental policies. Focusing on increasing productivity in rural areas can help improve workforce skills, strengthen capital investment in firms and foster entrepreneurship. Strategies focused on identifying and mobilizing local assets rather than relying on external subsidies and other support can help improve performance.

Many of the characteristics of small and rural communities present disadvantages in the context of traditional approaches to measuring innovation. Long distances and low population density, for example, tend to make it more difficult to co-locate activities that would be mutually beneficial. At the same time, technology can be used to mitigate these factors.

Uniform economy-wide policies tend to be designed to support urban areas and fail to take into account the needs of smaller communities. An understanding of how to stimulate and recognize innovation in rural areas and small communities is critical to promoting innovation outcomes and growth.

This understanding allows communities to turn knowledge into useful products and services. It is also fundamental for building prosperity today and in the future. For example, when the firms in a regions innovate, low value-added commodities, such as soybeans, can become higher value-added products like crayons and candles. Indeed, having the ability to create new ideas, products and services– and on a continuous basis—is critical to economic development at the local, regional and federal levels.



Traditionally, the rural economy tends to be dependent on low-end services and manufacturing, with lower levels of education, weaker skills and an aging workforce, lower levels of innovation and formal R&D, lower productivity and limited entrepreneurial activities, lagging in internet access and SMEs with limited growth opportunities. However, there are still ways to leverage the assets, for example, by shifting focus from the number of jobs to the quality of jobs, by maximizing local markets to promote collaboration and clusters, by identifying regions with a strong entrepreneurial culture and replicating it, by investing in new ways to attract and develop staff, by leveraging public sector procurement to drive local development and innovation, by strengthening linkages to national and international markets and by promoting mobility as with "rurban" (rural-urban) entrepreneurs who spend time between city and country. Recognizing and understanding the different types of innovation in rural areas is critical to facilitating these developments. Wal-Mart, Bombardier, Ikea and Lego are all large companies that originated in small communities. One argument for starting businesses outside of city centres is that smaller communities provide a "safe" space in which to refine products and business models. While craft and small-scale enterprises present one model of success, accessing larger national and international markets is key to scaling and growth.

Innovation Ecosystem Elements and Mapping

The innovation ecosystem map allows different stakeholders to explore innovation in the region providing a framework for collecting and sharing information and also for setting goals and developing strategies to move forward that align with the region's aspirations and capacity.

Post Secondary Institutions and Research Facilities

For a relatively small population, Eastern Ontario is well served by first class post-secondary institutions. Excluding Ottawa, which is home to the trifecta of Carleton University, University of Ottawa and Algonquin College and also Pickering, which is home to University of Ontario Institute of Technology, Eastern Ontario houses two universities – Trent and Queen's – as well as Loyalist College in Belleville and Sir Sanford Fleming in Peterborough. Given the population, this is a high level of post-secondary capacity. Added to this is the fact that Queen's is ranked as one of the top research-intensive universities in the country with extremely strong science, technology, engineering and mathematics (STEM) faculties.

The university punches above its weight in terms of research intensity, having its sponsored-research income growing to nearly $190 million in the 2013 fiscal year, up from $168 million in the previous year (RE$EARCH Infosource, 2014). Queen's ranks sixth in the country in terms of research intensity, which measures research income per full time faculty member. The university is home to many prominent researchers and scientists including a recent Nobel Prize winner. Many prominent, successful entrepreneurs are alumni of Queen's, including Elon Musk and "Desh" Deshpande. While Trent University is smaller and less research intensive, it boasts unique expertise in many areas relevant to the eastern Ontario ecosystem, including strong programs in environmental sciences, material sciences and social innovation. Trent recently ranked first among primarily undergraduate universities for "publication intensity" and placed second for "publication impact" and "number of publications" in its category. Loyalist College in Belleville has a strong history of providing career-relevant education for the high tech industry and is well known for its programs in the skilled trades, as well as business and entrepreneurship education. In terms of objective assessments of capacity of post-secondary institutions Eastern Ontario is well served. More information is needed to empirically evaluate some of the measures of impact on innovation considered important.

Respondents from this study were mixed in their assessments of the extent to which post-secondary assets are leveraged in the region. While Queen's is actively participating in a series of new initiatives aimed at accelerating innovation (discussed below under intermediaries) respondents indicated that there was room for improvement in strengthening connections between the university, local businesses and community organizations. Few respondents indicated that the post-secondary institutions were sources of research or information which helped promote their businesses and few knew where to start to look for support from the Queen's, Trent or Loyalist. Sir Sanford Fleming received kudos for internships and placements in local businesses. Some business people described successful collaborations with the post-secondary institutions while others expressed frustration with their interactions with academics whom they indicated appeared "more interested in publishing papers than in solving business problems."

In general, it would seem that the region has incredible assets in its post-secondary institutions but the connections between those institutions and businesses are uneven.

Apart from the Universities, the nuclear industry has its own research ecosystem in the region –for example, GE-Hitachi Nuclear Energy and Rolls Royce (ODIM Numet Limited) located in Peterborough; Sandvik Materials Technology Canada and Nu-Tech Precision Metals Inc. located in Arnprior; Bubble Technology Industries, located in Chalk River and Cameco Corporation - Conversion Facility and Fuel Manufacturing, located in Port Hope.

Table 2 below shows some of the measures identified within existing literature to assess the impact of research.

Measures of Impact	Sources
General	
The monetary yield or commercial success of research relative to money invested in the research / returns on public investment.	Toole, 2012
University-Industry Engagement	
The effect of consulting, research, and educational activities on the share of sales attributable to new or improved products	Arvanitis et al., 2008
The effect of technology proximity on the probability of university-industry technology transfer activities. The propensity and intensity (diversification) of transfer activities with universities.	Woerter, 2011
Survey of the sources of knowledge used by firms (frequency of university research as a source of industry ideas).	Cohen et al., 2002
Access to upstream modes of knowledge, provided by universities and research centres to firms.	Feller et al., 2002
Exclusive license agreements secured for transferred technologies.	Van der Berghe & Guild, 2008
Perception of the strategic value of transferred technologies.	Van der Berghe & Guild, 2008
Spinoffs and Behaviours of Academics	
Capacity of academics to recognize entrepreneurial opportunities – determined by individual traits, past experiences, and tenure status.	Clarysse et al., 2011
University resources and capabilities compared to the rate of spin-off formation.	O'Shea et al., 2005
Contributions to GDP from spinoffs compared to government investment in research.	Vincett, 2010
Characteristics of technology transfer offices compared to the rate of spinoff formation.	Algieri et al., 2011
Characteristics of the regional economy compared to the rate of spinoff formation.	Algieri et al., 2011
Performance of spinoffs compared to other startups.	Salvador, 2011
The disclosure of inventions by academics.	Owen-Smith & Powell, 2001; Siegel et al., 2003; Hulsbeck et al., 2011
The effects of patenting on publications and knowledge transfer.	Crespi et al., 2011
The locality of collaboration.	Hussler & Rondé, 2007

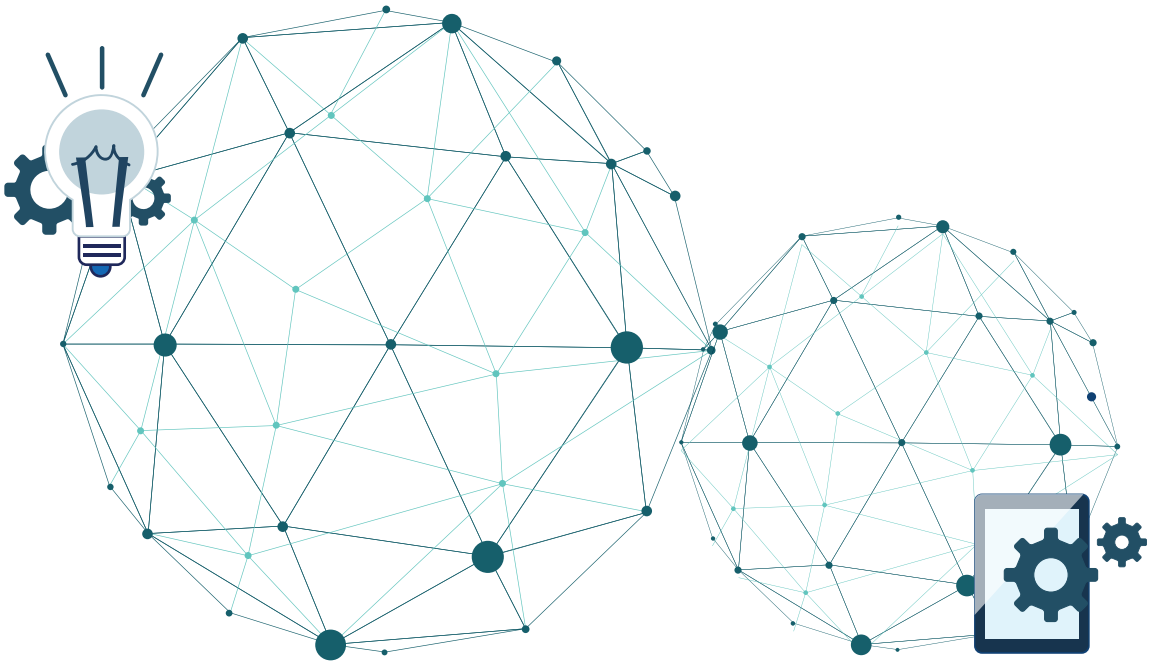
Measures of Impact	Sources
Technology Transfer Offices	
Patent applications, licenses, royalties, and sponsored research.	Thursby et al., 2001
Effectiveness of TTOs as determined by Faculty reward systems, staffing policies, and cultural differences between universities and firms.	Siegel et al., 2003
Effectiveness of TTOs as determined by the degree of centralization, incentive structures, and decision monitoring processes.	Debackere & Veugelers, 2005
Performance of TTOs as measured by invention disclosures, total university research income, number of staff, the level of intellectual property expenditures, and the size and R&D intensity of the regional economy.	Chapple et al., 2005
Number of licenses and licensing income.	Kim, 2011
Effectiveness of TTOs as determined by conflict of interest policies, royalty sharing, and spinoff leave time.	Caldera & Debande, 2010
Research Consortia	
Level of potential R&D spillovers within the consortium.	Branstetter & Sakakibara, 2002
The degree of product competition among consortium members.	Branstetter & Sakakibara, 2002
Business Support Programs	
Revenue growth, equity financing, and patent applications as affected by publicly funded advisory services.	Cumming & Fischer, 2012
Science Parks and Incubators	
Elasticity of firm revenues to investments in R&D. Efficiency of R&D investments compared to off park firms.	Yang et al., 2009
Job growth, revenue growth, patents, profits, frequency of new products and services being introduced to the market.	Lindelof & Lofsten, 2002; 2004
Venture patent citations to university research, venture success/failure.	Rothaermel & Thursby, 2005
Managerial and market differentiation and star power characteristics; strategic management, monitoring, and assistance comprehensiveness/quality; learning by incubates; and resource utilization.	Hackett & Dilts, 2008
R&D Tax Credits	
Innovation output measured in terms of the number of new products, the proportion of sales from the new products, and whether the new products are new to the world or just Canada.	Czarnitzki et al., 2011

Measures of Impact	Sources
Country Level Studies	
Changes in national industrial development and global competitiveness as a result of investments.	Choi et al., 2009
Impact of national culture, economic openness, and patent protection frameworks on levels of investment.	Versakelis, 2001
Economic Impact	
Quantitative and non-quantitative data on the regional and national economic impacts of funding.	Roessner et al., 2010
Spillovers	
University knowledge spillover measured by distance from firms; impact on growth rate of firms.	Audrestech & Lehmann, 2004
Extent of technology and knowledge transfer in relation to the distance from the source of knowledge (the research institute).	Coccia, 2008
Relationship between technology sourcing and the impact of international stock on national firms / international spillover.	Griffith et al., 2006
Impact of domestic and foreign R&D spillovers on productivity: elasticity of output in relation to inputs.	Hignon, 2007
Innovation performance in terms of in-house R&D expenditure, bought-in R&D, and intra-company knowledge transfer.	Frenz & Ietto-Gillies, 2009
Social Embeddedness	
Likelihood that the firm will cooperate with a public research organization.	Busom & Fernandez-Ribas, 2008
Length of firm-institute relationship; use of "high information gap" services.	Izushi, 2003
Firm-level learning, knowledge-spillovers within "communities of practice", and community identification.	Autio et al., 2008
Dialogues bridging research and practice, facilitating learning in relationships between researchers and firm representatives.	Roelofsen et al., 2011
Effect of relationship factors like trust, geographic proximity, communication effectiveness, intellectual property policies, patents, and licenses on technology transfer.	Santoro & Gopalakrishnan, 2001
Effect of qualification of staff, managerial attitude, and length of relationship on technology transfer.	Barge-Gil & Modrego, 2011
Population Ecology	
Effect of industry competition on the efficiency of the university technology commercialization industry.	Cardozo, et al., 2011
Collaboration	
Scale of internal and external networking activity.	Soetanto & Jack, 2011a
Technological capabilities and labour productivity of firms.	Barajas et al., 2011
Likelihood of firms to collaborate.	Eom & Lee, 2010
Impact of patent awards on the timing of cooperation and licensing agreements between firms and entrepreneurs.	Gans et al., 2008

Talent Pool

The talent pool for innovation can consist of highly skilled or lower skilled individuals, migrants (from other communities or internationally) and covers a broad range of sectors and disciplines. While many innovations are driven by technological breakthroughs (and so science and technology disciplines do play an important role), other businesses in the area are grown from ideals about innovative products or services. Regardless of the technological intensity, however, respondents talked about the need to attract and retain young, highly trained individuals, although the definitions of skills required varied considerably. There were concerns expressed by some that the post-secondary institutions were not aligned with local talent needs and/or that they were not educating people who stayed in the region. Significant differences across the region were also noted with Kingston, for example, having high demand for public sector professionals and management staff while other communities had shortages of tradespeople or service workers. Respondents were not uniform in their perception of the role of immigration in driving economic development, but they did agree on the issues around the aging population.

Intermediaries: Incubators and Accelerators



The Eastern Ontario Region has eight incubators which are designed to help launch startups and grow small to medium enterprises (SMEs). Each of these incubators are home to five to more than twenty companies, and each has a different area of focus and scale (See Appendix). The region is also home to a number of structured acceleration programs, as well as less formal business mentoring and coaching systems.

There are many ways to assess the effectiveness of incubators and accelerators depending on their core objectives. Indicators may include performance outcomes (such as program sustainability and growth, tenant survival and growth, contributions to the university mission, and community impacts), management policies (particularly the effective use of resources, e.g., governance, finance and capitalization, operational policies, target markets), and value added from services (with a focus on the perceived value, e.g., space, business assistance, human resources, consulting). Table 3 provides a list of some of the indicators that have been used. A recent report by the Provincial Auditor General (2015), coupled with new programs such as the Campus-Led Accelerator initiative and Canadian Accelerator and Incubator Program, are forcing the question of outcome measurement and impact. In the case of Eastern Ontario, many of the initiatives are too new to assess but some of the indicators may be instructive in formulating questions about their role and impact.

There is limited analysis of the incubators in the region but one message that emerged in the discussion is the opportunity to do a better job of sharing information about assets and resources available on the one hand and companies being incubated on the other. Additionally, opportunities to access coaching and mentoring from some of the larger incubators and to form B2B collaborations were identified as desirable.

Table 3: Assessments of Incubators

Measures of Success/ Performance Indicators	Sources
Definition and scope of industry	Hamdani & Statistics Canada, 2006
Governance structure or sponsors	Hamdani & Statistics Canada, 2006; Fan et al., 2004; Espina, 2008; Mian, 1997
Services provided, e.g., space, training, faculty consultants, etc.	Hamdani & Statistics Canada, 2006; Fan et al., 2004; Espina, 2008; Mian, 1997; Lendner, Dowling, 200; Allen & McCluskey, 1990; Chirgui, 2012; UKBI, 2009; CSES, 2002
Incubation period	Hamdani & Statistics Canada, 2006; Matt & Tang, 2010; CSES 2002
Graduation criteria	Hamdani & Statistics Canada, 2006
Objectives and goals	Hamdani & Statistics Canada, 2006; Fan et al., 2004; Espina, 2008; Mian, 1997
Industry sector	Hamdani & Statistics Canada, 2006
Incubator's image	Hamdani & Statistics Canada, 2006
Laboratories and equipment	Hamdani & Statistics Canada, 2006; Fan et al., 2004
Technology transfer programs	Hamdani & Statistics Canada, 2006; Philbin 2008; Fan et al., 2004; Lendner, Dowling, 2007; Tamasy, 2007
Finance and capitalization; sources of funding	Hamdani & Statistics Canada, 2006; Fan et al., 2004; Espina, 2008; Lendner, Dowling, 2007; Mian, 1997; Chirgui, 2012
SMEs with product or process innovations	European Union, 2012
SMEs with marketing or organizational innovations	European Union, 2012
High-growth innovative firms	European Union, 2012
Job creation or employment in knowledge-intensive activities	European Union, 2012; Hamdani & Statistics Canada, 2006; Lendner, & Dowling, 2007; Tamasy, 2007; Westhead & Storey, 1994; Allen & McCluskey, 1990; M'Chirgui, 2012; Akcomak & Taymaz, 2004
Community-related impacts or regional economic development	Fan et al., 2004; Smilor, 1987; Espina, 2008; Mian, 1997; Lendner, & Dowling, 2007; Akcomak & Taymaz, 2004
Medium and high-tech product exports	European Union, 2012; Basile, 2011
Knowledge-intensive services exports	European Union, 2012
Sales of new to market and new to firm innovations	European Union, 2012; Akcomak & Taymaz, 2004
Incubator revenues	Siegel, Veugelers & Wright, 2007; Fan et al., 2004
Incubatees revenues	Allen & McCluskey, 1990
Incubatees contributions to the sponsoring university in equity return	Fan et al., 2004; Mian, 1997
Incubator occupancy rate	Allen & McCluskey 1990; UKBI, 2009, Smilor, 1987
Target market	Fan et al., 2004; Espina, 2008; Mian, 1997
Entry/exit policies	Mian, 1997; Lendner, Dowling, 2007; Hamdani & Statistics Canada, 2006; Chirgui, 2012; Viera Borges, 2007
Incubatee performance review policy	Mian, 1997

Measures of Success/ Performance Indicators	Sources
Equity/ royalty policy	Mian, 1997; Viera Borges, 2007
Intellectual property safeguard policy	Mian, 1997
Incubatees' survival and growth	Hamdani & Statistics Canada, 2006; Espina, 2008; Bergek & Norman, 2008; Fan et al., 2004; Lendner, & Dowling, 2007; Matt & Tang, 2010; Mian, 1997; Westhead & Storey, 1994; Allen & McCluskey, 1990; Hacket and Dilts 2004; UKBI, 2009; Amezcua, 2010; Chen, 2009; Schmitt and Bayad, 2003
Program sustainability and growth	Espina, 2008; Mian, 1997
Attainment of mission of university	Espina, 2008; Mian, 1997
Operational policies	Espina, 2008
Input and output	Colombo, Delmastro, 2002; Hamdani & Statistics Canada, 2006; Thursby, 2002
Patent applications per firm	Philips, 2002
Patents, licenses and copyrights granted	Colombo, Delmastro, 2002; Lendner, & Dowling, 2007; Thursby, 2002; Lofsten, Lindelof, 2002
Skill level of the workforce	Colombo, & Delmastro, 2002; M'Chirgui, 2012
A dimension of innovative activity	Colombo, & Delmastro, 2002
Research commercialization	Lendner, & Dowling, 2007
Number of firm per incubators	Matt & Tang, 2010; CSES, 2002
Number of employees per incubated firms	Matt & Tang, 2010
Number of discontinued businesses	Philips, 2002
Start-up creation, coaching and support	Lendner, & Dowling, 2007; Tamasy, 2007; Chirgui, 2012; Schmitt and Bayad, 2003
Improvement of university image	Lendner, & Dowling, 2007
Technological sophistication	Westhead & Storey, 1994
Type and quality of connections to universities	Westhead & Storey, 1994
Cost per job (gross)	CSES, 2002

Intermediaries: Business Services

In the Eastern Ontario Region, there are many agencies providing business services and advice ranging from municipal small business centres to local Chambers of Commerce. The feedback on the value of these services was uneven – some felt they were very helpful, others felt that there were significant gaps in the support required. Some of this was dependent on location and on requirements. What was consistent, however, was the need for a single point of access to information and resources available from a user perspective. In addition, many respondents saw opportunities to better coordinate and share information across the region. While travel distances are an impediment, more extensive use of electronic means – shared websites and webinars, for example – was suggested. Additionally, ensuring that information is shared about specialized resources, events and assets was particularly important.

Startups

Eastern Ontario, exclusive of Ottawa, has a higher rate of self-employment than the provincial average. According to 2011 census data, more than 11% of Eastern Ontario respondents reported self-employment compared to 10.3% for the rest of the province. However, most of the SMEs in the region are relatively small with 90% having fewer than five employees. In addition, most of the companies have been in existence for more than six years, meaning the proportion of startups among all SMEs in the region is relatively low.

Established Businesses and Organizations

The structure of the economy in Eastern Ontario (excluding Ottawa) has a lower percentage of companies in the ICT sector than the provincial average or in innovation-intensive regions like Kitchener-Waterloo. A detailed analysis of the data from the consultation undertaken to support Eastern Ontario's Economic Development Strategy identifies some important features of the innovation ecosystem in the region. Some established businesses in the region reported understanding the importance of innovation to their business. Most of them focused on market-driven innovation (new products and services) rather than technology-driven innovation. High-end value-added farming, green tech, as well as niche consumer products and services bring high-value jobs. Building resources and capacity to drive innovation in existing industries and government agencies is critically important to promote the economic revitalization of the region.

Investors

Lack of financing is a common complaint of new and established businesses across Canada, and the issue emerges in Eastern Ontario as well. There is little doubt that established financiers have biases towards certain sectors and that a disproportionate amount of venture capital is invested in companies located in large urban of high-tech focused centres. At the same time, there is evidence that Eastern Ontario has developed innovative approaches to providing financing for startups, as well as established businesses, that appear to hold promise.

For example, an evaluation of the return on investment generated from Community Fund Development Corporations in Southern Ontario indicated that every dollar loaned produced $15.64 in revenues and $3.70 in wages in the fifth year " (Ference-Weicker & Company, 2014).

A number of angel investor networks exist with some focusing only on companies located in specific communities and others investing in both eastern Ontario and beyond. Some respondents felt that there were many local investors who would contribute $20-25K but that these investments would tend to follow well-established big name investors. Larger investors in the region have made multimillion dollar investments. Some deals have a mixed group of local and other investors. A recurring theme was that there are many programs supporting start-up funds –although these were reported to be difficult to navigate –but that there is limited access to "patient capital" in the 200 – 500K range. As well, some felt that many local companies with potential for growth simply were not positioned to consider or find appropriate investors and that intermediaries play a critical role.

Government Policies and Programs

Many respondents identified a wide range of government programs that they had accessed or helped companies access but noted that there were issues related to fragmentation, overlap and access to information. Many also noted that navigating forms and applications was time consuming and difficult and that consequently many businesses did not take advantage of the resources available to them. There was also a strong feeling that while there were programs from both the Federal and Provincial government to support economic development in smaller towns and rural regions, they were mostly ignored in discussions of innovation and that government innovation policy and discussion was very urban and high-tech focused. In the words of one respondent, "Ontario and Canada's innovation policies need to extend beyond the Toronto-Waterloo corridor." Respondents also discussed government programs like Fed Dev, which leverages private sector investments in economic development and innovation as being useful for ensuring that local businesses had "skin in the game" and also that the programs had real benefits. Some individuals commented on issues around "red tape" and bureaucracy. Others noted the need for "one-stop shopping." There was no awareness of any level of government using procurement to provide opportunities for businesses in eastern Ontario although many thought this could be a good idea. Few people discussed taxes which had a local focus, although it did come up in discussions with larger organizations or those who saw themselves as competing with American companies. Some felt that business-support services provided by governments were strong and others were not convinced that people working in local business-support services had the expertise needed.

It was suggested that an increase in networking opportunities might help local businesses access specialized services and supports that are not economical to provide in small communities (for example R&D and SRED support). It is clear that there are many services and programs aimed at supporting small businesses, entrepreneurs and innovation, but there are concerns regarding lack of coordination in programs and services, ease of access, as well as their impact (See Appendix for a list).

Infrastructure

The importance of physical and virtual infrastructure is critical in geographically dispersed communities. Strong technological infrastructure can compensate for lack of population density and while there is no replacement for face to face interactions, high-speed networks can provide ways to better share information and expertise, as well as access talent, financing, services and markets.

Eastern Ontario's strategic attention to broadband infrastructure provides the capability to take advantage of many of the region's assets and to offset some of the deficits. However, more needs to be done to develop applications, promote technology -based innovation and encourage the use of the technological infrastructure to strengthen connections among geographically dispersed elements in the ecosystem and build critical mass through network effects.

Culture of Innovation

Culture is comprised of values and attitudes which both shape and reflect behaviour. In discussions of national innovation strategies, we see reference to the need to build a "culture of innovation" typically characterized by values of creativity, individualism, and risk tolerance. The International Association of Science Parks (IASP) (2002) sees building a "culture of innovation" along with "promoting the competitiveness of its associated businesses and knowledge-based institutions" as the principal role of a science parks. The OECD has also highlighted the importance of expanding entrepreneurial training to build entrepreneurial culture, encouraging "independence, competition, excellence, entrepreneurial spirit, and flexibility" (OECD Innovation Strategy, 2010: p. 10).

The Global Entrepreneurship Monitor (Minitti, 2005) has compiled a series of surrogate measures to compare national indices of entrepreneurship, and other organizations (notably the OECD, 2010) have compiled related but distinct indices of innovation. Singapore, for example, is one of the few countries that has formally defined a strategy to build entrepreneurial mindsets as part of its national innovation strategy (Fetters et al., 2010). One of the stronger predictors of entrepreneurship is that a parent was an entrepreneur or self-employed.

Farming communities, in some respects, provide the most competitive and Darwinian experiences of entrepreneurship which, if tapped into, can drive strong cultures of entrepreneurship.

This may have changed somewhat in recent years, owing to concerted efforts by government and foundations. Examples were cited of interesting and innovative programs aimed at promoting entrepreneurial intent even in public schools but in general there was a feeling that there was a lack of attention to entrepreneurial education and to celebrating eastern Ontario's entrepreneurial success stories.

Table 4: Measuring the impact of entrepreneurship education programs

Measures of Impact	Sources
Number of spin-offs founded by students during and after the program.	Mwasalwiba, 2010
Economic development of spin-offs/startups (i.e., longevity, size, sales volume, investment volume, turnover, number of employees, etc.).	Nandram & Samson, 2004; Charney & Libecap, 2000; Henry et al., 2003; Kailer, 2010
Total tax revenue of a program's graduates compared to the cost of the program (cost-benefit analysis).	Mitterauer, 2003; Kailer, 2010
Graduate employment level.	Queenton et al., 2012; Kailer, 2010; Allan et al., 2009
Development of personal income of graduates from programs.	Charney & Libecap, 2000; Mitterauer, 2003; CRS, 2003; Holzer & Adametz, 2003; Kailer, 2010
Student performance in business plan competitions.	Queenton et al., 2012; Kailer, 2010; Allan et al., 2009
Scientific productivity.	Dzisah et al., 2012; Van Looy et al., 2011
State investment in the program.	Dzisah et al., 2012; Youtie and Shapira, 2008
Industry investment in the program.	
Applications to the program / international applications to the program.	Queenton et al., 2012; Friedman, 2008; Kailer, 2010; Allan et al., 2009
Contribution to the community (i.e. technology transfer, new jobs created, or assistance to local entrepreneurs	Mwasalwiba, 2010; Henry, 2004; Vesper and Gartner, 1997
Effects of startups on the regional economy (incorporating "regionality" into the assessment of impact).	Dzisah et al., 2012; Kim, Kim, & Yang, 2012; Lawton-Smith & Bagchi-Senb, 2012; Etzkowitz, 2008; Kailer, 2010; CRS, 2003
Knowledge transfer, academic standards, changes in attitudes and inclinations toward entrepreneurship, future student/graduate plans, and entrepreneurial potential. (Data collected through student and alumni surveys, as well as pre-/post-tests and psychological testing.)	BMBF, 2002; Fueglistaller et al., 2004; Fayolle, 2004; Boissin, 2003; Klapper, 2004; Carayannis et al., 2003; Pihkala & Miettinen, 2002; Holzer & Adametz, 2003; Bauer & Kailer, 2003; Nandram & Samson, 2004; Nakkula, 2004; Lucas & Cooper, 2004; Westhead et al., 2001; Kailer, 2010; Charney and Libecap, 2000; Vesper and Gartner, 1997; Hynes, 1996; Souitaris et al., 2007; Lee et al., 2006; Fayolle et al., 2006; Veciana et al., 2005; Peterman and Kennedy, 2003
Competence/performance of graduates after employment.	Schamp & Deschoolmeester, 2002; Kailer, 2010
Comparison with students who did not graduate from entrepreneurship education programs and comparison between programs (in terms of the above metrics).	Westhead et al., 2001; Fueglistaller et al., 2004; Schamp & Deschoolmeester, 2002; Sternberg & Mueller, 2004; Tohmo & Kaipainen, 2000; Kailer, 2010
International comparison between students from Entrepreneurial Education (EE) programs and non-EE educated students, as well as between EE programs.	Carayannis et al., 2003; Franke & Luethje, 2004; Kailer, 2010; Veciana, 2005

Innovation Index[1]

While there are a range of approaches to assessing innovation, recent work has focused on providing frameworks for assessing innovation at the regional level.

Working with leading researchers in the US (US, 2010), the U.S. Economic Development Administration has provided a framework to assist regions in assessing their innovation capacity based on evidence.

The Innovation Index aligns with other models of innovation and focuses on four groups of indices: Human Capital, Economic Dynamics, Productivity and Employment and Economic Wellbeing. Each of these elements has been given a weight and specific metrics (see Figure 4 below). The data helps to focus discussions among regional stakeholders. Each of these elements is important for understanding and assessing the capacity and potential of the innovation ecosystem in Eastern Ontario.

Human Capital examines characteristics of the regional population and labour. Factors such as high educational attainment, ability to attract and retain youth measured through growth in young adults and of the proportion of innovation-related occupations and jobs relative to the overall labour force are the key measures.

Productivity and Employment assesses economic growth, regional attractiveness and direct measures of innovative activity.

Economic Dynamics addresses local business conditions and resources available to entrepreneurs and businesses. Resources such as research and development funds for example are seen as fueling high growth innovation.

Economic Well-Being examines employment and personal income as important indicators.
The University of Indiana based researchers concluded that measures that have the greatest statistically significant relationship to innovation are:

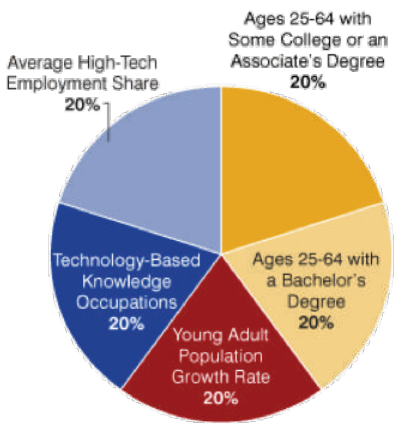
- Change in high-tech employment share
- Average small establishments per 10,000 workers
- Percent of population, ages 25-64, with post-secondary credentials
- Population growth rate for ages 25-44.

1 The Innovation Index is available at www.statsamerica.org/innovation. For more background on the topic, see the article "Measuring Regional Capacity for Innovation" in the January-February issue of InContext. The Innovation Index was developed as part of a recent study conducted for the U.S. Economic Development Administration and done in collaboration with Purdue Center for Regional Development, Strategic Development Group, Inc., the Rural Policy Research Institute, and Economic Modeling Specialists, Inc.

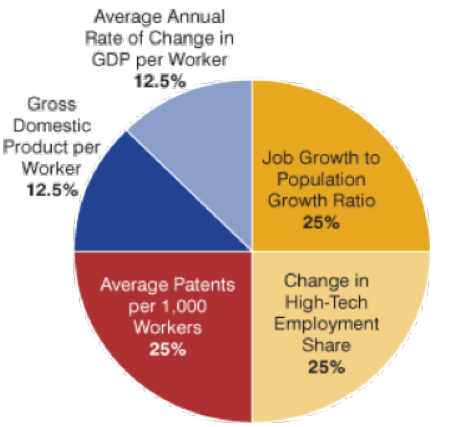
An important dimension of Eastern Ontario is that it has a higher percentage of workers employed in SMEs than the provincial average. When Ottawa and the Capital Region is excluded from the statistics we see that in Eastern Ontario more than 11% of workers are in SMEs compared to 10.3% across the province.

On the other measures Eastern Ontario does not fare particularly well. Its share or growth in the high tech employment sector is below average. As well, its population is aging. The average age in the region is higher than the provincial average and the level of education is lower in terms of University graduation but higher in terms of college graduation.

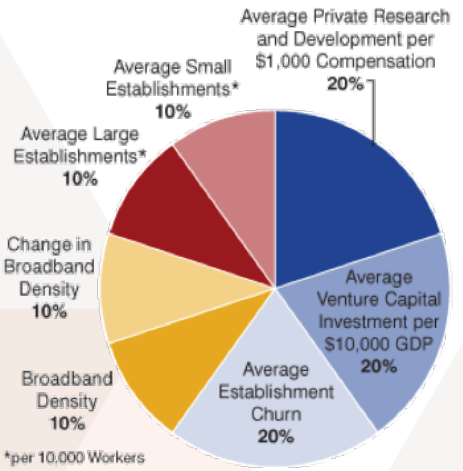
Figure 4: Innovation index measures



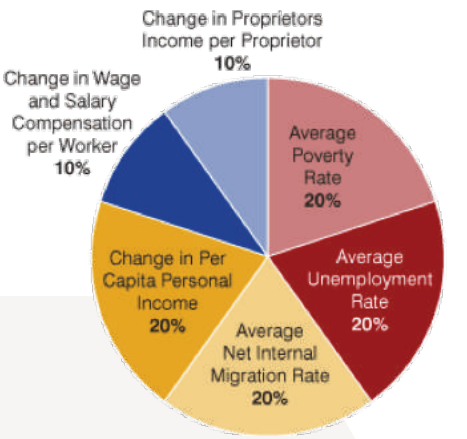
Human Capital (30%)



Productivity and Employment (30%)



Economic Dynamics (30%)



Economic Well Being (10%)

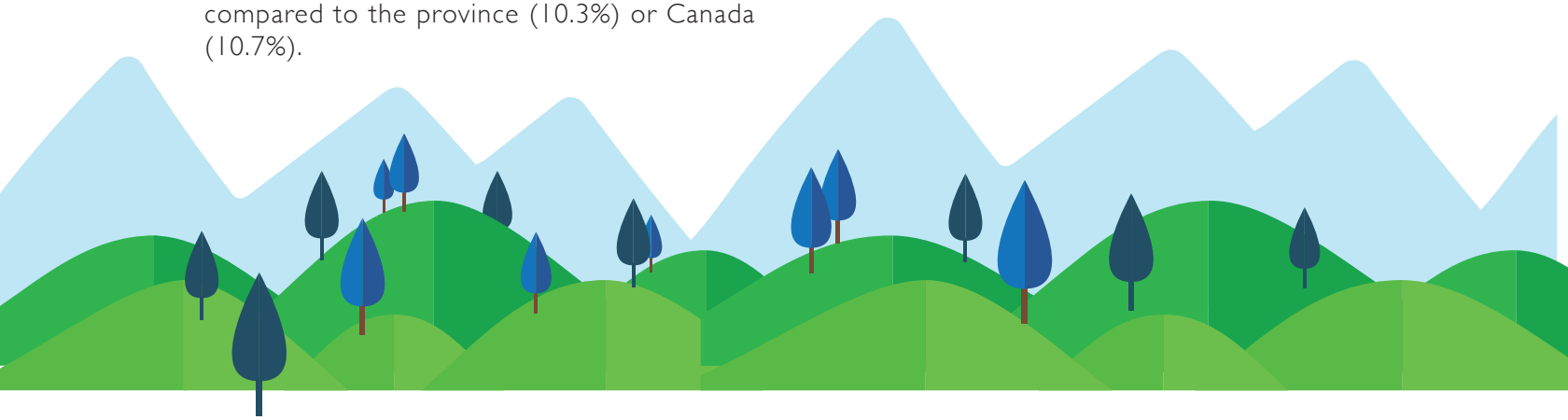
Regional Data And Analysis

As detailed in Appendix 3, the data necessary to measure and evaluate the innovation ecosystem of eastern Ontario is extensive and not currently available. To be able to look at Eastern Ontario and exclude Ottawa from the analysis, a limited amount of data can be used. First is the Statistics Canada Household Survey. This was completed in 2011 and reports summary information for various geographic levels. Second is more recent labour market data collected from various web sources and processed. This data from Magnet/Vicinity Jobs provides information about both the supply and demand in the local labour markets. Data from both of these sources have been used and combined and compared to develop an economic model of Eastern Ontario. The focus is on Eastern Ontario not including Ottawa, but data for Eastern Ontario including Ottawa and the Province of Ontario are also included. Specific information and observations are included in Appendix 2 along with greater detail for the various communities across the region. Summarized information and general trends are presented later in this section. First, a synopsis that encapsulates all of the various regional economic data and findings is presented.

The only available measure of entrepreneurial activity is the extent of self-employment. Eastern Ontario has a higher share of its workforce that is self-employed (11.3%) compared to the province (10.3%) or Canada (10.7%).

It also has a higher share of self-employed individuals that are women (37.3%) than the province (35.7%) or Canada (36.0%). A portion of this self-employment share is from agriculture, as both independent farmers and any unpaid family members who also work the farm would be counted as self-employed. This does indicate a slightly higher degree of entrepreneurship across the region, whether by choice or necessity. This could provide useful leverage around which a culture of entrepreneurial innovation could flourish.

Eastern Ontario's overall economy and economic future is dominated by high growth but low value employment. Retail and Healthcare account for 50% of all newly posted jobs in the region and are 25% of existing jobs.



While some Healthcare jobs are higher paying, many are not. Given the lower average wages seen across the region, it is reasonable to suspect that most existing and new Healthcare jobs are not particularly high-paying. The much higher share of new jobs being in these two industry sectors is not encouraging: There is growth, but it is not in desirable places.

One somewhat bright spot for the region can be seen in Manufacturing. While not a sector that is showing much growth and a sector that has decreased over time in the region, across Eastern Ontario, Manufacturing is about 10% of existing employment and is also about 10% of all new job postings. The region is holding its own while the rest of Ontario has a higher share of existing employment in Manufacturing than the share of newly posted jobs in Manufacturing. The provincial difference isn't large but is consistent with a declining industry while eastern Ontario could even be showing slight growth from new job postings.

The region has several sectors where higher growth is projected at the national level and this can be seen in the job posting and labour market data in other places, but Eastern Ontario is not showing much growth potential. Further, the region already has a lower share of existing employment in these sectors which combined with lower growth will result in the region falling even further behind in these sectors. The impact on the region is exacerbated through these sectors, which in addition to having a high growth rate, are also higher paying. Specifically, this can be seen in Professional, Scientific and Technical Services; Information and Culture; Arts, Entertainment and Recreation. Weakness in these high growth, high wage, high potential sectors—especially ones typically associated with innovation—poses a significant challenge for the region. One option to overcome this would be to focus innovative activity and attention in the less "traditional" sectors where the region has a larger existing presence and/or growth and/or growth potential such as Education or Agriculture or, possibly, Manufacturing.

The Education sector may provide an interesting opportunity for the region. It is worth noting that with Ottawa excluded, the region is strong. With Ottawa included, however, the results are even stronger. The region currently has a higher share of its existing employment in the Education sector (8.2%) compared to the province (7.5%). And, the region's share of new jobs in Education (5.3%) is higher than the provincial average (3.8%). The Education sector is a strength for the region, and the indicators suggest that it is and will continue to grow faster than across the province. However, it also may be slowing down. The share of the existing Education workforce is higher than the share of new jobs in Education. So, the creation of new jobs is not keeping pace with current employment. It is possible that this is the result of having lower turnover in Education jobs – a strong possibility. But, this result is also indicative of slower growth or even a decline in the sector. Any emphasis on Education should be pursued with care, and additional information from other primary sources (i.e., educational institutions) should be considered.

Looking beyond specific sectors, the economic models show three other areas of concern for Eastern Ontario: educational attainment and job skill requirements, full-time employment, and incomes.

Despite the region's strength in Educational employment, average educational attainment levels are lower across the region than across Ontario and Canada. The region has a high share of its population without a high school diploma and a higher share with only a high school diploma and lower shares with university undergraduate or graduate degrees. The educational requirements for newly posted jobs in the region also reflect these lower levels. Compared to the province, the region has a greater share of new jobs that require either no education or lower levels of education and a smaller share of new jobs that require a university education. In other words, not only are existing levels of education lower than the province, but the new jobs being created also require a lower level of education. In effect, the region is in an educational attainment deficit that is just getting deeper.

A similar situation exists around full-time employment. The region has a lower share (78%) of existing jobs that are full-time than the province (86%). This is also true of newly posted jobs where the region's share that is full-time (63%) is also lower than the provincial share (75%). In both cases, the share of new jobs that is not full-time is lower than the share of existing jobs that are not full-time. While some of this is the result of more jobs shifting away from stability and permanence, including full-time status, much of this is likely the result of part-time jobs needing to be filled much more often, creating a greater share of posted jobs that are part-time. Nevertheless, the lower shares in both existing and new jobs for the region show that the region already has fewer full-time jobs than the province and the trend is for that to continue and possibly get worse.

The final area of concern seen in the economic analysis is the current and potential result of all the other factors. At all levels (individual, family, household), average incomes across the region are lower than the province. Only Prescott, Ontario and Frontenac, Ontario have any average income above the provincial average—and even then, just barely. Factors such as the preponderance of jobs in lower paying sectors, fewer existing or new jobs in higher growth/higher value sectors, lower educational attainment levels, and fewer full-time jobs all combine to create a situation where wages are lower. Creating an innovation ecosystem across the region would help to stimulate growth and quality of jobs and would help to raise incomes and increase prosperity across Eastern Ontario.

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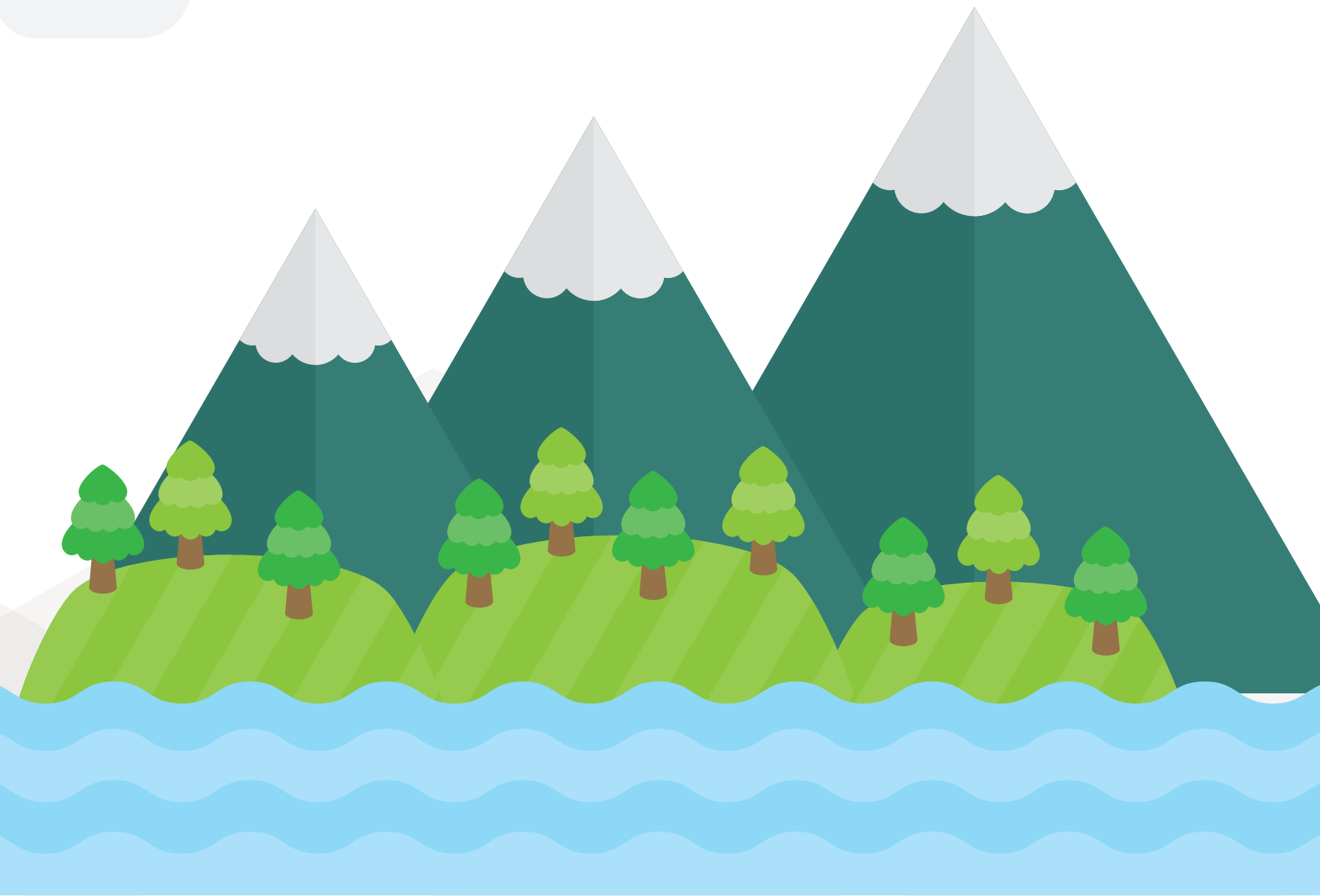

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A further summary of some of the detailed information presented in Appendix 2 is presented next. This information has been incorporated into the analysis above, though this section provides greater detail. Looking across the various items, patterns and trends emerge:

- Although the focus of this report is on Eastern Ontario exclusive of Ottawa, Ottawa has an important influence on the region. Ottawa is an employment location for residents of the surrounding communities. It also has Information industry, educational and other resources that could be assets for the remainder of the region. The remainder of the discussion focuses on the region with Ottawa excluded.

- The Eastern Ontario region (excluding Ottawa) has significant assets spread across the whole of the region. The entire region has a greater presence and diversity (of many kinds) when considered in its entirety.

- Self-employment is higher in the region than the province or country, and a higher share of those who are self-employed are women.

- The region has a much higher percentage of its workforce in part-time jobs compared with the province or national averages, but roughly the same number of people with full-year (versus part-year) employment and the same average number of weeks worked (45).

- The large decline in the manufacturing base over the 2001-2011 period is seen in many ways, including looking at industry and occupational information. The share of employment in manufacturing for the region is now lower than the province's share.

- The strength and importance of agriculture to the region is apparent through a variety of the measures presented. While agriculture has declined as a share of total employment, it has still gained concentration in the region relative to the rest of Canada.

- The Information industry, on the other hand, has increased, but not as quickly as the rest of the country. The concentration of employment in Information remains below the national average with nearly 35% fewer people employed in that industry than across Canada.

While attracting immigrants remains a challenge for the region, people are moving into and across the region. This mobility suggests strategies may be successfully developed that can focus on attraction and retention, but they will need to be targeted and focused on the region's assets. Recent (2001-2011) immigrants entering the region is even lower:

- Eastern Ontario minus Ottawa – 1.1%
- Ontario – 8.1%
- Canada – 6.6%

The Education sector has been growing and has seen its employment concentration increase relative to the national average, but education levels, especially for university and graduate education, remain well below provincial and national averages. However, the average for other post-secondary education (college, certificates, trades, apprenticeships, etc.) is higher than provincial and national averages, which suggests a different kind of workforce is available across the region than in many other places.

Public Administration is still pretty important in the region with Ottawa excluded –it comprises mostly of people working in/around Ottawa. While the region needs to understand itself without being overshadowed by Ottawa, it still needs to think about Ottawa in context.

Agriculture is more important in the region than across the province and has grown in importance relative to the rest of the country. This is not true, however, in terms of employment share.

The region has seen a slightly higher population of people who identify as Aboriginal. Hastings and Renfrew has higher concentrations, but many places across the region are higher than the average in other regions in Ontario.

Detailed information is presented in Appendix 2 which includes information for Eastern Ontario's individual cities and counties (Statistics Canada's Census Divisions) and shows summary information with Ottawa included and excluded.

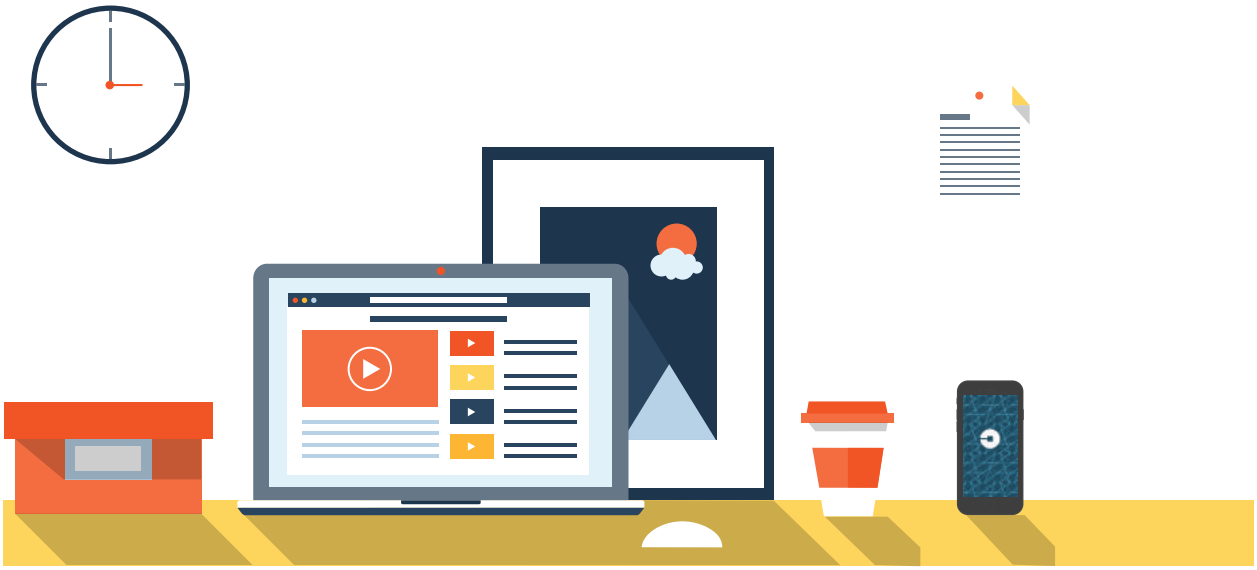
This includes tables, graphs, and charts on:

- Self-Employment
- Economic Diversification
- Industrial Specialization
- Employment by Industry
- Employment by Occupation
- Immigrant Status and Period of Immigration
- Immigrant Source Regions
- Immigrant Generational Status
- Aboriginal Identity
- Mobility
- Education Levels
- Industry Mix
- Occupational Mix
- Full-Time / Part-Time Employment
- Full-Year / Part-Year Employment
- Average Income

Data was extracted from Magnet/Vicinity Jobs (www.magnet.today), which have been pulled from various web sources and extensively processed to eliminate duplicates, and categorized based on labour supply (people looking for jobs) and labour demand (job openings). This information is from the first quarter of 2016 (January – March) and represents an up-to-date snapshot of the labour market across the region. This includes tables, graphs, and charts on:

- Labour Supply (resumes posted) by
- Month and Location
- Labour Demand (new jobs posted) by
- Month and Location
- Labour Demand by Industry
- Labour Demand by Occupation
- Labour Demand by Education/Skill Required
- Labour Demand by Full-Time Status

RECOMMENDATIONS AND FURTHER WORK



The dilemma that every regional leadership team must resolve is how to direct limited resources that produce the desired outcomes for the region in the long-term. This is no small feat, since the leadership team must weigh the likely returns with associated risks (as well as questions of returns for whom). Mapping the ecosystem can help assess a region's capabilities and help regional leaders focus the strategic dialogue on the issues that matter.

Eastern Ontario has a well–developed economic development strategy which outlines a series of goals. This analysis will add to that.

While conventional approaches to innovation focus on technology-driven approaches and, in particular, the ICT sector, an emerging body of research suggests that other approaches are needed to understand the often overlooked potential of regions characterized by small and rural communities.

The consultation reinforced the importance of defining the principal pillars of the region's economic development strategy and, in particular, the importance of attracting and retaining talent and exploiting technology. Our analysis has produced ten recommendations for further development.

In addition to a wide range of conventional sources of financing for startups and businesses, Eastern Ontario also has access to government programs including the Community Futures Program, as well as specialized funds such as First Stone Venture Partners.

While access to financing is always an issue, easy-to-navigate information about the sources and use of funds and more support for accessing them was a pressing concern for some respondents.

RECOMMENDATIONS

Based on this exploratory study, there are a number of areas we have identified that should, in our view, inform an innovation strategy for the region (and indeed the country). Creating scale through network effects is not just an issue in regions like Eastern Ontario but it is also important to a large country like Canada, characterized by distance and diversity.

1 **Leverage technology infrastructure and create a coordinating mechanism or team to leverage network effects.** The whole must be more than the sum of the parts.

2 **Share best practices and assets for the benefit of the entire region.** Access to financing, mentoring and above all, build the profile of entrepreneurship. Focus on evidence-based approaches and improve tracking and evaluation. Learn from successes and from failures. Encourage, reward and celebrate entrepreneurs.

3 **Look beyond incubating ICT startups.** Strengthen opportunities for sectors such as food processing and green technologies. Consider sectoral approaches and expanding access to specialized services such as shared maker spaces, manufacturing and processing.

4 **Drive ICT-enabled innovation across sectors.** Encourage existing organizations – businesses, nonprofits and government agencies – to leverage technology and other innovative processes.

5 **Develop a strategy to leverage postsecondary assets to advance the region.** Eastern Ontario has strong postsecondary institutions, but there seems to be untapped potential. Harness the power of postsecondary institutions to drive innovation and provide the talent needed.

6 **Succession planning and investment in family-based businesses** is very important in a community where there are strong and stable businesses without obvious heirs. Attracting immigrant entrepreneurs to the region to take over existing businesses could complement efforts in generating new startups.

7 **Align strategies to develop and retain talent and leverage diversity.** There is little doubt that the talent strategy and innovation strategy need to be aligned to attract—and more importantly—retain highly skilled workers in the region.

8 **Lobby for "made in Canada" innovation strategy beyond the Toronto-Waterloo corridor**. Current discussions of innovation tend to focus on ICT startups without looking at the adoption of technology. They also tend to have a strong urban bias in spite of the strong evidence that smaller communities make important contributions. Work together to access resources and political will and ensure that all levels of government and related agencies support inclusive innovation.

9 **Develop stronger regional brand identity and work together to promote access to larger markets – GTA, upstate NY, International.** This is one of the largest challenges to coordinated activity – "Eastern Ontario" too often is thought of as a space between rather than a distinct region. Building a shared narrative and telling the story is critically important to building a coordinated strategy.

10 **Improve information and resources sharing through coordinated access (e.g., Innovation Portal).** There are many services, programs and sources of funding available, as well as support for research and development but navigating the range of programs and services is a challenge. Leveraging technology to support information exchange and coordination can compensate for the lack of density in the region.

In terms of processes to move forward some of these ideas forward, developing a commitment that links strategy to action is critical. "Strategic Doing" is emerging as a strategy protocol for designing and guiding strategy in open, loosely connected networks. By linking talent, innovation networks, and human capital with a compelling narrative, the region can ensure that the strategy is more than words on paper and is strongly linked to action. Ed Morrison, regional economic development advisor at the Purdue Center for Regional Development, has championed the notion of "strategic doing" as an approach to driving transformative change in regional planning: "we need to move our mindsets from developing "plans" to developing flexible and lean "planning platforms." Think of them as a new form of "civic infrastructure."

Finally, there is little doubt that the models being developed in the region have application across the country, so telling the story will benefit not only eastern Ontario but Canada's innovation ecosystem.

Figure 5: Strategic Doing Protocol

Source: Morrison (2014)

APPENDICES

Innovation Ecosystem Scorecard

Appendix 1.1: Innovation Ecosystem Scorecard (Innovation in American Regions)

	Weight	Score		Assessment Notes
Human Capital	**30%**	**M/L**	**45**	
Ages 25-64 with a college diploma	20%	**H**	90	Includes other post-secondary
Ages 25-64 with a bachelor's degree	20%	**L**	30	Includes graduate degrees
Young Adult Population Growth Rate	20%	**L**	30	Based on overall mobility & other patterns
Technology based occupations	20%	**M/L**	45	Sciences and Natural Resources (includes Agriculture) Occupations
Average High Tech Employment share	20%	**L**	30	Information (L); Professional, Technical and Scientific Services (L); Healthcare (M) Industry Sectors
Economic Dynamics	**30%**	**M/L**	**52.5**	
Average Small Establishments	12.5%	**M**	60	Only reported at provincial level. Special order from Statistics Canada to get more geographically detailed information.
Average Venture Capital Investment per 10,000 GDP	25%	**L**	30	Anecdotal and from interviews.
Average Establishment Churn	25%	**M**	60	Only reported at provincial level. Special order from Statistics Canada to get more geographically detailed information.
Broadband Connections per 1000 households	12.5%	**M**	60	Given national efforts
Change in Broadband density	12.5%	**M**	60	Given national efforts
Average large Establishments	12.5%	**M**	60	Only reported at provincial level. Special order from Statistics Canada to get more geographically detailed information.
Productivity and Employment	**30%**	**M**	**60**	
Job growth to population growth ratio	25%	**H**	90	(2001-2011; job growth/population growth) Eastern Ontario: 7.8% / 6.2% Ontario: 11.5% / 19.5%
Change in High Tech Employment Share	25%	**M**	60	Information (L); Professional, Technical and Scientific Services (M); Healthcare (M)
Average Patents per 1000 workers	25%	**L**	30	Patents (from OECD 2013) per 100,000 Eastern Ontario: 4.97 Ontario: 11.21
Gross Domestic Product per worker	12.5%	**L**	30	Wages (2011) Eastern Ontario: $25,268 Ontario: $31,618
Average Annual Rate of Change in GDP per Worker	12.5%	**H**	90	Change in Wages (2001-2011) Eastern Ontario: 23.0% Ontario: 14.2%

Appendix 1.1: Innovation Ecosystem Scorecard (Innovation in American Regions)

	Weight	Score		Assessment Notes
Economic Well Being	**10%**	**M**	**57**	
Average Poverty rate	20%	**L**	30	Household Income Levels
Average Unemployment rate	20%	**M**	60	Eastern Ontario (2011): 7.0% Ontario (2011): 8.3% Economic Regions (April 2016) Ottawa: 7.3% Kingston-Pembroke: 7.7% Muskoka-Kawarthas: 5.7% Ontario: 7.0%
Average Net Internal Migration Rate	20%	**L**	30	Mobility
Change in per Capital Personal Income	20%	**H**	90	Change in Average Income (2001-2011) Eastern Ontario: 35.4% Ontario: 23.7%
Change in Wage and Salary Compensation per Worker	10%	**H**	90	Change in Wages (2001-2011) Eastern Ontario: 23.0% Ontario: 14.2%
Change in Proprietor's Income per Proprietor	10%	**M**	60	Not available at regional level
Overall Score		**M/L**	**52.9**	

Appendix 1.2: Definitions of the Variables Used in the Computation of the Component Indexes of the Innovation Index (Indiana Business Research Center, 2009)

A. Human Capital		
Classification	**Variable**	Definition
Education attainment	"Percent of Population Ages 25-64 with Some College or an Associate's Degree, 2000" "Percent of Population Ages 25-64 with a Bachelor's Degree, 2000"	These variables measure the extent to which the skills and knowledge, that could contribute to a population's capacity to innovate, are acquired through the education attainment of (i) some college or an associate' degree and (ii) a bachelor's degree or higher.
Population growth	"Mid-Aged Population Growth Rate, 1997 to 2006"	This variable measures the increase in the number of residents ages 25 to 44. These people are most likely to engage in innovative activities. They are also expected to be less risk averse and more entrepreneurial. These residents are likely to expand the innovative and entrepreneurial characteristics of the base community as well.
Occupation mix	"Technology-Based Knowledge Occupations Share, 2007"	This variable measures the extent to which the combination of local industries can possibly contribute to innovation. Innovation here is reflected by the existence of technology-based industries that are hypothesized to highly likely favor innovative behaviors, including but are not limited to the development of new and innovative ideas, products and processes that might lead to economic growth.
High-tech Employment	"Average High-Tech Employment Share, 1997 to 2006"	This variable measures the extent to which a place's occupational and industry mix can provide either (i) the existing capacity to generate innovative products and processes or (ii) the ability to enhance local innovative capacity by attracting new firms and new talents.
B. Economic Dynamics		
Classification	**Variable**	Definition
R&D investment	"Average Private Research & Development per $1,000 Compensation, 1997-2006"	This variable measures the private R&D expenditure relative to the compensation to workers and proprietors.
Venture capital investment	"Average Venture Capital Investment per $10,000 GDP, 2000 to 2006"	This variable measures the availability and/or the easiness of access to venture capital funds for the launch of new ideas and the expansion of innovative firms.
Broadband density	"Broadband Density, 2007" "Change in Broadband Density, 2000 to 2007"	These variables measure the availability of the high-speed internet connections that can (i) help businesses and individuals collaborate and/or (ii) connect businesses and consumers, from anywhere. These two variables record the number of residential high-speed connectors per 1,000 households and the annual average change in the number of broadband holding companies.
Churn	"Average Establishment Churn, 1999 to 2004"	This variable measures the turnover rate of the local businesses, in terms of firm entry (growth) and exit (contraction) rates. These rates reflect the extent to which innovative and efficient companies replace outdated firms that failed to modernize their techniques and processes.
Business size	"Average Small Establishments per $10,000 Workers, 1997 to 2006" "Average Large Establishments per 10,000 Workers, 1997 to 2006"	These variables measure the existence of small firms that are thought to be highly adaptable and can easily change their processes to conduct innovative activities.

Appendix 2 Definitions of the Variables Used in the Computation of the Component Indexes of the Innovation Index (Indiana Business Research Center, 2009) continued

C. Productivity and Employment		
Classification	**Variable**	**Definition**
High-tech employment growth	"Change in High-Tech Employment Share, 1997 to 2006"	This variable measures the extent to which the share of high-tech employment, for skilled and specialized workforce critical to innovative activities, is increasing relative to the total employment. In turn, this measures also the degree to which home grown and high-tech firms have expanded their presence.
Job and population growth	"Job Growth to Population Growth Ratio, 1997 to 2006"	This variable compares the employment growth with the population growth to reflect whether job creation of a place can keep up with the influx of people to and/or the natural growth of people of the place. Strong employment growth is desirable for an innovative place.
Patent	"Average Patents per 1,000 Workers, 1997 to 2006"	This variable measures the IBRC's filer-adjusted patent data as recorded by the U.S. Patent Office. A single patent may be counted multiple times if it consists of filer locations in different places.
Gross domestic product	"Average Annual Rate of Change in GDP ($Current) per worker, 1997 to 2006" "Gross Domestic Product ($Current) per Worker, 2006"	These variables measure a place's level of current-dollar GDP per worker today (2006) and the growth in value over the past decade.
D. Economic Well-Being		
Classification	**Variable**	**Definition**
Poverty	"Average Poverty Rate, 2003 to 2005"	This variable measures the average of the three (2003-2005) years' poverty rates of the place. Its inverse is used in the computation of the component index.
Unemployment	"Average Unemployment Rate, 2005 to 2007"	This variable measures the average of the three (2005-2007) years' unemployment rates in the place. Again, its inverse is used in the computation of the component index.
Net migration	"Average Net Internal Migration Rate, 2000 to 2006"	This variable measures the net result of people moving in (out of) a place due to (because the lack of) some appealing factors such as employment opportunities and environment amenities.
Compensation Growth	"Change in Wage and Salary Compensation per Worker, 1997 to 2006" "Change in Proprietors Income per Proprietor, 1997 to 2006"	These variables measure the growth in how much workers and proprietors made as their income based on their places of work. The values of the variables reflect the relationship between the innovative activities and their rewards based on where these activities take place.
Personal Income Growth	"Change in Per Capita Personal Income, 1997 to 2006"	This variable measures the growth in income by place of residence.

Human Capital

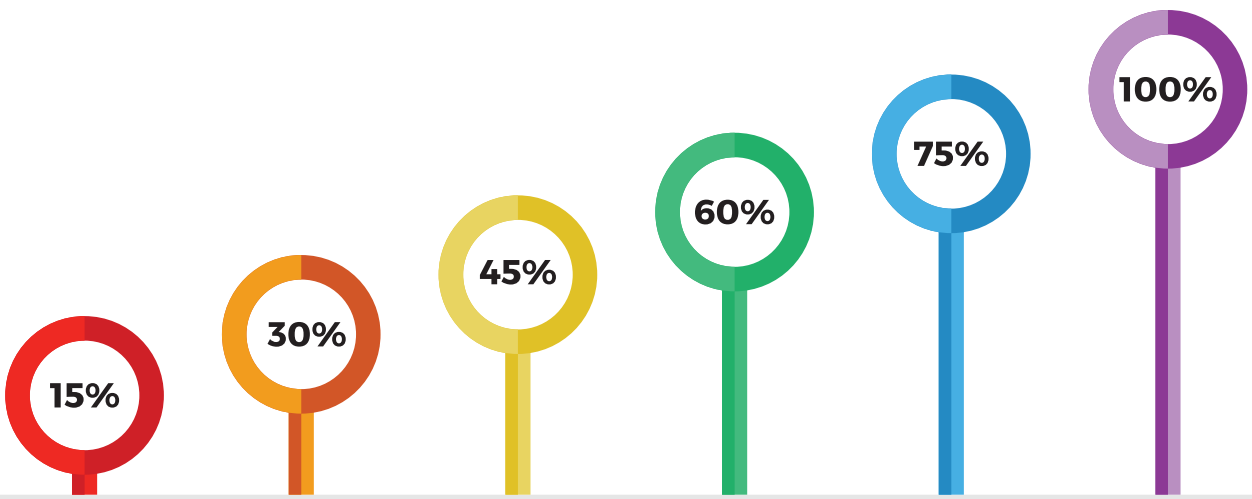
Variables included in the human capital component index suggest the extent to which a county's population and labour force are able to engage in innovative activities. Counties with high levels of human capital are those with enhanced knowledge that can be measured by high educational attainment, growth in younger age brackets of the workforce (signifying attractiveness to younger generations of workers), and a sizeable number of innovation-related occupations and jobs relative to the overall labour force.

Education: Educational attainment measures the skills and knowledge that contribute to a population's capacity to innovate. The research team was particularly interested in individuals in the labor force with tertiary degrees. Thus, educational attainment was divided into two categories:

- Some college or an associate's degree
- Bachelor's degree or higher

The distinction is made to capture the relative importance of a knowledge differential, together with regional distinctions in the types of degrees earned. In many states, educational funding mechanisms favour 4-year universities. Elsewhere state policy tends to favour 2-year community colleges and vocational schools. An important educational differential is also present within states and counties where higher concentrations of bachelor's degrees tend to surround metropolitan areas, whereas associate degree concentrations tend to be elevated in more rural counties where fewer residents have the resources or ability to travel to distant four-year institutions. Community colleges and vocational schools are more widely dispersed and proximate to rural residents. They also tend to provide education at a lower cost, with easier access, and tend to offer more flexible course schedules, such as evening or weekend courses. Community colleges are also more likely to cater to a region's economic development needs than larger universities.

Population growth rate: A growing population is desirable. But growth in the number of newborns or retirees does little to suggest whether those persons most likely to engage in innovative activities are present. For this reason, population growth rates are confined in this study to ages 25 to 44. The lower bound ensures transient college students typically aged 18 to 21 become less of a factor in influencing the overall rate of growth, whereas the upper bound signifies a point at which a professional's geographic location would likely remain more stable. The 25-to-44 age bracket is likely to be less risk averse and more entrepreneurial. Moreover, population growth in this age bracket suggests the possibility that new residents are likely to expand the innovative and entrepreneurial characteristics of the base community.



Occupational Mix: Certain occupational mixes favor innovative behaviors. The research team defined six technology-based knowledge occupation clusters that are hypothesized to have a higher probability of developing new and innovative ideas, products and processes that drive economic growth:

- Information technology
- Engineering
- Health care and medical science practitioners and scientists
- Mathematics, statistics, data and accounting
- Natural sciences and environmental management
- Postsecondary education and knowledge creation

Productivity and Employment

The productivity and employment component index describes economic growth, regional desirability, or direct outcomes of innovative activity. Variables in this index suggest the extent to which local and regional economies are moving up the value chain and attracting workers seeking particular jobs.

High-Tech Employment Share Growth: Just as the share of high-tech employment in a country was an important input, the extent to which that share is increasing relative to total employment is an important performance measure. Firms requiring a highly skilled and specialized workforce are drawn to innovative areas. In a similar way, this measure also registers the degree to which home-grown, high-tech firms have expanded their presence. Growth in the share of high-tech employment suggests the increasing presence of innovative activity and signifies that high-tech firms are growing in the county or region both in relative as well as absolute terms.

Job Growth-to-Population Growth Ratio: High employment growth relative to population growth suggests jobs are being created faster than people are moving to a region. Even though the ratio measures the change in level between jobs and population (and therefore, can't be used to compare rates of growth), it can rank order counties or regions in terms of employment performance. A high ratio between these two variables indicates strong employment growth. A negative value signifies that population is growing while employment is declining or vice versa. In cases for which population is declining while employment is increasing, the absolute value of the ratio is used as that would be considered favourable employment performance.

Patent Activity: Newly patented technologies provide an indicator of individuals' and firms' abilities to develop new technologies and remain competitive. The number of patents produced is a commonly used output measure for innovative activities, but the data can mislead. Patent data are coded to distinguish between the residence of the filer and the recorded location of the employer (if the applicant is not a private inventor), but the recorded location of the employer may or may not correspond to the location of the work that produced the patent, especially if the employer is a large, diversified company with many locations. In addition, the available patent data cover only utility patents and not all patent types. Patent data are recoded from the raw data provided by the U.S. Patent Office and awards patents to any county from which one of the filers reported as their location. This means that for any single patent with more than one filer, a patent may be counted multiple times if filers are located in different counties. Patents can also be an inaccurate indicator of innovation outcomes, particularly in areas where a single firm overwhelms the total patent count, such as Eli Lilly in Indianapolis.

Gross Domestic Product: The final component of the productivity and employment component index is the single most important measure of productivity available—gross domestic product (GDP). The index incorporates both the level of a county's current-dollar GDP per worker today, and also growth in the value over the past decade.

Economic Dynamics

The economic dynamics component index measures local business conditions and resources available to entrepreneurs and businesses. Targeted resources such as venture capital funds are input flows that encourage innovation close to home, or that, if not present, can limit innovative activity.

Venture Capital Investment: Venture capital (VC) funds are used to launch new ideas or expand innovative companies. In the United States, VC may be responsible for up to 14 percent of all innovative output activity. VC investment firms are highly selective with their investments to maximize the probability of high returns. The return on VC, and possibly the importance of VC, is diminished somewhat by the fact that the VC investments are typically management-intensive. Looking for VC funding may consume a considerable level of effort by the seeking firm's management, just as VC firms exert considerable effort seeking suitable projects to invest in.

Broad Density: Broadband provides high-speed Internet connections to businesses and consumers. Several state-level studies have attempted to capture the effect of adding broadband capacity to a region's infrastructure. These studies suggest that broadband capacity has an overwhelmingly positive effect on economic performance. High-speed Internet access ensures that businesses and individuals can collaborate from virtually any location.

Code	Connections per 1,000 Households
0	Zero
1	Zero < x <= 200
2	200 < x <=400
3	400 < x <=600
4	600 < x <=800
5	800 < x

The Innovation Index uses 2 measures of broadband density. The first is the number of residential high-speed connections per 1,000 households. The FCC reports these data in ranges, not as a specific number of connections in a particular county (see below). The midpoint in the range is presented within the index output. For a custom region—an aggregation of two or more counties—the midpoint for the region is calculated as the weighted average of the midpoints of

Churn: Competition is crucial to innovation. Market structures can influence the degree to which innovation is even possible. Specifically, markets with high rates of firm entry have been linked to increased levels of innovation. Conversely, the rate at which businesses shut their doors or reduce their workforce indicates a decrease in economic deadwood. Together the growth and contractions along with births and deaths produce the notion of economic churn, which serves as an indicator of the extent to which innovative and efficient companies replace outdated firms unable to modernize techniques and processes. Churn has been linked to positive employment growth and is not subject to agglomeration effects that often distinguish urban and rural economic structures.

Business Sizes: Small firms, it is thought, are highly adaptable and can easily change their processes to incorporate new ideas. In recent years, high merger rates between small and large firms have coincided with increased technological influence of small firms. Some evidence, however, suggests these acquisitions may not be significant sources of innovation for large firms. Theoretically, a higher proportion of large businesses would positively contribute to innovation through the increased availability of funds for research and development, as well as the resources to directly employ scientists rather than hire out research services. Available data, however, do not identify whether, or the degree to which, an establishment is engaged in innovation activities. Moreover, using data on large establishments, defined as establishments with 500 or more employees, may be of limited utility for explaining innovative capacities in rural counties with small economies. Just the same, because the variable has some theoretical merit, the number of large establishments per 10,000 workers remains in the index.

Economic Well-Being

Innovative economies improve economic well-being because residents earn more and have a higher standard of living. Decreasing poverty rates, increasing employment, in-migration of new residents and improvements in personal income signal a more desirable location to live and point to an increase in economic well-being.

Average Poverty Rate: Innovative economies have greater employment opportunities with higher compensation, thus lowering rates of poverty. Reduced rates of poverty will tend to lag growth in employment opportunities. As a result, the last three years of the most recent data are used. Since a high poverty rate is a negative outcome, the index uses the inverse of the average poverty rate.

Average Unemployment Rate: Innovative economies have greater employment opportunities and lower unemployment rates. Since a high unemployment rate is a negative outcome, the index uses the inverse of average unemployment rate.

Net Migration: Migration measures the extent to which a county or region is broadly appealing and excludes other elements of population dynamics such as fertility rates. While people may migrate into a region for a host of reasons, from employment opportunities to environmental amenities, migration out of a region almost certainly signals declining economic conditions and the inability to keep the innovative talent that will spawn economic growth in the future.

Compensation: Compensation data convey how much workers make based on their place of work. Likewise, proprietors' income is also based on place of work. Compensation and proprietor's income, therefore, probably provide a strong relationship between the activities of innovation and the rewards of innovation based on the location of innovation.

Growth in Per Capita Personal Income: As an alternative to measuring remuneration based on place of work, per capita personal income (PCPI) measure incomes by place of residence. Because PCPI includes other forms of income in addition to wages, salaries and fringe benefits, it is a more comprehensive measure of well-being. That said, the linkage between where innovation occurs (county of work) and the financial rewards of innovation (county of residence) is less direct.

Regional Data And Analysis

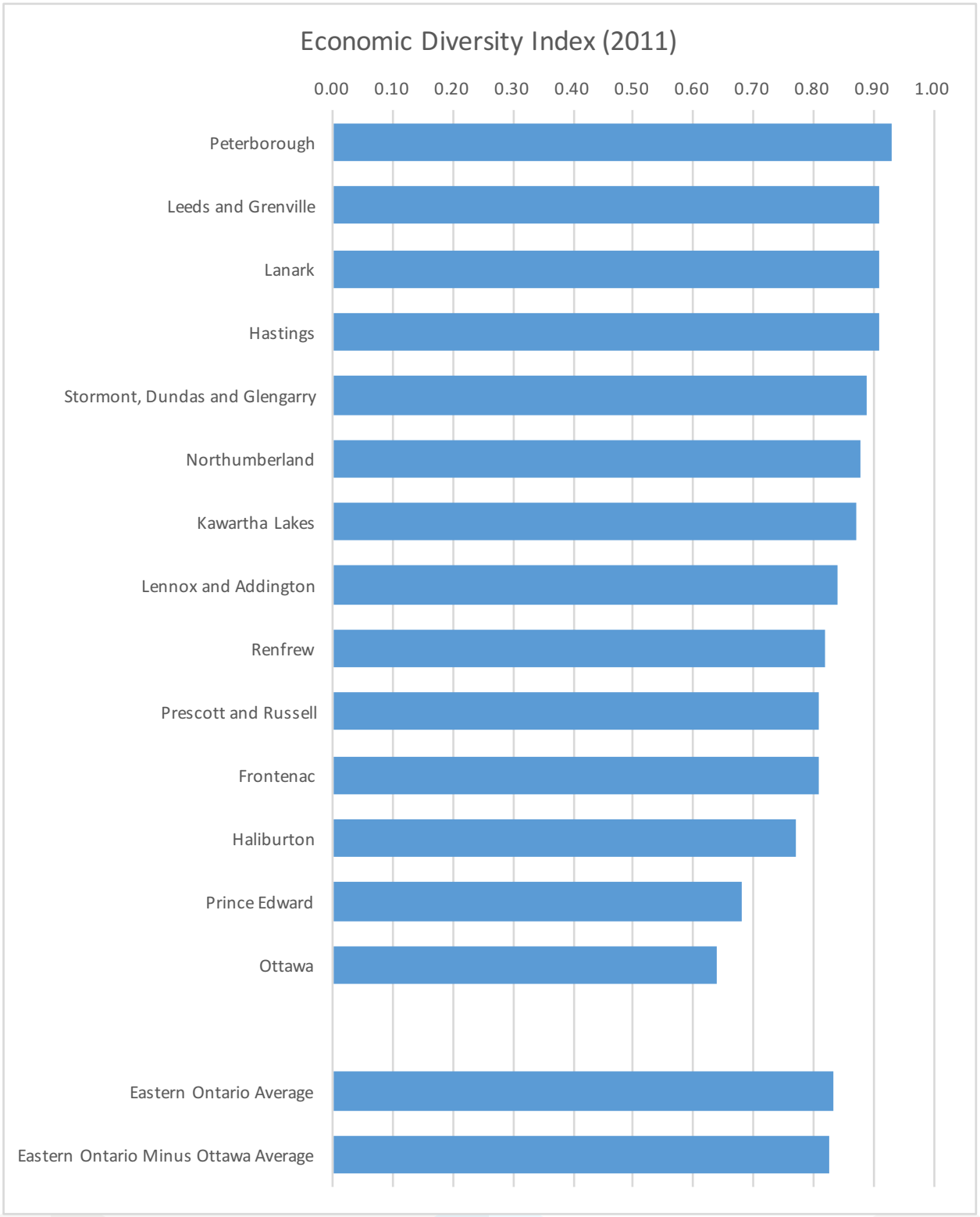
Appendix 2.1: Regional Data and Analysis Self-Employment in Eastern Ontario (2011, Household Survey)

Name	GNR*	Total Workers						Percent Self-Employed			Share Self-Employed who are	
		Total	Male	Female	Self-Emp	Self-Emp Male	Self-Emp Female	All	Men	Women	Men	Women
Stormont, Dundas and Glengarry	32.8	55,470	28,810	26,665	6,140	3,855	2,290	11.10%	13.40%	8.60%	62.80%	37.30%
Prescott and Russell	24.5	47,930	24,930	23,005	5,270	3,470	1,800	11.00%	13.90%	7.80%	65.80%	34.20%
Ottawa	21.8	498,370	253,485	244,885	45,345	27,745	17,600	9.10%	10.90%	7.20%	61.20%	38.80%
Leeds and Grenville	37.8	51,190	26,390	24,800	5,960	3,885	2,065	11.60%	14.70%	8.30%	65.20%	34.60%
Lanark	39.1	34,760	17,680	17,075	4,365	2,825	1,540	12.60%	16.00%	9.00%	64.70%	35.30%
Frontenac	29.2	78,855	39,280	39,575	7,060	4,165	2,890	9.00%	10.60%	7.30%	59.00%	40.90%
Lennox and Addington	33.0	20,815	10,845	9,975	2,155	1,340	820	10.40%	12.40%	8.20%	62.20%	38.10%
Hastings	32.4	66,330	34,240	32,090	6,350	3,980	2,375	9.60%	11.60%	7.40%	62.70%	37.40%
Prince Edward	37.3	11,890	6,130	5,755	1,860	1,185	675	15.60%	19.30%	11.70%	63.70%	36.30%
North-umberland	36.3	41,370	21,375	19,995	5,860	3,695	2,165	14.20%	17.30%	10.80%	63.10%	36.90%
Peter-borough	38.1	67,445	34,305	33,145	7,785	4,750	3,035	11.50%	13.80%	9.20%	61.00%	39.00%
Kawartha Lakes	40.8	36,130	19,020	17,115	5,025	3,395	1,630	13.90%	17.80%	9.50%	67.60%	32.40%
Haliburton	47.9	7,575	4,015	3,565	1,205	800	400	15.90%	19.90%	11.20%	66.40%	33.20%
Renfrew	33.8	51,785	27,480	24,300	5,480	3,105	2,375	10.60%	11.30%	9.80%	56.70%	43.30%
Eastern Ontario		1,069,915	547,985	521,945	109,860	68,195	41,660	10.30%	12.40%	8.00%	62.10%	37.90%
Eastern Ontario w/ Ottawa		571,545	294,500	277,060	64,515	40,450	24,060	11.3%	13.7%	8.7%	62.70%	37.29%
Ontario		6,864,985	3,542,030	3,322,960	706,425	454,005	252,415	10.30%	12.80%	7.60%	64.30%	35.70%
Canada		17,990,080	9,388,570	8,601,510	1,926,990	1,233,685	693,310	10.70%	13.10%	8.10%	64.00%	36.00%

*non-response rate for Household Survey

The self-employed include persons with or without a business as well as unpaid family workers. Includes self-employed with an incorporated business and self-employed with an unincorporated business. Also included among the self-employed are unpaid family workers.

Appendix 2.2: Economic Diversification



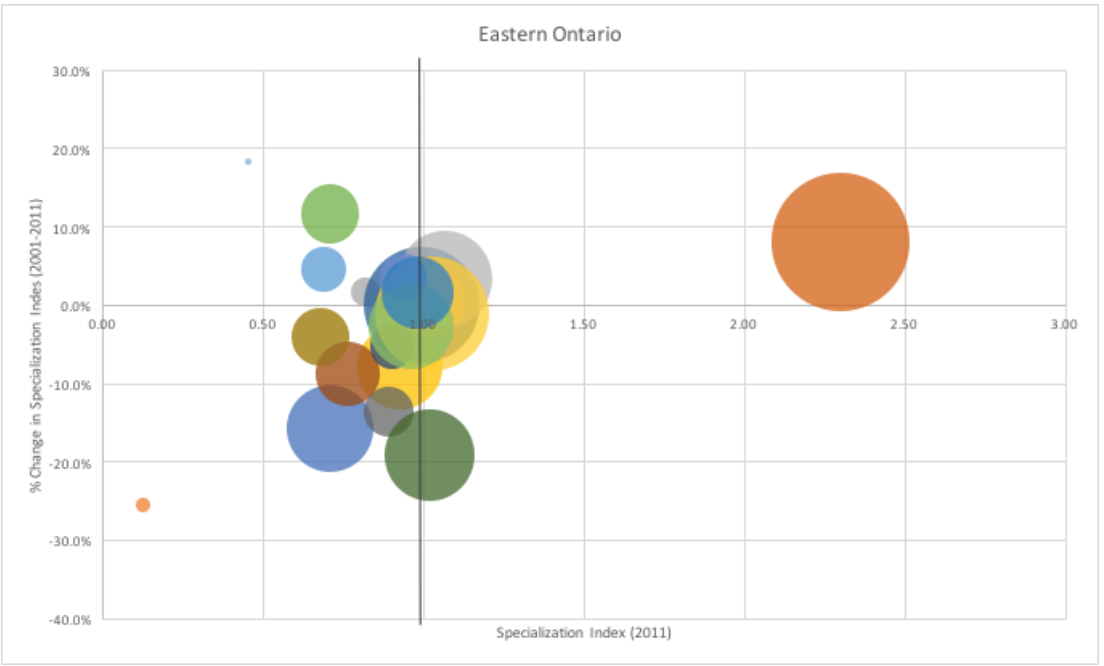
*non-response rate for Household Survey

The economic diversity index is bounded between 0 and 1. A community that has the same industrial structure as the Canadian economy is given a value of 1 and is considered well diversified. A community that has a completely different industrial structure than the Canadian economy is given a value of 0 and is considered poorly diversified.

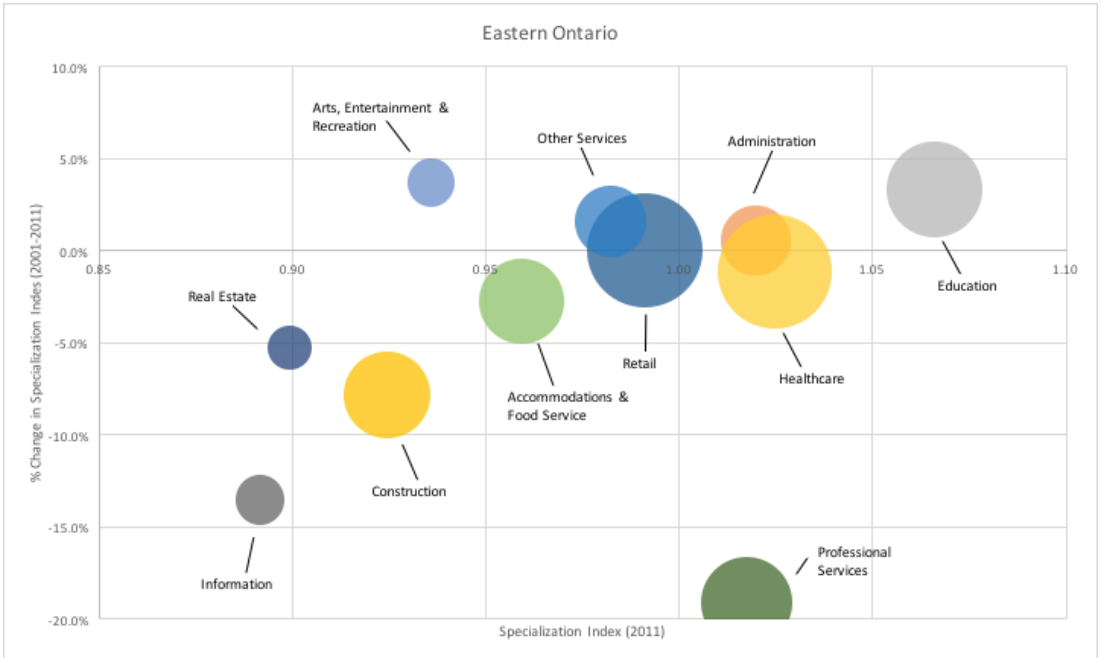
Degree of Industrial Specialization and Change over Time

The following four graphs show the degree of industrial specialization compared to the national average across the region (x-axis) and the change in that specialization between 2001 and 2011 (y-axis). A specialization index value of 1.0 means that the region has the same concentration of employment in that industry as the national average. Greater than 1 indicates a higher concentration; less than 1 a lower concentration. The size of the bubble is the total employment in that industry in the region in 2011. The two sets of graphs show Eastern Ontario with Ottawa (first two) and without Ottawa (next two). Within each set, the second graph is simply a "zoom in" on the portion of the graph around (1.0, 0.0%) to provide clarity around all the overlapping bubbles.

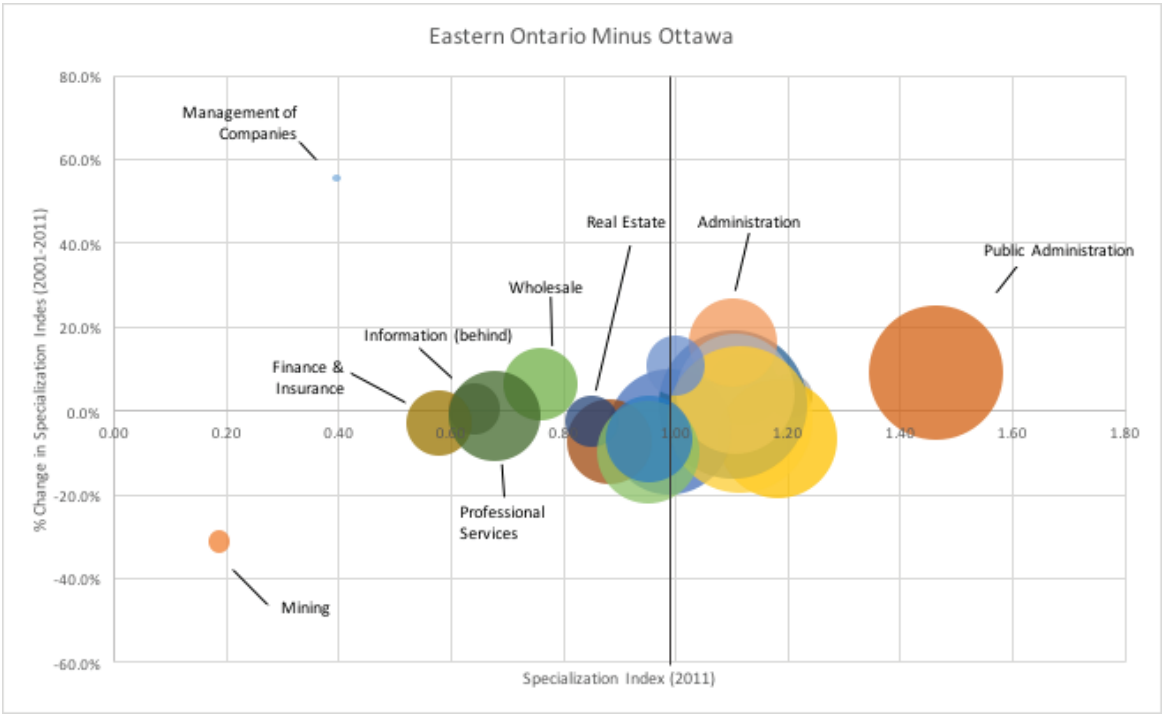
Appendix 2.3: Eastern Ontario degree of industrial specialization and Change over Time



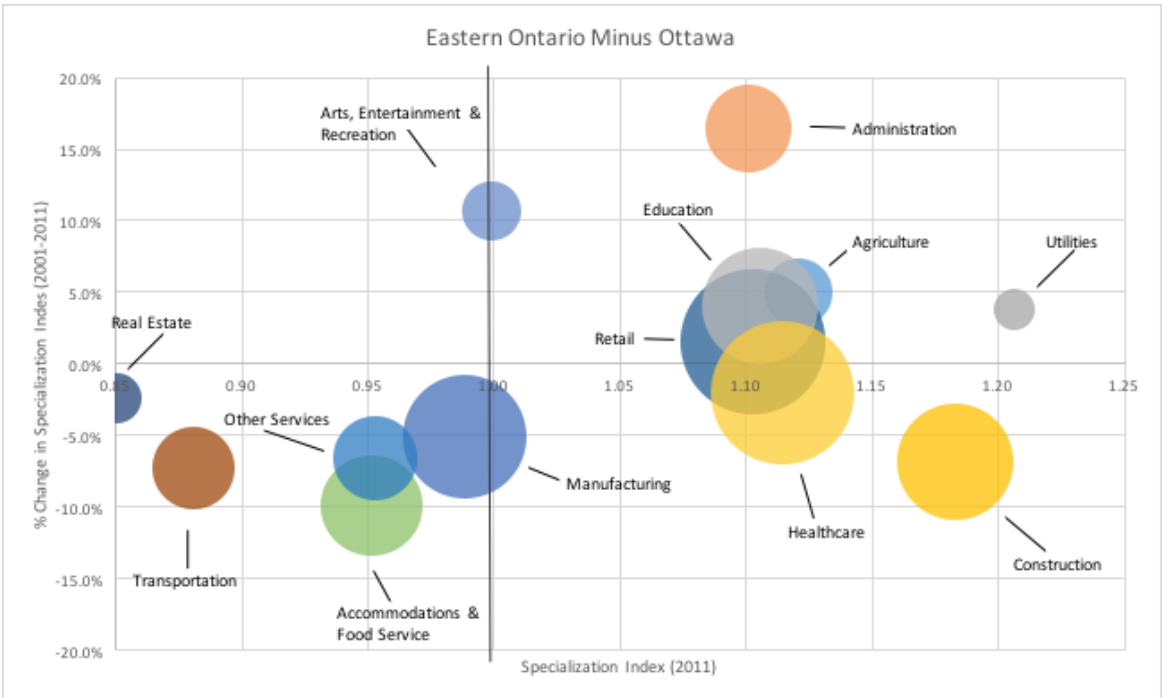
Appendix 2.4: Eastern Ontario degree of industrial specialization and Change over Time (zoomed in)



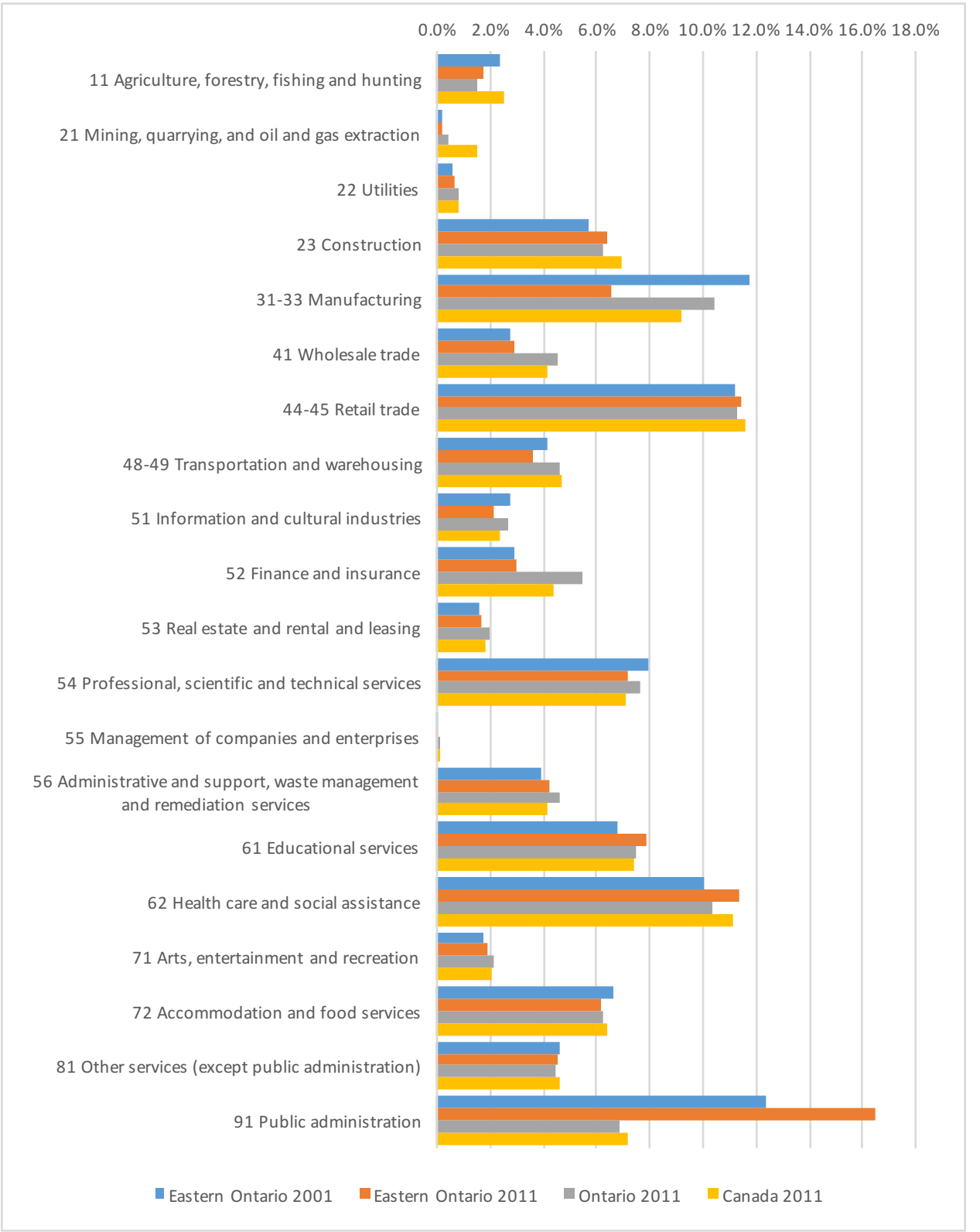
Appendix 2.5: Eastern Ontario minus Ottawa degree of industrial specialization and Change over Time



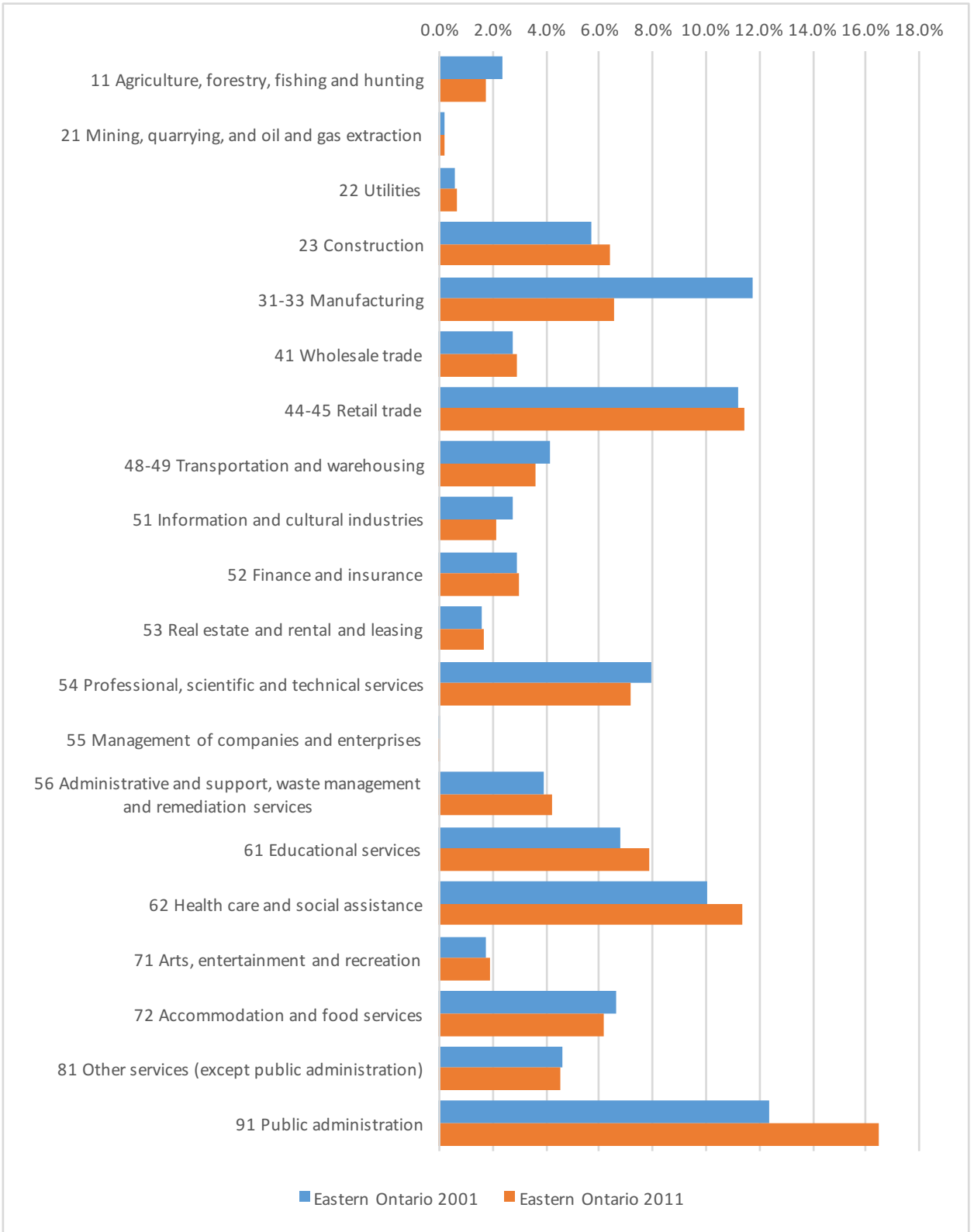
Appendix 2.6: Eastern Ontario minus Ottawa degree of industrial specialization and Change over Time (zoomed in)



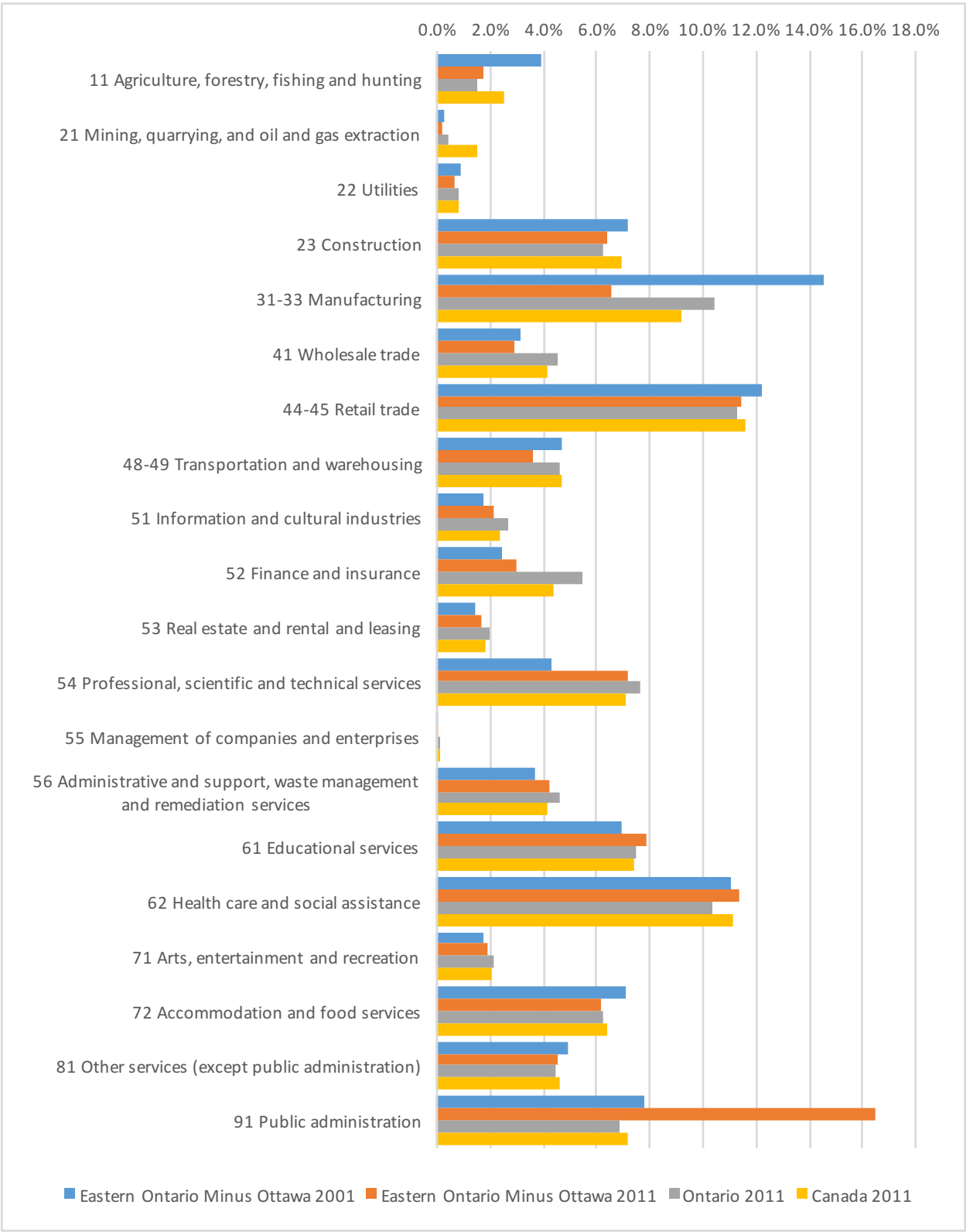
Appendix 2.7: Share of Workforce by Industry (2001, 2011 & Ontario/Canada 2011)



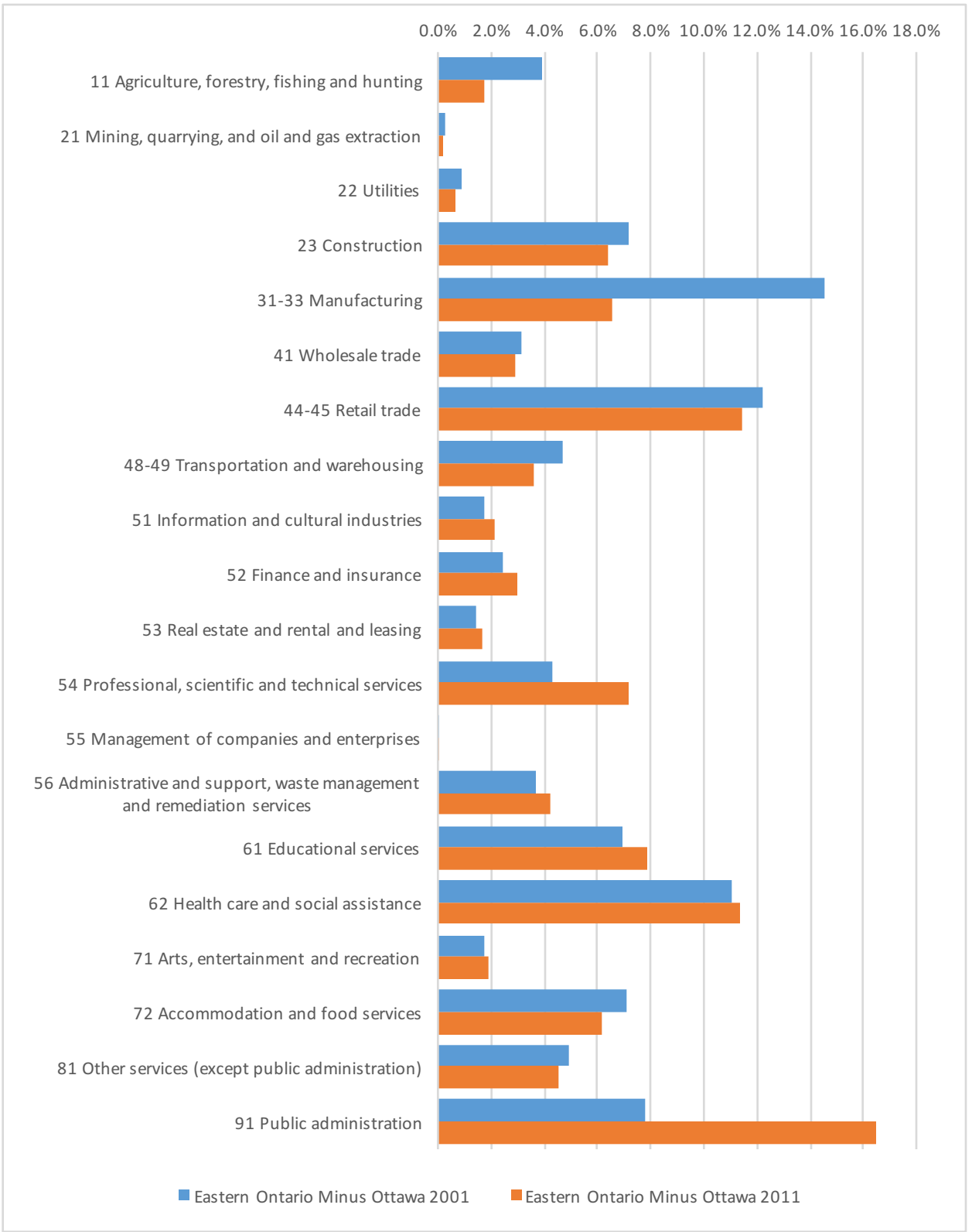
Appendix 2.8: Share of Workforce by Industry, Eastern Ontario Only (2001 & 2011)



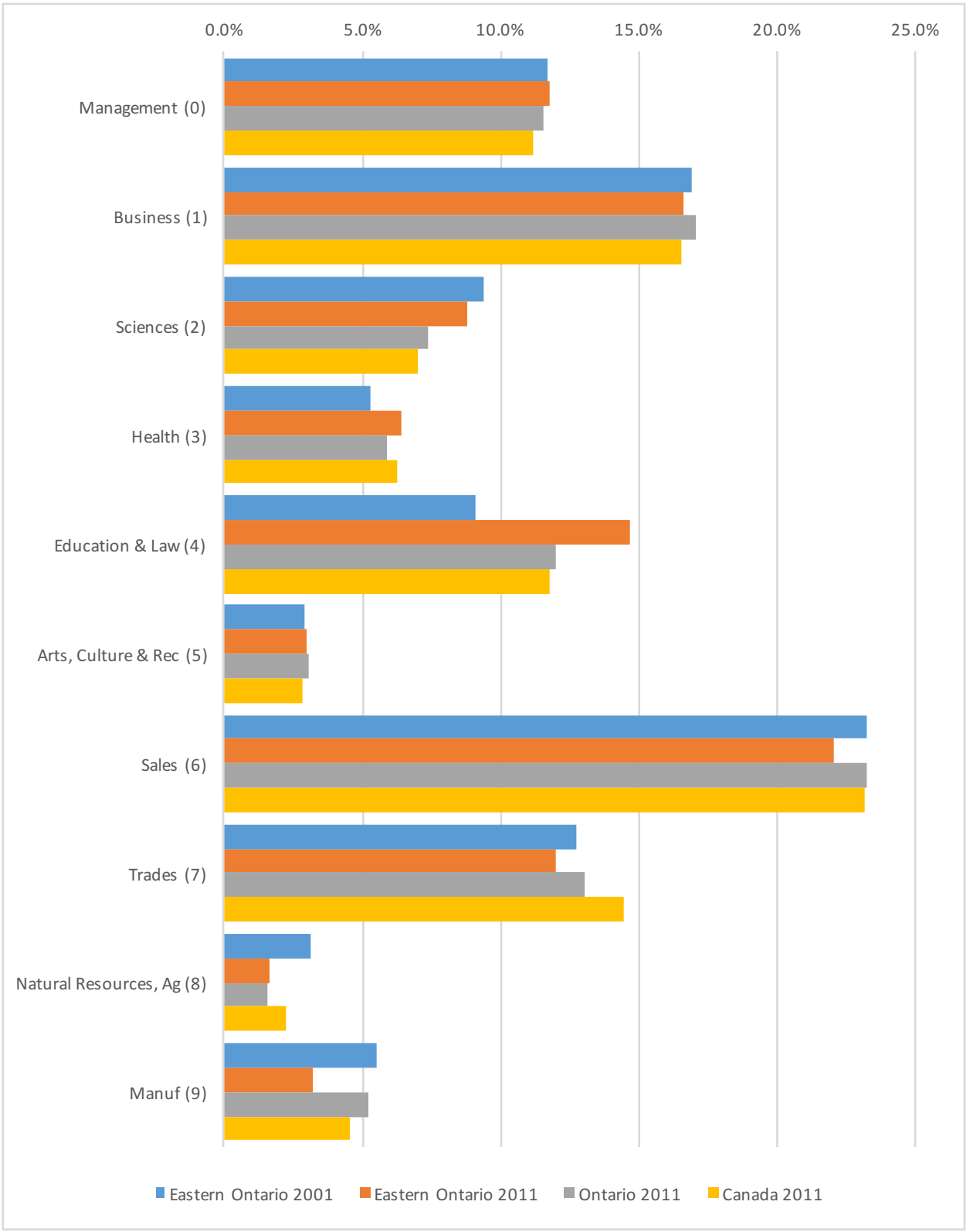
Appendix 2.9: Share of Workforce by Industry, Eastern Ontario Only - Minus Ottawa (2001, 2011 & Ontario/Canada 2011)



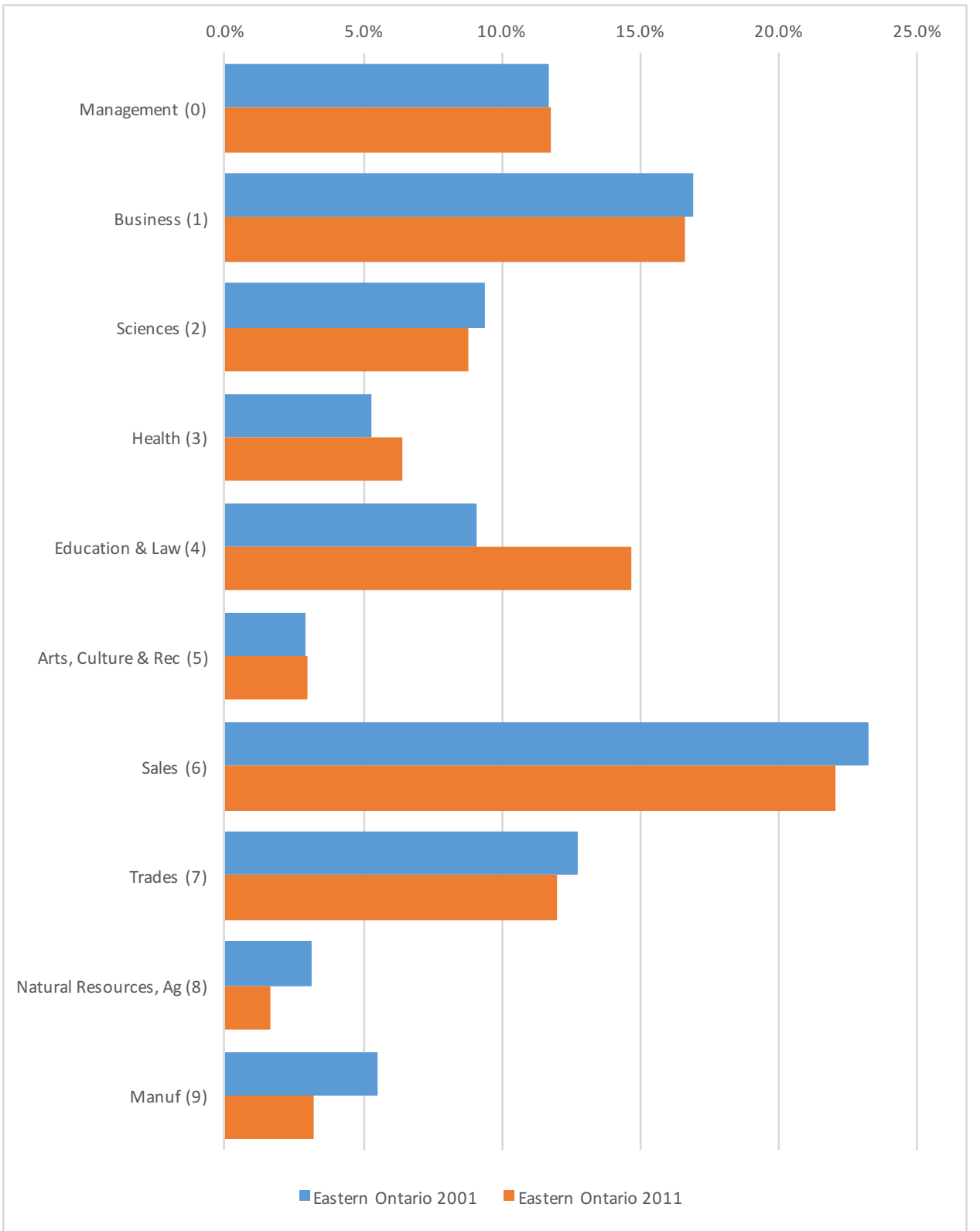
Appendix 2.10: Share of Workforce by Industry, Eastern Ontario Only – Minus Ottawa (2001 & 2011)



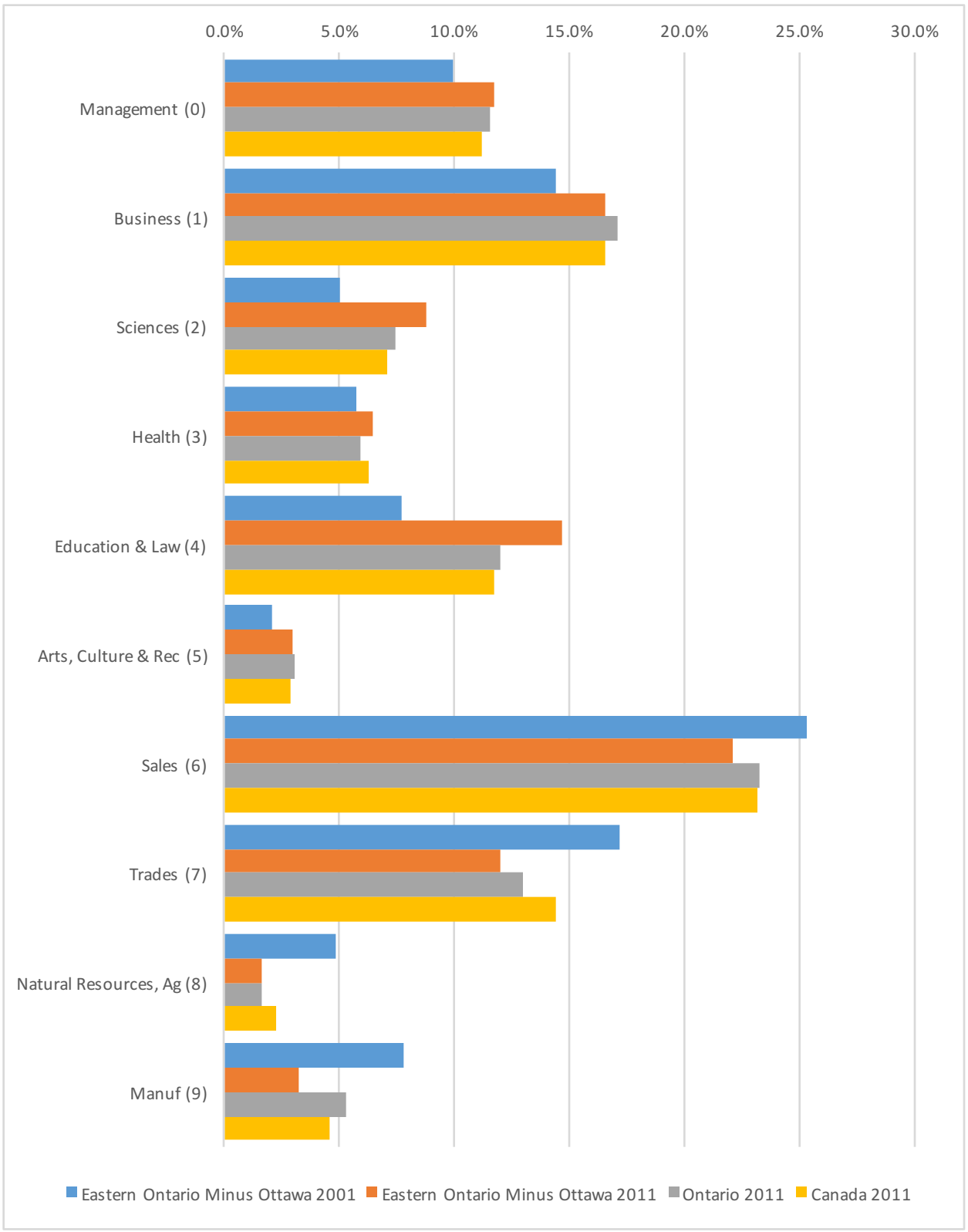
Appendix 2.11: Share of Workforce by Occupation (2001, 2011 & Ontario/Canada 2011)



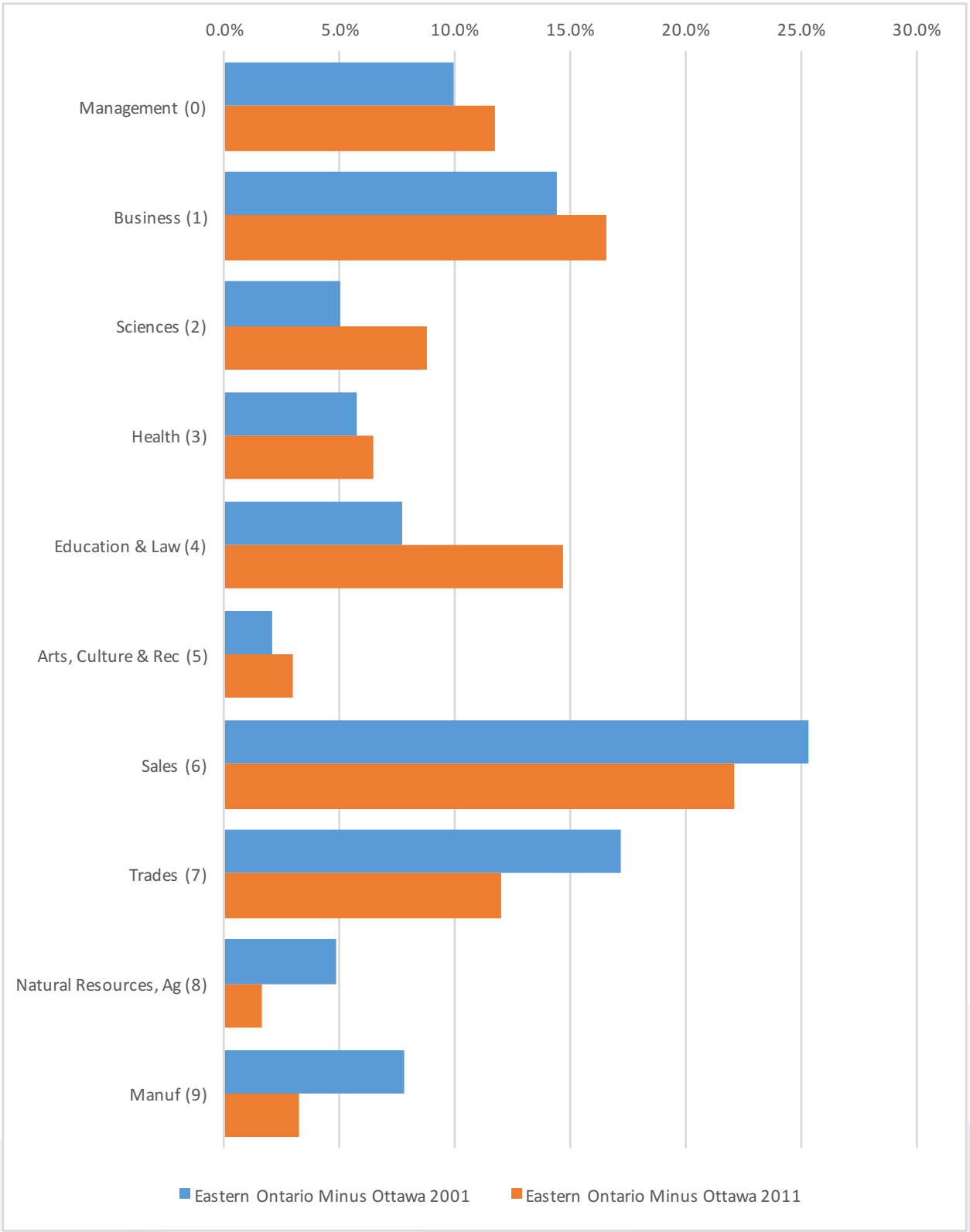
Appendix 2.12: Share of Workforce by Occupation, Eastern Ontario Only (2001 & 2011)



Appendix 2.13: Share of Workforce by Occupation- Minus Ottawa (2001 & 2011)



Appendix 2.14: Share of Workforce by Occupation, Eastern Ontario - Minus Ottawa Only (2001 & 2011)



Appendix 2.15: Immigrant Status & Period

CD_Name	GNR	Non-Immigrant	Immigrant	Immigrated when?	
				Before 1991	1991 or later
Stormont, Dundas and Glengarry	32.8	92.7%	7.3%	4.9%	2.4%
Prescott and Russell	24.5	95.5%	4.5%	2.6%	1.9%
Ottawa	21.8	75.3%	24.7%	10.4%	14.3%
Leeds and Grenville	37.8	92.9%	7.1%	5.2%	1.9%
Lanark	39.1	93.5%	6.5%	5.0%	1.5%
Frontenac	29.2	87.3%	12.7%	8.0%	4.7%
Lennox and Addington	33.0	93.2%	6.8%	5.9%	0.9%
Hastings	32.4	93.2%	6.8%	5.1%	1.7%
Prince Edward	37.3	91.1%	8.9%	7.5%	1.4%
Northumberland	36.3	89.5%	10.5%	9.1%	1.4%
Peterborough	38.1	91.5%	8.5%	6.3%	2.2%
Kawartha Lakes	40.8	92.1%	7.9%	6.7%	1.2%
Haliburton	47.9	89.8%	10.2%	9.3%	0.9%
Renfrew	33.8	94.7%	5.3%	3.9%	1.4%
Eastern Ontario		84.6%	15.4%	7.9%	7.5%
Eastern Ontario minus Ottawa		92.0%	8.0%	5.9%	2.1%
Ontario	27.1	70.4%	29.6%	13.6%	16.0%
Canada	26.1	78.3%	21.7%	9.4%	12.3%

Appendix 2.16: Immigration Source Region

CD_Name	GNR	Americas	Europe	Africa	Asia	Oceania and other
Stormont, Dundas and Glengarry	32.8	17.5%	57.2%	2.2%	22.6%	0.6%
Prescott and Russell	24.5	23.9%	51.1%	10.2%	14.1%	0.7%
Ottawa	21.8	15.6%	28.5%	12.6%	43.0%	0.4%
Leeds and Grenville	37.8	19.3%	65.6%	2.1%	12.1%	0.9%
Lanark	39.1	21.2%	64.7%	2.4%	10.5%	1.3%
Frontenac	29.2	17.6%	54.8%	3.8%	23.2%	0.6%
Lennox and Addington	33.0	16.1%	76.8%	0.9%	5.6%	0.4%
Hastings	32.4	16.4%	67.3%	2.0%	14.0%	0.4%
Prince Edward	37.3	12.2%	76.5%	1.6%	9.2%	0.0%
Northumberland	36.3	12.6%	76.7%	1.1%	8.6%	1.1%
Peterborough	38.1	14.9%	65.8%	2.8%	15.6%	0.9%
Kawartha Lakes	40.8	11.4%	75.4%	2.3%	10.3%	0.8%
Haliburton	47.9	19.8%	73.2%	0.0%	6.7%	0.0%
Renfrew	33.8	18.8%	62.8%	2.0%	14.9%	1.6%
Eastern Ontario		15.9%	39.1%	9.7%	34.8%	0.5%
Eastern Ontario minus Ottawa		16.7%	64.5%	2.7%	15.3%	0.8%
Ontario	27.1	16.1%	33.4%	5.4%	44.8%	0.3%
Canada	26.1	15.6%	31.4%	7.3%	44.9%	0.8%

Appendix 2.17: Generation Status

CD_Name	GNR	First generation	Second generation	Third generation or more
Stormont, Dundas and Glengarry	32.8	7.5%	10.9%	81.7%
Prescott and Russell	24.5	4.7%	6.5%	88.8%
Ottawa	21.8	25.4%	20.3%	54.4%
Leeds and Grenville	37.8	7.4%	13.1%	79.5%
Lanark	39.1	6.7%	12.1%	81.1%
Frontenac	29.2	13.4%	16.0%	70.6%
Lennox and Addington	33.0	7.1%	12.5%	80.4%
Hastings	32.4	7.1%	12.8%	80.1%
Prince Edward	37.3	9.2%	12.4%	78.4%
Northumberland	36.3	10.9%	15.7%	73.3%
Peterborough	38.1	8.7%	14.7%	76.6%
Kawartha Lakes	40.8	8.0%	15.0%	77.0%
Haliburton	47.9	10.4%	14.9%	74.8%
Renfrew	33.8	5.6%	9.3%	85.1%
Eastern Ontario		15.8%	16.1%	68.1%
Eastern Ontario minus Ottawa		8.3%	12.8%	78.9%
Ontario	27.1	29.9%	22.5%	47.6%
Canada	26.1	22.0%	17.4%	60.7%

Appendix 2.18: Aboriginal Identity

CD_Name	GNR	Aboriginal identity	Non-Aboriginal identity
Stormont, Dundas and Glengarry	32.8	2.9%	97.1%
Prescott and Russell	24.5	2.7%	97.3%
Ottawa	21.8	2.1%	97.9%
Leeds and Grenville	37.8	2.5%	97.5%
Lanark	39.1	3.7%	96.3%
Frontenac	29.2	3.3%	96.7%
Lennox and Addington	33.0	3.8%	96.2%
Hastings	32.4	6.0%	94.0%
Prince Edward	37.3	2.5%	97.5%
Northumberland	36.3	2.4%	97.6%
Peterborough	38.1	3.6%	96.4%
Kawartha Lakes	40.8	1.9%	98.1%
Haliburton	47.9	1.8%	98.2%
Renfrew	33.8	7.5%	92.5%
Eastern Ontario		3.0%	97.0%
Eastern Ontario minus Ottawa		3.7%	96.3%
Ontario	27.1	2.4%	97.6%
Canada	26.1	4.3%	95.7%

Appendix 2.19: Mobility

CD_Name	GNR	Over the Past 1 Year		Over the Past 5 years	
		Moved	Did Not Move	Moved	Did Not Move
Stormont, Dundas and Glengarry	32.8	10.4%	89.6%	32.9%	67.1%
Prescott and Russell	24.5	11.4%	88.6%	36.3%	63.7%
Ottawa	21.8	13.5%	86.5%	41.9%	58.1%
Leeds and Grenville	37.8	10.3%	89.7%	32.7%	67.3%
Lanark	39.1	9.9%	90.1%	34.6%	65.4%
Frontenac	29.2	14.2%	85.8%	41.9%	58.1%
Lennox and Addington	33.0	9.3%	90.7%	30.8%	69.2%
Hastings	32.4	11.3%	88.7%	35.3%	64.7%
Prince Edward	37.3	8.6%	91.4%	30.2%	69.8%
Northumberland	36.3	10.9%	89.2%	33.0%	67.0%
Peterborough	38.1	11.9%	88.1%	35.7%	64.3%
Kawartha Lakes	40.8	8.5%	91.5%	28.6%	71.4%
Haliburton	47.9	9.2%	90.8%	30.1%	69.9%
Renfrew	33.8	11.5%	88.5%	34.7%	65.3%
Eastern Ontario		12.2%	87.8%	37.9%	62.1%
Eastern Ontario minus Ottawa		11.1%	88.9%	34.8%	65.2%
Ontario	27.1	11.6%	88.4%	37.5%	62.5%
Canada	26.1	12.4%	87.6%	38.6%	61.4%

The education level numbersabove are for current residents. So those that moved, moved into or within the region. For the previous year (2010 since this is from the 2011 Household Survey), the number of people within the region that moved is pretty similar to Ontario and close to the Canadian average. Keep in mind, the move could be across town, around the region, within the province, outside the province, within or outside Canada.

Appendix 2.20: Education Levels

CD_Name	GNR	Not HS	HS Only	Post-Sec or College	Bachelors	Graduate
Stormont, Dundas and Glengarry	32.8	24.3%	30.1%	35.6%	6.4%	3.6%
Prescott and Russell	24.5	22.4%	29.9%	34.0%	9.4%	4.3%
Ottawa	21.8	12.9%	23.4%	28.2%	20.8%	14.6%
Leeds and Grenville	37.8	19.6%	29.4%	37.1%	9.3%	4.6%
Lanark	39.1	18.8%	29.2%	36.9%	9.9%	5.2%
Frontenac	29.2	15.8%	26.7%	33.4%	12.9%	11.3%
Lennox and Addington	33.0	22.8%	28.1%	37.8%	7.5%	3.8%
Hastings	32.4	23.5%	30.2%	35.5%	7.3%	3.5%
Prince Edward	37.3	21.1%	26.6%	37.2%	9.4%	5.7%
Northumberland	36.3	19.1%	29.9%	36.7%	9.2%	5.1%
Peterborough	38.1	19.5%	28.3%	35.5%	9.9%	6.7%
Kawartha Lakes	40.8	22.3%	30.9%	35.9%	6.9%	4.0%
Haliburton	47.9	22.4%	27.6%	37.5%	7.3%	5.3%
Renfrew	33.8	21.4%	31.1%	35.1%	8.1%	4.3%
Eastern Ontario		17.3%	26.7%	32.4%	14.2%	9.5%
Eastern Ontario minus Ottawa		20.7%	29.3%	35.6%	9.0%	5.5%
Ontario	27.1	18.7%	26.8%	31.2%	14.5%	8.9%
Canada	26.1	20.1%	25.6%	33.5%	13.3%	7.5%

Appendix 2.21: Industry Mix

CD_Name	GNR	Agric, Mine, Util (11, 21, 22)	Constr (23)	Manuf (31-33)	Trade, Trans (41, 44-45, 48-49)	Info (51)	FIRE (52, 53)	Prof Svcs (54, 55, 56)	Edu-cation (61)	Healthcare (62)	Arts & Rec (71)	Accomm (72)	Other (81,91)
Stormont, Dundas and Glengarry	32.8	5.2%	8.0%	11.7%	22.8%	1.4%	4.1%	9.8%	6.1%	12.1%	1.8%	5.2%	12.0%
Prescott and Russell	24.5	4.4%	10.8%	7.2%	19.0%	1.5%	4.3%	7.6%	8.3%	11.1%	1.9%	3.8%	20.1%
Ottawa	21.8	0.9%	4.3%	3.5%	15.6%	2.8%	5.2%	13.8%	7.6%	10.2%	1.8%	6.2%	28.0%
Leeds and Grenville	37.8	3.7%	8.0%	11.2%	22.3%	1.3%	3.6%	9.8%	6.1%	12.0%	2.8%	5.9%	13.2%
Lanark	39.1	3.3%	9.9%	9.5%	20.3%	1.7%	4.1%	11.2%	5.7%	13.6%	2.1%	5.3%	13.1%
Frontenac	29.2	1.6%	6.1%	4.7%	16.6%	1.6%	4.8%	9.1%	14.9%	14.0%	1.9%	8.4%	16.4%
Lennox and Addington	33.0	4.4%	10.3%	9.4%	20.7%	1.1%	4.3%	7.2%	6.7%	12.9%	1.5%	5.6%	15.9%
Hastings	32.4	3.0%	7.4%	11.0%	22.8%	1.4%	3.6%	8.8%	7.1%	11.5%	1.6%	6.2%	15.8%
Prince Edward	37.3	8.8%	8.4%	8.4%	18.0%	1.9%	3.9%	9.3%	5.6%	13.9%	2.2%	7.5%	11.9%
Northumberland	36.3	6.7%	8.4%	13.6%	18.0%	1.5%	3.3%	9.8%	7.8%	11.3%	2.3%	5.6%	11.6%
Peterborough	38.1	3.7%	7.5%	8.7%	20.2%	1.9%	4.8%	9.9%	8.9%	13.3%	2.7%	6.9%	11.5%
Kawartha Lakes	40.8	5.8%	9.4%	8.7%	22.5%	1.1%	4.3%	7.9%	7.9%	11.3%	2.6%	5.4%	12.9%
Haliburton	47.9	3.5%	14.0%	3.9%	21.9%	2.3%	5.5%	8.3%	6.1%	12.4%	2.4%	8.8%	10.8%
Renfrew	33.8	5.0%	7.3%	8.0%	17.0%	1.7%	3.1%	11.2%	6.1%	11.7%	1.5%	6.0%	21.5%
Eastern Ontario		2.6%	6.4%	6.5%	18.0%	2.1%	4.6%	11.4%	7.9%	11.4%	1.9%	6.2%	21.0%
Eastern Ontario minus Ottawa		4.1%	8.2%	9.1%	20.0%	1.5%	4.1%	9.4%	8.2%	12.4%	2.1%	6.1%	14.9%
Ontario	27.1	2.8%	6.3%	10.4%	20.4%	2.7%	7.5%	12.4%	7.5%	10.4%	2.2%	6.3%	11.3%
Canada	26.1	4.8%	6.9%	9.2%	20.4%	2.4%	6.2%	11.3%	7.4%	11.1%	2.1%	6.4%	11.8%

Appendix 2.22: Occupational Mix

CD_Name	GNR	Management (0)	Business (1)	Sciences (2)	Health (3)	Education & Law (4)	Arts, Culture & Rec (5)	Sales (6)	Trades (7)	Natural Res & Ag (8)	Manuf (9)
Stormont, Dundas and Glengarry	32.8	10.5%	14.1%	4.2%	6.5%	11.2%	1.7%	23.9%	18.2%	2.7%	7.1%
Prescott and Russell	24.5	12.4%	19.1%	6.2%	5.3%	12.6%	1.8%	18.9%	18.0%	2.2%	3.4%
Ottawa	21.8	12.5%	19.4%	12.7%	5.9%	15.8%	3.7%	20.8%	7.1%	0.8%	1.2%
Leeds and Grenville	37.8	11.1%	14.3%	6.4%	7.2%	10.7%	2.0%	23.5%	15.8%	3.1%	5.8%
Lanark	39.1	11.9%	15.9%	6.8%	6.8%	11.0%	2.5%	23.1%	16.2%	1.9%	4.0%
Frontenac	29.2	10.4%	14.5%	5.9%	8.3%	19.1%	2.9%	24.3%	11.6%	1.0%	1.9%
Lennox and Addington	33.0	9.9%	14.4%	5.1%	6.8%	12.7%	1.9%	23.3%	19.1%	2.1%	4.9%
Hastings	32.4	10.6%	12.8%	4.5%	6.2%	13.7%	2.3%	23.6%	17.6%	1.8%	7.0%
Prince Edward	37.3	13.0%	11.0%	4.1%	7.4%	11.4%	3.8%	21.9%	17.9%	4.5%	5.1%
Northumberland	36.3	11.7%	12.7%	4.6%	5.6%	12.5%	2.8%	21.6%	16.8%	3.5%	8.2%
Peterborough	38.1	10.0%	13.7%	5.7%	7.7%	13.7%	2.6%	25.2%	14.8%	1.9%	4.7%
Kawartha Lakes	40.8	12.2%	13.4%	3.4%	7.3%	12.2%	1.8%	21.7%	19.8%	3.4%	4.6%
Haliburton	47.9	13.8%	13.8%	3.8%	6.4%	10.0%	2.2%	21.8%	21.5%	3.7%	3.0%
Renfrew	33.8	11.0%	11.8%	6.2%	6.8%	17.5%	1.9%	23.5%	14.4%	2.2%	4.7%
Eastern Ontario		11.7%	16.6%	8.8%	6.4%	14.7%	3.0%	22.1%	12.0%	1.6%	3.2%
Eastern Ontario minus Ottawa		11.0%	14.1%	5.4%	6.9%	13.7%	2.3%	23.1%	16.2%	2.3%	5.0%
Ontario	27.1	11.5%	17.0%	7.4%	5.9%	12.0%	3.1%	23.2%	13.0%	1.6%	5.2%
Canada	26.1	11.2%	16.5%	7.0%	6.3%	11.7%	2.9%	23.1%	14.4%	2.3%	4.6%

Appendix 2.23: Employment: Full-Time/Part-Time

CD_Name	GNR	Worked Full-Time	Worked Part-Time
Stormont, Dundas and Glengarry	32.8	79.1%	20.9%
Prescott and Russell	24.5	81.2%	18.8%
Ottawa	21.8	80.3%	19.7%
Leeds and Grenville	37.8	77.9%	22.1%
Lanark	39.1	76.5%	23.5%
Frontenac	29.2	77.5%	22.5%
Lennox and Addington	33.0	80.1%	19.9%
Hastings	32.4	76.9%	23.1%
Prince Edward	37.3	74.7%	25.3%
Northumberland	36.3	76.4%	23.6%
Peterborough	38.1	75.2%	24.8%
Kawartha Lakes	40.8	77.4%	22.6%
Haliburton	47.9	77.4%	22.6%
Renfrew	33.8	78.8%	21.2%
Eastern Ontario		78.9%	21.1%
Eastern Ontario minus Ottawa		77.7%	22.3%
Ontario	27.1	85.8%	14.2%
Canada	26.1	86.6%	13.4%

Appendix 2.24: Employment Status: Full-Year/Part-Year

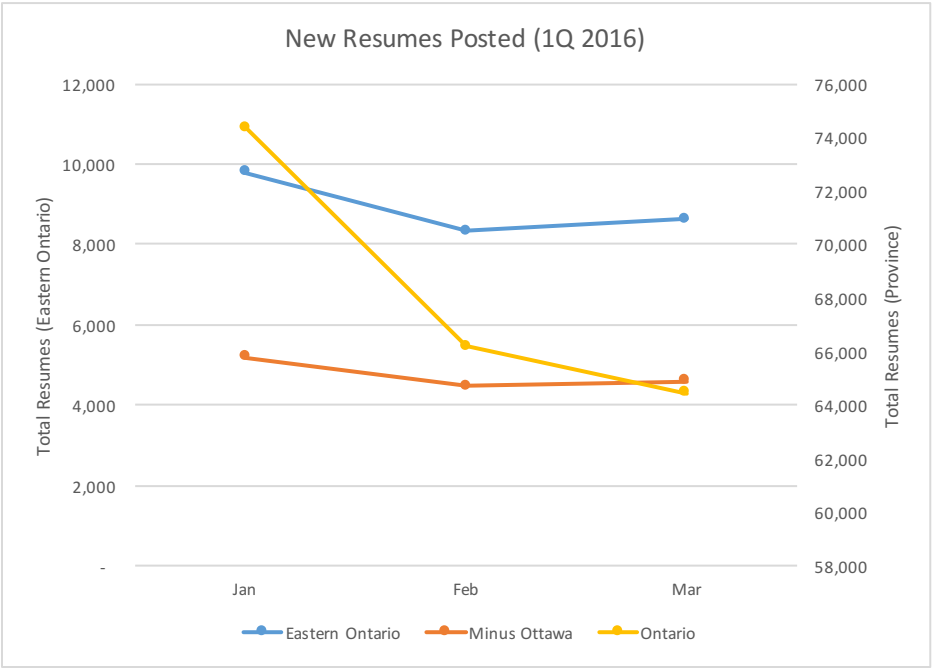
CD_Name	GNR	Worked Full-Year	Worked Part-Year	Average weeks worked in 2010
Stormont, Dundas and Glengarry	32.8	67.9%	32.1%	44.9
Prescott and Russell	24.5	69.3%	30.7%	45.6
Ottawa	21.8	68.1%	31.9%	45.2
Leeds and Grenville	37.8	69.6%	30.4%	45.2
Lanark	39.1	68.5%	31.5%	45.0
Frontenac	29.2	64.2%	35.8%	44.2
Lennox and Addington	33.0	70.7%	29.3%	45.6
Hastings	32.4	67.3%	32.7%	44.8
Prince Edward	37.3	64.9%	35.1%	44.1
Northumberland	36.3	66.5%	33.5%	44.5
Peterborough	38.1	68.1%	31.9%	44.9
Kawartha Lakes	40.8	67.9%	32.1%	44.9
Haliburton	47.9	59.1%	40.9%	43.2
Renfrew	33.8	67.6%	32.4%	45.1
Eastern Ontario		67.8%	32.2%	45.0
Eastern Ontario minus Ottawa		67.5%	32.5%	44.9
Ontario	27.1	66.3%	33.7%	44.8
Canada	26.1	64.1%	35.9%	44.5

Appendix 2.25: Average Income

CD_Name	GNR	Average Individual income ($)	Average family income ($)	Average household total income ($)
Stormont, Dundas and Glengarry	32.8	34,820	77,767	65,821
Prescott and Russell	24.5	41,018	93,624	81,709
Ottawa	21.8	49,826	116,630	96,815
Leeds and Grenville	37.8	38,319	86,149	74,019
Lanark	39.1	39,356	88,596	76,485
Frontenac	29.2	40,983	94,699	77,109
Lennox and Addington	33.0	36,125	80,727	71,385
Hastings	32.4	34,432	76,690	65,693
Prince Edward	37.3	39,945	92,440	78,710
Northumberland	36.3	38,231	86,119	74,998
Peterborough	38.1	37,288	84,994	72,033
Kawartha Lakes	40.8	36,873	83,541	72,694
Haliburton	47.9	35,510	79,816	67,564
Renfrew	33.8	37,131	82,289	70,546
Eastern Ontario		43,000	98,343	83,144
Eastern Ontario minus Ottawa		37,703	85,160	72,651
Ontario	27.1	40,650	94,125	79,102
Canada	26.1	42,264	100,152	85,772

Data presented below is from Magnet/Vicinity Jobs and reflects real-time labour market data from the first quarter of 2016, January-March, and is reported either by month or totalled across the three months.

Appendix 2.25: New resumes posted (1Q 2016)



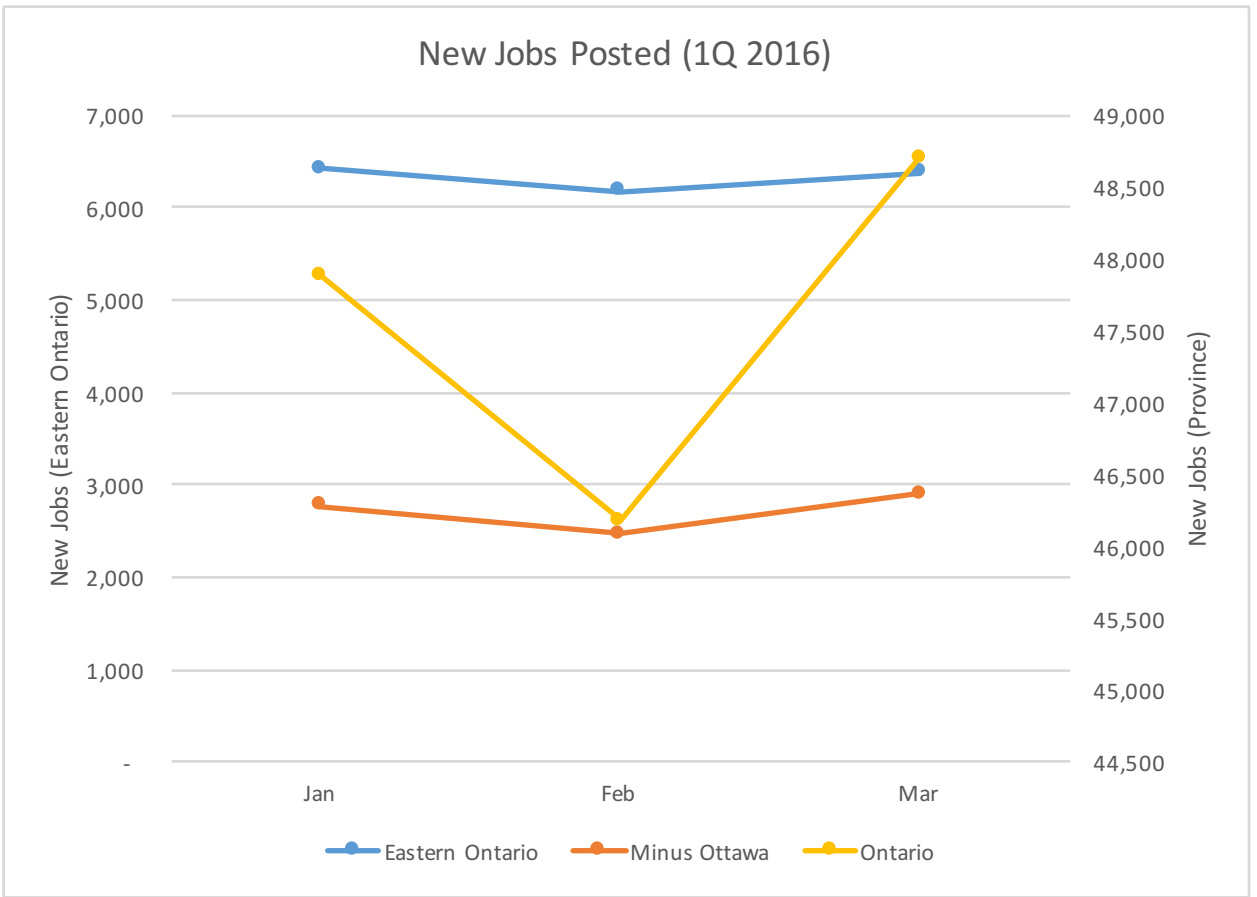
Appendix 2.26 shows the number of new resumes posted each month by region of residence. While the number of posted resumes doesn't guarantee that someone is unemployed, it does indicate that they are at least actively looking for a new job. The data is only from a single source, indeed, but it is the most used in Canada and assures that job-seekers are counted only once.

Appendix 2.26: New Resumes Posted by Location and Month (1Q 2016)

Region	Jan	Feb	Mar	Total Jan-Mar	Worked in 2010	New Resumes per 1,000
Frontenac	506	514	493	1,513	75,325	20.09
Haliburton	8	6	7	21	7,220	2.91
Hastings	320	258	303	881	62,975	13.99
Kawartha Lakes	138	121	145	404	34,335	11.77
Lanark	197	169	133	499	33,375	14.95
Leeds and Grenville	273	254	203	730	49,140	14.86
Lennox and Addington	43	59	44	146	19,695	7.41
Northumberland	2,710	2,269	2,309	7,288	39,080	186.49
Ottawa	4.581	3,850	4,036	12,467	474,940	26.25
Peterborough	511	425	511	1,447	63,755	22.70
Prescott and Russell	70	52	62	184	46,250	3.98
Prince Edward	6	12	15	33	11,355	2.91

Region	Jan	Feb	Mar	Total Jan-Mar	Worked in 2010	New Resumes per 1,000
Renfrew	190	169	169	528	49,390	10.69
Stormont, Dundas and Glengarry	227	170	196	593	52,865	11.22
Eastern Ontario	9,780	8,328	8,626	26,734	1,019,700	26.22
Minus Ottawa	5,199	4,478	4,590	14,267	544,760	26.19
Ontario	74,351	66,204	64,434	204,989	3,355,645	61.09

Appendix 2.27: New jobs posted (Q1 2016)



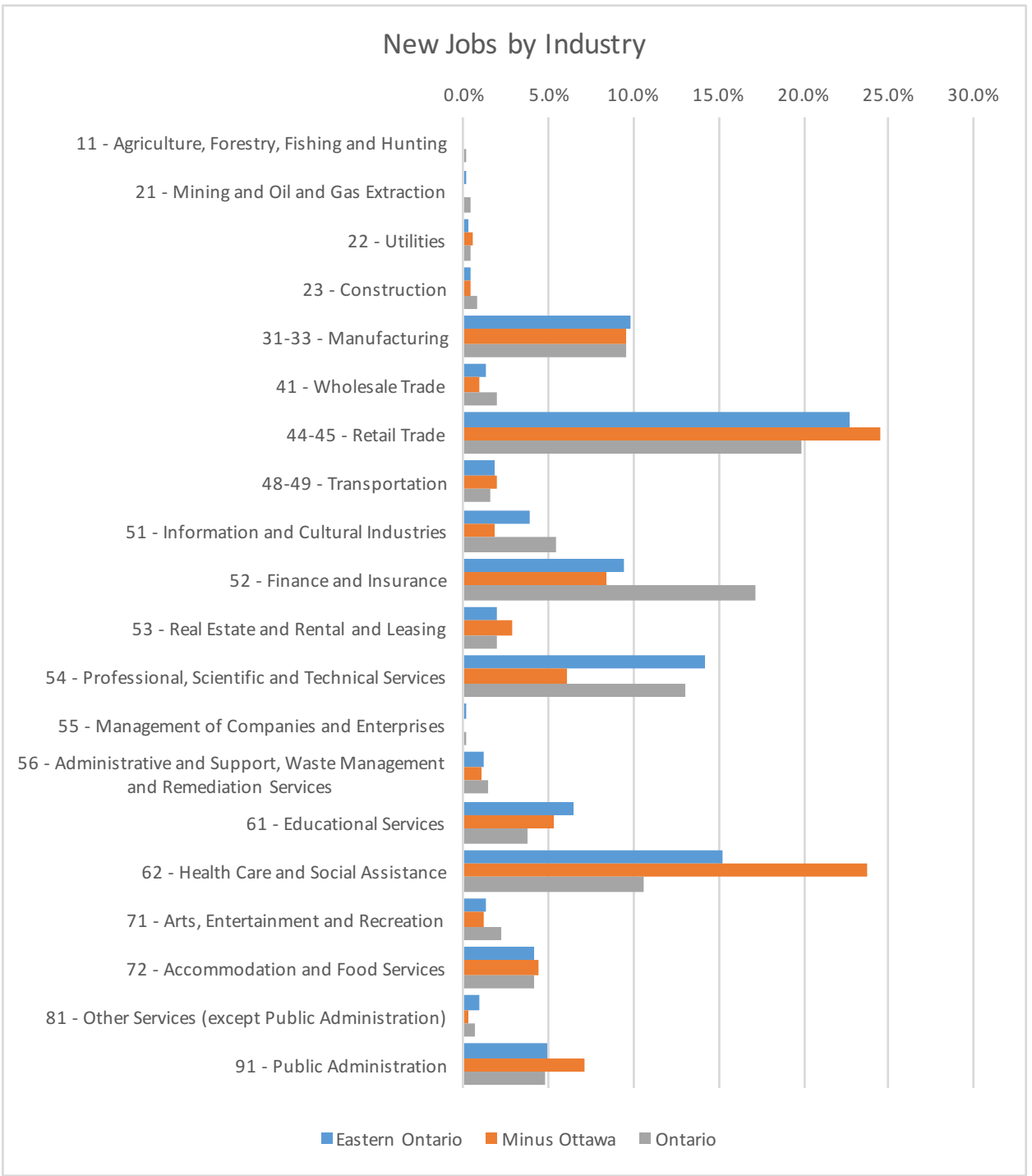
New jobs are collected across a wide variety of job posting websites and extensive efforts are undertaken to eliminate duplicates. (See Magnet/Vicinity Jobs for details.)

Appendix 2.28: New Jobs Posted by Location and Month

Region	Jan	Feb	Mar	Total Jan-Mar	Worked in 2010	New Jobs per 1,000
Frontenac	478	423	515	1,416	75,325	18.80
Haliburton	5	8	14	27	7,220	3.74
Hastings	189	172	202	563	62,975	8.94
Kawartha Lakes	67	70	87	224	34,335	6.52
Lanark	86	126	183	395	33,375	11.84
Leeds and Grenville	142	110	138	390	49,140	7.94
Lennox and Addington	26	20	20	66	19,695	3.35
Northumberland	1,125	930	1,047	3,102	39,080	79.38
Ottawa	3,659	3,710	3,486	10,855	474,940	22.86
Peterborough	311	253	297	861	63,755	13.50
Prescott and Russell	58	66	51	175	46,250	3.78
Prince Edward	55	59	82	196	11,355	17.26
Renfrew	78	85	103	266	49,390	5.39
Stormont, Dundas and Glengarry	142	139	155	436	52,865	8.25
Eastern Ontario	6,421	6,171	6,380	18,972	1,019,700	18.61
Minus Ottawa	2,762	2,461	2,894	8,117	544,760	14.90
Ontario	47,881	46,181	48,696	142,758	3,355645	42.54

Location is based on the location of the job as reported in the posting. Individual towns and cities have been summarized to the Census Division (CD) level, which are typically cities, counties or united counties.

Appendix 2.29: New Jobs Posted by Industry



Appendix 2.30: New Jobs by Industry (1Q 2016)

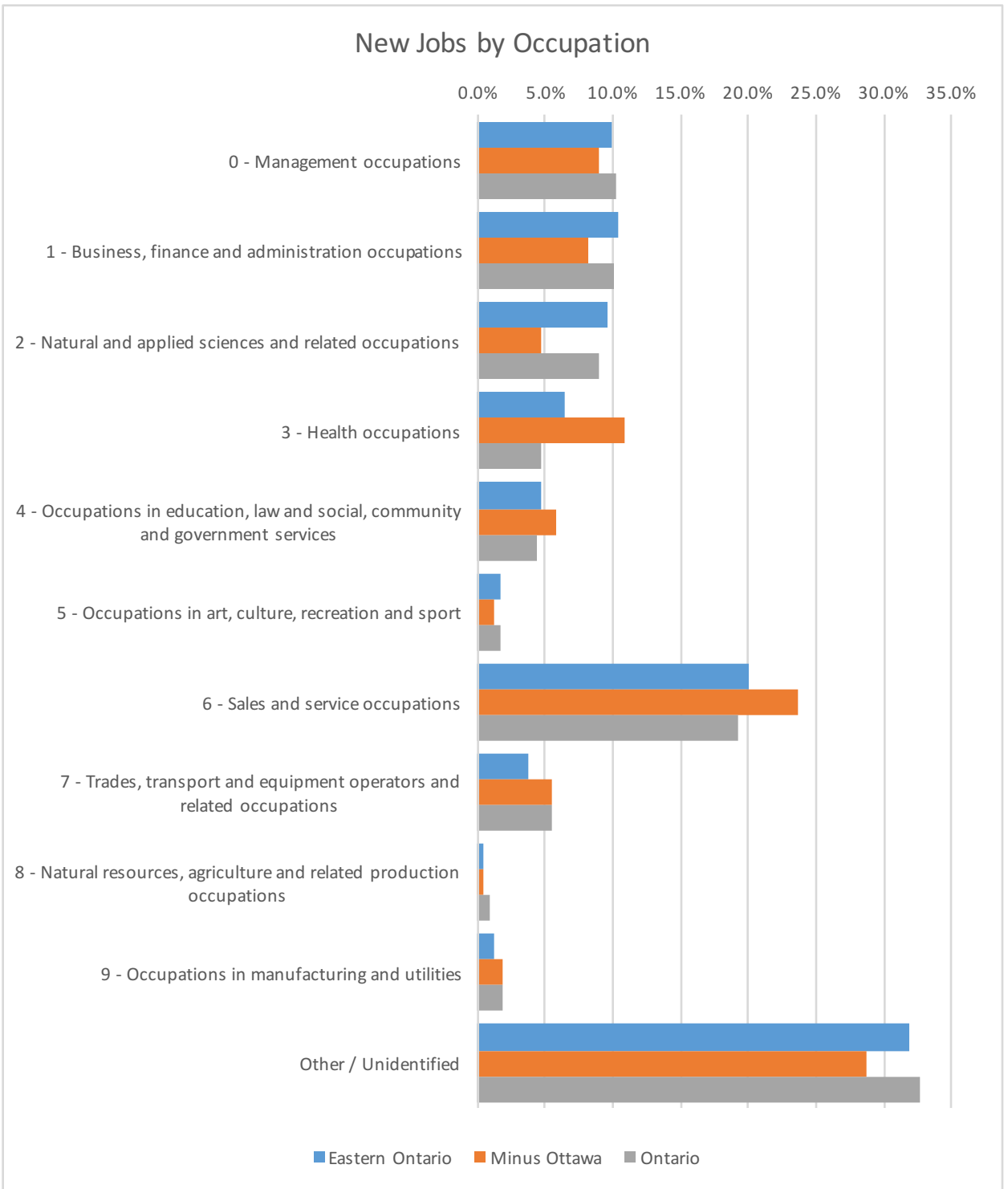
Industry/Sector	Eastern Ontario	Minus Ottawa	Ontario
11 - Agriculture, Forestry, Fishing and Hunting	0.0%	0.0%	0.1%
21 - Mining and Oil and Gas Extraction	0.0%	0.0%	0.4%
22 - Utilities	0.3%	0.6%	0.5%
23 - Construction	0.5%	0.4%	0.9%
31-33 - Manufacturing	9.8%	9.6%	9.5%
41 - Wholesale Trade	1.3%	1.0%	2.0%
44-45 - Retail Trade	22.7%	24.5%	19.9%
48-49 - Transportation	1.8%	1.9%	1.6%
51 - Information and Cultural Industries	3.9%	1.9%	5.5%
52 - Finance and Insurance	9.4%	8.4%	17.2%
53 - Real Estate and Rental and Leasing	1.9%	2.8%	1.9%
54 - Professional, Scientific and Technical Services	14.2%	6.0%	13.0%
55 - Management of Companies and Enterprises	0.0%	0.0%	0.0%
56 - Administrative and Support, Waste Management and Remediation Services	1.2%	1.0%	1.4%
61 - Educational Services	6.5%	5.3%	3.8%
62 - Health Care and Social Assistance	15.2%	23.8%	10.6%
71 - Arts, Entertainment and Recreation	1.3%	1.1%	2.2%
72 - Accommodation and Food Services	4.2%	4.5%	4.1%
81 - Other Services (except Public Administration)	0.9%	0.3%	0.7%
91 - Public Administration	4.9%	7.1%	4.8%

Appendix 2.31: New Jobs (2016) & Existing Jobs (2011) by Industry

	New Jobs			Existing Jobs		
Industry/Sector	**Eastern Ontario**	**Minus Ottawa**	**Ontario**	**Eastern ON**	**Minus Ottawa**	**Ontario**
11 - Agriculture, Forestry, Fishing and Hunting	0.0%	0.0%	0.1%	1.7%	2.8%	1.5%
21 - Mining and Oil and Gas Extraction	0.0%	0.0%	0.4%	0.2%	0.3%	0.4%
22 - Utilities	0.3%	0.6%	0.5%	0.7%	1.0%	0.9%
23 - Construction	0.5%	0.4%	0.9%	6.4%	8.2%	6.3%
31-33 - Manufacturing	9.8%	9.6%	9.5%	6.5%	9.1%	10.4%
41 - Wholesale Trade	1.3%	1.0%	2.0%	2.9%	3.2%	4.6%
44-45 - Retail Trade	22.7%	24.5%	19.9%	11.4%	12.7%	11.2%
48-49 - Transportation	1.8%	1.9%	1.6%	3.6%	4.1%	4.6%
51 - Information and Cultural Industries	3.9%	1.9%	5.5%	2.1%	1.5%	2.7%
52 - Finance and Insurance	9.4%	8.4%	17.2%	3.0%	2.5%	5.5%
53 - Real Estate and Rental and Leasing	1.9%	2.8%	1.9%	1.6%	1.6%	2.0%
54 - Professional, Scientific and Technical Services	14.2%	6.0%	13.0%	7.2%	4.8%	7.6%
55 - Management of Companies and Enterprises	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
56 - Administrative and Support, Waste Management and Remediation Services	1.2%	1.0%	1.4%	4.2%	4.6%	4.6%
61 - Educational Services	6.5%	5.3%	3.8%	7.9%	8.2%	7.5%
62 - Health Care and Social Assistance	15.2%	23.8%	10.6%	11.4%	12.4%	10.4%
71 - Arts, Entertainment and Recreation	1.3%	1.1%	2.2%	1.9%	2.1%	2.2%
72 - Accommodation and Food Services	4.2%	4.5%	4.1%	6.2%	6.1%	6.3%
81 - Other Services (except Public Administration)	0.9%	0.3%	0.7%	4.5%	4.4%	4.4%
91 - Public Administration	4.9%	7.1%	4.8%	16.5%	10.5%	6.9%

The table above compares the share of new jobs by industry with the share of existing jobs in those same industries.

Appendix 2.32: New Jobs Posted by Occupation Group



Appendix 2.33: New Jobs (1Q 2016)

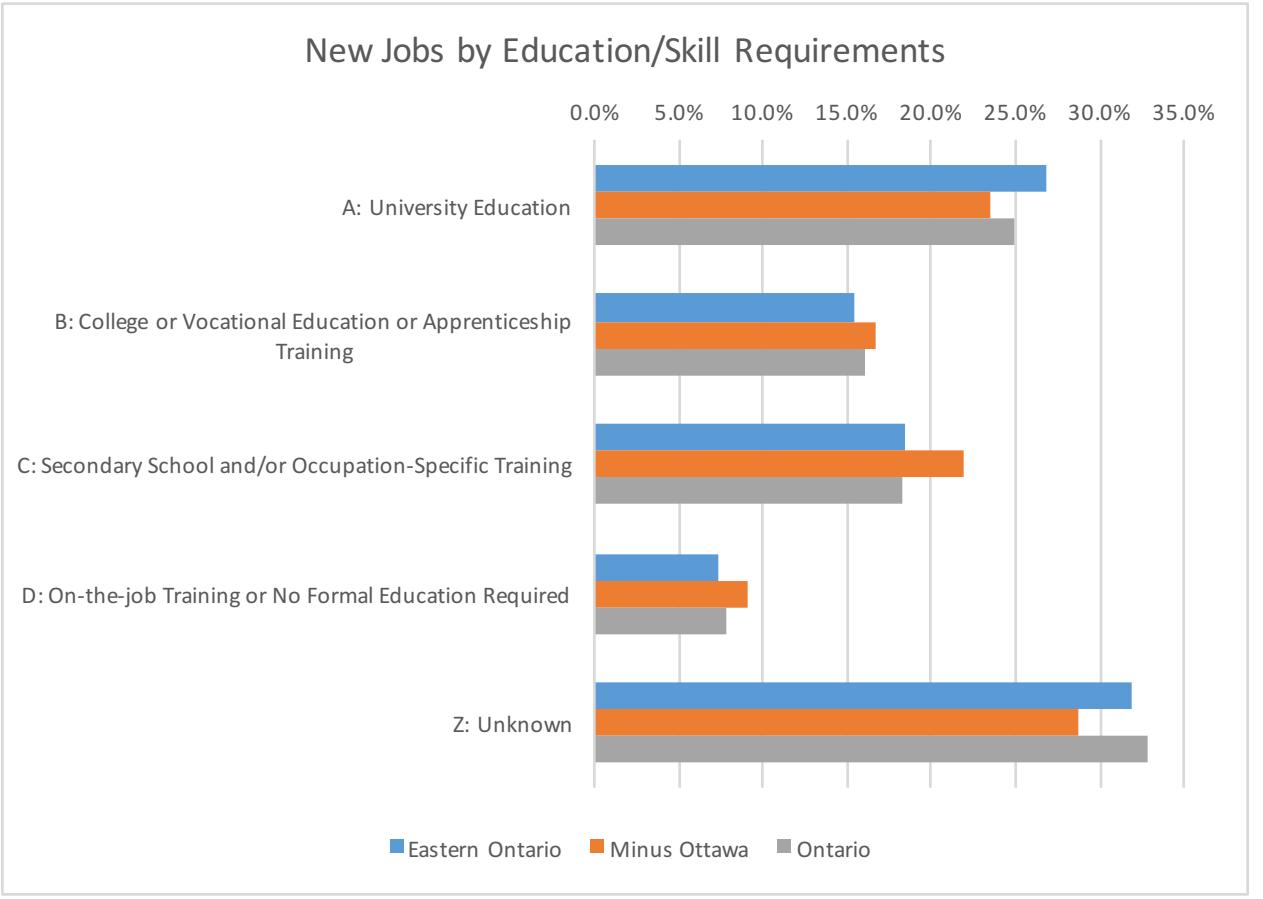
Occupation Group (first NOCS digit)	Eastern Ontario	Minus Ottawa	Ontario
0 - Management occupations	9.9%	8.9%	10.2%
1 - Business, finance and administration occupations	10.4%	8.2%	10.1%
2 - Natural and applied sciences and related occupations	9.7%	4.7%	9.0%
3 - Health occupations	6.4%	10.9%	4.6%
4 - Occupations in education, law and social, community and government services	4.7%	5.8%	4.4%
5 - Occupations in art, culture, recreation and sport	1.7%	1.2%	1.7%
6 - Sales and service occupations	20.0%	23.6%	19.2%
7 - Trades, transport and equipment operators and related occupations	3.7%	5.6%	5.5%
8 - Natural resources, agriculture and related production occupations	0.4%	0.5%	0.9%
9 - Occupations in manufacturing and utilities	1.3%	1.9%	1.8%
Other / Unidentified	31.9%	28.7%	32.7%

Appendix 2.34: New Jobs (2016) & Existing Jobs (2011)

	New Jobs			Existing Jobs		
Occupation Group (first NOCS digit)	Eastern Ontario	Minus Ottawa	Ontario	Eastern Ontario	Minus Ottawa	Ontario
0 - Management occupations	14.5%	12.5%	15.2%	11.7%	11.0%	11.5%
1 - Business, finance and administration occupations	15.3%	11.5%	15.0%	16.6%	14.1%	17.0%
2 - Natural and applied sciences and related occupations	14.2%	6.6%	13.3%	8.8%	5.4%	7.4%
3 - Health occupations	9.4%	15.3%	6.9%	6.4%	6.9%	5.9%
4 - Occupations in education, law and social, community and government services	6.8%	8.2%	6.5%	14.7%	13.7%	12.0%
5 - Occupations in art, culture, recreation and sport	2.5%	1.7%	2.5%	3.0%	2.3%	3.1%
6 - Sales and service occupations	29.4%	33.1%	28.6%	22.1%	23.1%	23.2%
7 - Trades, transport and equipment operators and related occupations	5.5%	7.8%	8.2%	12.0%	16.2%	13.0%
8 - Natural resources, agriculture and related production occupations	0.6%	0.7%	1.3%	1.6%	2.3%	1.6%
9 - Occupations in manufacturing and utilities	1.9%	2.6%	2.6%	3.2%	5.0%	5.2%
Other / Unidentified (excluded for comparison)						

The table above compares the share of new jobs by occupational group with the share of existing jobs in those same occupations. (Other/unidentified are removed and the shares recalculated using only those jobs with a clearly identifiable occupational group.)

Appendix 2.35: New Jobs by Education/Skill Required



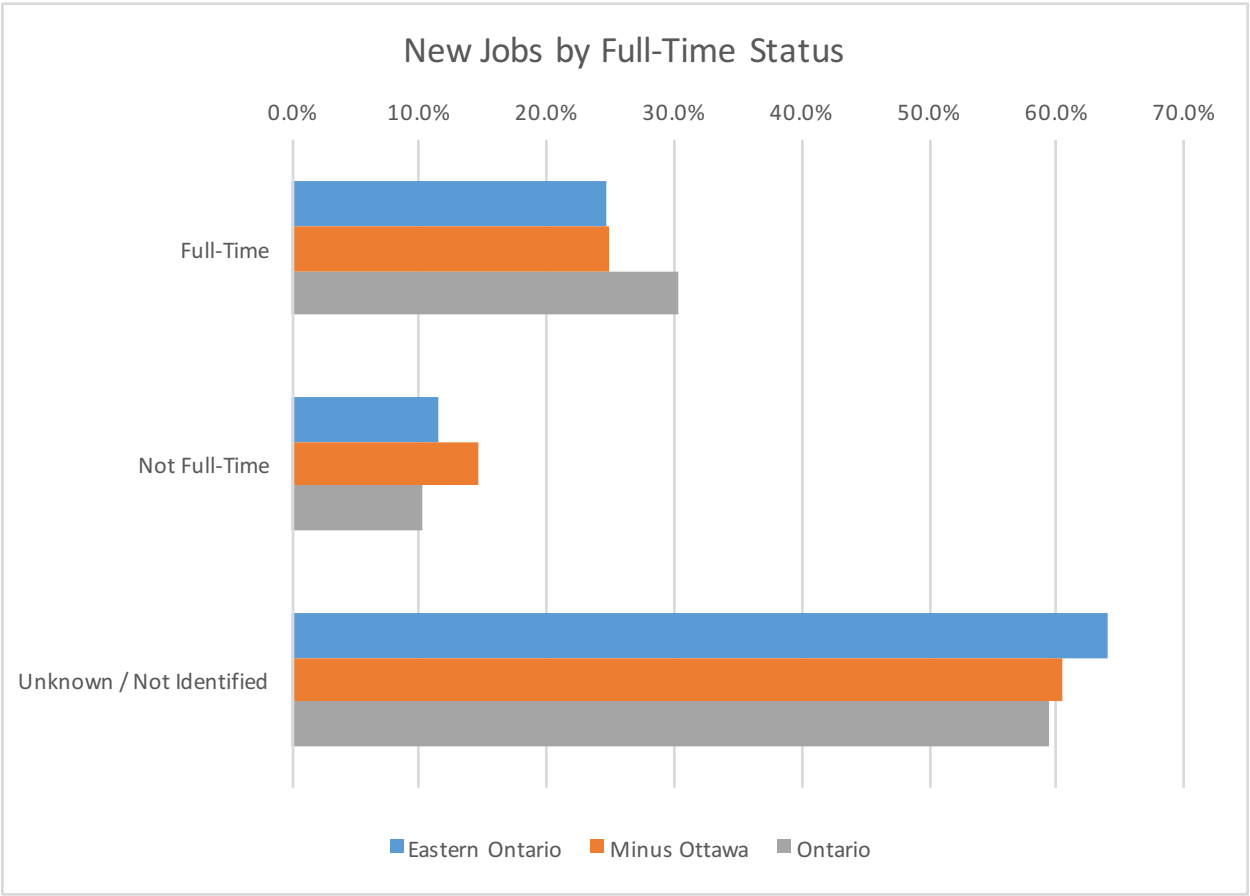
Appendix 2.36: Highest Education/Skill Requirement Listed

Highest Education/Skill Requirement Listed	Eastern Ontario	Minus Ottawa	Ontario
A: University Education	26.9%	23.5%	25.0%
B: College or Vocational Education or Apprenticeship Training	15.4%	16.8%	16.1%
C: Secondary School and/or Occupation-Specific Training	18.5%	22.0%	18.3%
D: On-the-job Training or No Formal Education Required	7.3%	9.1%	7.9%
Z: Unknown	31.9%	28.8%	32.8%

Appendix 2.37: Highest Education/Skill Requirement Listed (not including "unknown")

Highest Education/Skill Requirement Listed (unknown excluded)	Eastern Ontario	Minus Ottawa	Ottawa	Ontario
A: University Education	39.5%	32.9%	44.8%	37.2%
B: College or Vocational Education or Apprenticeship Training	22.6%	23.5%	21.8%	23.9%
C: Secondary School and/or Occupation-Specific Training	27.2%	30.8%	24.2%	27.2%
D: On-the-job Training or No Formal Education Required	10.8%	12.7%	9.2%	11.8%

Appendix 2.38: New Jobs by Full-Time Status



Appendix 2.39: New Jobs (1Q 2016)

Full-Time Status	Eastern Ontario	Minus Ottawa	Ontario
Full-Time	24.6%	24.9%	30.3%
Not Full-Time	11.4%	14.6%	10.3%
Unknown / Not Identified	64.0%	60.4%	59.4%

Full-time status cannot be determined for around 6 in 10 newly posted jobs. It is likely that most of them would be full-time positions since a job posting for a part-time job would be much more likely to indicate that it is part-time in the job posting. In this case, unknown jobs will be ignored which is the same effect as assuming the split in unknown jobs is the same as known jobs (around 3:1, full-time to not full-time). Additionally, full-time includes only those jobs that are strictly full-time. Jobs that are identified as "full-time or part-time" are counted as "not full-time." The result is that these estimates should be expected to under-estimate the share of jobs that are full-time. But, this approach gives the most conservative estimate and had been consistently applied across the various geographies.

Appendix 2.40: New Jobs Unknown/Not Identified–excluded for comparison (1Q 2016)

	New Jobs			Existing Jobs		
Full-Time Status	**Eastern Ontario**	**Minus Ottawa**	**Ontario**	**Eastern Ontario**	**Minus Ottawa**	**Ontario**
Full-Time	68.3%	63.0%	74.7%	78.90%	77.70%	85.80%
Not Full-Time	31.7%	37.0%	25.3%	21.10%	22.30%	14.20%
Unknown / Not Identified – excluded for comparison						

Elements Of The Eastern Ontario Innovation Ecosystem

Trent University	Peterborough	Research, Talent
Queen's University	Kingston	Research, Talent
St. Lawrence College	Kingston, Cornwall, Brockville	Applied Research, Talent
Sir Sanford Fleming College	Peterborough	Applied Research and Talent
Loyalist College	Belleville	Applied Research and Talent
Chalk River Nuclear Power	Chalk River	Research
First Stone Partners Incubator	Picton	Incubator
Sustainability Capacity Centre	Perth	Incubator
Queen's Innovation Connector	Kingston	Incubation and Support
Spark Centre - Head Office	Oshawa	Incubator (outside region)
Spark Centre - Satellite Office	Cobourg	Incubator
Launch Lab	Kingston	Incubator
Launch Lab Satellite Office	Belleville	Incubator
Haliburton Creative Business Incubator	Haliburton	Incubator
Northumberland CFDC (IdeaHub)	Cobourg	Incubator
Northumberland CFDC (N100and N1M Program)	Cobourg	Incubator
Eastern Ontario International Incubator	Belleville	Incubator
Excelerator Business Incubator	Smith Falls	Incubator
Eastern Ontario International Incubator	Belleville	Incubator
Peterborough Economic Development	Peterborough	Support
Northumberland Business Advisory Centre	Cobourg	Support
MEDEI Business Advisory Services – Eastern Region	Kingston	Support
Cornwall Business Enterprise Centre	Cornwall	Support
Enterprise Renfrew County	Pembroke	Support
Enterprise Renfrew County	Renfrew	Support
Kingston Economic Centre	Kingston	Support

Kawartha Lakes Economic Development Small Business Advisory centre	Lindsay	Support
Leeds Grenville Small Business Enterprise Centre	Brockville	Support
Brockville Economic Development	Brockville	Support
Prescott-Russell Entrepreneurship Centre	Hawkesbury	Support
Small Business Advisory Centre	Smith Falls	Support
Small Business Centre	Belleville	Support
Prince Edward Lanmark Addington CFDC (PELA CFDC)	Picton	Support
Peterborough Innovation Cluster	Peterborough	Support
Peterborough Angel Network	Peterborough	Support
1000 Islands CDC	Brockville	Support
CFDC of North & Central Hastings and South Algonquin	Bancroft	Support
Cornwall & The Counties CFDC	South Glengarry	Support
Frontenac CFDC	Harrowsmith,	Support
Grenville CFDC	Prescott	Support
Haliburton County CDFC	Haliburton	Support
Kawartha Lakes CFDC	Lindsay	Support
Peterborough Business Development Centre Inc.	Peterborough,	Support
Prince Edward/Lennox & Addington CFDC	Picton	Support
Renfrew County CFDC	Renfrew	Support
South Lake CFDC	Keswick	Support
Trenval Business Development Corporation	Belleville	Support
Valley Heartland CFDC	Smith Falls	Support
Southern Ontario Angel Network	Kingston	Support
Prescott and Russell Entrepreneurial Academy	Alfred	Training
Peterborough Economic Development	Peterborough	Support
Greater Peterborough Innovation Cluster	Peterborough	Support
County of Frontenac, Economic Development	Glenburnie	Support
County of Halliburton	Haliburton	Support
County of Hastings, Economic Development	Belleville	Support

City of Kawartha Lakes, Economic Development	City of Kawartha Lakes	Support
County of Lanark Economic Development	Perth	Support
United Counties of Leeds and Grenville, Economic Development	Brockville	Support
County of Lennox & Addington, Economic Development	Napanee	Support
County of Northumberland, Economic Development	Cobourg	Support
County of Peterborough, Economic Development	Peterborough	Support
Regional Centre for Business Development and Innovation	Smith falls	Support
Community Futures East	Peterborough	Support
United Counties of Prescott and Russell, Economic Development	L'Orignal	Support
County of Renfrew, Economic Development	Petawawa	Support
Kingston Economic Development KEDCO	Kingston	Support
Peterborough small business startup	Peterborough	Support

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