Eastern Ontario Leadership Council
Innovation Sub Committee Agenda
Thursday, June 13, 2024 – 11:00 a.m.
Via Zoom:
https://us06web.zoom.us/j/84282134860?pwd=vPQPi5V9Hnb2bJNawmEwaQryrMGXVS.1

Agenda

Page

1. **Call to Order/Welcome - Sheridan Graham**

2. **Declaration of Conflict of Interest**

3. **Adoption of the Agenda**

4. **Election of Vice-Chair**

5. **Election of Chair**

6. **Terms of Reference - Review and Update**

3 - 19 a)

7. **Innovation Ecosystem Report - Kathy Wood**

20 - 131 a)

8. **Circular Procurement Presentation - Jodi Houston, Circular Innovation**

132 - 135 a)

9. **EORN Digital Strategy**

136 - 192 a)

10. **10. Bloomberg Spark – Igniting Public-Sector Innovation – Craig Desjardins**

- Bloomberg Philanthropies (list-manage.com)
- Home - Cities Today (cities-today.com)

11. **Other Items for Discussion**

12. **Date of the Next Meeting**

TBD

13. Adjournment

Terms of Reference

Technology Integration & Innovation Working Group

1. **General Purposes**
   - To serve as a catalyst and to provide leadership in implementation of the actions identified in the Eastern Ontario Regional Economic Development Strategy or other actions that achieve the same ends.
   - To develop, prioritize, advise and recommend actions to the Eastern Ontario Leadership Council related to improvements to the Eastern Ontario region's development and utilization of technology, and innovative approaches to both public and private sector activity, that stimulate entrepreneurship, the creation and growth of businesses, improve the cost-effectiveness of production and service delivery, strengthen the economy, improve the financial circumstances of the region's residents as well as its private and public organizations.
   - To work collaboratively to identify partners and other resources required to implement recommended actions, and provide leadership in the preparation of business cases and/or funding/financing applications to support implementation.

2. **Scope of Working Group Assignment**
   - Subject to the Working Group's deliberations, the scope of Working Group activity may include:
     - Short or long-term actions listed under the Technology Integration and Innovation Theme of the Regional Economic Development Strategy
     - Innovation related to products, services, business models, financing, marketing or other business functions. For the purposes of the Working Group, "innovation" goes beyond new or improved technology.
     - Programs, services, facilities or events that support or assist entrepreneurs and innovators, start-ups and SMEs. These could include access to R&D and prototyping services, financing, advice/mentoring, or introduction of innovation into an existing enterprise.
     - Region-wide technology infrastructure that will serve as a springboard for organizations to use in establishing and growing their businesses or delivering services in new ways. Examples include access to Magnet (for human resources purposes), the existing Eastern Ontario Regional Network, cell/mobile broadband, or sector-focused applications for either private or public sector use. Note that neither the EOLC, the Working Group or any of its members need own or operate these technologies.
     - Data and/or analysis related to the operation of the region's innovation system, the relative strength of its entrepreneurial nature, ability to generate

innovations of all types, business formation, the regional 'stock' of intellectual property, and the growth and development of the regional economy and the organizations that comprise it. All of this data and analysis is in support of evaluating opportunities or supporting the development of business cases for same.

The Working Group's assignment does not include:

- Matters related to skills development, education and training, availability of employment in particular communities or across the region. However, this Working Group may solicit assistance from or collaborate with the EOLC Workforce Development and Deployment Working Group (or other similar groups beyond the EOLC) to understand, recommend or develop innovation or technology solutions deemed to be important to the development and deployment of the region's workforce.
- Matters related to the development and deployment of transportation systems, including infrastructure to support the efficient movement of goods, services and people across the region. However, this Working Group may solicit assistance from or collaborate with the EOLC Integrated, Intelligent Transportation System Working Group (or other similar groups beyond the EOLC) to understand, recommend and implement innovation or technology solutions deemed to be important to the development and operation of an integrated, intelligent transportation system.

Generally, the rule of thumb would be that this Working Group is not the lead Group for any action shown in the Eastern Ontario Regional Economic Development Strategy as part of either the Workforce Development and Deployment Theme or the Integrated, Intelligent Transportation System Theme. However, nothing precludes this Working Group from approaching any other Working Group to discuss or work jointly on initiatives considered to have indirect significance for the Technology Integration & Innovation Working Group.

3. Background to Working Group Formation

i. **History of advocacy on region's behalf:** Both individual municipalities and regional bodies (e.g. EOWC, EOMC) have advocated to upper levels of government for greater consideration for the region's technology infrastructure (e.g. broadband). The region has just witnessed the introduction of a broadband network known as the Eastern Ontario Regional Network, but the presence of other forms of Information and Communications Technology (ICT) is variable (e.g. cell/mobile broadband). The EOLC has received the report from its first regional innovation-related initiative: Mapping the Innovation Ecosystem. There is a need for discussion and formulation of recommendations on how to prioritize the report's recommendations and begin implementation. A number of stakeholder groups – from PELA CFDC and FedDev to post-secondary education institutions –

have undertaken initiatives that tie into regional innovation, entrepreneurship and technology development. In addition, an Eastern Ontario-wide Post Secondary Education Task Force has been formed, under the leadership of Carleton University, to leverage PSE assets in service to the economic development of the region.

4. **Nature of region and its economy:** As a region of rural communities and small towns & cities, Eastern Ontario has roughly a population of roughly 1.1 million distributed over a 50,000 square-kilometre area. In that area, there are approximately 32,400 employment locations plus another 65,000 indeterminate businesses/organizations. Of the 32,400 locations, 24,000 have fewer than 10 employees. Jobs in retail trade (62,700) health care & social assistance (61,000) and education (40,500) dominate the regional economy. Goods producing industries (agriculture, forestry and manufacturing) employ 67,000 with manufacturing alone accounting for 61,000 of the 440,000 jobs in the region. Roughly 14,600 of the region's 440,000 jobs are in professional, scientific and technical services (NAIC 54). Some of the region's small businesses – particularly family businesses – are likely included in the region's 65,000 "indeterminate" employment location category because employment levels are harder to quantify. The dollar value of physical goods moving into, out of an around the region is currently unknown. In addition, Eastern Ontario communities 'export' roughly 87,600 members of their labour force to other communities in and outside the region each day.

5. **Recent developments potentially affecting technology and innovation** (in no particular order):
   i. Increasing reliance on technology in delivery of public and private services (e.g. education and training, emergency services, information services, remote sensing and systems controls) as well as a pervasive tool for personal communications
   ii. Technology and Associated Business Models --- V2V, V2I, digital mapping and conditions reporting, electric vehicles; Uber
   iii. Trade deals (e.g. CETA, TPP, NAFTA)
   iv. First Nations' interests in technology and economic development
   v. Federal and provincial innovation strategies, including consultations
   vi. Eastern Ontario Regional Economic Development Strategy http://www.eowc.org/en/futuredirections/resources/WorkshopReportNovember21st2014.pdf
   vii. Completion of the Innovation Ecosystem Mapping Project (part of Strategy)
   viii. EORN Digital Strategy

6. Expectations of Working Group

- ***To identify, approach and engage individuals and stakeholder organizations*** with interest and a contribution to make to the general purposes of this Working Group***.***
- ***To consider, articulate and share with the EOLC a general vision for technology and innovation*** in the region in support of the Vision articulated in the Eastern Ontario Regional Economic Development Strategy (see Appendix A) (e.g. what would a region characterized by technology integration and innovation look like?)
- ***To evaluate the technology and innovation-related actions proposed in the Eastern Ontario Regional Economic Development Strategy as well as in other forums and reports***, and to provide comment to the EOLC on the degree to which those actions address the challenges that the Working Group sees ahead in achieving its general vision.
- ***To develop, prioritize, advise and recommend to the EOLC overall strategies, specific actions and/or next steps*** related to improvements to the Eastern Ontario region's technology profile (assets, capabilities, utilization/deployment) and innovation system that will move the region toward achievement of its Vision, including but not limited to:
  - strengthening the region's economy through the deployment of technology (all types), improved productivity, more business start-ups and growth, increased prevalence of innovative approaches to economic and social enterprise, and associated job creation
  - connecting the region's people and organizations in support of regional/sectoral or other innovation networks (innovation ecosystem), value chain development, access to product and service R&D capabilities, as well as the services and resources needed to help entrepreneurs and innovators bring their ideas to market.
  - Encouraging local residents, organizations and newcomers to add to the region's stock of intellectual property, commercialized innovations and deployments of technology in a variety of sectors.

  … all with an eye to regulatory compliance, stimulating inclusiveness, and maintained/improved quality of place across the region.
- ***To work collaboratively to identify partners and other resources*** required to implement recommended actions
- ***To provide leadership in the preparation of business cases and/or funding/financing applications*** to support implementation
- ***To provide guidance and direction*** *to the Working Group leadership (chair/co-chairs) or staff/consulting resources retained to assist the Working Group*
- ***To report at least quarterly on the Working Group activities*** to the EOLC, and
- ***To identify annually*** in advance, any financial or other resources that will be required to deliver on the preceding expectations.

7. **Ideas Already Tabled** (starting with the Regional Strategy and EORN Digital Strategy, then in no particular order)

A. Actions cited in the Eastern Ontario Regional Economic Development Strategy under the theme of "Technology Integration and Innovation":

- Map and profile Eastern Ontario's Innovation Ecosystem (competitive advantage; retention & expansion of businesses; stimulating start-ups)
- Identify and address gaps
- Develop an online client/business pathways tool
- Leverage programming and support of the Ontario Network of Entrepreneurs (www.onebusiness.ca) and IRAP
- Host 'Meeting of the Minds' on digital fabrication; develop network of prototyping/fabrication labs and maker spaces in Eastern Ontario
- Obtain Eastern Ontario business performance data from Statistics Canada
- Encourage industry associations to create a regional manufacturing innovation network
- New business models for agricultural sector

B. Recommendations from the Innovation Ecosystem Mapping Project Report:

a. Share best practices and assets
b. Look beyond incubating information and tech start-ups (for innovative ideas)
c. Look for opportunities to strengthen food processing, 'green' technology
d. Drive ICT-enabled innovation across sectors (e.g. natural resources, nuclear, tourism)
e. Use value chain mapping to create added value in existing sectors
f. Erode the ivory towers and access PSE assets
g. Develop a strategy for succession planning (esp. SMEs and family businesses), including access to capital
h. Align with strategy to develop and retain talent/leverage diversity
i. Lobby for 'made in Canada' innovation strategy beyond Toronto-Waterloo corridor
j. Develop stronger regional brand identity… go beyond definition as a part of Ontario
k. 60/40 strategy: 40% focus on foresight (where world might be in 5 years… suggestive of demand/what is needed rather than just 'cool stuff'; 60% on leveraging, exploiting/adding value to existing assets
l. Work together and leverage region's technology (BB) infrastructure.

C. Eastern Ontario Digital Strategy:

- Focused on three goals:
  - Increasing user uptake of digital technologies
  - Improving broadband access
  - Demonstrating technology leadership

  … using three approaches: advocacy, strategic investment, and mobilization of diverse groups of stakeholders.
- Targets four arenas of action:

- Regional economic development
- Municipal services
- Broadband education
- Infrastructure (fixed and mobile)

- Intends to evaluate performance based on a) financial results, b) stakeholder perspectives, c) operational effectiveness and d) contribution to fulfilment of corporate mission.

D. Actions that have already been taken, not all as a direct result of the EOLC

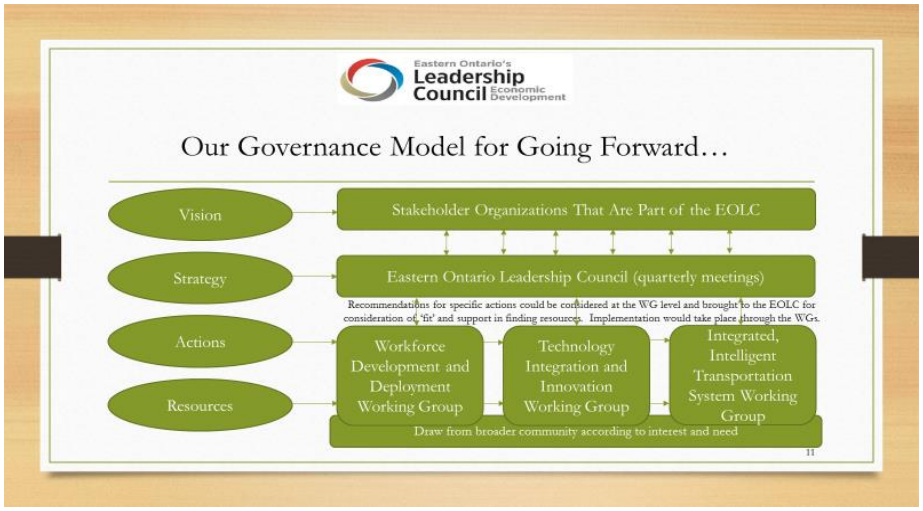
- Innovation Ecosystem Mapping Project (and report) complete
  - Successful launch event and panel discussion in conjunction with OEMC
- Ontario East value chain mapping/3D mapping under way
- New federal (business-focused) funding announcement via EO CFDC Network Inc.
- 'Signs of success' from PEC IT-focused incubator; includes linkage to FirstStone Capital (Toronto)
- Maker space in Lennox and Addington County with CFDC support
- Eight high-potential IT-focused start-ups chosen for support through GrindspaceXL – Kingston/ Queen's accelerator (an initiative with Invest Ottawa)
- Magnet-Manufacturing Association initiative to extend training resources to region's manufacturers undertaken with EODP support; successful in provision of training; significant job creation
- EORN pursuing cell/mobile broadband gap project; implications for emergency services/first responders as well as business
- EORN has produced an e-toolkit to help small organizations introduce digital technologies into their business.

8. Governance and Proposed Membership

This Working Group is one of three contemplated by the EOLC, with each one corresponding to a theme from the Eastern Ontario Regional Economic Development Strategy. The EOLC:

- Provides *overall* strategic direction and monitors progress in enhancing the economic development *of the region*
- Engages upper levels of government in broad discussions regarding economic development issues and funding opportunities that might be available to support Regional Economic Development Strategy implementation
- Funds coordination support for the EOLC and the three Working Groups,
- Supports research and analysis that is of value to the EOLC in its strategic role as well as to one or more of the Working Groups
- Supports communications/awareness activities for the work of the EOLC and its Working Groups

Recommendations for specific actions are considered by the Working Groups and brought to the EOLC for consideration of strategic fit and support in finding resources. Project development, engagement of stakeholders, preparation of funding/financing applications, and implementation of theme-focused projects would take place through the Working Groups. Any action or project that seeks financial or other support from the EOLC, or is to be undertaken in the EOLC's name, requires the EOLC's prior approval. However, a stakeholder organization may decide to take on, fund and manage a specific action or project on its own; in such cases, stakeholders are invited to keep the EOLC informed so as to prevent confusion or duplication of effort but formal approval is not required.



Working Groups are expected to follow good governance practices with respect to application of rules of order, declaration of conflicts of interest, documenting the outcomes of meetings or discussions, due diligence, transparency and accountability.

The EOLC itself is a membership-based organization with representation from the Eastern Ontario Wardens' Caucus (EOWC), the Eastern Ontario Mayors' Caucus (EOMC), the Eastern Ontario Regional Network (EORN), the Ontario East Economic Development Commission (Ontario East), and the Eastern Ontario CFDC Network (EOCFDC). Each organization designates its representatives to serve on the Council; those representatives are expected to serve as an information conduit between their members and the EOLC. This role is to be supported by an EOLC Communications Plan.

Member organizations in the EOLC may nominate representatives to serve as members of the Working Group, based on interest, expertise or ability to contribute to the Working Group activities. The Chair or Co-Chairs may be nominated from these representatives but may also be from any of the other organizations represented at the Working Group.

Decision-making: Each Working Group is expected to have a volunteer Chair (or Co-Chairs) with modest paid staff support through the EOLC. The Chair/Co-Chairs are expected to call Working Group meetings, chair the meetings and discussions, coordinate follow-up actions, ensure that the EOLC receives regular reports from the Working Group, and make any formal requests to the EOLC for support or engagement on any of the Working Group recommendations and prioritized actions. Decision-making at the Working Group level is expected to be by consensus, defined as 80% support from those participating in the meeting. Working Groups are expected to meet at least quarterly; timing and frequency of meetings (in-person or teleconference) will be at the discretion of the Working Groups themselves.

Membership: The Chair/Co-Chairs will ensure that a list of Working Group members is maintained, and direct the Working Group's attention to adjusting membership as required (e.g. to bring in specific expertise or to replace 'retiring' members). The Working Group has the power to add new members as required to address its mandate and execute tasks. All Working Group members serve in a volunteer capacity.

Organizations that are candidates for inclusion in discussions about any technology or innovation-related actions or projects include:

- Upper, lower and single tier municipalities
- First Nation communities
- Public and private sector organizations providing services to entrepreneurs, innovators, start-ups and SMEs
- Communities or organizations interested in serving as a pilot project/test site
- Owners of physical or technology infrastructure assets, whether public or private
- Organizations responsible for maintaining or regulating technology assets or services
- Academic and other researchers working on technology development, innovation processes
- Ontario Ministry of Research, Innovation and Science, and Ministry of Economic Development and Growth, Ontario Ministry of Small Business, Ontario Ministry of Agriculture Food and Rural Affairs
- Ministry of Innovation, Science and Economic Development of Canada
- CMC Microsystems
- Federation of Canadian Municipalities and/or Association of Municipalities of Ontario
- Private financial organizations and/or venture capital or angel investment groups
- Cybersecurity firms
- Firms or institutes with expertise in intellectual property and valuations
- Consulting firms providing services to the start-up/SME business or innovation communities

- Private firms, business/industry/sectoral associations or other organizations interested in stimulating innovation or the introduction of new technologies in either the public or private sectors
- Couriers, logistics and shipping companies
- Intensive users of innovation services or technology assets
- R&D intensive organizations whether in the public or private sector
- Software developers with applications that have high potential for application in Eastern Ontario
- Technology hardware firms, or
- Any other organization that the Working Group believes can add value to its work.

Appendices:

Appendix A:

Innovation-Related Content from Eastern Ontario Regional Economic Development Strategy

Vision 2024 for Eastern Ontario Economic Development Strategy
(from the approved Strategy as presented on the EOWC website)

"Eastern Ontario promotes business growth as the backbone of a sustainable regional economy. Our municipalities and counties use best practices to support this growth, and our region has earned a reputation as being progressive and innovative in our collaborations with the business community. We have built a culture of partnerships ith business, institutions and organizations to support the growth and development of our workforce, business communities, and entrepreneurs.

Eastern Ontario will be known for its highly skilled workforce and strong work ethic combined with a strong and diverse regional economy. People of all ages will have economic opportunity and choices for exciting work and lifelong learning. The region's economy is fueled by its world-class educational institutions and diverse and innovative business community, supported by an integrated and intelligent transportation system that enables the effective and efficient movement of goods, people and ideas across the region.

Eastern Ontario will be a dynamic and prosperous place to live, work and play in harmony with the natural environment. The region's vibrant rural and urban communities, steeped in tradition and rich in history, will continue to attract people and visitors seeking a high quality of place experience Growth of the region's communities will respect and incorporate the area's natural assets, ensuring a positive legacy for future generations."

Excerpts from Eastern Ontario Regional Economic Development Strategy

Seven Major Themes Emerge from the Consultation Processes (page 17)

The strategy's consultation processes yielded seven major themes to which stakeholders believe that economic development leaders in the region must respond. These include:

- Providing the right infrastructure for business;
- Creating a stable and predictable business environment;
- Introducing a new regional approach to economic development;
- Delivering innovation services;
- Redoubling our efforts on workforce development and attraction;
- Re-inventing traditional sectors of the economy; and
- Accelerating the adoption of new technologies.

Page 18: "The need for integrating technology into the region's economic sectors was raised by some as part of this theme (e.g. technology integration in education, manufacturing, agriculture, healthcare, tourism and retailing)."

Page 20: "4) **Delivering Innovation Services** Ranked as a top priority in five of nine focus groups, this theme focuses on actions which will generate business and economic activity from the ground up, by supporting local entrepreneurs and enhancing linkages to innovation services to help businesses grow.

- There was a strong sense of **greater need for entrepreneurship training and supports** (e.g. mentors, advisory services). Some stakeholders noted opportunities for **incubation services** – particularly targeted toward start-ups and SMEs in specific sectors. This view was often accompanied by comments about the need to establish a business case for any incubator. Otherwise these facilities are not sustainable over the medium or longer term.
- Many concerns were raised about **access to capital**. It is not clear that stakeholders understand how to use **new revenue generation tools** (example: crowd funding) or how to be investment-ready for angel investors, venture capitalists or perhaps even conventional lenders.
- Some **sector-based innovations** are already taking place (e.g. regionally-branded products) and these are seen as good models or case studies that could benefit others moving in the same direction.
- Multiple stakeholders referred to the **benefits of development and/or introduction of technology** in most of the sectors of the regional economy – from new (digital) applications for online business to technologies embedded in other equipment (e.g. sensors, GIS etc.). There was a sense that there may be sectors in which Eastern Ontario could provide leadership and create economic development opportunities. There was a sense that the supply chains for specific industries/sub-sectors are not

well understood across the region. In particular, larger firms may not know about suppliers outside of their own municipality and smaller firms may not know about opportunities to become part of large firm supply chains – even those quite close to home. **The use of technology to improve supply chain management** and utilization of regional suppliers was seen as being worthy of pursuit.

Page 22: 7) **Accelerating the Adoption of New Technologies** Ranked as a top priority in one of nine focus groups, this theme focuses on actions which would link together regional businesses, institutions and other stakeholders, as well as increasing economic transactions and trade. For many stakeholders, adoption of new technologies was focused on either availability of generic services (broadband, mobile communications) or related to a specific sector.

- Many stakeholders commented on the continuing need for better broadband and cellular services. However, many also acknowledged that the Eastern Ontario Regional Network was in mid-rollout and so availability might need to be reviewed after that process is complete at the end of 2014. Stakeholders also noted that capitalizing on the Network's existence is required to deliver an economic development ROI from the investment in EORN.
- There was a sense in online survey results, as well as one-on-one/small group discussions that there are opportunities for economic growth by capitalizing on technology, including:
  - Application of industrial robotics and digital fabrication (e.g. 3-D printing);
  - Delivery of business education including entrepreneurship programs, online marketing or advanced manufacturing concepts (e.g. LEAN, JIT, supply chain management);
  - Some industry associations /networks see opportunity to leverage technology to build a regional food network (traceability, online ordering, transportation and logistics, farmers' markets); and
  - Stakeholders recognized that there a shift to online sales channels in the retail sector that is both a threat to "bricks and mortar" retail operations and an opportunity (if local retailers understand how to market and sell online).
- There is a view that Eastern Ontario has sectoral expertise in one part of the region that could be leveraged – via broadband – to the benefit of other parts of the region (e.g. manufacturing, ICT/digital apps, local food etc.).
- Some stakeholders suggested that there is an opportunity to differentiate Eastern Ontario based on the concept of a "smart" region (rather than an individual community) and technologies. The focus of most comments was on actually becoming and marketing the attributes of a smart region rather than seeking any particular external designation as such.

Priority: Technology Integration and Innovation

Economically disruptive technologies—like the printing press in the Renaissance, or steam power in the Industrial Revolution or the semiconductor microchip and the Internet in today's economy— have transformed the way we live and work, enabled new business models, and provided an opening for new players to upset the established order.

In a 2013 report, McKinsey Global Institute identified 12 potentially disruptive technologies22 whose direct impact is near enough (10 years) to warrant consideration in the preparation of any economic development strategy. McKinsey has defined these as:

- Mobile Internet – mobile computing devices and Internet connectivity
- Automation of Knowledge Work – intelligent software systems
- The Internet of Things – network of low costs sensors and actuators for data collection, monitoring, process optimization
- Cloud Technology – use of computer hardware and software resources delivered over a network or Internet
- Advanced Robotics – capable robots with enhanced senses, dexterity and intelligence
- 3D Printing – an additive manufacturing technique to create objects by printing layers of material based on digital models
- Advanced Materials – material designed with superior characteristics Autonomous and near
- Autonomous Vehicles – vehicles that can navigate and operate with reduced or no human intervention
- Next Generation Genomics – fast, low cost gene sequencing, advanced analytics
- Energy Storage – devices or systems that store energy for later use
- Advanced Oil and Gas Exploration and Recovery – techniques to make extraction of unconventional oil and gas economical
- Renewable Energy – generation of electricity from renewable resources with reduced harmful effect.

The rapid rate of integration of these technologies promises to further disrupt and transform the economy of Eastern Ontario from manufacturing to agriculture, retail to healthcare. There can be no doubt that technology and innovation will continue to shape the global economy and society as a whole over the coming decade. The only question is how and to what extent this shift will affect Eastern Ontario's comparative advantage to attract and retain investment and talent in key sectors and the ability to grow and expand the region's economy as a whole.

It is also crucial to recognize that important technologies can come in any field or emerge from any scientific discipline. What they have in common is their ability to drive a high rate of change and the potential for disruptive economic impact – including the loss of existing jobs.

The decline of the Province's and by extension Eastern Ontario's manufacturing sector is illustrative of the impact that technology is having on the economy. While the sector has been greatly impacted by trade liberalization and an appreciating dollar, it is also well documented that Ontario manufacturers lag the peer states in machinery and equipment investment by a significant margin. This in turn has contributed to low productivity growth and rates of innovation, as reflected by spending in research and development. The result is an eroding of our competitive positioning and significant job losses across the sector. While business leaders recognize the importance of investment and innovation in improving productivity and gaining a competitive edge, they have failed to follow through on these activities.

Technology Integration and Innovation Recommendations

Recommendations	Suggested Partners
Short Term Actions	
Objective: Assemble competitive intelligence that will foster incubation, research and testing, peer-to-peer networking, and information sharing among regional businesses, organizations, and institutions	
9. 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 stimulate business start-ups. Include network of innovation sites, incubators, research partnering between universities and businesses, investment capital networks, and relevant workforce development programs.	Academic Researcher/ Post-Secondary Education Institution e.g. Queen's Entrepreneurs Group or 1125 Carleton; Contracted Consulting Services
9.1. Identify and address gaps in innovation ecosystem	As above
9.2. Work with ecosystem partners to develop an online client/business pathways tool	As above
9.3. Leverage the programming and support of the Ontario Network of Entrepreneurs www.onebusiness.ca and the Industrial Research Assistance Program (IRAP)	OEEDC
10. Host a 'Meeting of the Minds' gathering on the impact and opportunities for digital fabrication and additive manufacturing in Eastern Ontario, bringing together key leaders from industry, academia and the investment community to explore ways in which emerging technologies may be piloted and commercialized in the region. This should include specific exploration of the possibility of creating a network of prototyping fabrication labs and maker spaces across Eastern Ontario.	Manufacturing Associations; QMA; OEEDC
11. Obtain Eastern Ontario business performance data from Statistics Canada including assets, liabilities, equity, investment, and other financial indicators by industry sector to improve understanding of how the regional economy is performing, its contribution to the larger provincial economy and the level of investment and innovation that is underway across the region.	Academic Researcher/ Post-Secondary Education Institution; Contracted Consulting Services
12. Encourage existing industry associations to coordinate the creation of a regional manufacturing innovation network that brings together key institutional players and private sector business interests to identify research and joint venture opportunities.	OEEDC

Appendix B: Potential Technology or Innovation-Related Projects Suggested to the Province of Ontario by the EOWC in its submission to the Moving Ontario Forward Outside the Greater Toronto Hamilton Area consultations.

Name: Region-wide Next Generation ICT Project

Description: Development and implementation of a multi-year program of ensuring comprehensive coverage of Eastern Ontario with mobile broadband/cellular access, filling in the (few) remaining gaps in fixed high-speed internet, and scaling up the existing network for citizens' needs in 2024. The objective of the project is to ensure that the technical capacity is in place to support Information and Communications Technology (ICT) applications across multiple sectors. Led by the Eastern Ontario Regional Network (EORN), this project will ensure build on the recently completed high-speed internet network and a detailed gap analysis for mobile broadband/cellular service, to support EORN's Digital Strategy. The Strategy is designed to ensure that ICT infrastructure is in place to support applications in sectors of strategic importance to the region: emergency services and home-based health services, municipal asset monitoring and deployment systems, tourism promotion and guidance systems, ICT safety and security applications, possible deployment of drones, VPN access for mobile workers, electronic records management, and citizen engagement. This project would be undertaken in conjunction with the Intelligent Transportation System Project.

Fit with Province's Aspirations: Addresses expressed goal of getting people (and goods) around "safely and efficiently". Consistent with principles of Openness to Bold Solutions, and Adaptive and Responsive. Consistent with Next Generation Signature Investments.

Fit with Regional Aspirations and Criteria: Supports implementation of EORN Digital Strategy (2014). Requires extensive inter-municipal collaborations, includes opportunity for public-private partnerships, supports significant support to local and regional economic development. Helps to make communities investment ready and attractive for business investment including Foreign Direct Investment. Formalizes the region's commitment to remaining at the leading edge of rural broadband infrastructure and related participation in the digital society. Will draw upon EORN's mobile broadband/cell service gap analysis. Strong implementation capacity exists at local and especially regional levels (via EORN). Anticipated collaboration with technology/service providers and sectoral organizations to add required domain expertise.

Role Technology Plays: This project is technology-centred beginning with broadband/cellular service provision to support a wide range of technologies from online applications to technologies embedded in a wide range of products.

Business Case/ROI Implications: Through EORN**,** EOWC has extensive experience with ICT projects and the importance of encouraging utilization, thus driving ROI. Multiple sectors can leverage ICT for improved productivity, service levels, and operational efficiencies. The project would help to brand Eastern Ontario as a "smart", connected region. EORN would almost certainly lead this project.

Name: Intelligent Transportation System Project

Description: Development and implementation of a multi-year program of embedding Information and Communications Technology (ICT) in the transportation system of Eastern Ontario, enabling interactive exchange of transportation-related information between these assets (roads & bridges, signage, weather and road condition monitoring stations, maintenance and winter control vehicles etc.) and the travelling public and those responsible for ensuring safe, efficient transportation across the region. For a region-wide grid of arterial roads, this project would introduce a) pan-regional mobile broadband and/or cell service, b) road condition webcams and weather stations, c) signage and other methods of alerting travelers to the availability of information via (mobile) wireless communications (e.g. tourism information, roadside services), and d) eventual use of transportation assets for driverless vehicles or for energy generation. Emergency Services personnel would use ICT to deliver services to clients' homes or communicate with specialized personnel via intensive data exchange. This project would be undertaken in conjunction with the Regional Highway Integration Project and the Commutershed Infrastructure Investment Project, both of which are presented separately.

Fit with Province's Aspirations: Addresses expressed goal of getting people (and goods) around "safely and efficiently". Consistent with principles of Openness to Bold Solutions, and Adaptive and Responsive. Consistent with Additional Infrastructure Investments to Support Transportation, especially Next Generation Signature Investments.

Fit with Regional Aspirations and Criteria: Supports implementation of Eastern Ontario Economic Development Strategy (2014), and EORN Digital Strategy (2014). Requires extensive collaborations (among rural and urban municipalities, with MTO), includes opportunity for public-private partnerships, supports significant support to local and regional economic development. Demonstrates region's ability to deliver two of three most important considerations for Foreign Direct Investment (transportation, technology). Encourages municipalities to make strategic choices about transportation assets, high-traffic corridors, and provision of vital services in mobile mode. Helps to mitigate unintended consequences of EDR traffic. Will draw upon EORN's mobile broadband/cell service gap analysis. Implementation capacity exists at local and especially regional levels (via EORN). Anticipated collaboration with MTO and technology/service providers will enhance access to required expertise.

Role Technology Plays: ICT will add value to regional transportation system, increasing efficiency of travel/logistics, improving travellers' experience in the region, and prepare the region for future developments in transportation. ICT will help transportation system managers monitor and respond to changing conditions, deploying available resources where they are needed most. Responsiveness of Emergency Services personnel will also be enhanced.

Business Case/ROI Implications: Through EORN**,** EOWC has extensive experience with ICT projects as well as with conventional transportation systems (EOWC and EOMC). Strategic use of technology can help to overcome low population density and improve deployment of public services. The project would help to brand Eastern Ontario as a "smart", connected region.

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

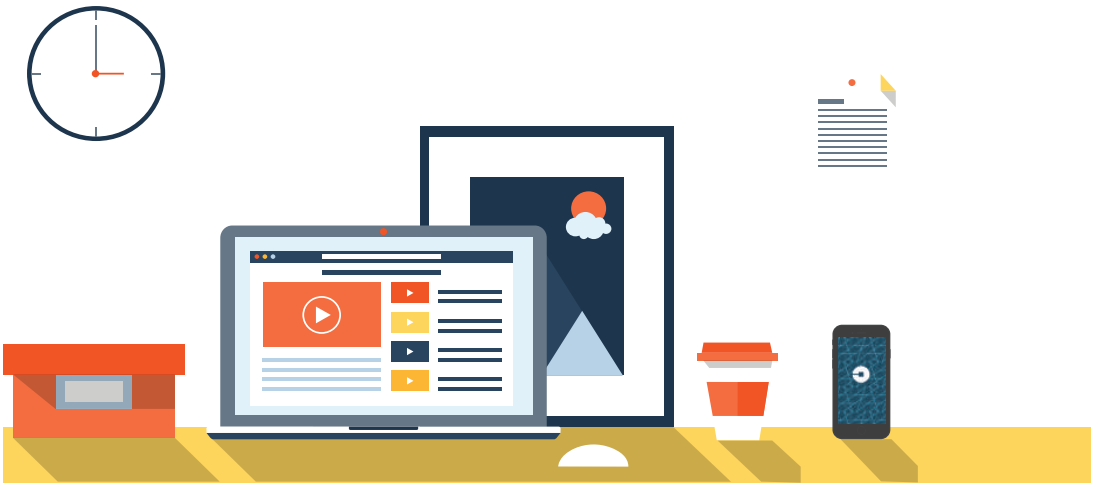
The strategic mission of Ted Rogers School of Management's Institute for Innovation and Technology Management (IITM) at Ryerson University is to find innovative solutions to real-world technology management problems. IITM takes an interdisciplinary, practice-oriented research and innovation that assists 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



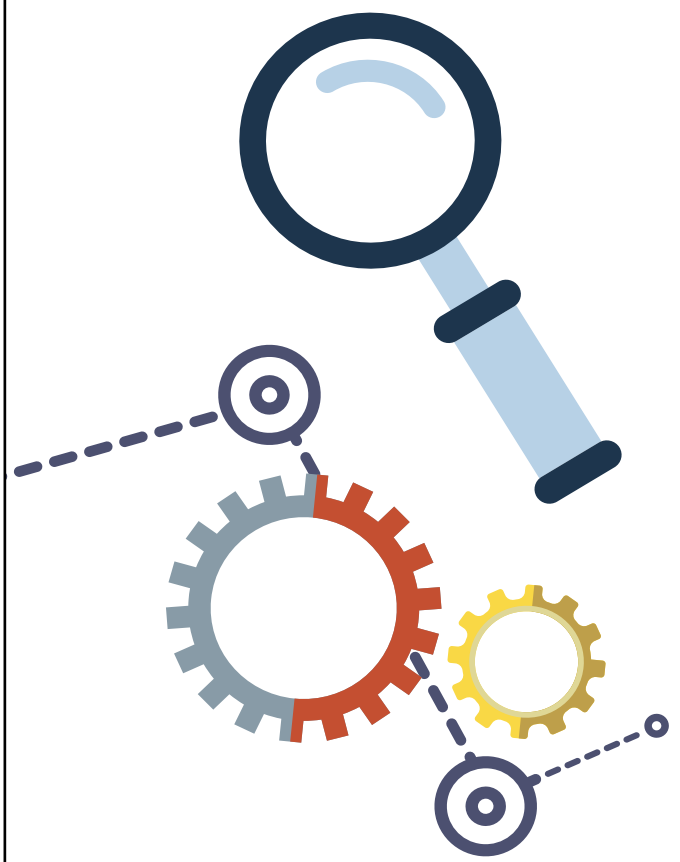
Innovation is "*a process through which economic or social value is extracted from knowledge—by creating, diffusing, and transforming ideas—to produce new or improved products, services, and processes.*" (Conference Board of Canada, 2016). While much of the attention in Canada has focused on disruptive 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.

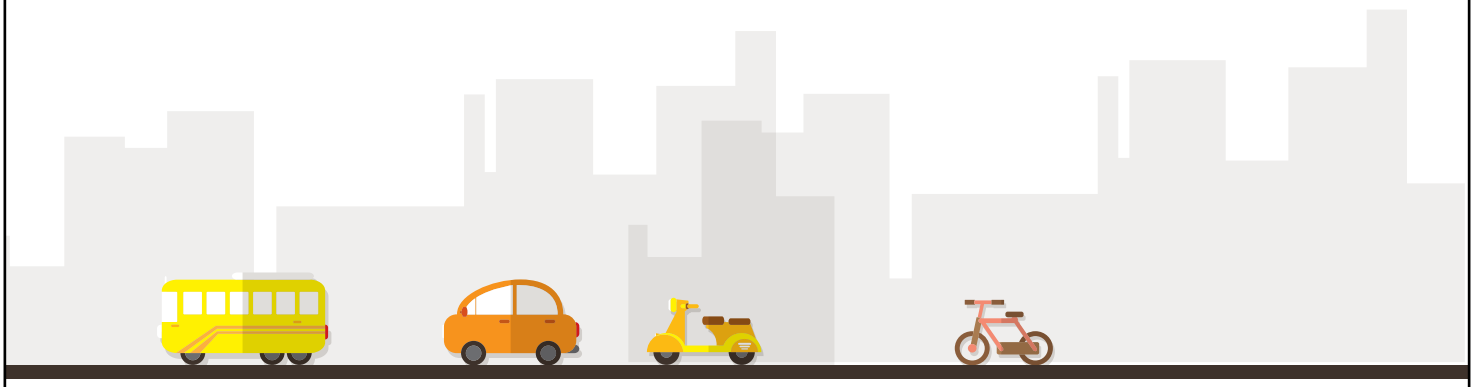
BACKGROUND

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.

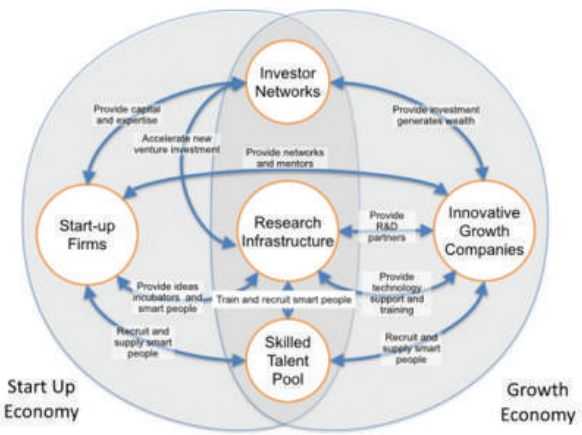
Although the innovation process is varied and non-linear by is its nature, there are some connecting elements. The innovation ecosystem in a particular region is a complex interplay of stakeholders, processes, and organizations in an enabling context. While models of innovation ecosystems vary in part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

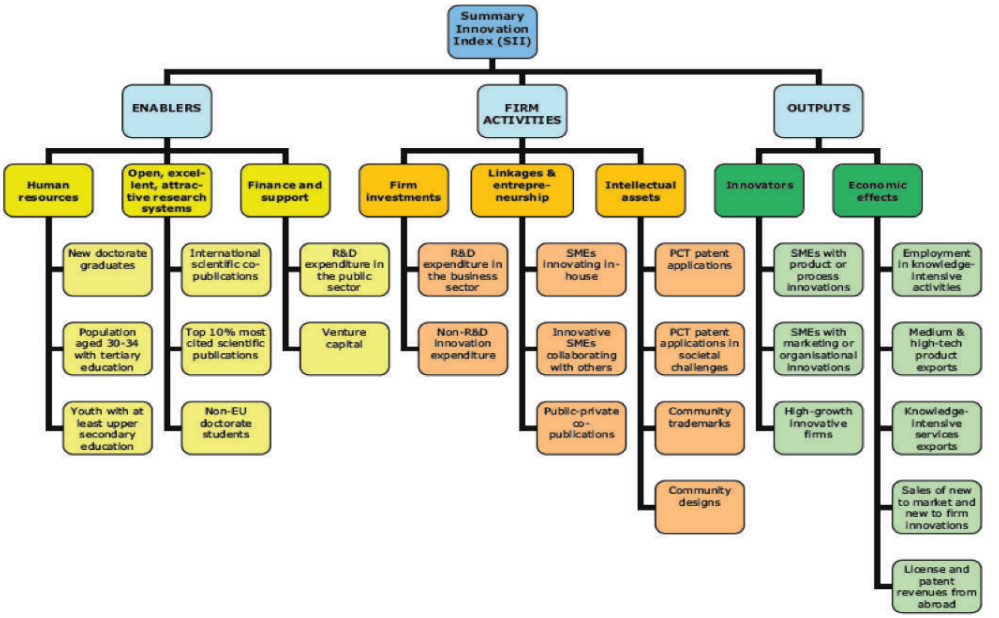
One view of a university's innovation ecosystem



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.

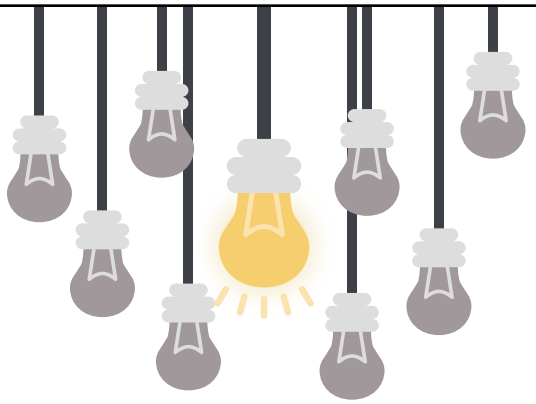
Figure 2: Diagram of EU Innovation Measures



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

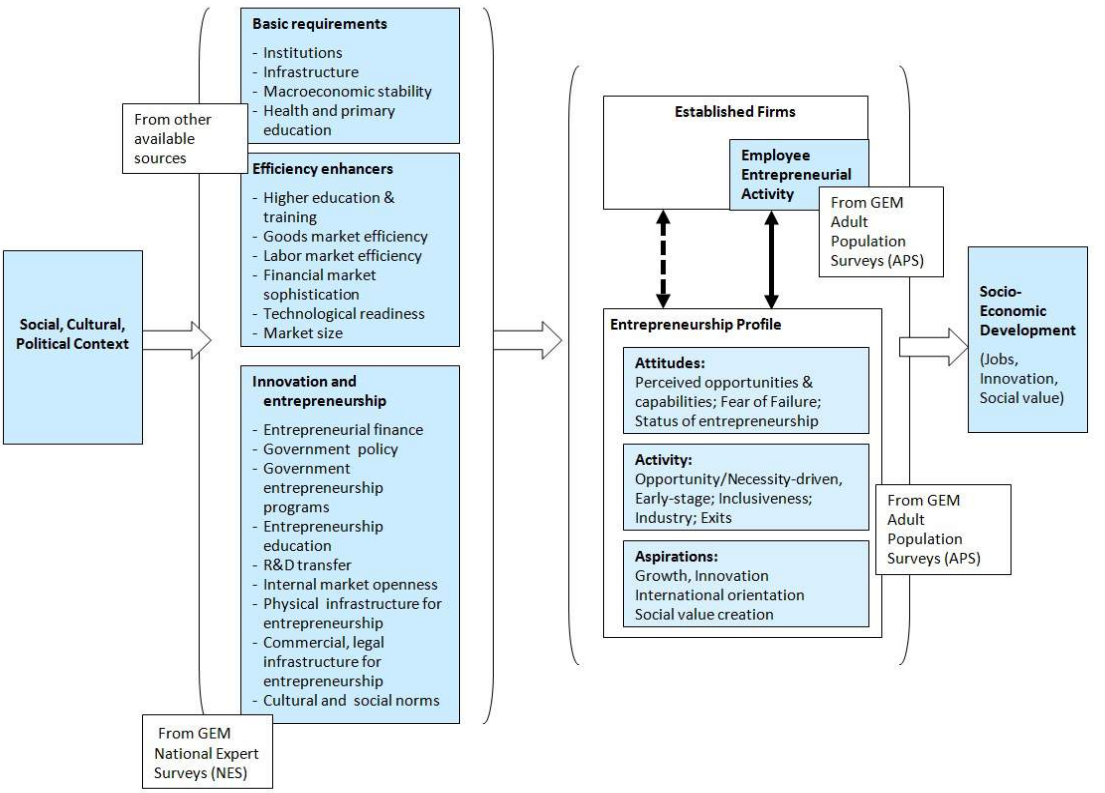
Measures	Sources
FIRM ACTIVITIES	
Number of firms collaborating in innovative activities with public or private partners, government, and higher education institutions by size	Government of Canada, 2011
Increased number of prototypes	Jenkins et al., 2011
Increased number of publications	Niosi & Bas, 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

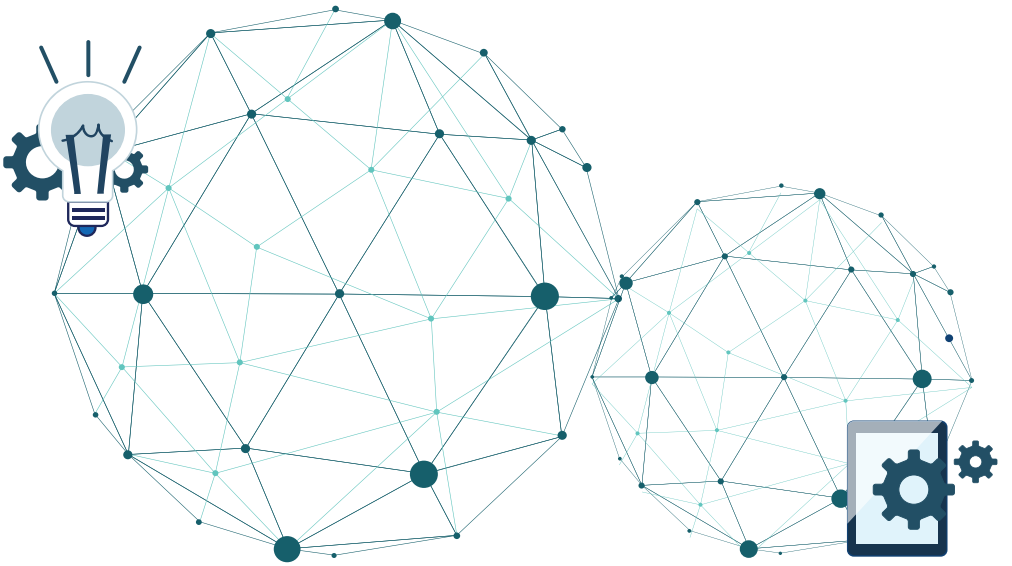
Measures of Impact	Sources
Technology Transfer Offices	
Patent applications, licenses, royalties, and sponsored research.	Thursby et al., 2001
Effectiveness of TTOs as determined by Faculty reward systems, staffing policies, and cultural differences between universities and firms.	Siegel et al., 2003
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:

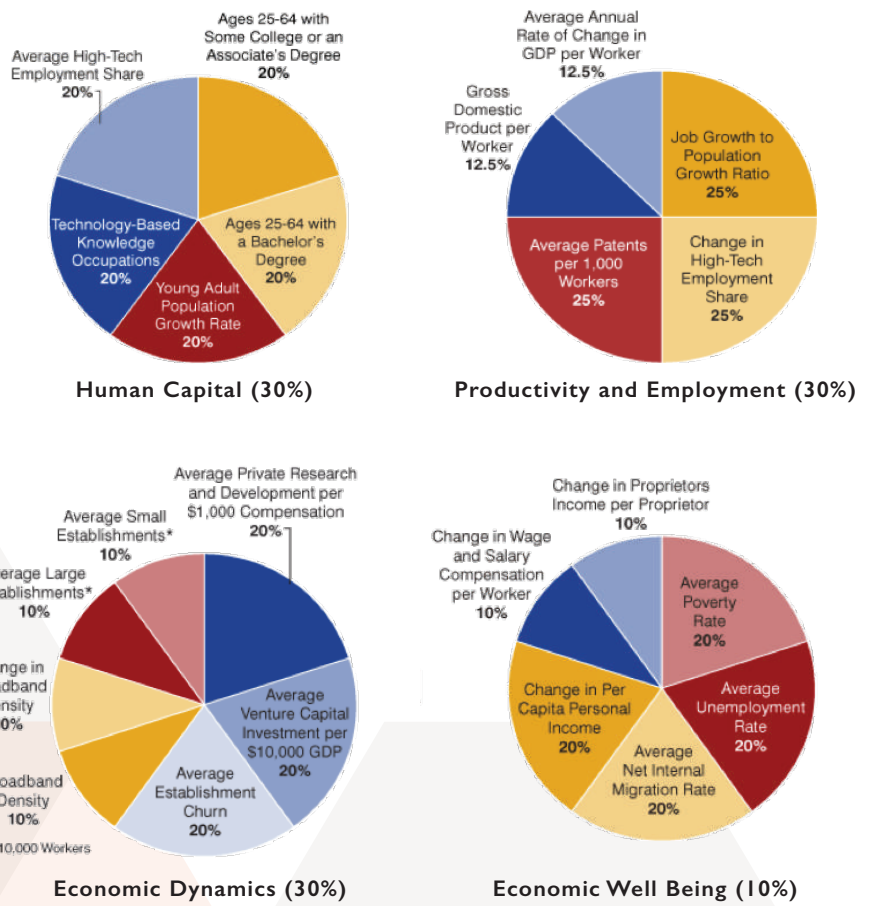
- Change in high-tech employment share
- Average small establishments per 10,000 workers
- Percent of population, ages 25-64, with post-secondary credentials
- Population growth rate for ages 25-44.

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



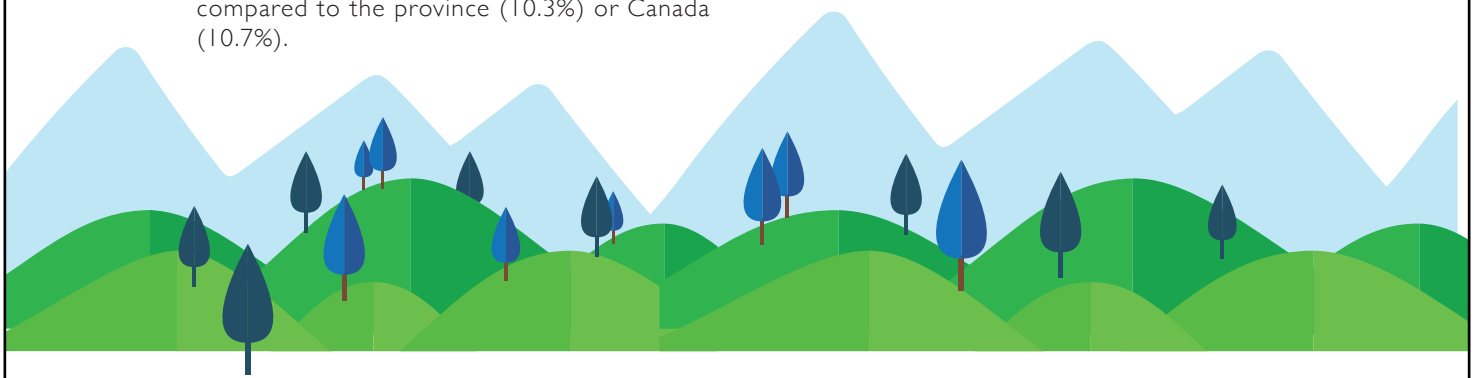
Regional Data And Analysis

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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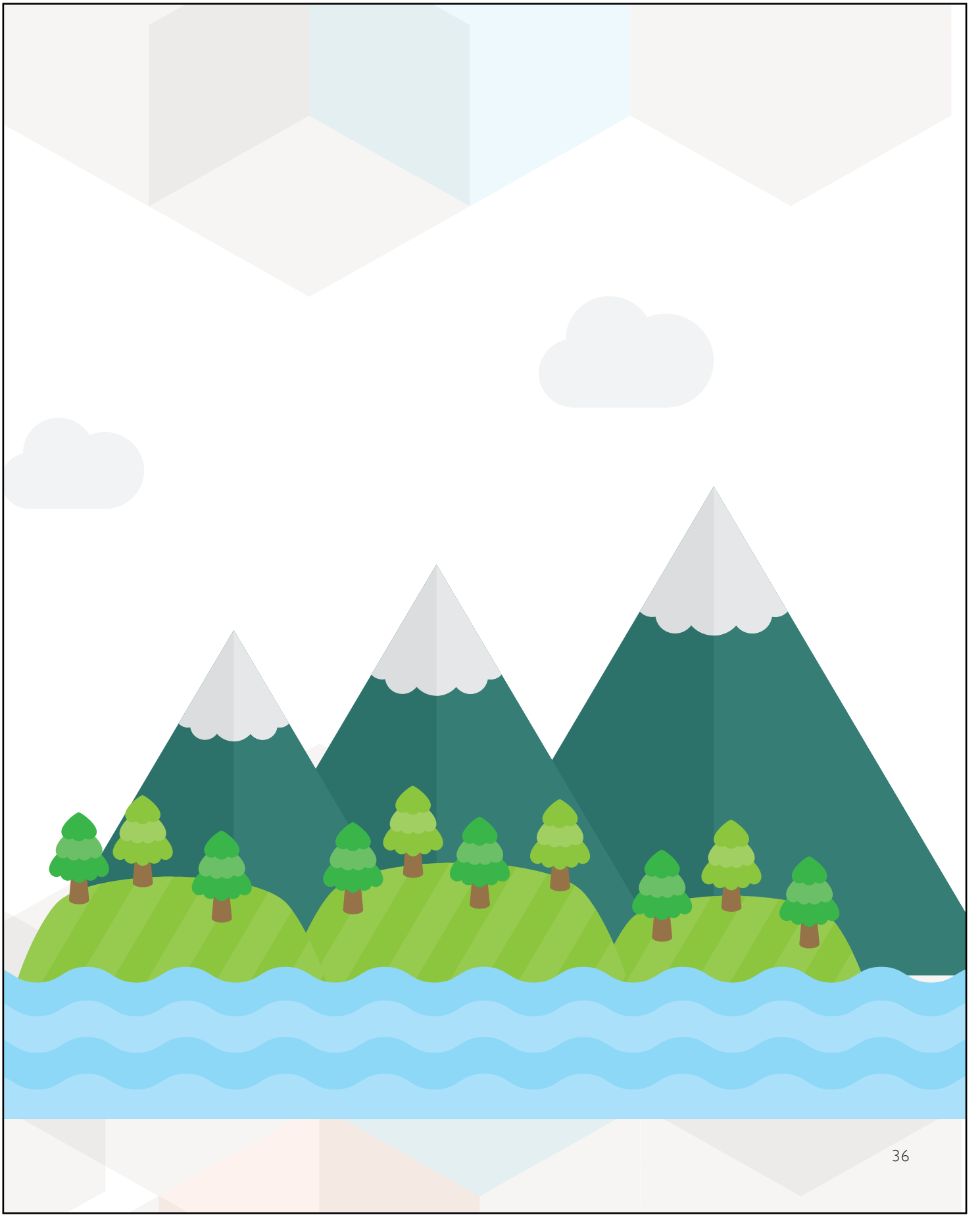

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A further summary of some of the detailed information presented in Appendix 2 is presented next. This information has been incorporated into the analysis above, though this section provides greater detail. Looking across the various items, patterns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

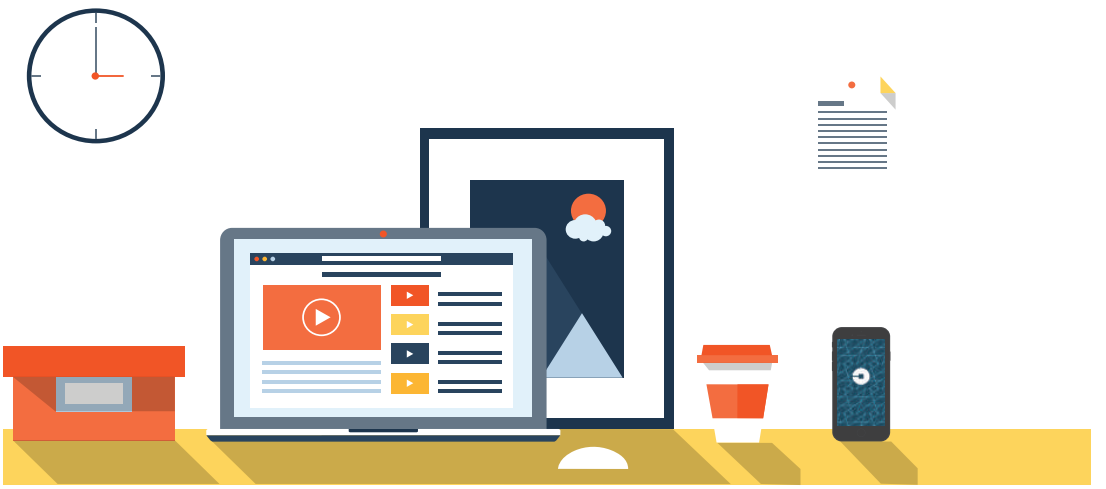
This includes tables, graphs, and charts on:

- 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.

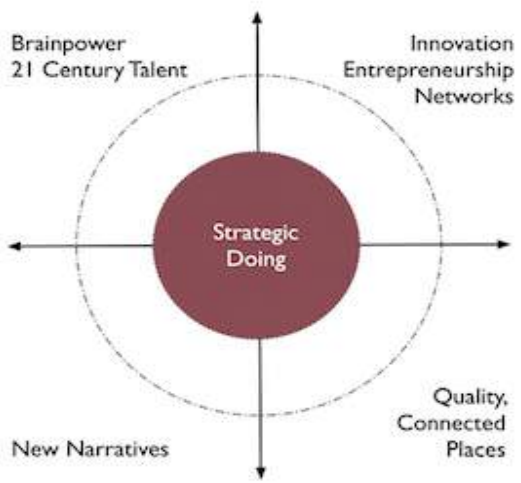
9 **Develop stronger regional brand identity and work together to promote access to larger markets – GTA, upstate NY, International.** This is one of the largest challenges to coordinated activity – "Eastern Ontario" too often is thought of as a space between rather than a distinct region. Building a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

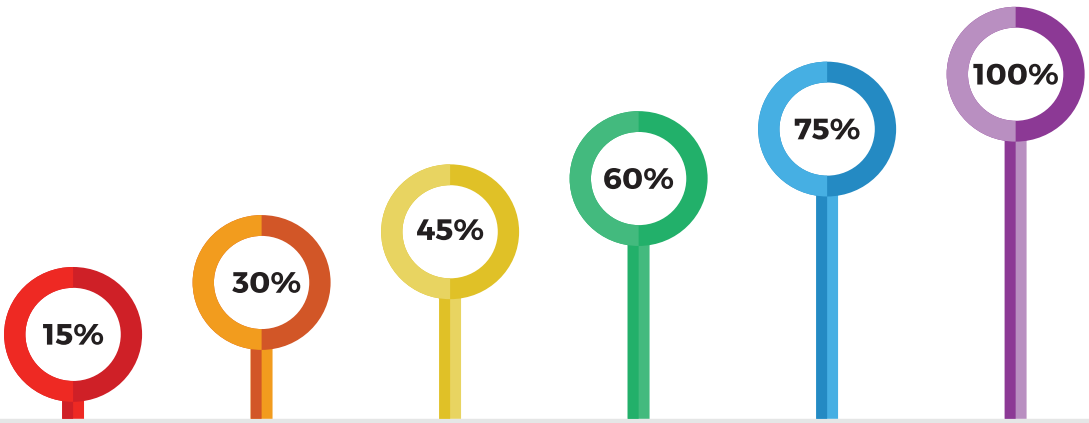
Variables included in the human capital component index suggest the extent to which a county's population and labour force are able to engage in innovative activities. Counties with high levels of human capital are those with enhanced knowledge that can be measured by high educational attainment, growth 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

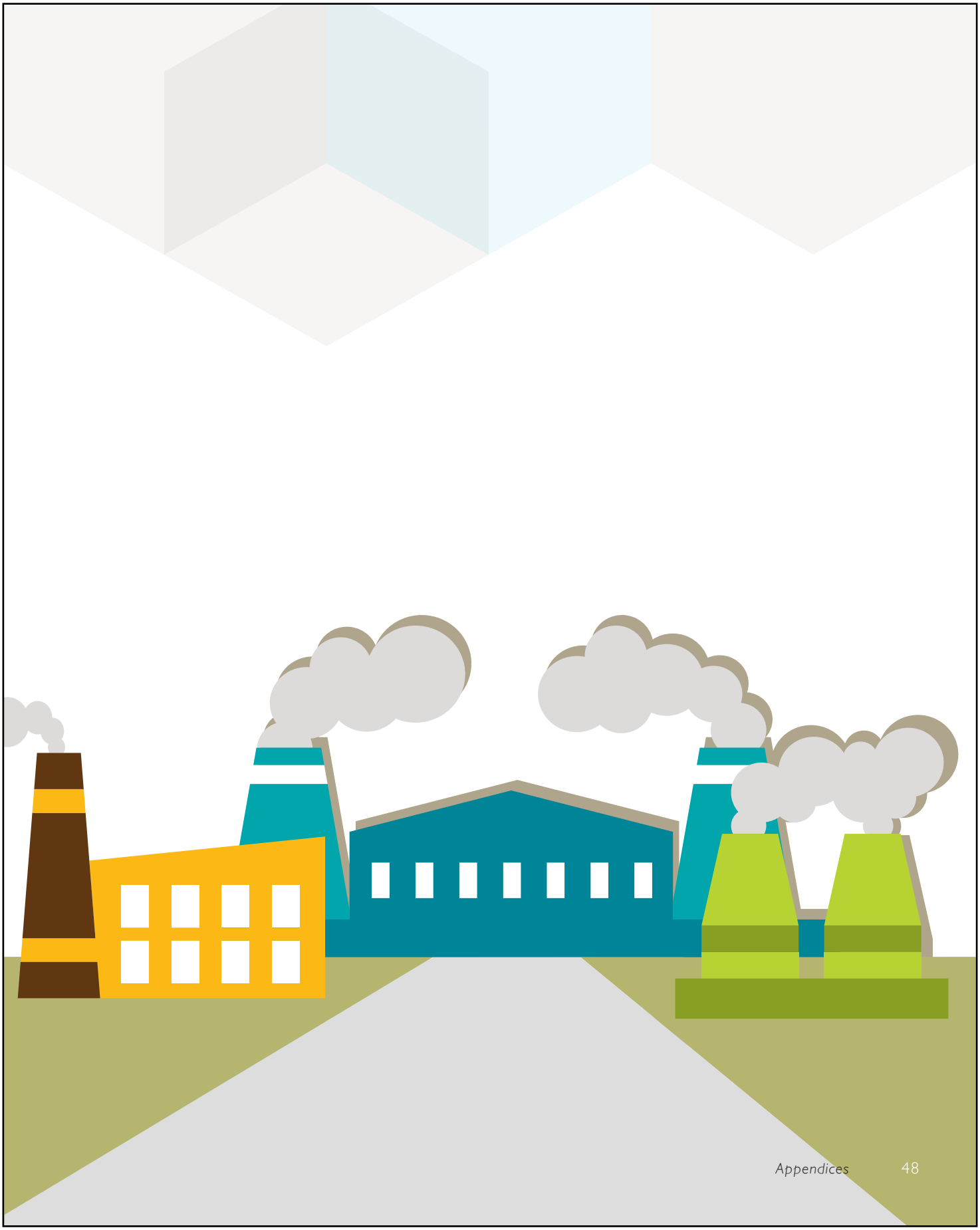
The distinction is made to capture the relative importance of a knowledge differential, together with regional distinctions in the types of degrees earned. In many states, educational funding mechanisms favour 4-year universities. Elsewhere state policy tends to favour 2-year community colleges and vocational 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

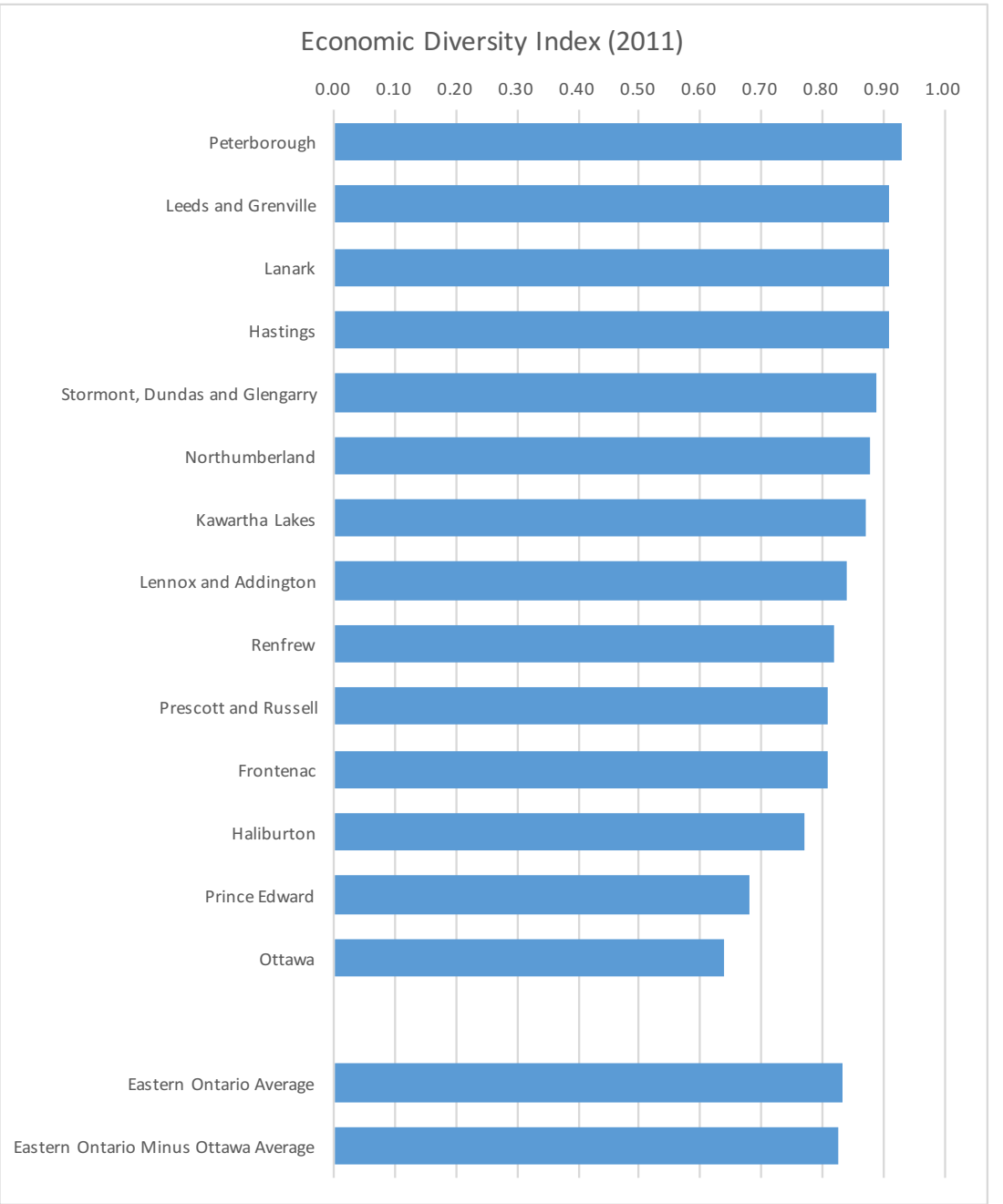
Appendix 2.1: Regional Data and Analysis Self-Employment in Eastern Ontario (2011, Household Survey)

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



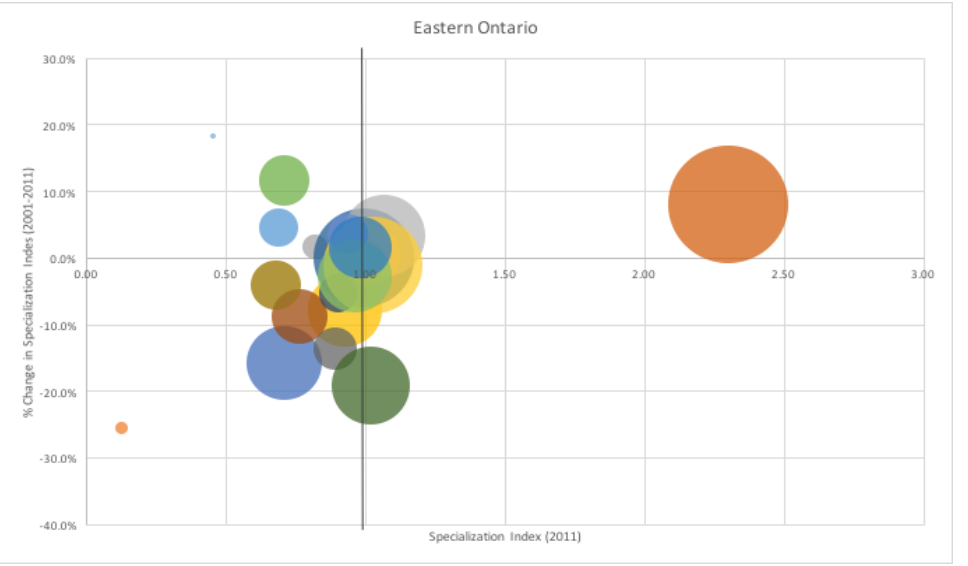
*non-response rate for Household Survey

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.

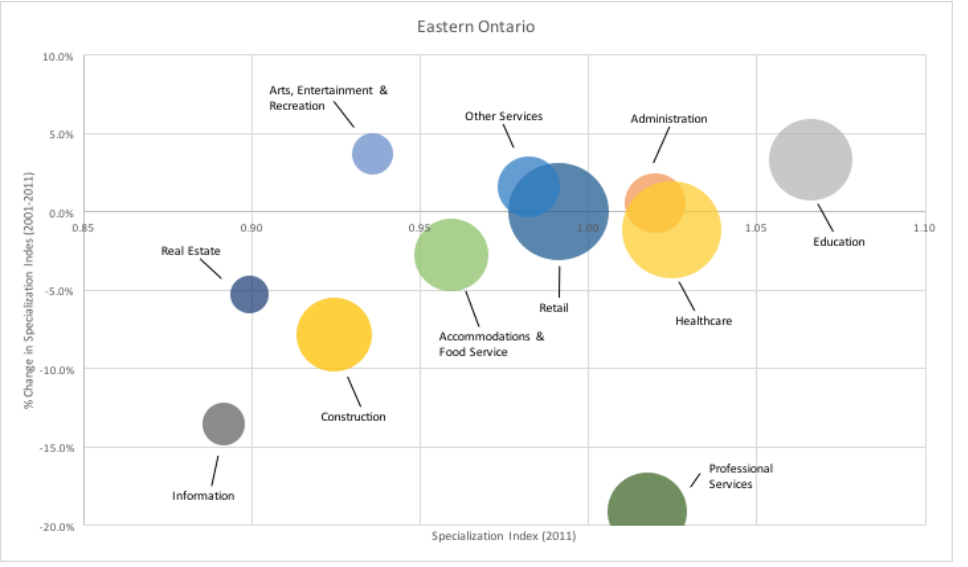
Degree of Industrial Specialization and Change over Time

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.

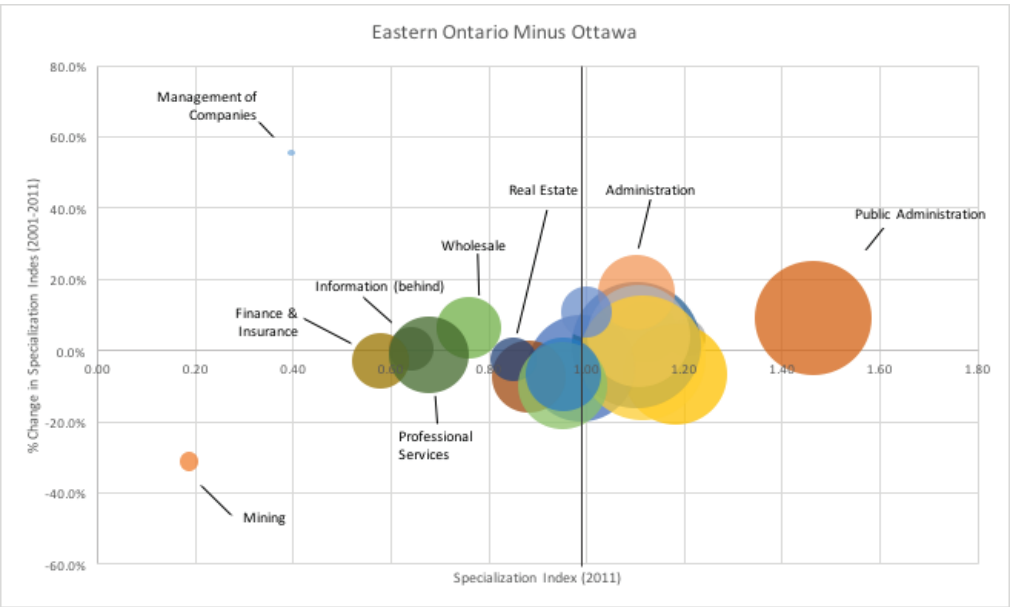
Appendix 2.3: Eastern Ontario degree of industrial specialization and Change over Time



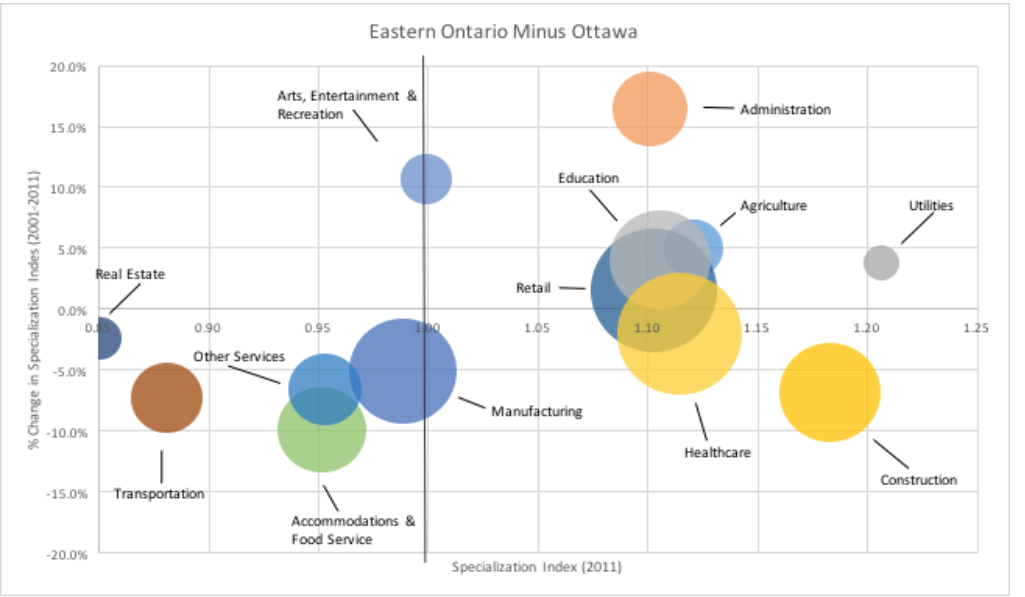
Appendix 2.4: Eastern Ontario degree of industrial specialization and Change over Time (zoomed in)



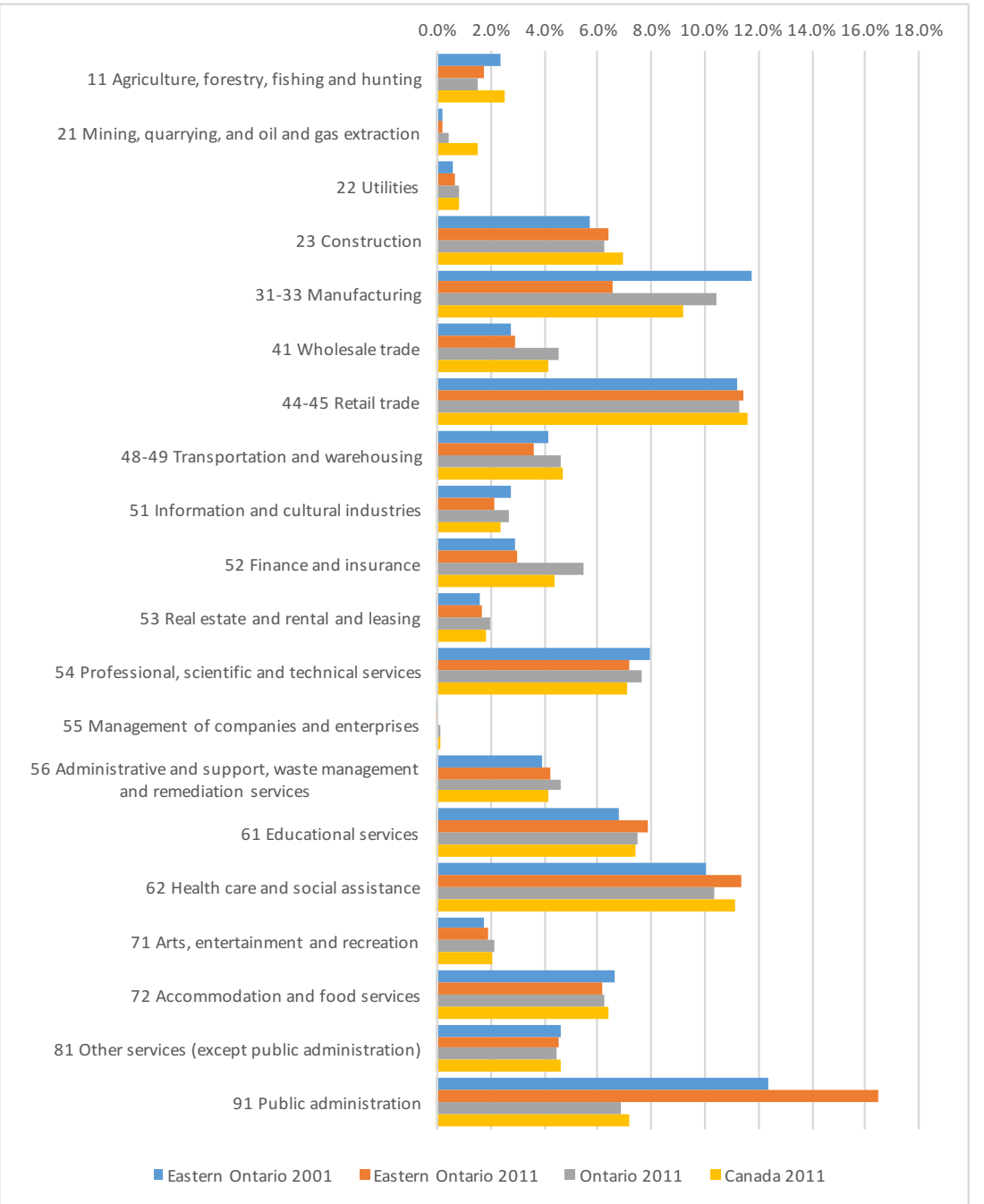
Appendix 2.5: Eastern Ontario minus Ottawa degree of industrial specialization and Change over Time



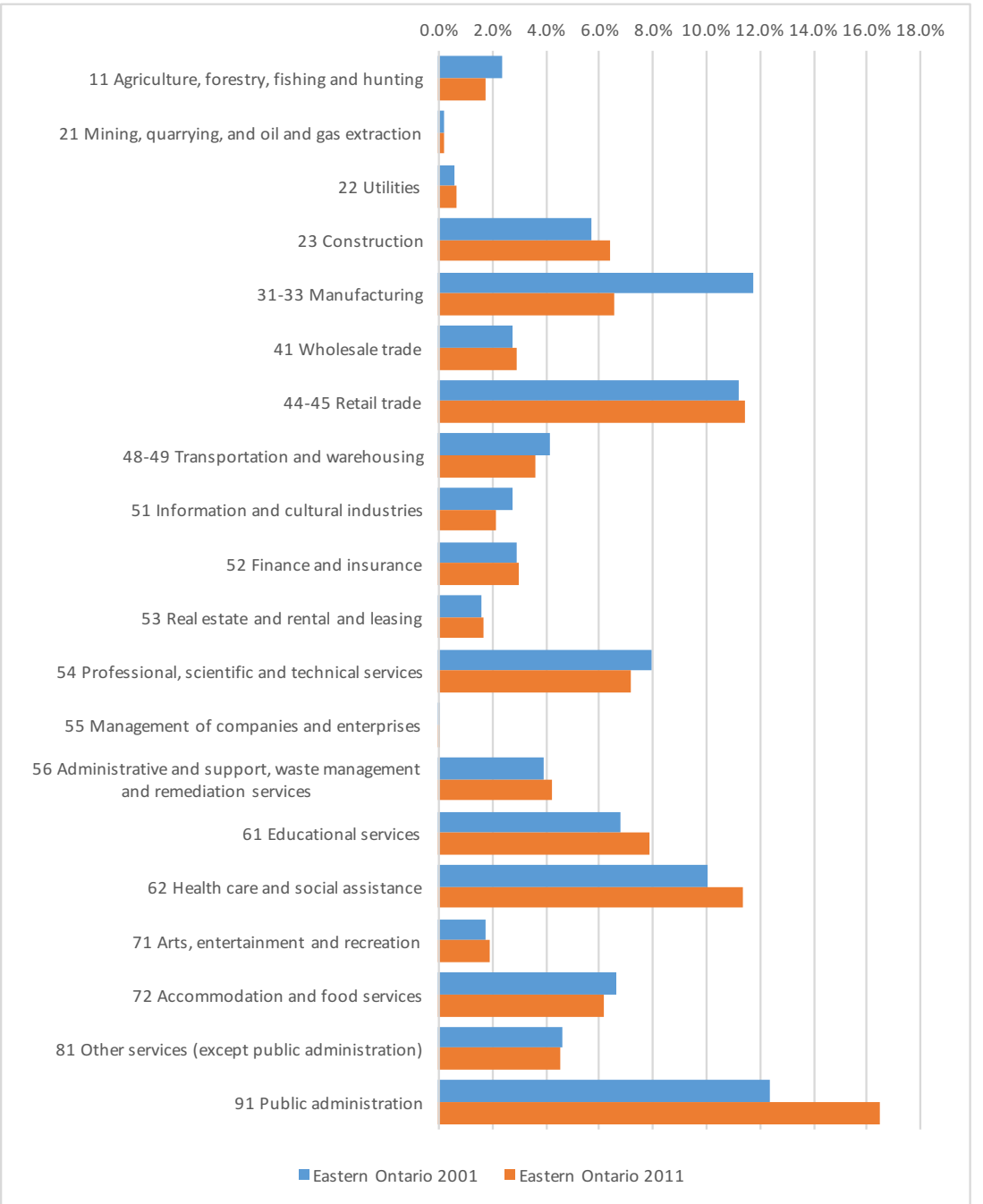
Appendix 2.6: Eastern Ontario minus Ottawa degree of industrial specialization and Change over Time (zoomed in)



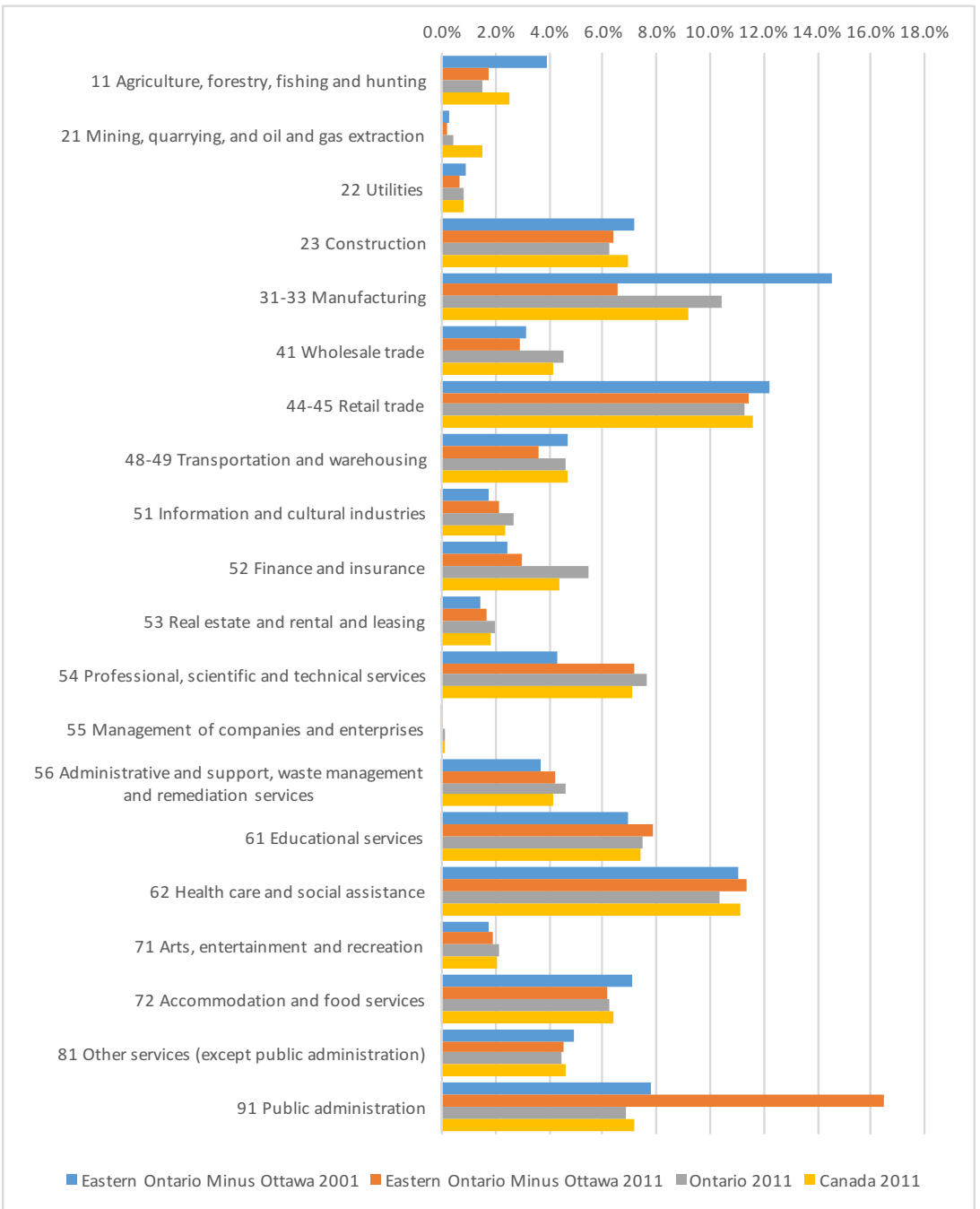
Appendix 2.7: Share of Workforce by Industry (2001, 2011 & Ontario/Canada 2011)



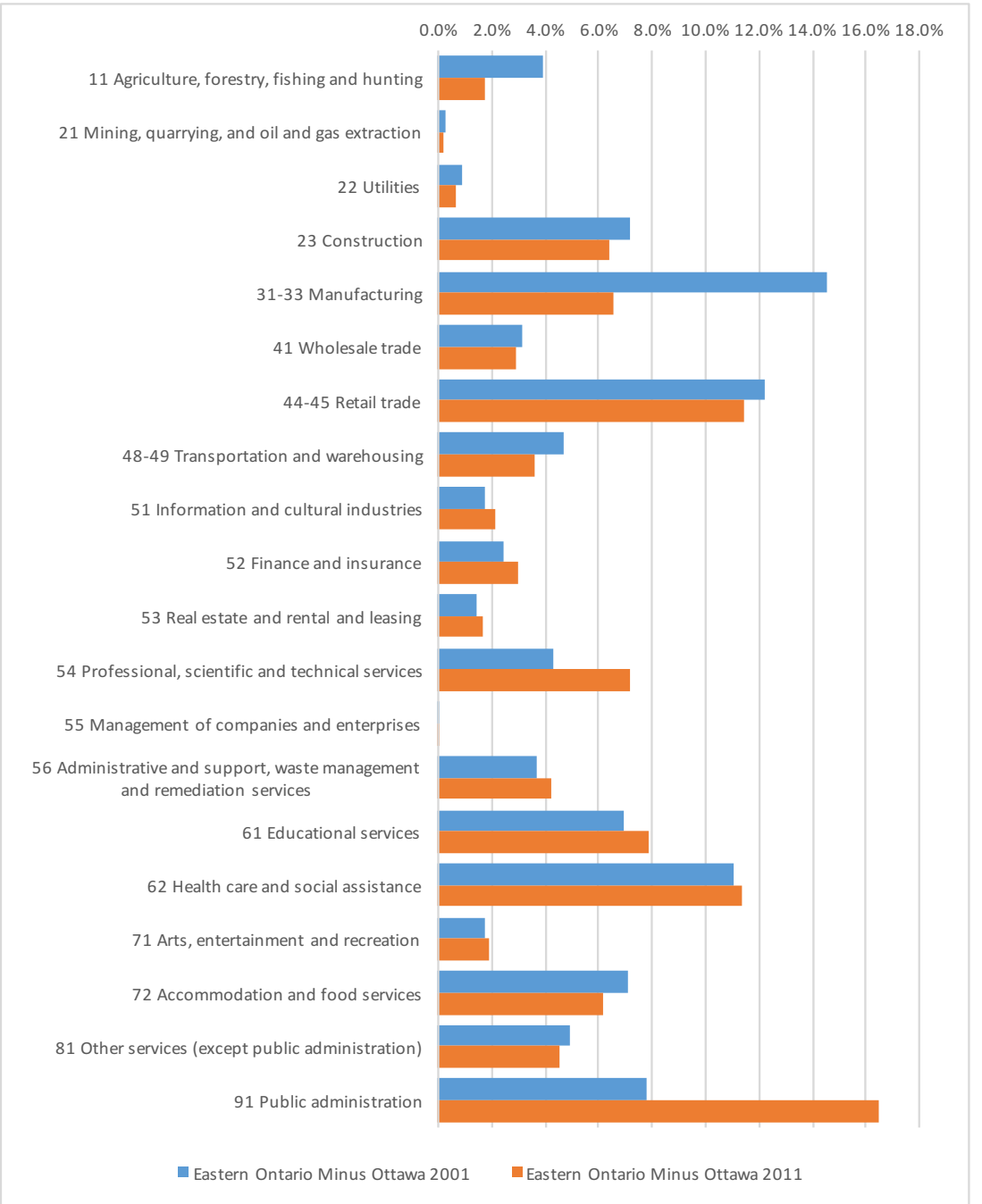
Appendix 2.8: Share of Workforce by Industry, Eastern Ontario Only (2001 & 2011)



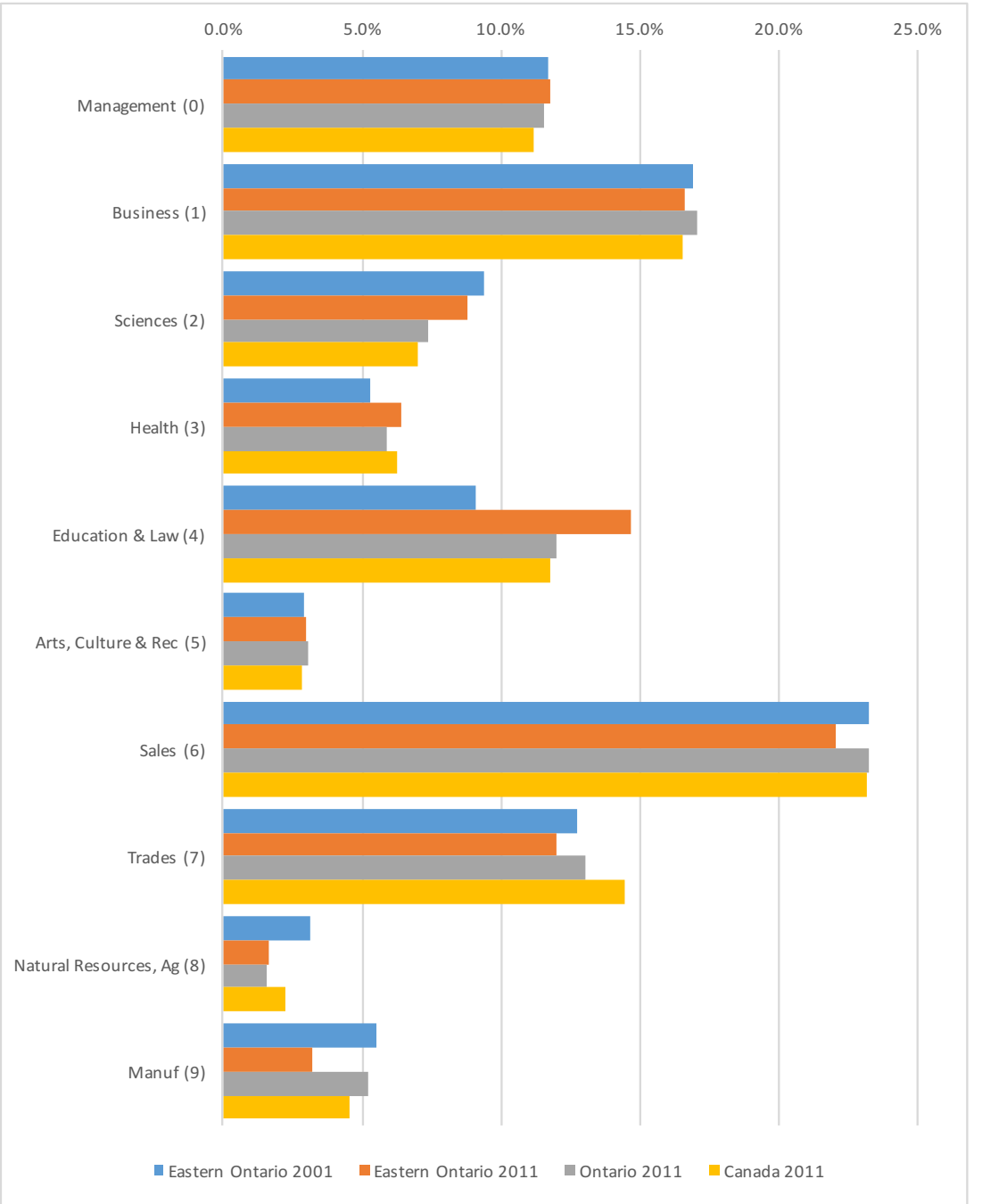
Appendix 2.9: Share of Workforce by Industry, Eastern Ontario Only - Minus Ottawa (2001, 2011 & Ontario/Canada 2011)



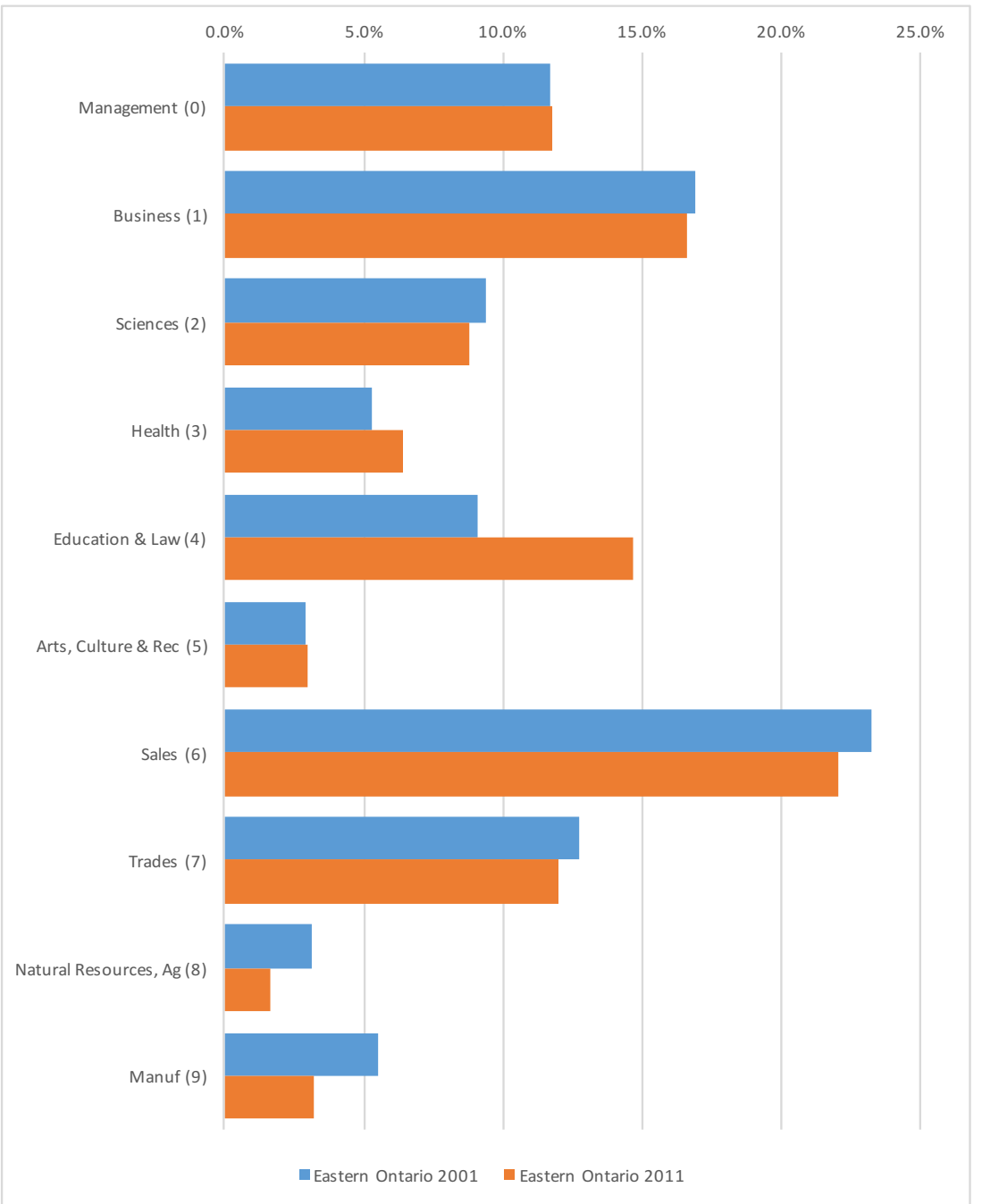
Appendix 2.10: Share of Workforce by Industry, Eastern Ontario Only – Minus Ottawa (2001 & 2011)



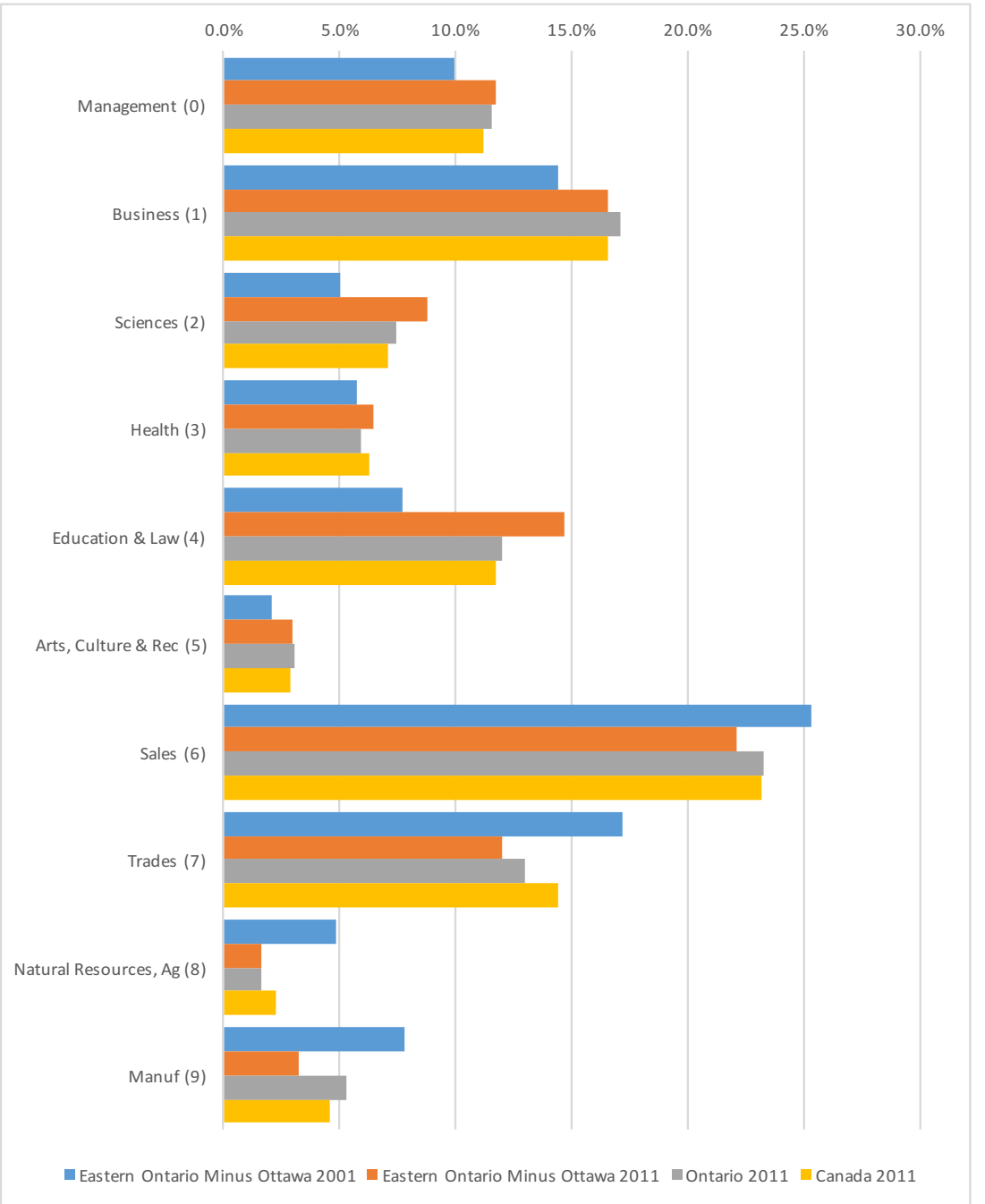
Appendix 2.11: Share of Workforce by Occupation (2001, 2011 & Ontario/Canada 2011)



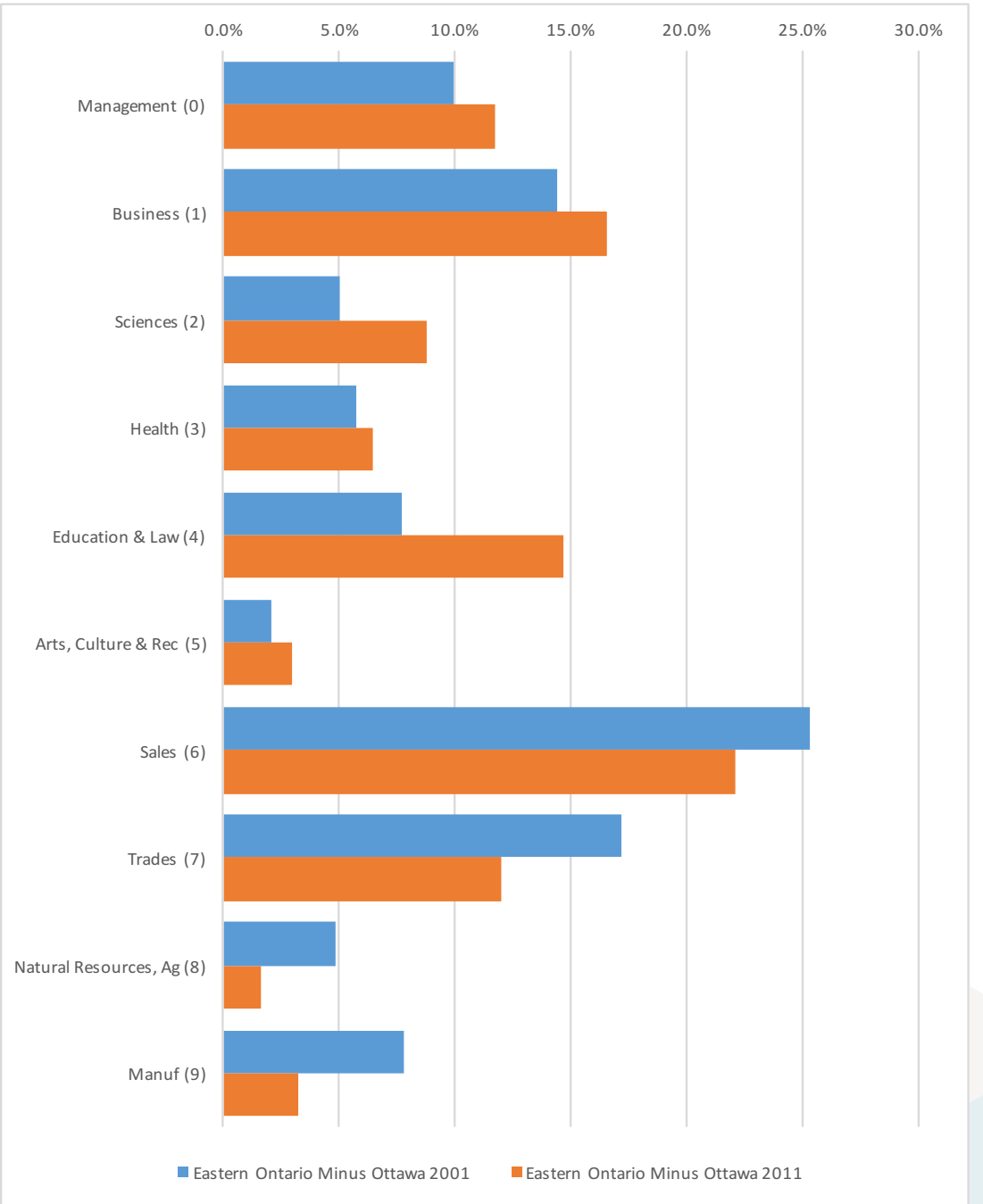
Appendix 2.12: Share of Workforce by Occupation, Eastern Ontario Only (2001 & 2011)



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-Secor 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)	Healt hcare (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

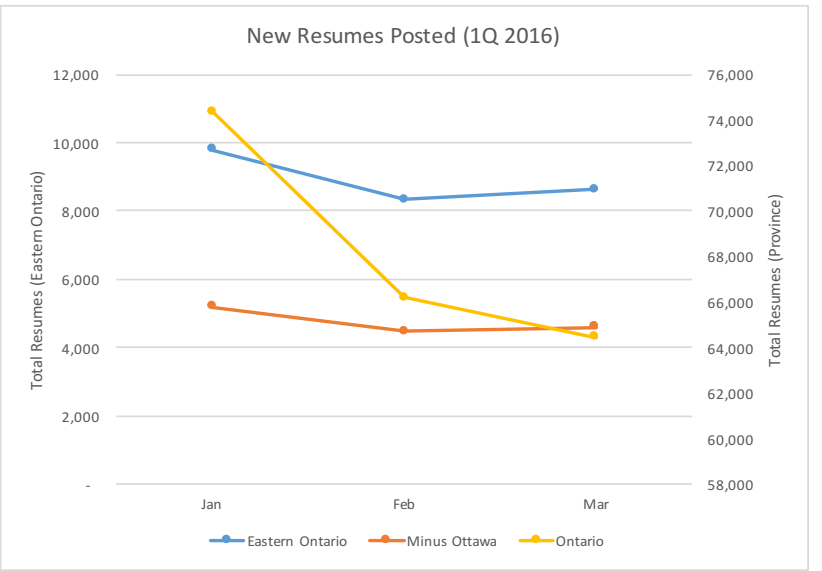
CD_Name	GNR	Worked Full-Year	Worked Part-Year	Average weeks worked in 2010
Stormont, Dundas and Glengarry	32.8	67.9%	32.1%	44.9
Prescott and Russell	24.5	69.3%	30.7%	45.6
Ottawa	21.8	68.1%	31.9%	45.2
Leeds and Grenville	37.8	69.6%	30.4%	45.2
Lanark	39.1	68.5%	31.5%	45.0
Frontenac	29.2	64.2%	35.8%	44.2
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)



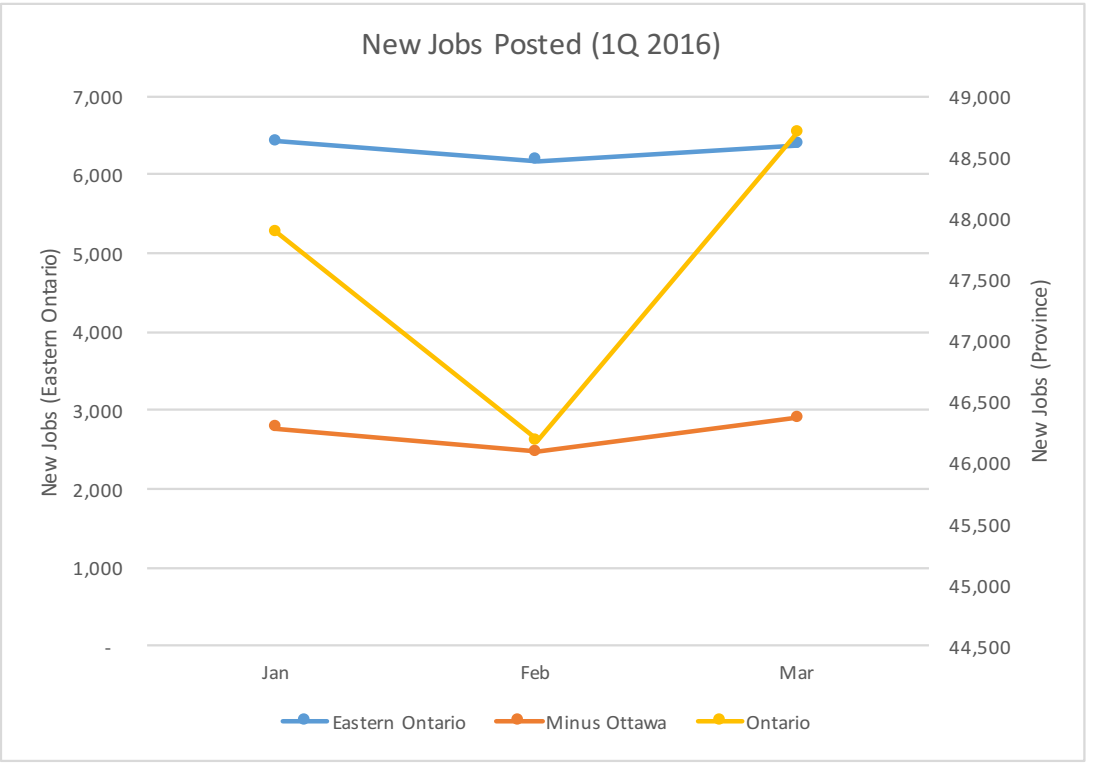
Appendix 2.26 shows the number of new resumes posted each month by region of residence. While the number of posted resumes doesn't guarantee that someone is unemployed, it does indicate that they are at least actively looking for a new job. The data is only from a single source, indeed, but it is the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



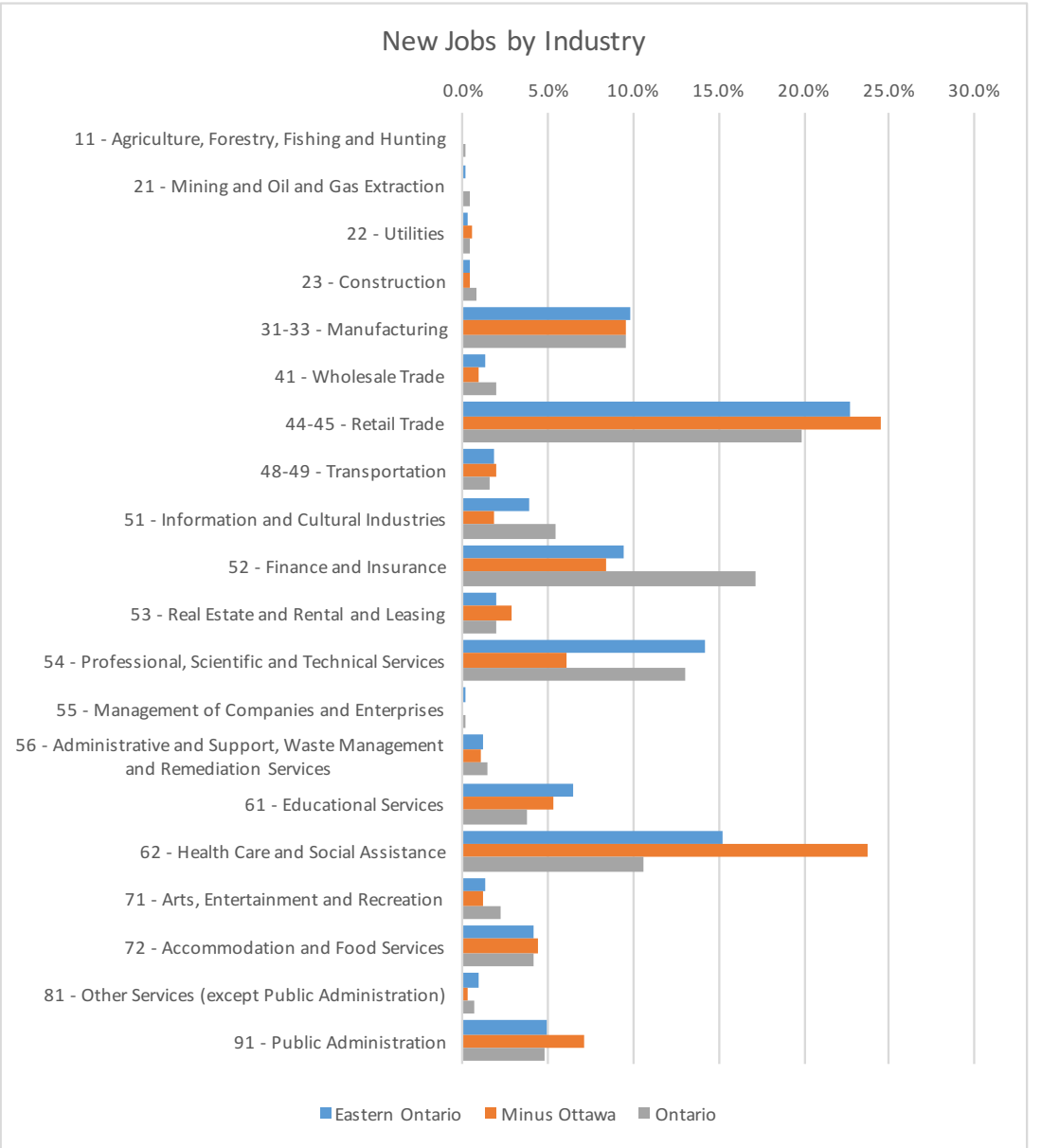
New jobs are collected across a wide variety of job posting websites and extensive efforts are undertaken to eliminate duplicates. (See Magnet/Vicinity Jobs for details.)

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)

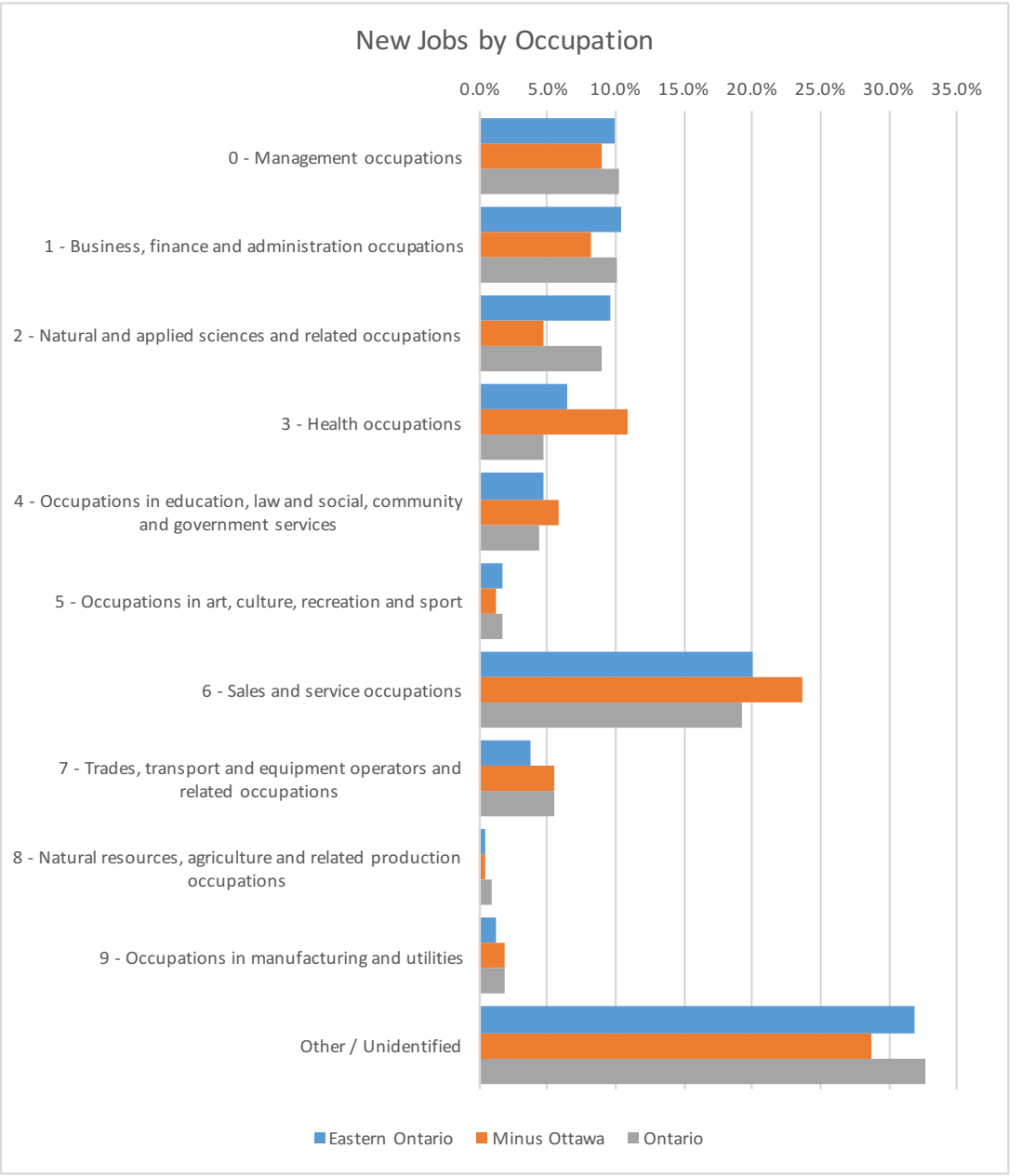
Industry/Sector	Eastern Ontario	Minus Ottawa	Ontario
11 - Agriculture, Forestry, Fishing and Hunting	0.0%	0.0%	0.1%
21 - Mining and Oil and Gas Extraction	0.0%	0.0%	0.4%
22 - Utilities	0.3%	0.6%	0.5%
23 - Construction	0.5%	0.4%	0.9%
31-33 - Manufacturing	9.8%	9.6%	9.5%
41 - Wholesale Trade	1.3%	1.0%	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)

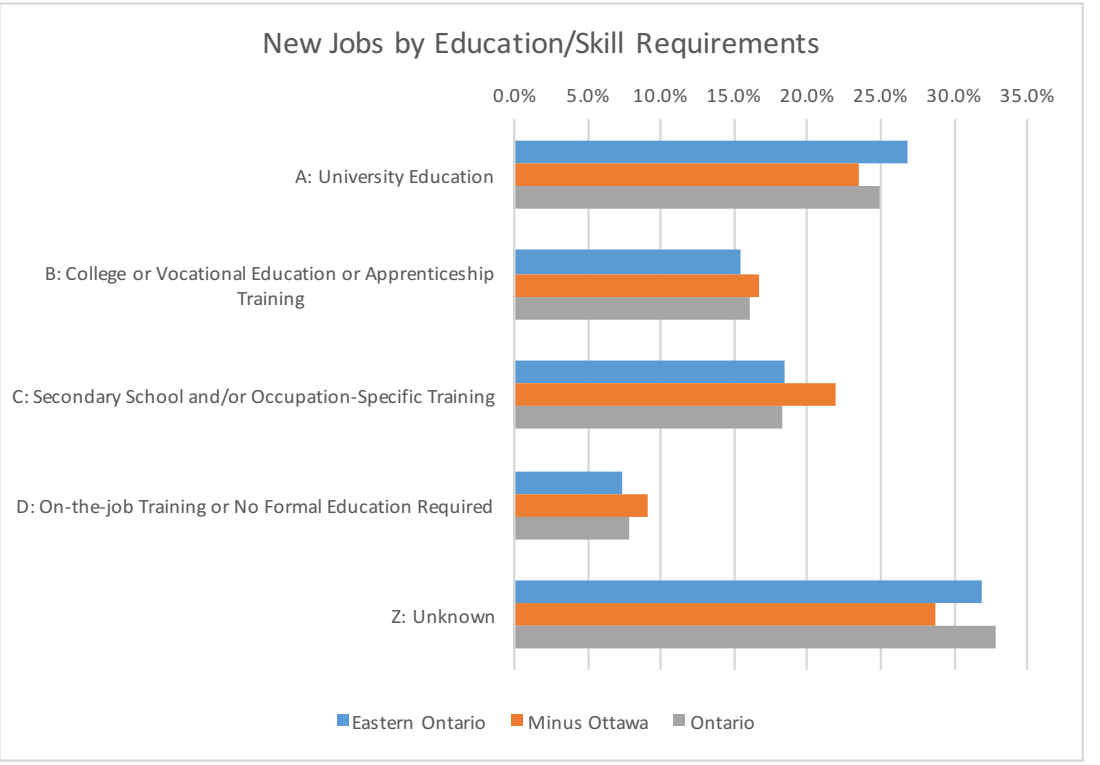
Occupation Group (first NOCS digit)	Eastern Ontario	Minus Ottawa	Ontario
0 - Management occupations	9.9%	8.9%	10.2%
1 - Business, finance and administration occupations	10.4%	8.2%	10.1%
2 - Natural and applied sciences and related occupations	9.7%	4.7%	9.0%
3 - Health occupations	6.4%	10.9%	4.6%
4 - 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



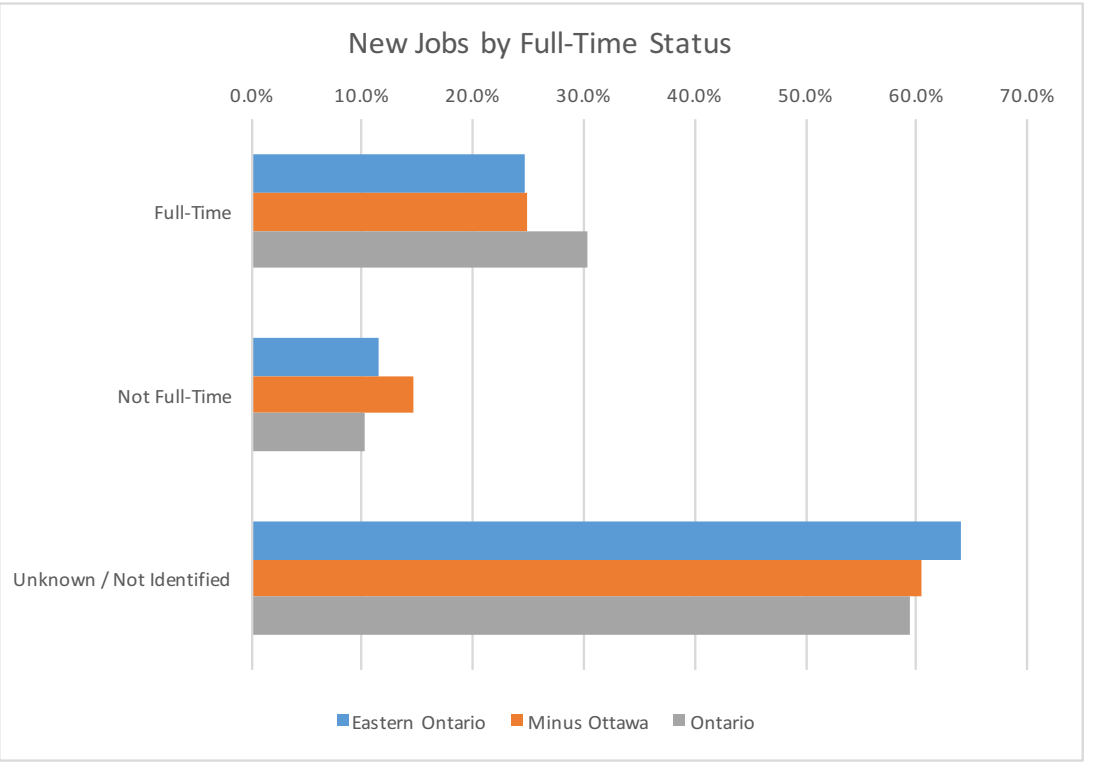
Appendix 2.36: Highest Education/Skill Requirement Listed

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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Partnership Proposal

Circular Innovation Council
and the
Eastern Ontario Leadership Council

Revised by:
Jodi Houston, Program Manager
Circular Innovation Council

Summary

In November 2023, the Circular Innovation Council (CIC) was invited by the Eastern Ontario Leadership Council (EOLC) to present on the potential for a circular economy through procurement. CIC suggested a partnership with EOLC building on previous work done with the City and County of Peterborough. At that time, CIC proposed hosting a market engagement workshop with vendors and suppliers to advance the circular economy and achieve social and environmental goals. CIC also recommended the creation of an Eastern Ontario Regional Buying Group as part of the newly launched Procure4Circular (P4C) Network. Joining the P4C network would enhance knowledge, build capacity, and foster collaborative procurement opportunities. The EOLC expressed interest in this partnership and invited CIC to discuss further with the Eastern Ontario Innovation Committee (EOIC).

In response to the EOIC's request, this document serves as a revised proposal and aims to:

1. summarize CIC's vision and benefits for the regional partnership,
2. clarify the connection to CIC's circular procurement work and Procure4Circular, and
3. propose a funding approach through the Federation of Canadian Municipalities Green Municipal Fund

Vision:

The estimated annual economy of the Eastern Ontario Region is approximately 82.5 billion. Expanding the partnership beyond the City and County of Peterborough to include the Eastern Region is strategic because combining the collective buying power can greatly accelerate the transition to the circular economy while delivering on regional priorities simultaneously.

Currently, procurement processes vary between municipalities and are siloed, limiting the potential to use procurement to address pressing regional issues. However, coordinating the collective buying power of the region and engaging with the market is a streamlined approach that will identify solutions to regional priorities such as integrated intelligent transportation systems, technology integration and innovation, and affordable housing.

Engaging with the market allows for open and cooperative conversations, providing learning opportunities for both parties. This also builds the region's capacity to understand the capabilities of the private sector in supporting the region's objectives and promoting circularity.

The proposal for the initial market engagement with the City and County involved sharing criteria and specifications developed for three spend categories (furniture, fleet, and textiles) to gather reactions and insights from the vendors and suppliers on their ability to provide environmentally preferred goods and services. The insights from the workshop would refine the criteria and specifications, ensuring positive outcomes for future procurements for these categories. This approach would also be applied to the regional partnership. Instead, the focus would expand to include region's priorities and gain market insight on how to advance and achieve those goals.

The procurement criteria and specifications would be developed based on the insights gathered from the workshop and may lead to a potential pilot project that could apply for funding through the Federation of Canadian Municipalities Green Municipal Fund.

It is important to acknowledge the efforts of the City and County to develop criteria and specifications for the three spend categories. Therefore, CIC also recommends including this work as part of the regional workshop to improve and standardize the current criteria and specifications already completed so that effort is not wasted. Such standardization of procurement criteria is highly welcomed by vendors and suppliers. Standardization criteria increases their ability to respond to tenders and helps build a business case for future investments. The investments can align with the region's goals leading to economic development opportunities, job creation, and the delivery of environmental and social benefits like reduced waste and greenhouse gas emissions.

Procure4Circular (P4C)

As part of the newly launched Procure4Circular network, CIC recommended establishing an eastern Ontario buying group to share the process, outcomes and lessons learned from the market engagement with fellow network members.

P4C is Canada's first national public procurement network focused on using buying power to advance a circular economy. The network is comprised of individuals from all levels of government and the wider public sector and is organized by common spend categories. The spend categories include fleet and transportation, facility and building management, office and furniture supplies, food and catering, construction and renovation, and information technology.

The P4C network is an ever-evolving, ever-scaling initiative that aims to advance the circular economy through the development of standardized procurement criteria, metrics, and key performance indicators to be tested through pilot projects.

Participation is voluntary and participating would align with the objectives of the market engagement. Members of the Eastern Ontario group would gain valuable insight, build capacity and knowledge to share with colleagues, and have access to new approaches, initiatives, tools, and resources.

Funding through the Green Municipal Fund

To obtain project funding from the Green Municipal Fund, applicants must go through a pre-determined process, which includes a feasibility study. CIC believes the proposed market engagement session could be framed as a feasibility study, demonstrating market readiness to drive outcomes related to the GMF project funding requirements. For example, the GMF has several funding streams, including active and low carbon transportation systems. The transportation funding stream could align with the regional priority of integrated intelligent transportation systems. The targets under this stream include reducing GHG emissions or energy use by a municipal fleet or fleet subset 20 percent below current baseline and have the potential to reduce vehicle kilometres travelled in single- occupancy vehicles by encouraging alternative modes of travel. The funding stream also requires a 20% reduction in GHG emissions and energy use below current baseline.

The objectives of the Eastern Ontario Regional market engagement workshop could align with the outcomes of the funding stream and therefore, determine the feasibility and ability of the market to deliver a 20% reduction or more. This insight can then be used as evidence in the application to secure funding for pilot projects.

Moreover, the City and County of Peterborough took part in the Circular Cities and Regions Initiative. The CCRI program for 2024-2025 was initiated on February 22, 2024, providing participants with funding and access to coaching services from circular economy experts. CIC has been selected by CCRI and FCM to offer expert guidance and coaching services to participating communities. Due to CIC being commissioned by this initiative to provide expert guidance, the ECOL could access funding, through the City and County's participation in CCRI, to offset some of the expenses of the partnership and market engagement workshop. Additionally, CIC has already discussed the potential partnership with FCM representatives which has generated interest in creating a case study to share with the CCRI community.

Conclusion

In conclusion, we propose the following steps to move forward:

- Establish the EOLC buying group with Procure4Circular.
- Arrange a meeting with GMF to discuss the vendor engagement workshop and its relevance to the feasibility study requirement.
- Determine the approach and priorities for the market engagement workshop.
- Host the market engagement workshop.
- Submit proposal to fund pilot projects based on the results of the vendor engagement workshop.
- Develop case studies / implementation guide / webinars to bridge knowledge.
- Share insights and lessons learned with the Procure4Circular network.

Proposed Financial Commitment

Cost Breakdown		
Task	**Description**	**Projected Cost**
Management	Preparation of workshop materials and customization	$1290.00
Execution	Workshop Delivery (including travel costs)	$3360.00
Follow up	Wrap up Reporting – What heard summary	$1000.00
Total		**$5650.00**

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EORN
EASTERN ONTARIO
REGIONAL NETWORK

Digital Strategy Environmental Scan

September 2023 update

By: Koren Lam and Kristen Myers

Table of Contents

Executive summary

As a means to better understand current digital trends and revise its current Digital Strategy 2015-2024 amidst the onslaught of Covid-19, EORN undertook an environmental scan of existing digital strategies, programs and associated key performance measurements, within Canadian and international contexts in 2021. The following is an overview of the findings gathered from the environmental scan conducted in 2021, as well as additional research undertaken in 2023. The scan includes key information gathered within Canada at the federal, provincial, and municipal and local levels, as well as internationally, including those associated with national governments, regional institutions and inter-governmental bodies. Indigenous digital strategies and initiatives are also explored.

Summary of themes across digital strategies

Federal	Provincial	Municipal	International	Indigenous
2021				
1. Connectivity and access 2. Digital infrastructure (high quality networks) 3. Economic development 4. Competition 5. Partnerships 6. Data knowledge 7. Security and safety 8. Affordability 9. Spectrum 10. Innovation	1. Connectivity and access 2. Economic development 3. Data knowledge 4. Digital infrastructure 5. Reconciliation 6. Innovation 7. Digital government 8. Digital skills 9. Community broadband models	1. Digital government 2. Smart cities 3. Economic development 4. Digital infrastructure 5. Consultation 6. Inclusion 7. Connectivity/access 8. Partnerships	1. Digital Infrastructure 2. Security and safety 3. Accessibility, Connectivity, and Inclusiveness 4. Collaboration and partnerships 5. Digital Services 6. Accountability, trust, and transparency 7. Digital literacy and skills 8. Innovation 9. Data power and protection	1. Governance 2. Leadership 3. Access 4. Affordability 5. Digital equity and inequity 6. Digital ability and skills development 7. Innovation 8. Resilience 9. Economic reconciliation 10. Infrastructure 11. Employment and business development

2023				
1. Connectivity 2. Data 3. Digital infrastructure	1. Connectivity 2. Economic development 3. Community broadband model 4. High quality network (resilient)	1. Connectivity 2. Access 3. Digital service delivery 4. Connecting communities 5. Online services 6. New and emerging technologies 7. Digital and data governance 8. Digital literacy 9. Digital equity 10. Human rights and democracy 11. Privacy and security – protection of infrastructure and data privacy and security 12. Transparency and accountability 13. Collaboration and partnerships 14. Innovation 15. infrastructure and Healthy and vibrant communities and economic growth	1. Digital infrastructure 2. Transparency 3. Accessibility 4. Trust 5. Accountability 6. Harmonization of regulations and policy 7. Innovation 8. New and emerging technologies 9. Resilience 10. Public service delivery 11. Data governance 12. Cyber security 13. Public safety 14. Affordable security 15. Collaboration and partnerships 16. Health care – telehealth, access, etc. 17. Digital workforce 18. Technology and Economic and social development 19. Entrepreneurship 20. Competitiveness 21. E-commerce 22. Digital transformation of businesses	1. Governance 2. Indigenous leadership in technology 3. Digital infrastructure 4. Relationship management 5. Partnerships and accountability 6. Resilience 7. Cyber security 8. Innovation 9. Online platforms 10. ICT capability 11. Digital equity and rights implementation 12. Accessibility and participation 13. Affordability 14. Digital ability 15. Data governance 16. Data access and repatriation 17. Data trust, ethics and OCAP (ownership, control, access and possession)

Overarching themes and key takeaways across digital strategies in 2021

1. Digital infrastructure – improve accessibility, connectivity, affordability, and inclusiveness by investing in high quality networks that are resilient and provide high capacity (increased spectrum) in rural and remote areas
2. Digital knowledge– emphasis placed on digital skills and digital literacy. Knowing how to access the internet securely and safety, and accessing datasets from open government sources that build on accountability, trust and transparency
3. Partnerships and collaboration – collaboration amongst multi-level governments, private sector and community organizations is often required to build financial capacity and deliver large scale broadband projects
4. Data knowledge and protection- the power of data to guide decision-making and the need for better protection, safety and security when it comes to accessing and sharing data
5. Innovation – research and development in sustainable telecom technologies that could help lower carbon emissions
6. Honourable mention: Indigenous connectivity

Overarching themes and key takeaways across digital strategies in 2023

All key themes and trends across digital strategies explored in 2021 (as above) remained relevant to those explored during the 2023 update. However, there were a number of new trends, as well as themes which took on a greater level of importance.

1. Digital governance – coordination and harmonization of policy, governance principles, frameworks for trust and transparency across multiple levels of government, and across organizations and communities
2. Digitization of services – increase in public service delivery via online platforms, collaboration of platforms, quality of digital services, accessibility of services, transformation of existing digital services
3. New and emerging technologies – adoption of new technologies to expedite and improve service delivery
4. Technology supporting economic and social development – digital services, health care services, human rights, equity and inclusion, food security, connected communities, digital villages, adoption of technology for development and competitiveness, business development and improvement, e-commerce, and entrepreneurship
5. Cyber security – including affordable security, public safety, data protection, abuse prevention of cyber infrastructure, combating of cyber crime, cyber insurance, and security affordability
6. Resilience – while mentioned in the 2021 findings, a growing emphasis has been placed on resilience, including quality infrastructure and networks, flexible and secure infrastructure, resilience in the face of cyber security
7. Indigenous connectivity – digital equity, economic reconciliation, Indigenous rights, data access and repatriation, data trust, ethics and OCAP (ownership, control, access and possession)

An overview of digital strategies

Federal digital strategies in Canada

	Article title	Theme(s)	Summary
		2021	
National/federal level			

1.	Canada's Connectivity Strategy (2019)	• Connectivity/ access
		• Digital infrastructure (resilient)
		• High quality networks (bandwidth and latency)
		• Partnerships
		• Investments
		• Economic development
		• Data
		• Affordability
			• The document serves as Canada's first connectivity strategy with a focus on policy objectives that relate to bridging the digital divide, reducing regulatory barriers (reducing radio license fees, lowering pole attachment costs) and expanding the availability of spectrum
			• Scalability of technological solutions (mix of wireline, wireless and satellite) must meet the connectivity demand for businesses and at residential premises
			  ○ Anchor institutions/MUSH sites often require higher network speeds of up to 1 Gbps due to population density and need connectivity to deliver essential services (health, education)
			  ○ Network infrastructure must be resilient, reliable and support low latency performance
			• Broadband deployment has found to increase employment growth and average wage growth in service industries by 1.17 and 1.01 percentage points respectively per year in rural regions (Ivus and Boland, 2015)
			• In 2018, only 41 per cent of rural households had access to high-speed Internet at 50/10 Mbps, compared with 98 per cent of urban homes, limiting their ability to participate in the digital economy and their potential for economic development.
			• Forming partnerships amongst government levels can align application requirements, improve information, access to funding and program resources, transparency with relevant datasets

2.	Canada's Digital Charter (2019)	• Connectivity/access • Economic development • Digital government • Digital infrastructure	• In 2022, Bill C-27 (Digital Charter Implementation Act) was introduced and was amended to this charter. This bill would modernize the framework for the protection of personal information in the private sector and introduce new rules for the development and deployment of artificial intelligence (AI). This bill mainly focuses on the broadcasting sector

		• Data • Privacy • Affordability • Competition	• Canada's Digital Charter principles help address challenges and leverage unique talents and strengths in order to harness the power of digital and data transformation. 10 principles of the charter are mentioned below: 1. Universal access 2. Safety and security 3. Control and consent 4. Transparency, portability, and interoperability 5. Open and modern digital government 6. A level playing field 7. Data and digital for good 8. Strong democracy 9. Free from hate and extremism 10. Strong enforcement and real accountability • The charter recognizes investment incentives for next generation technologies such as the need to accelerate the deployment of 5G connectivity. It also aims to modernize the privacy ecosystem to give more control to consumers using data-driven innovations (page 18) by examining changes to the Personal Information Protection and Electronic Documents Act (example: monitoring spam and electronic threats) • Canadian research in artificial intelligence promotes collaboration, talent building. Canada works with international partners in the International Panel on Artificial Intelligence to support and guide responsible adoption of AI that is human centric (inclusion, diversity, innovation and economic growth). Certain partnerships include World Economic Forum on fourth Industrial Revolution on the development of data policy • Programs: rural broadband – connecting families, accessible technology program, Cancode, Innovation and Skills Plan program, municipal modernization
3.	Canada's Digital Charter in Action (2019)	• Connectivity/access • Economic development • Digital government • Digital infrastructure • Data • Privacy	• Provides a progress update on Canada's digital charter in action • During public consultation sessions, individuals noted technology will impact the labour market, unleash innovation, and every individual's privacy and trust • Rural and remote communities cannot unleash their potential innovation and are slow adopters of new technology because access to connectivity is limited

4.	Rural Opportunity, National Prosperity: Canada's Economic Development Strategy for Rural Canada (2019)	• Connectivity/access • Data • Economic development • Digital literacy • Digital infrastructure • Affordability	• In 2021, ISED published a progress report indicating the release of Statistics Canada Rural Data Hub for data specific to rural communities in Canada. The update also touched on new federal funding (Labour market, economic development, green infrastructure) for rural communities. The funding aims to "enhancing Canada's competitiveness through digital adoption to improve productivity and manufacturing processes" and continue to build resiliency in a post-pandemic era • Overview of economic development strategies for Canadian rural and remote communities. During the consultation process, the following themes were identified: higher access to connectivity, talent attraction and retention, improved infrastructure that is resilient to climate change • Poor connectivity in rural areas remains a challenge for economic development elements (retaining youth, talent attraction, growing businesses, training new workers and adopting new technologies) • Tracking rural aging public infrastructure remains a challenge because 60 per cent of Canadian municipalities have five staff members or fewer and own 49 per cent of infrastructure assets • Programs: federal and provincial broadband programs, smart cities challenge, FCM's asset management program
5.	Budget 2021: Recover plan for jobs, growth and resilience (2021)	• Connectivity • Data • Digital infrastructure	• Provides a breakdown of government stimulus to social, economic and cultural issues to help Canada recover from the aftermath of the COVID-19 pandemic • A newly announced data commissioner role will ensure Canadians can trust their data is protected and ongoing standardization of data • Programs: $1 billion added to UBF, Operation High Speed Quebec, data commissioner ($17.6 million over five years), industry wide data governance standard through SCC ($8.4 million over five years)
6.	Yesterday's Gone: Exploring possible futures of Canada's – Future Skills Centre and Brookfield (2021)	• Connectivity/access • Economic development • Labour market	• Technology has impacted the future of work in Canada. Examples include automation and AI accelerating tasks in vertical industries, international talent attraction, and work from home capabilities • The future of work in Canada could have an implication on the labour market. These include greater demand for social, emotional and metacognitive skills as a result of the expansion of virtual learning environments. Also, students who would not have been able to access training programs are able to do so over a virtual platform • Increasing investments in space technology could open up new opportunities towards an emerging 'space economy'

7.	Waiting to Connect – Council of Canadian Academies (CCA) (2021)	• Connectivity/access • Indigenous • Reconciliation/self-determination	• This report discusses whether high throughput networks (1 Gbps) would solve the rural-digital divide. The findings indicate several rural communities might not be ready for embracing technology and existing access divides between have and have nots could increase (digital inequity) • Remote and Indigenous communities are in higher need of ultra-fast broadband connectivity limiting self-determination and Indigenous economic reconciliation. Indigenous people work in industries with higher risk of job loss due to automation and will require the digital skills and literacy to fully use the internet • Rural communities can assess the legal/regulatory, ethical, economic, social and policy (LESP) before broadband investments to ensure citizens are ready to embrace technology. Otherwise, technology can exacerbate existing disparities
2023			
National/federal level			
8.	2023–2026 Data Strategy for the Federal Public Service	• Connectivity • Data • Digital infrastructure	• Data Strategy for the Federal Public Service is a document that sets renewed priorities, goals and expectations for the federal public service to use data as a strategic asset and improve outcomes for Canadians and others served by the government • Four mission areas: the main focus of the strategy, which are data by design, data for decision-making, enabling data-driven services, and empowering the public service with talent and tools
9.	Canada's Digital Government Strategy (2022)	• Connectivity • Data • Digital infrastructure	• Historical and current issues that affect the quality/consistency of digital services across federal government, such as siloed services and data, fragmented IT infrastructure, technical debt, aging software/hardware, and talent recruitment/retention • The progress and investments in digital transformation: the achievements/initiatives that the government has made to modernize/enhance its digital services, such as decommissioning legacy data centres, implementing cross-government IT solutions, supporting rural and remote connectivity, addressing COVID-19 impacts, and attracting tech employees with digital skills • The future direction and vision for digital government: the guiding principles and goals that the government has set to become a truly digital government that delivers user-centric, secure, accessible and reliable services to Canadians and businesses

Provincial and regional digital strategies in Canada

	Jurisdiction	Article title	Theme(s)	Summary
2021				
Provincial level				
1.	Ontario	Building a Digital Ontario (2021)	• Connectivity • Data • Digital literacy • Digital government	• Increase digital uptake, participation and digital literacy by expanding access to high quality broadband, cellular internet, and forming a strategic data leadership council to help build digital capacity across government • Developing a data rights portal and reviewing digital data standards with the public through consultations to protect Canadians • New provincial data authority and AI framework supports high quality data access that is private, secure, anonymous for Canadians • Implementing digital services for Canadians through the *Simpler, Faster, Better Services Act* and *Ontario's Digital and Data Directive, 2021* • Current programs: Digital Main St., digital and data innovation fellows program, digital service squads, Ontario Works (device lending program)
2.	Ontario	ROMA Broadband Connectivity – municipal primer (November 2020) ROMA Broadband Connectivity: A Municipal Roadmap (2020)	• Connectivity • Community broadband model • Digital government • Digital equality • Data	• Broadband municipal toolkit and roadmap that provides council with the information and resources on existing and future broadband technologies, broadband models and investment partnerships. The first recommendation is to develop a provincial broadband strategy and showcase the SuperNet as a national leader in broadband deployment. Other recommendations were to accelerate broadband projects but also strategically invest in network infrastructure as data uptake trends continues to increase • Broadband investments rely on multi-level government partnerships and governments should assess the level of digital capacity required at the community level
3.	Alberta	Government of Alberta Information Management and Technology	• Connectivity • High quality network (bandwidth and latency)	• Both documents provide an overview of the state of broadband in Alberta, more specifically rural areas. Technology opportunities, regulatory barriers and future investments will change

		5 Year Strategic Plan (2016-2021) Cybera - State of Rural Alberta (2020)	• Data • Digital literacy • Digital government • Innovation	• SuperNet has allowed government to inter-connect between supporting citizens with services. The availability of government services in rural areas will play a significant part in digital literacy uptake • Data is the foundation of Alberta's future and the province must invest more in strategic pillars 1. Focus on citizens/organizations to deliver virtual services. There will be ongoing consultation throughout the process and business intelligence and analytics will identify, promote and provide information and services to citizens/organizations (example: open government action plan) 2. Culture of innovation and collaboration by working with IMT staff addressing program needs and sharing assets and knowledge across government sectors through communities of practice and implement tools and support to enable workforce ability 3. Digital government program/service delivery as streamlined official government records, implement green/sustainable practices to reduce carbon footprint 4. Implement a governance model, central management/stewardship for investments, and establish operating policy framework
4.	Nova Scotia	Review of Alternatives for Rural High-Speed Internet (2018) Nova Scotia Rural Internet Jurisdictional Scan (2018)	• Connectivity • Network quality • Community broadband model • Economic development • Digital government	• The provincial role in broadband delivery includes: strategic goals on connectivity, coordination of municipal and community initiatives, develop a community-based solution evaluation framework, coordination of provincial telecom procurement and infrastructure investment activities. Province could also step back and allow the TSP to work with private businesses/residents since demand is constant • Results from the study showed that rural residents across Canada did not have access to broadband than urban counterparts. This is due to market failure and large investments towards network infrastructure • Conducted a jurisdictional scan to understand how other governments are tackling the digital divide (access, affordability and technology) • Bandwidth is a factor of broadband performance and is tied to internet access. Recommendations from this report include the lack of government policy enforcement for resilient and future proof technologies. Example: 50/10 Mbps standard which hinders other economic spillovers regarding lack of access

				• Community broadband programs between multi-level governments and private sectors were recommended for the province • Supplementary tools for community-based initiatives: business case templates, educational technology overviews, service provider database, education on government support programs for rural broadband, education on how to work with service providers, how to guide on raising community awareness of benefits and applications of broadband services • In 2020, Internet for Nova Scotia Initiative projects (Develop Nova Scotia) have connected 90,000 homes and businesses with 50/10 Mbps. This project is leveraging $163 million from the provincial trust and working with other stakeholders for broadband projects. The project aims to connect the remaining underserved households • Broadband for Rural Nova Scotia (BRNS) in 2007 and reached 99 per cent of rural households with 1.5 Mbps download service
5.	British Columbia	B.C. Connectivity Report 2019 B.C. Connectivity Handbook 2019	• Connectivity • Economic development • Community broadband model • High quality network (resilient)	• Internet service characteristics include access, affordability and speed • Implementing a local level connectivity plan helps make better informed decisions to achieve economic and well-being benefits from connectivity and evaluate the infrastructure ROI • Four pillars of value: Indigenous communities (right to self-determination and increased opportunity), SME in rural communities, digital equality, emergency alert and preparedness (increase in resilient communities and coordinate to reduce possible conflicts between assistance strategies) • Programs: Connecting B.C. Program (1 B), pathways to technology, Connected Coast
2023				
Provincial level				
6.	British Columbia	B.C. Provincial Digital Health Strategy (2021-2024)	• Connectivity • Economic development	• The Digital Health Strategy guides B.C.'s effort to create a digitally enabled health system entrusted by all who use it • B.C.'s Digital Health Strategy envisions a connected, trusted health system, which empowers all users and addresses our population health needs

			• High quality network (resilient)	• The 2022-2025 Digital Health Strategy was developed with input of citizens, the Provincial Health Services Authority, the First Nations Health Authority, the five regional health authorities, and the doctors of B.C.

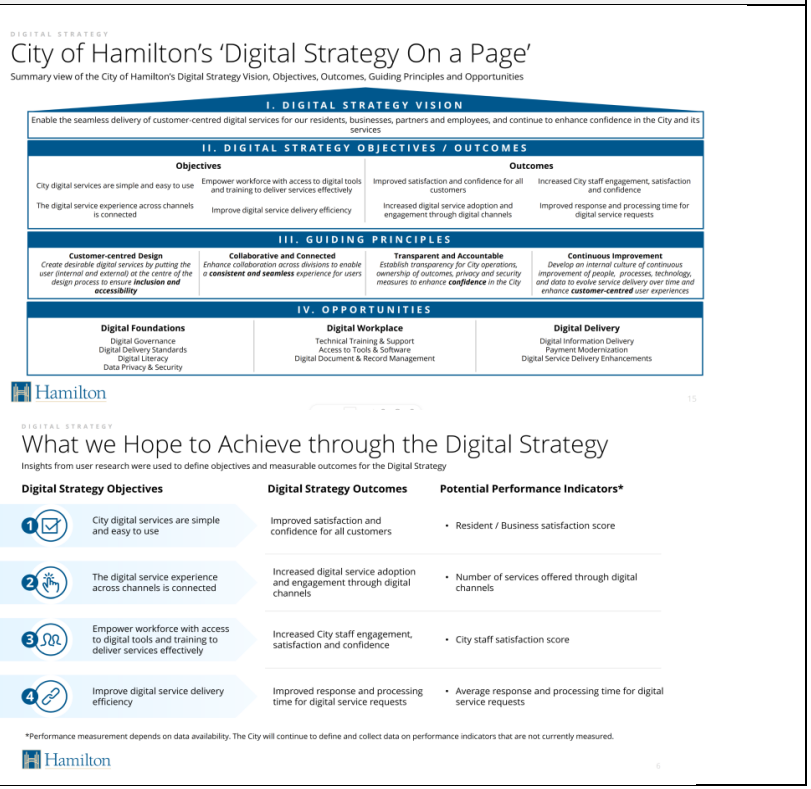
Municipal and local level digital strategies

	Jurisdiction	Article title	Theme(s)	Summary
2021				
County and regional levels				
1.	Northumberland County	SMART Northumberland: an intelligent community (August 2019)	• Smart cities • Connectivity/access • Innovation • Digital government • Digital literacy • Digital equality • Advocacy • Sustainability • Economic development • Consultation	• The objective of this smart plan is to transform the rural county into an intelligent community by using technology and innovation to creative inclusivity and tackle social and governance challenges • Broadband availability and capacity is the largest issue • Recommendations to overcome broadband challenges would be to assess the state of fixed and mobile broadband and collaboration with multi-level government broadband projects • Intelligent community indicators (broadband, knowledge workforce, innovation, digital equity, sustainability, and advocacy) were identified from public consultation sessions. By using implementation plans that touch on modernizing internal operations, service delivery and community focused, these metrics be ranked by priority and monitored over time
2.	Middlesex County	Collaborative Service Delivery Review for Digital Transformation (2020)	• Connectivity Affordability	• Used the Lean Six Sigma and business process re-engineering for the county's digital transformation • County is unable to move toward an end-to-end digital service delivery due to the inadequate access (affordability and connectivity) of high-speed internet and thus the county continues to rely on a multi-service delivery model • Programs: municipal modernization program, hotspot loan project

3.	County of Renfrew	Digital Strategy RFP (No publication to date)	Digital transformation	• Renfrew's strategic plan 2016-2022 identifies the need to advance technology within the region to ensure residents and staff have fair, affordable, and reasonable access to technology. The plan references Renfrew to be top priority for EORN's Cell Gap Project • Internal digital transformation for staff and residents
4.	Region of Durham	Connecting our Communities: A Broadband strategy for Durham Region	• Community broadband model • Economic development • Consultation	• The Region of Durham has undertaken a broadband project as a municipal services corporation and will partner with Oshawa Power Utilities Corporation to stimulate public-private partnership investment in rural areas of Durham • A regional municipal approach simplifies permits and access to regional facilities for co-locating and permitting for TSP • Smart cities framework would enhance Durham's intelligent community status and would leverage funding, partnership opportunities and align with regional priorities under the strategic plan
City level				
5.	City of Calgary	The City of Calgary Digital Strategy (2014)	• Digital government • Smart cities • Innovation • Data transparency • Economic development • Partnerships • Consultation • Digital equity • Digital literacy	• Reviewed how the City of Calgary can improve better information to residents, enhance technology and improve operations and cost-effective solutions through technology. Citizens are given the power to become active and inclusive in this process through consultations. The following are digital strategy objectives: 1. Reliable government services are accessible on a self-service basis and available if the user is in a fixed/mobile location 2. Foster collaboration amongst strategic partners with aligned goals and embrace a digital economy 3. Give citizens access to public information while being transparent on data protection and the collection of information 4. Focus on public participation (forums, emerging opportunities to participate, innovative use of technology for public consultations Innovation is required to keep pace with private industry, to lower costs and to build partnerships with other organizations and internally

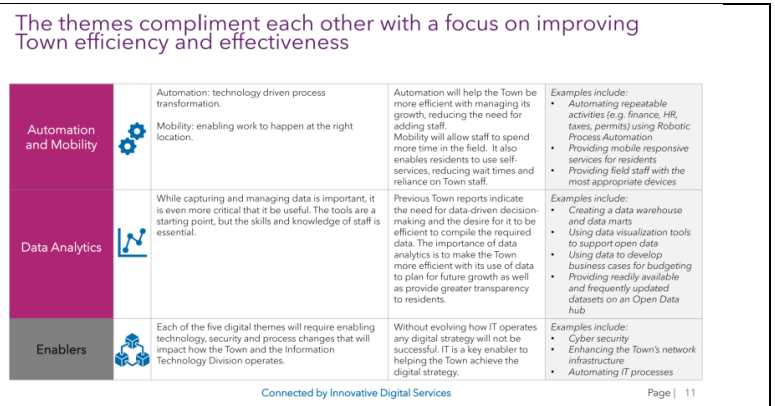
6.	City of Kitchener	Digital Kitchener (2021)	• Digital government • Connectivity (increased public Wi-Fi areas) • Economic development • Data transparency • Consultation • Smart cities • Digital literacy • Digital equity	• Vision to transform the City of Kitchener and leverage technology to become smarter and connected. There are four main themes identified in this strategy: • Connected 1. Telecom infrastructure with access and capacity required to remain competitive. These future proof technologies will rely on fibre optic broadband and wireless networks 2. Create municipal assets to service providers through the use of policy tools and streamlining processes to create new partnership opportunities for community benefit 3. Wireless access should be more of a seamless service (Public Wi-Fi) 4. Smarter infrastructure to the city can be more competitive, productive and attractive place to live and work. Using connected sensors to encourage the city as an incubator to pilot smart tech projects • Innovative 1. Continue to advocate for the city's mobile strategy and ensure corporate policies are in place to empower creative workforce (remote work and hybrid) 2. Explore digital procurement processes • On demand: municipal online service delivery to increase engagement and connectivity while offering convenience and intuitive. Using information in more dynamic ways to inform decision making • Inclusive: ensure residents have equitable access to the benefits of a smart city 1. Work with community organizations to identify public access needs and address them collaboratively 2. Establish a baseline of service level standard for public tech and internet access across the city 3. Increase digital literacy by working with economic development, library to support community tech programming and have local tech sector promote digital inclusion initiatives • Next steps

				1. Invest in technologies, processes and initiatives that support our goals 2. Create partnerships that strengthen and sustain initiatives 3. Bring Digital Kitchener to life for every citizen to understand and embrace
7.	City of Hamilton	Digital Transformation and Smart City (2021)	• Digital government • Smart cities • Data • Innovation	• Digital strategy focuses on enabling open government and citizen-centered • Reviewed digital tools and technology to enhance user experience in services, efficiencies and productivity • Main components 1. Smart city strategy: maximize resources and enabling sustainability through technology 2. Digital strategy: enabling open government by delivering services online and is complemented by internal digital transformation using data sharing and analytics to drive decisions 3. Open data program: meaningful high quality municipal data that is publicly available 4. Digital service channels: e-service delivery through a digital platform (web/mobile app)

2023				
City level				
8.	City of Hamilton	City of Hamilton's Digital Strategy	• Improve digital service delivery • Access to digital tools and training, empowering workforce • Digital governance • Digital delivery standards • Digital literacy • Data privacy and security • Digital document and record management • Transparency and accountability • Collaboration	

9.	The City of Waterloo	Digital Services Strategy Final Report March 2023	• Digital services • New and emerging technologies • Online services • Adoption of technology to speed up services • Equitable services	• The strategy sets out a vision for the city to start its journey to become a more service-centred, digital organization – one that rethinks services to take advantage of new and emerging technology capabilities. It targets delivering more city services online, in ways that make services more accessible and convenient – available 24 x 7, and available from anywhere; while ensuring all services continue to be available across all channels – including phone and face-to-face for those who don't wish to or cannot use digital services. It envisages using service and process re-design and the adoption of new technology to speed up delivery of services and to make services easier, less labour intensive, and less costly to operate and manage **3.0 The Strategy** In response to the opportunity, the City identifies with this Strategy, a vision and initial roadmap for the work ahead. 3.1 The Digital Vision Our vision sees the City of Waterloo as a **service-centred digital organization** that supports an equitable community that leads the world in learning, discovering and caring. The vision is a long-term target that can act as a north star. 3.2 The Digital Journey Achieving the vision – becoming a service-centred, digital organization – is not an overnight effort. It's a large ask that will feel like a marathon, not a sprint. It will take time, patience, determination, and ongoing commitment and investment. With the publication and commitment to this Strategy, the City begins the concerted journey to become a digital organization. We expect this journey to be comprised of three phases: **Exploring Digital, Designing Digital** and **Being Digital.**  *Figure 1: Journey to Becoming a Digital Organization*

				3.2.1 Exploring Digital: Setting the Foundation for Digital Over the last few years, we have been "exploring digital" as a model for good service, particularly during the pandemic. While developing this Strategy, we found many examples of digital services and behaviours across the organization. We will continue our exploration of digital in 2023 with the formal creation of the Digital and Web Services team. This team will become an organizational resource for establishing digital standards, developing service delivery and digital best practices, delivering a digital education program and leading service design pilots designed to surface the organization's resource, service and architecture needs. Part of the responsibilities of the Digital and Web Services team will include the development of a comprehensive Digital Program for the 2024-2026 budget that will help transition us to the second phase of our journey, Designing Digital. 3.2.2 Designing Digital: Building the Design Framework and Digital Architecture The Designing Digital phase will be a funded program of architecture and digital service design projects for 2024 to 2026. The work plan will be developed collaboratively in 2023 by the Supervisor of Digital and Web Services, reporting to the Digital and Technology Steering Committee (DTSC) and senior leadership. The full Designing Digital phase is likely to include multiple programs across multiple budget cycles, based on available funding, resource and corporate prioritization. 3.2.3 Being Digital: A Transformed Organization We will know when we are a digital organization when we have incorporated digital thinking and a service management approach into our operational framework, building services that embrace digital tools for self-serve and process automation, with digital skills and resources available across the organization.
10.	Town of Milton	Town of Milton Digital Strategy August 2022	• Connecting the community • Collaborative platforms • Digital service delivery • Automation and mobility • Data analytics	Connectivity provides the foundation for residents and businesses to use digital services Below we provide further details on each theme, what they are, why they are important, and some examples of current and future initiatives that support these themes: Connecting the Community — The application of digital technologies can only be achieved when people have access to good connectivity. — Internet has become a utility, a basic need for people to access services. This is also a key requirement to accessing digital services. — *Examples include:* • *Partnering and working with agencies to expand high-speed internet in Milton* • *Offering free WI-FI in Town facilities* Collaborative Platforms — Beyond connecting is collaborating. Access to internet is only one part of the requirement to help digitize services. The Town also needs to have in place and actively pursue/evolve technology to collaborate between departments, as well as with residents, visitors and businesses. — It is important to have efficient collaboration tools so that the Town is able to reduce transaction costs, provide timely and efficient services to residents and facilitate two-way interaction and communication with the community. — *Examples include:* • *Staff being able to work efficiently in office, home and remote* • *Offering online services to submit and track requests* • *Enabling two-way communication with the community* Digital Service Delivery — Digital by Default challenges the Town to offer as many services as possible digitally and that it is the preferred choice as it is easier, simpler and more convenient for residents and businesses. — It enables the Town to provide more cost-effective services and a platform to launch more. — *Examples include:* • *Digitizing processes* • *Creating more self-services for residents and businesses to perform their own transactions* • *Educating the public on how to use digital services* Connected by Innovative Digital Services Page | 10

				
11.	City of Toronto	Digital infrastructure Strategic framework City of Toronto March 2022	• Equity and inclusion • Access • Data governance • Human rights • Digital literacy and adoption • Interaction between digital infrastructure and healthy and vibrant communities and economic growth • Privacy and security – protection of infrastructure • Democracy • Transparency	Digital Infrastructure Strategic Framework Scope: **1. Principle: equity and inclusion** Vision: digital Infrastructure will be used to create and sustain equity, inclusion, accessibility, and human rights in its operations and outcomes. Digital Infrastructure will be flexible, adaptable and human-centred, responding to the needs of all Torontonians, including Indigenous, Black, equity-deserving groups, and those with accessibility needs **2. Principle: a well-run city** Vision: digital Infrastructure will enable high quality, resilient and innovative public services, and support the use of data and evidence to inform decision-making **3. Principle: society, economy and the environment** Vision: digital Infrastructure will enhance quality of life for Torontonians, support economic prosperity, and advance environmental sustainability, while also avoiding potential harms that could result from its use **4. Principle: privacy and security** Vision: Toronto will uphold human dignity, autonomy and safety by limiting the collection of personal information, implementing safeguards that uphold

				5. Principle: democracy and transparency Vision: decisions about Digital Infrastructure will be made democratically, in a way that is ethical, accountable, transparent, and subject to oversight. Torontonians will be provided with understandable, timely, and accurate information about the technologies in their city, and opportunities to shape the digital domain **6. Principle: digital autonomy** Vision: the city will maintain control in the selection, use and design of its Digital Infrastructure, so that it—and its residents—can act with autonomy and in a self-determined manner within the digital realm
12.	City of Oakville	2022 Digital Plan Progress Report and Look Ahead	• Connected communities • Partnerships • Data management • Digital infrastructure – economical and social • Online services • Access to services and information	The 2022 Digital Oakville Plan: connected community through online services • Improve the ease, speed, and experience for residents to access information, programs, and services, safely and securely • Adopt a customer-centric approach to designing digital tools and services Connected community through partnership and data management • Make better use of data and analytics to drive evidence-based decisions • Establish partnerships with private, public and academic leaders Connected community through digital infrastructure • Create pilot projects to test out smart technologies • Engage partners to help find new applications and benefits of technologies • Continue investing in the town's digital infrastructure to support livability and economic development Connected community through continuous improvement • Encourage a "build-measure-learn" approach to service and process design • Build a continuous improvement culture • Seek opportunities to enhance services, streamline internal processes, build efficiencies, and continuously improve the quality of service delivered

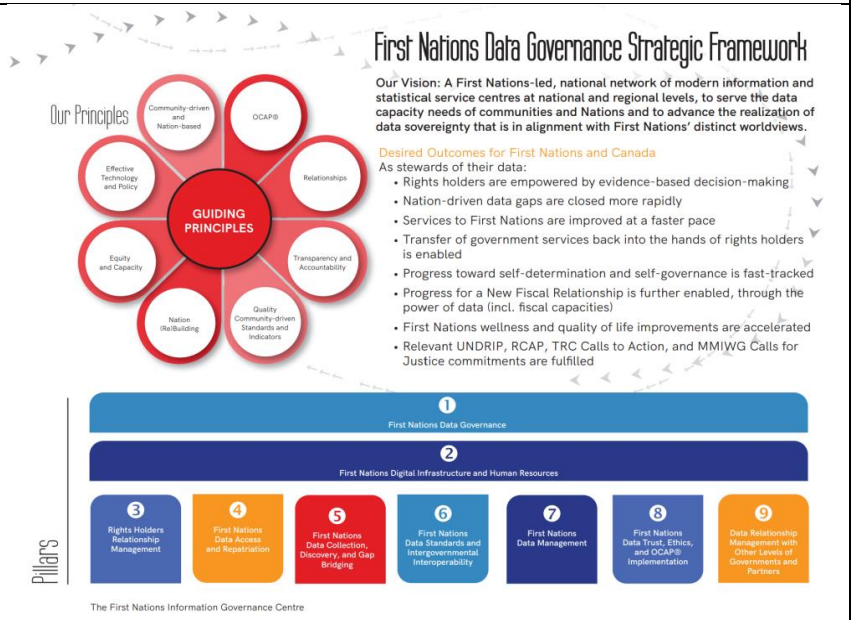
Indigenous digital strategies

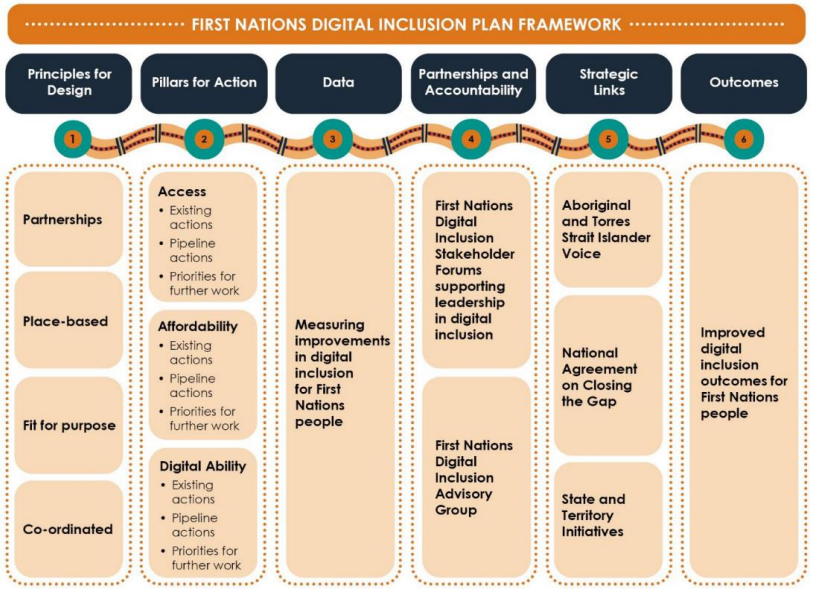
	Jurisdiction	Article title	Theme(s)	Summary
			2021	
1.	Indigenous (Canada)	Pathways to Technology – Connecting 203 FN across B.C. (2020)	• Governance • Digital inequity • Innovation	• Using ownership, control, access, and possession (Indigenous research approach) to understand barriers to access (increased technology partnership, mentorship opportunities) • Programs: Pathways to Technology (Ministry of Advanced Education and Skills Training's Sector Labour Market Partnerships Program)
2.	Indigenous (Canada)	Indigenous Digital Equity Strategy (2023-2033)	• Equity • Resilience • Economic reconciliation • Innovation • Leadership • Infrastructure • Skills development • Employment and business development	• The First Nations Technology Council is currently co-creating an Indigenous Digital Equity Strategy as a focused, strategic response that will achieve digital equity and nurture long-term resilience and self-determination for our communities • The vision for the strategy is to help coordinate a comprehensive and collaborative approach to achieving digital equity, technological advancement, and economic reconciliation for Indigenous peoples in B.C., while stimulating the needed investment for implementation and adoption • The Truth and Reconciliation Commission of Canada has identified the government must provide safety for Indigenous women and children, and increased funding for access to technical resources (41 and 54). Connectivity access to mobile services
3.	Indigenous (Australia)	Indigenous Digital Inclusion Plan (IDIP) (2021)	• Access • Affordability • Digital ability • Digital inclusion	• The Indigenous Digital Inclusion Plan (IDIP) is being developed by the National Indigenous Australians Agency, with support from the Department of Infrastructure, Transport, Regional Development and Communications • This work is part of the Australian government's response to the recommendations of the 2018 Regional Telecommunications Review • The IDIP will address key issues to improve Indigenous digital inclusion in the three areas of: access, affordability and digital ability • The IDIP is being developed in consultation with Indigenous organisations and communities, businesses and government agencies during 2021. Consultation will include a series of virtual round tables with key

				stakeholders and follow up discussions and an opportunity for stakeholders to provide a submission on the key issues to the IDIP
				2023

4.	The Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) (Australia)	AIATSIS Digital Strategy 2021–2030	• Infrastructure
			• Support
			• Cyber security
			• Resilience
			• Innovation and online platforms
			• ICT capability
				• This digital strategy presents a view of investment and action over a long-term period, to 2030, which will deliver new capabilities across ICT domains of:
				  ○ Systems
				  ○ Supporting technology
				  ○ Digital services and skills
				  ○ Data and information
				  ○ Cyber security
				The commitments made through this digital strategy will prepare AIATSIS for an expanding role in providing services via digital channels, drive greater efficiency and innovation, and sustain capability to deliver high quality research and collection management well into the future.
				• Strategy: https://aiatsis.gov.au/sites/default/files/2021-08/aiatsis-digital-strategy-2021-2030.pdf

5.	First National Technology Council	Indigenous Digital Equity Strategy	• Governance • Digital inequity • Digital equity and rights implementation • Innovation • Accessibility and participation • Indigenous leadership in technology	• A First Nations-led initiative that aims to achieve digital equity and uphold First Nations rights and influence the future of technology • The legacy of colonialism in Canada that has failed to recognize Indigenous rights and excluded them from equitably participating in digital society, which has reinforced colonial practices and inhibited Indigenous self-determination • A comprehensive, coordinated, and community-led approach that is rooted in First Nations' inherent title, rights, and treaty rights, and that asserts the right to own, control, access, influence, and steward digital technology • A collaborative and inclusive process that engages a diverse group of rightsholders and subject matter experts to contribute to the strategy, with a steering committee and policy and planning circles to guide the work • The key areas that the strategy will address, such as connectivity, data sovereignty, digital literacy, innovation and economic development, culture

				and language, health and wellness, education and lifelong learning, governance and leadership
6.	First Nations Information Governance Centre	A First Nations Data Governance Strategy (2020)	• Data governance • Digital Infrastructure • Indigenous rights • Relationship management • Data access and repatriation • Data collection • Data management • Data trust, ethics and OCAP	

7.	National Indigenous Australians Agency (Government of Australia)	First Nations Digital Inclusion Plan (2023-26)	• Access • Affordability • Digital inclusion • Digital ability • Leadership in digital inclusion • Partnerships and accountability • Data	**Strategic Framework** The Plan focuses on three elements of digital inclusion: *access*, *affordability* and *digital ability*. It also considers the need for improved data to measure improvements in digital inclusion for First Nations people. The Plan focuses on the needs of First Nations communities in regional and remote areas. However, many of the actions identified in the Plan will also benefit First Nations people living in urban locations. The Plan will apply from 2023 to 2026, consistent with the period of the *Access to Information* target (Target 17) under the National Agreement on Closing the Gap. The strategic framework for the Plan is illustrated in Figure 2. The framework establishes a set of principles and actions that can be applied to facilitate and support improvements in digital inclusion for First Nations people. The strategic framework includes mechanisms to ensure elements of the Plan are developed and implemented in partnership with First Nations people. **Figure 2: First Nations Digital Inclusion Plan Framework** 

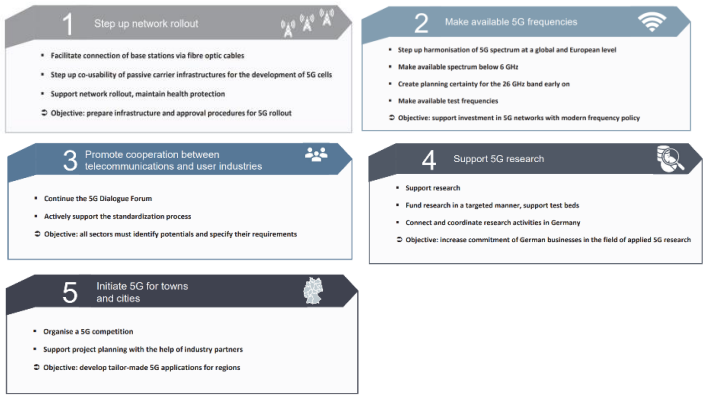
International digital strategies

	Jurisdiction/ area	Article title	Theme(s)	Summary
			2021	
	National level			
1.	United Kingdom	Digital Data and Technology Strategy: 2021 to 2024 (April 2021)	• Culture, people and skills • Engagement • Continuous improvement • Technology and security foundation • Data for decision making	• The U.K. government's Digital, Data and Technology (DDaT) strategy, lists five key interconnected aims for the strategy (as pictured left).
		The Seven Pillars of the Digital Strategy. U.K. Minister of State for Digital Matt Hancock's address to the Institute of Directors' Digital Strategy Summit. (2017).	• Digital infrastructure • Digital skills • Digital business support • Safety strategy • Digitize government • Power of data and improving public confidence	• Speech given by U.K. Minister of State for Digital Matt Hancock to the Institute of Directors' Digital Strategy Summit 2017. Outlines seven pillars in the U.K. government's digital strategy
		The 'Ten Tech Priorities' behind the U.K.'s 2021 Digital Strategy - Lexology Herbert Smith Freehills. (2021).	• Digital infrastructure • Power of data • Tech savviness • Safety and security • Fueling start-ups and scaleups • Tech and AI • Free and fair digital trade • Digital prosperity • Digital innovation	Ten priorities form the foundation of the U.K.'s digital strategy: 1. Rolling out world-class digital infrastructure nationwide 2. Unlocking the power of data 3. Building a tech-savvy nation 4. Keeping the U.K. safe and secure online 5. Fuelling a new era of start-ups and scaleups 6. Unleashing the transformation power of tech and AI 7. Championing free and fair digital trade 8. Leading the global conversation on tech 9. Levelling up the digital prosperity across the U.K. 10. Using digital innovation to reach net zero

2.	United States	Digital Government Building a 21st Century Platform to Better Serve the American People	• Accessibility and access to services • Security and affordability • Unlock the power data to spur innovation and improve quality of services	• US digital strategy. Retrieved from the Obama administration website (n.d.) • The digital government strategy sets out to accomplish three things: 1. Enable the American people and an increasingly mobile workforce to access high-quality digital government information and services anywhere, anytime, on any device 2. Ensure that as the government adjusts to this new digital world, we seize the opportunity to procure and manage devices, applications, and data in smart, secure and affordable ways 3. Unlock the power of government data to spur innovation across our nation and improve the quality of services for the American people • To drive this transformation, the strategy is built upon four overarching principles: 1. An "***information-centric"*** approach – moves us from managing "documents" to managing discrete pieces of open data and content which can be tagged, shared, secured, mashed up and presented in the way that is most useful for the consumer of that information 2. A ***"shared platform"*** approach – helps us work together, both within and across agencies, to reduce costs, streamline development, apply consistent standards, and ensure consistency in how we create and deliver information 3. A ***"customer-centric"*** approach – influences how we create, manage, and present data through websites, mobile applications, raw data sets, and other modes of delivery, and allows customers to shape, share and consume information, whenever and however they want it 4. A platform of ***"security and privacy"*** – ensures this innovation happens in a way that ensures the safe and secure delivery and use of digital services to protect information and privacy

3.	United States	Connecting America: The National Broadband Plan. Federal Communications Commission. (2010).	• Affordability, accessibility and cost barriers • Innovation • Digital skills and literacy/ inclusion • Public safety and security • Infrastructure • Capacity • Health care services • Education- online • Data • Transparency • Innovation • Energy and environment • Economic development • Civic engagement • Government performance	• The U.S. National Broadband Plan. The long-term goals of the plan are: 1. At least 100 million U.S. homes should have affordable access to actual download speeds of at least 100 megabits per second and actual upload speeds of at least 50 megabits per second by the year 2020 2. The United States should lead the world in mobile innovation, with the fastest and most extensive wireless networks of any nation 3. Every American should have affordable access to robust broadband service, and the means and skills to subscribe if they so choose 4. Every American community should have affordable access to at least 1 gigabit per second broadband service to anchor institutions such as schools, hospitals, and government buildings 5. To ensure the safety of the American people, every first responder should have access to a nationwide, wireless, interoperable broadband public safety network 6. To ensure that America leads in the clean energy economy, every American should be able to use broadband to track and manage their real-time energy consumption • The plan also aimed to reallocate spectrum to increase capacity of mobile broadband

4.	Germany	Digital Strategy for Germany 2025.	• Availability, capacity and latency • Assisting start-ups • Company collaboration • Regulatory framework for investment and innovation • Data security • Smart networks • Fostering digital technology research • Digital education	• The Digital Strategy 2025 program demonstrates how the German government's Federal Ministry for Economic Affairs and Energy (BMWi) has been setting priorities in recent years, developing capabilities and using new tools to make a digitised Germany possible • Focus of the strategy consists of: • Creating a gigabit optical fibre network for Germany by 2025, focusing on availability, capacity, latency • Launching the new start-up era: assisting start-ups and encouraging cooperation between young companies and established companies • Creating a regulatory framework for more investment and innovation • Encouraging "smart networks" in key commercial infrastructure areas of our economy • Strengthen data security and developing informational autonomy • Enabling new business models for SMEs, the skilled craft sector and services • Utilising Industry 4.0 to modernise Germany as a production location • Creating excellence in digital technology research, development and innovation • Introducing digital education to all phases of life. School and vocational training • Creating a digital agency as a modern centre of excellence

5.	Germany	5G Strategy for Germany to 2025	• 5G • Digital infrastructure • Cooperation • Research and development	• A scheme to promote the development of Germany to become a lead market for 5G networks and applications 
6.	Australia	Vision 2025. We will deliver world-leading digital services for the benefit of all Australians. Digital Transformation Agency. (2018).	• Services • Secure access • Data • Trust and transparency • Digital capability and skills • Infrastructure • Accountability • Partnerships	• Government of Australia's digital strategy and vision to 2025. Focus of the strategy is on government digital services • Three strategic priorities: 1. Government that's easy to deal with • Intuitive and convenient services • Integrated services supporting your needs and life events • Digital identity for easy and secure access 2. Government that's informed by you • Smart services that adapt to the data you choose to share • Greater insights for better services • Trust and transparency 3. Government that's fit for the digital age • Expanding digital capability • Developing modern infrastructure • Providing accountability

	Inter-governmental and regional digital strategies			
7.	OECD	Recommendations of the Council on Digital Governance Strategies. OECD. (2014).	• Transparency, openness and inclusiveness • Engagement in policy making • Data driven culture in public sector • Risk management in digital security and privacy • Secure government commitment • Coherent use digital technologies • Organizational and governance frameworks to implement digital strategy • Institutional capacity • Legal and regulatory frameworks which support digital opportunities	The recommendations are to help governments adopt more strategic approaches for a use of technology that spurs more open, participatory and innovative governments. Recommends that governments develop and implement digital governance strategies: • Which ensure greater transparency, openness and inclusiveness of government processes and operations • Encourage engagement and participation of public, private and civil society stakeholders in policy making and public service design and delivery • Create a data driven culture in the public sector • Reflect a risk management approach to addressing digital security and privacy issues and include the adoption of effective and appropriate security measures Recommends that, in developing their digital governance strategies, government should: • Secure leadership and political commitment to the strategy • Ensure coherent use of digital technologies across policy areas and levels of government • Establish effective organisational and governance frameworks to co-ordinate the implementation of the digital strategy within and across levels of government Recommends that, in implementing the digital government strategies, governments should: • Develop clear business cases to sustain the funding and focused implementation of digital technologies projects • Reinforce institutional capacity to manage and monitor projects' implementation • Procure digital technologies based on assessment of existing assets- digital skills, job profiles, technologies, etc. • Ensure that general and sector-specific legal and regulatory frameworks allow digital opportunities to be seized

8.	United Nations	Report of the Secretary-General. Roadmap for Digital Cooperation. (June 2020).	• An inclusive digital economy and society: global connectivity, digital public goods, digital inclusion • Human and institutional capacity: digital capacity building • Human rights and human agency: digital human rights, artificial intelligence • Trust, security and stability • Global digital cooperation	• In July 2018, the secretary-general convened a high-level panel on digital cooperation to advance proposals to strengthen cooperation in the digital space among governments, the private sector, civil society, international organizations, academic institutions, the technical community and other relevant stakeholders • The report is aimed at, first, summarizing the state of play in relation to each of the panel's recommendations, incorporating the subsequent consultations on follow-up, and second, setting out in the concluding observations the envisaged action points for the way forward
9.	United Nations Development Programme (UNDP)	UNDP Digital Strategy 2019	• Leadership • Enable information technology- align IT and digital strategies • Foster innovation • Digital literacy • Digital communication • Digital technology for development	• The UNDP Digital Strategy will be implemented through an activation plan. The Digital Strategy Activation Plan runs through to the end of 2021, in unison with the Strategic Plan. The activation plan consists of three workstreams that will establish a foundation upon which the entirety of UNDP can seek out and embrace existing and emerging digital technology to better serve its partners in their efforts to achieve the SDGs 1. Workstream 1: establish leadership for the digital transformation • Chief digital - UNDP officer • Digital champions 2. Workstream 2: enable information technology (IT) to deliver the digital transformation • Alignment of IT strategy and digital strategy • Service-oriented IT as a business partner 3. Workstream 3: empower and inspire the business and increase digital capabilities and capacities • Foster innovation

				• Digital literacy • Digital communication • Alliances and ecosystems • Lighthouse initiatives The activation plan is informed by these core principles: • Digital enables the business • Capacity should service clients first • Data is knowledge • Start small and scale fast
10.	European Union	Smart Villages and rural digital transformation. European Network for Rural Development and the European Commission. (n.d.).	• Accessibility • Stakeholder involvement in identification of digital needs • Support for digital transition • Cooperation • Connection	• This thematic briefing is one of the tools developed by the ENRD to assist managing authorities and rural stakeholders in designing and implementing smart villages initiatives in key domains. The focus of this document is on promoting digital transformation in villages and rural areas • What are the conditions that managing authorities need to ensure in smart villages to support digital transformation? ○ Access to connectivity ○ Mechanisms for involving local stakeholders in the identification of digital needs and in the co-creation of digital solutions need to be in place ○ Villages must have access to intermediaries, brokers and 'spaces' to support digital transition ○ Cooperation with other digital players in wider regional and national ecosystems need to be supported Assess the digital maturity of smart villages:

Table 1. Matrix for assessing the digital maturity of a village or rural area

A. The extent and quality of digital resources and skills	Digital infrastructure (incl. WIFI) and public access points	Score (1-5)	Score (1-5)
	The existence of creative, work, innovation and maker spaces/hubs	Score (1-5)	Score (1-5)
	Coordination by a multi-skilled individual/ team (within a wider network)	Score (1-5)	Score (1-5)
	Local & networked experts, skills, technical support & equipment pool	Score (1-5)	Score (1-5)
B. The types of digital functions that the village can carry out	Facilitation of social and economic digital inclusion of local stakeholders	Score (1-5)	Score (1-5)
	Support to digital and social innovation and co-creation in coordination with external policy-makers/service deliverers	Score (1-5)	Score (1-5)
	Mediation/brokerage services to enable the village to access external Research, Technological Development and Innovation (RTDI)	Score (1-5)	Score (1-5)
	Relay for national and regional Digital Innovation Hubs (DIH) and Incubator/Accelerator networks	Score (1-5)	Score (1-5)

Figure 1. Key stages in the digital transformation of rural areas

The diagram illustrates that in the early stages there is a stronger need to support hard physical investments to bring internet and digital infrastructure to rural areas, together with soft interventions for capacity building in digital skills to take advantage of the investments made. As villages move towards more advanced stages, the interventions focus increasingly on the combination of soft and hard actions to enable villages and their actors to become digital players within wider regional and national ecosystems.

11.	European Union	Smart Villages- how to ensure that digital strategies benefit rural communities. European Network for Rural Development and the European Commission. (n.d.).	• Broadband infrastructure • Uptake of digital services • Digital skills and literacy • Rural innovation ecosystems • Coordinated governance • Vision and strategy • Engagement • Build business case • Digital skills and literacy partnerships	• This briefing document looks at how the digital strategies, that are being developed at different levels across Europe, can benefit rural communities. It is based upon work carried out in the ENRD Thematic Group on smart villages • Smart villages are places where rural communities are empowered and are taking the initiative to find solutions to the challenges they face • Overcoming the digital divide in rural areas: o Broadband infrastructure. Investment in broadband infrastructure needs to be mapped against socio-economic benefits o Promoting the uptake of digital services. Important to work with the community itself to develop and promote the uptake of digital services in rural regions o Digital skills and literacy. Digital skills must be delivered alongside digital infrastructure to enable people to benefit from it o These key points range from thinking more holistically about infrastructure; to how digital skills can be delivered, and how innovation ecosystems can help to drive the development of rural digital services. The benefits can only be mobilised when there is a coordinated governance, from a national to local scale and involving multiple stakeholders: • Targeting investments in broadband infrastructure • Strategies to build digital skills • Creating rural innovation ecosystems • Building coordinated governance • Recommendations: • Do not wait for ultra-fast broadband to arrive. Bring together local users, public bodies, suppliers and researchers to review digital needs and opportunities,

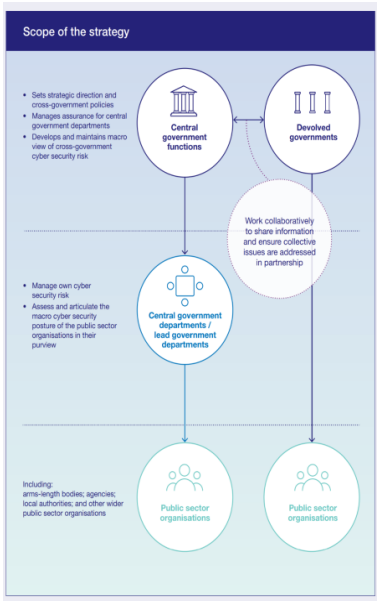
				build a vision of the future and a strategy for getting there • Aggregate demand, build a business case and a financial plan for investments in key areas • Recommendations: • Upskill local stakeholders to deliver the training initiatives, including both local people and local organisations, municipalities and service providers. • Identify and enable digital champions • Recommendations: • Map and identify the key gaps and opportunities in the local digital ecosystem to produce a road map which focuses on the most promising areas • A key mechanism is the support for the development of 'enablers' and 'multipliers' such as living laboratories, fab-labs and various forms digital hubs within villages and rural settlements to link regional level initiatives to local communities • Recommendations: • Support for partnerships between stakeholders at a regional and local level. This includes the telecoms /infrastructure providers, regional municipalities, regional NGOs and rural community organisations • Implement a range of software and supportive applications to interconnect different systems (e-governance, distant learning and upskilling, etc.), combining the various services and initiatives implemented in different areas (example: mobility, public services, education, health, etc.)

12.	European Union	The four pillars of a digital strategy. Maria Demeritsiz. (2021).	• Digital skills • Digital infrastructure • Cooperation • Engagement	Commentary on the E.U.'s digital compass to help advance E.U. ambitions for a digital transformation by 2030 1. Ethics 2. Social fabric 3. The economy 4. Security 1) ensure more citizens and professionals have basic digital skills 2) provide sustainable digital infrastructure, promote the digital transformation of private 3) businesses and public services and encourage a system of cooperation between member states to monitor and promote these goals
13.	Across eight different countries	Seven pivots for government's digital transformation. William D. Eggers, Jason Manstof, Pankaj Kamleshkumar Kishnani, and Jean Barroca. (2021).	• Data for efficiency and service delivery • Flexible and secure infrastructure • Open talent networks-digital competencies • Engagement via ecosystems • Intelligent workflows • Innovation and new business models for service delivery	• Study is based on a survey of more than 800 government executives across eight countries with varied sectors and levels of governments. The survey also included 2,000 executives from the private sector sampled across industries. We analyzed these responses to understand the digital maturity of organizations sampled • Seven digital pivots which an organization or government must have to become truly digital were identified: FIGURE 4 **The seven digital pivots to propel an organization's progress toward digital maturity**  Data mastery — Aggregating, activating, and connecting siloed, underutilized data by embedding it into services and operations to increase efficiency and enhance service delivery Flexible, secure infrastructure — Implementing technology infrastructure that balances security and privacy needs with the ability to flex capacity according to demand Digitally savvy, open talent networks — Retooling training programs to focus on digital competencies, and staffing teams through flexible, contingent talent models to rapidly access in-demand skill sets and flex the organization's workforce based on the organization's need Ecosystem engagement — Working with external business partners including R&D organizations, technology incubators, and startups to gain access to resources such as technology or people to increase the organization's ability to improve and innovate Intelligent workflows — Implementing and continuously recalibrating processes that make the most of both human and technological capabilities to consistently produce positive outcomes and free up resources for higher-value actions Unified customer experience — Delivering a seamless customer experience built around a 360-degree view of the customer that is shared companywide so that customers experience coordinated digital and human interactions that are useful, enjoyable, and efficient in immersive, engaging environments Innovation and new business models — Innovating the organization's array of business models by adopting new business models to adapt to changing constituent needs and improving service delivery Source: Deloitte analysis. Deloitte Insights | deloitte.com/insights

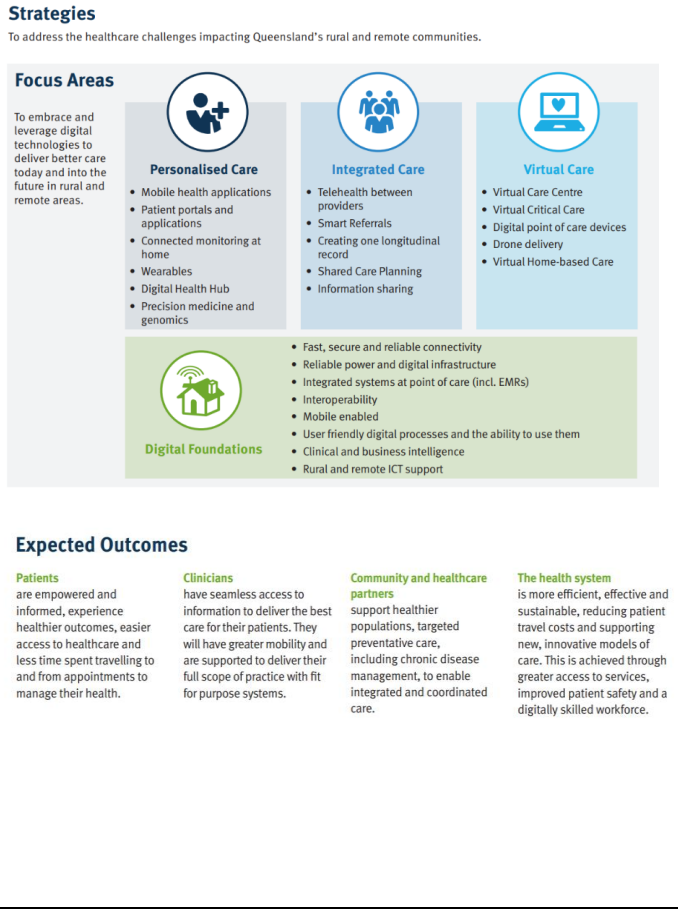
14.	Nordic Countries and Latvia	Rural perspective on digital innovation: Experiences from small enterprises in the Nordic countries and Latvia. Nordregio. (2020).	• Broadband infrastructure
			• Connectivity
			• Framing digitalization-digital literacy
			• Digital education
			• Local initiatives to support digitalization
			• Collaboration
			• Company-centred approach
				• Overall conclusions from the project, along with advice for policy makers about how to best support rural and sparsely populated areas to make the most of the opportunities digitalisation offers:
				  • Continue to work towards broadband infrastructure provision targets until every last household is connected
				  • Acknowledge the stage companies are at in their digital journey
				  • Frame digitalisation in a way that small enterprises in rural areas can relate to
				  • Take an individualised approach that generates a dialogue between technical experts and experts in traditional industries
				  • Develop locally anchored initiatives to support SMEs in rural areas to engage with digitalisation
				  • Focus on the development potential digitalisation presents
				  • Work collaboratively with the local community to address the implications of increased digital media attention for tourism sites
				  • Take a company-centred approach and promote mutually beneficial collaboration
				  • Create opportunities for cross-border collaboration between participants in successful locally driven digitalisation initiative

15.	ITU Member States- includes 193 countries	The Benchmark for Fifth Generation Collaboration Regulation- Abstract. International Telecommunications Union (ITC). (n.d.)	• Collaborative governance
			• Policy design
			• Regulatory collaboration
			• Principles of law and regulation:
			  • Forward looking
			  • Evidence based
			  • Innovation base
			  • Inclusive
			• Accessibility
			• Data protection
			• Security
			• Digital services
			• Infrastructure
				• The G5 Benchmark is a powerful, straightforward tool for policymakers and regulators. It enables you to track how regulatory frameworks are evolving in the digital economy and dives deep into policy trends
				• The G5 Benchmark is based on data provided by ITU member state administrations through annual ITU surveys. Additional research was carried out to complement the dataset The new G5 Benchmark takes data from 157 countries and expands to cover four pillars, with 66 indicators taken into account. Each country can score itself, with a 100-point maximum. The pillars are:
				  • National collaborative governance
				  • Policy design principles
				  • Digital development
				  • Digital economic policy agenda:
				  • Collaboration is the dominant element – the very watermark of G5 regulation. It measures the breadth and depth of cross-sector collaboration between the ICT regulator and her/his peers. This track factors in institutional set-up (agencies and their mandate) as well as practices around regulatory collaboration, formal and informal (see Table 2). Digital regulation now occurs across a network of centres of expertise and enforcement. Shared focus and accountability among government agencies and stakeholders is replacing the ICT silo model, and the G5 Benchmark reflects this trend

2023				
National level				
16.	United Kingdom	The U.K.'s International Technology Strategy	• Cross government implementation plan • Values based technology leadership • Collaborative expertise and support • Principles	Priority actions: International approach guided by four principles: • Open • Responsible • Secure • Resilient Six strategic priorities: 1. International partnerships for global leadership 2. Values-based governance 3. Technology investment and expertise for the developing world 4. Technology to drive the U.K. economy 5. Protecting security interests 6. Priority technologies • Artificial intelligence • Quantum tech • Engineering biology • Semiconductors • Telecos

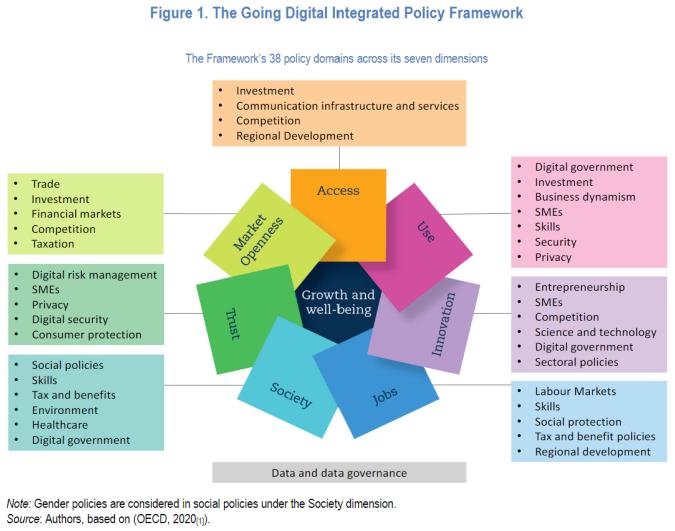
17.	United Kingdom (2022-2030)	Government Cyber Security Strategy	• Cyber security and resilience • Public service delivery • Data protection	Vision: strategy seeks to ensure that core government functions – from the delivery of public services to the operation of national security apparatus – are resilient to cyber attack, strengthening the U.K. as a sovereign nation and cementing its authority as a democratic power and responsible cyber power. **AIM:** **Government's critical functions to be significantly hardened to cyber attack by 2025, with all government organisations across the whole public sector being resilient to known vulnerabilities and attack methods no later than 2030.** **Unpacking the Aim:** The aim of the strategy sets out a clear ambition for government. Progress towards it will be driven by an understanding of risk. This means identifying areas of particular risk and prioritising the most impactful interventions to ensure that government can rapidly improve its cyber resilience. The strategy's aim focuses on the management of 'known vulnerabilities and attack methods'. This focus refers to more than publicly disclosed security flaws, also accounting for the improper security practices and behaviours that unduly expose an organisation to cyber attack. Good cyber security practices are well established and their adoption will mitigate the vast majority of cyber attacks. As well as dramatically improving an organisation's cyber resilience, adopting well-established cyber security practices will ensure that an organisation is structured and organised to manage unknown and more sophisticated threats when they do arise.  **FOCUS ON: Cyber Resilience** Cyber resilience refers to the ability of an organisation to maintain the delivery of its key functions and services and ensure the protection of its data, despite adverse cyber security events. Given government's fundamental duty to deliver functions and services that maintain and promote the UK's economy and society, cyber resilience lies at the very heart of this strategy.

18.	United States Government	National cybersecurity strategy March 2023	• Cyber security
			• Public safety
			• Harmonize regulations
			• Affordable security
			• Dismantling threat actors
			• Collaboration and partnerships
			  ○ Public-private collab
			  ○ Collaboration between levels of government
			  ○ International partners
			• Abuse prevention of cyber infrastructure
			• Combat cyber crime
			• Resilience
			• Data stewardship
			• Accountability
			• Cyber insurance
			• Cyber workforce development
				Pillar one | defend critical infrastructure
				Strategic objective 1.1: establish cybersecurity requirements to support national security and public safety
				• Establish cybersecurity regulations to secure critical infrastructure
				• Harmonize and streamline new and existing regulation
				• Enable regulated entities to afford security
				Strategic objective 1.2: scale public-private collaboration
				Strategic objective 1.3: integrate federal cybersecurity centers
				Strategic objective 1.4: update federal incident response plans and processes
				Strategic objective 1.5: modernize federal defenses
				
				Pillar two | disrupt and dismantle threat actors
				Strategic objective 2.1: integrate federal disruption activities
				Strategic objective 2.2: enhance public-private operational collaboration to disrupt adversaries
				Strategic objective 2.3: increase the speed and scale of intelligence sharing and victim notification
				Strategic objective 2.4: prevent abuse of U.S.-based infrastructure
				Strategic objective 2.5: counter cybercrime, defeat ransomware
				
				Pillar three | shape market forces to drive security and resilience
				Strategic objective 3.1: hold the stewards of our data accountable
				Strategic objective 3.2: drive the development of secure IOT devices
				Strategic objective 3.3: shift liability for insecure software products and services
				Strategic objective 3.4: use federal grants and other incentives to build in security
				Strategic objective 3.5: leverage federal procurement to improve accountability
				Strategic objective 3.6: explore a federal cyber insurance backstop
				
				Pillar four | invest in a resilient future
				Strategic objective 4.1: secure the technical foundation of the internet
				Strategic objective 4.2: reinvigorate federal research and development for cybersecurity
				Strategic objective 4.3: prepare for our post-quantum future
				Strategic objective 4.4: secure our clean energy future
				Strategic objective 4.5: support development of a digital identity ecosystem
				Strategic objective 4.6: national strategy to strengthen our cyber workforce
				
				Pillar five | forge international partnerships to pursue shared goals
				Strategic objective 5.1: build coalitions to counter threats to digital ecosystem
				Strategic objective 5.2: strengthen international partner capacity
				Strategic objective 5.3: expand U.S. ability to assist allies and partners
				Strategic objective 5.4: build coalitions to reinforce global norms of responsible state behavior
				Strategic objective 5.5: secure global supply chains for information, communications, and operational technology products and services

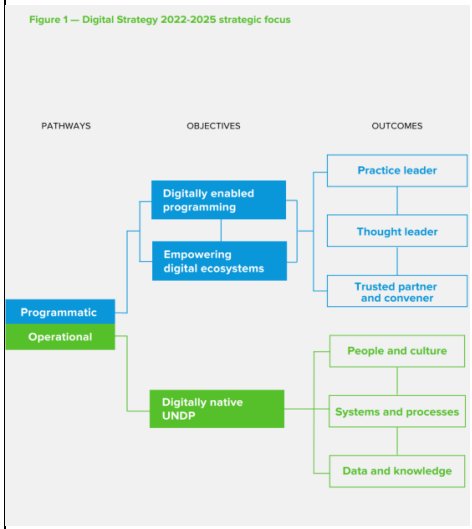
State level				
19.	Queensland, Australia	Digital Strategy for Rural and Remote Health Care - 10 year plan	• Integrated care • Telehealth • Health care access • Virtual care • Digital health hub • Leverage digital tech to improve health care • Drone delivery	

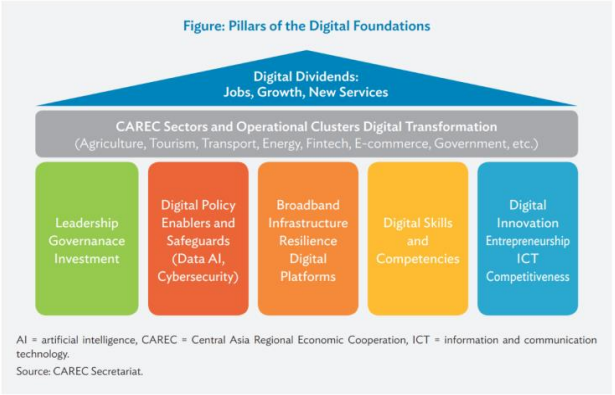
County level				
20.	County of Hertfordshire, U.K	Digital and technology strategy 2023-27	There are four parts to this strategy: • Knowledge and collaboration • Customer experience and self-service • Data and decision-making • Technology and integration •	For residents • Web services so good, people prefer to do things online • Can still access services in a non-digital way • Consistent experience when accessing services • Improved skills and confidence to use online and digital services • Can get help and give feedback easily • Provide information once For staff • A more innovative and customer-focused culture • The right equipment and systems to do the job • Better access to accurate, relevant data • Capacity to plan and improve services based on data • Flexibility to do the job, especially when out and about • Skills and confidence to use the technology For businesses and partners • Easier ways to communicate and do business with us • Clear roles and responsibilities between organisations • Be a part of improving services • More joined up services with better sharing of data and best practice • Investment in local economy • Links with local skills initiatives Provide information once

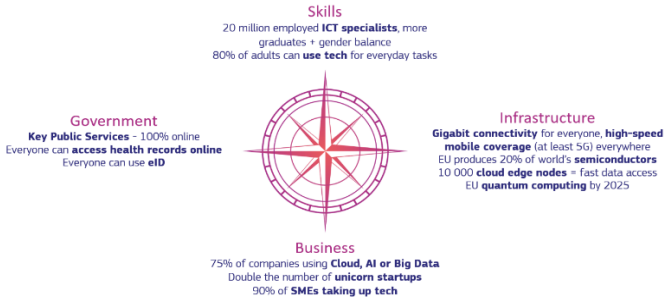
City level				
21.	City of Sacramento, California	City of Sacramento Information Technology, Digital Strategy Summary 2022-2023	• Transparency • Accountability • Sustainable • Innovation • Collaboration • Partnerships	Our plan is ambitious, broad, and comprehensive. It covers many aspects including vision, governance, structure, and initiatives. Our strategy ensures that investments are sound, equitable, and deliver the highest possible value to the city and its constituents. We will: • Deliver IT services that enable Sacramento to be a leader in public service known for our transparency accountability and integrity • Build a sustainable, reliable, and agile IT organization aligned with the city's business requirements, goals, and objectives • Create an environment of innovation and collaborative working relationships with the community, businesses, city staff and our customers Goals: 1. Digital - expand access to city services to anyone, at any time, from anywhere (responsive, touchless, accessible and mobile) 2. Innovative - transform the city's services delivery through new and creative solutions 3. Dynamic - create a dynamic workforce that is well trained, self-reliant, responsive, and adaptable 4. Partner - create a citywide community of partnerships with citizens, businesses, communities, higher education and a wide array of stakeholders

Inter-governmental and regional strategies				
22.	OECD (2022)	Assessing National Digital Strategies and Their Governance, OECD Digital Economy Papers May 2022 No.324	• Access • Trust • Labour market and skills – regional development • Innovation • Society – environment, health care, digital government, skills • Market openness – trade, investment competition • Data governance • Entrepreneurship • Competitiveness • Policy coordination • Governance • Policy landscape	Paper explores, compares and evaluates national digital strategies from around the world.  *Note:* Gender policies are considered in social policies under the Society dimension. *Source:* Authors, based on (OECD, 2020[1]). Many countries have turned to a national digital strategy as a tool towards digital transformation, but the content and governance of national digital strategies can vary significantly across countries, and questions have arisen as to what a comprehensive national digital strategy should cover and how to govern it. This report provides key answers to these questions. The new NDSC indicator presented in this report measures the comprehensiveness of national digital strategies benchmarked against the seven dimensions of the Framework, providing insights into the potential of a country's NDS to co-ordinate policies across domains. The results indicate, for example, that policies under the

				access dimension are on average the most comprehensive across countries, which reflects the strong tradition of ICT sector specific strategies, such as for broadband development. On the other hand, much scope remains for national digital strategies to better reflect and co-ordinate policies under the jobs and market openness dimensions. Governance of national digital strategies has evolved in line with the growing importance of digital transformation policies and the need for stronger leadership and more effective co-ordination of such policies via national digital strategies. This is evident in the trend towards allocating responsibility for developing the NDS to a ministry, body or function dedicated to digital affairs or to an above-ministerial body or function. While a majority of countries have adopted a multi-stakeholder approach to developing and implementing their NDS, other essential success factors, notably dedicated funding for implementation, still have substantial room for improvement in many countries. The insights from the assessment of national digital strategies and their governance in this report can help policymakers as they develop new or revise existing national digital strategies and governance arrangements. Looking ahead, it may be beneficial for future work to also consider assessing countries' broader digital policy landscape.

23.	United Nations Development Programme (UNDP)	UNDP Digital Strategy 2022-2025 (Organizational Digital Strategy)	• Social vs. digital • Enable and amplify digital across programming to support development outcomes • Inclusive and resilient digital ecosystems • Digital workforce • Digital upgrading	**Vision and objectives** This renewed Digital Strategy is based on UNDP's experiences implementing the previous Digital Strategy, the Strategic Plan, and its exploration of the outlook for the future of digital development. It is grounded in UNDP's longstanding commitment to eradicating poverty and supporting countries in their progress towards the 2030 Agenda for Sustainable Development[31], the Paris Agreement[32], and the approach outlined in the previous section. It is also supportive of several existing strategies within UNDP, including the IT Strategy 2020-2023, the Data Strategy and the People For 2030 Strategy[33]. UNDP's long-term vision is to help create a world in which **digital is an empowering force for people and planet.** To make progress towards this long-term vision, UNDP will continue to evolve its two pathways to change, which reflect the programmatic and operational capabilities needed to achieve the following mutually reinforcing objectives: **Pathway 1 – Programmatic objectives** + **Digitally enabled programming:** Amplify development outcomes by embedding digital across all UNDP programming. + **Empowering digital ecosystems:** Support societies in their efforts to create more inclusive and resilient digital ecosystems[34]. **Pathway 2 – Operational objectives** + **Digitally native UNDP:** Transform UNDP so that it has fit-for-purpose digital systems, processes, tools, and data, as well as a digitally competent workforce to effectively support the first two objectives. Figure 1 — Digital Strategy 2022-2025 strategic focus 

24.	CAREC and the Asian Development Bank (February 2022)	CAREC Digital Strategy 2030 Accelerating Digital Transformation for Regional Competitiveness and Inclusive Growth	• Accessibility • Broadband infrastructure • Connection gaps • Harmonize legislature – digital policy enablers • Digital skills • Digital innovation • Entrepreneurship • ICT • Talent attraction to the region • Reduction in trade barriers - competitiveness • E-commerce • Digital platforms	Objectives • Encourage investmen in the digital infrastructure across the rregion to close connectivity gaps • Harmonize digital and data legislature to promote an enabling environment • Develop new digital skills, including for women, disadvantaged, and minority populations, to create jobs • Attract talent into the region to strengthen CAREC's innovation ecosystem • Reduce regional trade barriers to increase cross-border trade and expand business opportunities for companies across the region, particulary e-commerce • Improve the digital foundations (represented through the pillars in Section 5 -below) and create interoperable digital platforms to enable the development of CAREC's opertional clusters 

25.	European Union (E.U.)	E.U.'s 2030 Digital Decade	• Digital skills • Digital infrastructure • Digital transformation of businesses • Digitalisation of public services	Targets and objectives The Digital Decade policy programme sets out digital ambitions for the next decade in the form of clear, concrete targets. The main goals can be summarised in four points: • A digitally skilled population and highly skilled digital professionals • Secure and sustainable digital infrastructures • Digital transformation of businesses • Digitalisation of public services  Policy programme: measuring progress. The Digital Decade policy programme 2030 sets up a monitoring and cooperation mechanism to achieve the common objectives and targets for Europe's digital transformation. As a first step under the policy programme, the commission will define the KPIs, such as, key progress indicators, in an implementing act. The KPIs will be based on the existing DESI exercise that measures the state of the digital transformation in Europe each year. Then the commission, in cooperation with the member states will work together to develop E.U.-level trajectories to assess

				whether the progress observed for each target is sufficient to reach the 2030 values. Each year the commission will publish the State of the Digital Decade report in which it will measure and assess the progress towards the E.U. level trajectories and the ultimate Digital Decade targets and recommend further actions and efforts, where needed. The first State of the Digital Decade report will be published in 2023. Each member state will define its own national trajectories that are necessary to reach the common E.U. trajectories and targets. The national trajectories will be defined in the first national roadmaps that the member state will submit to the Commission. The member state will review and revise their national roadmaps every two years to inform about the planned actions, measures and investments they will undertake to achieve the objectives and targets. Digital rights and principles. The declaration on digital rights and principles was signed at the highest level by the European Commission, the parliament and the council. The declaration covers key rights and principles for the digital transformation. It is shaped around six chapters: • Putting people and their rights at the centre of the digital transformation • Supporting solidarity and inclusion • Ensuring the freedom of choice online • Fostering participation in the digital public space • Increasing safety, security and empowerment of individuals • Promoting the sustainability of the digital future

News article on international digital strategies (NEW!)

	Country	Topic	Themes	Description	Article website
2023					
1.	China	Accelerating Rural Digital Transformation: China's Priorities for 2023	• Digital villages • Digital infrastructure • Technology and farming • Food security • Broadband access • Poverty alleviation through digital technology	The goal is to empower rural industries and rural areas through digitalization, driving the modernization of agriculture and rural areas, promoting common prosperity for rural farmers, and achieving new progress in building a strong agricultural country and a digitally advanced China. The "work points" outline the work goals to be achieved by the end of 2023. These include making staged progress in the development of digital villages, providing stronger support for national food security and consolidating the achievements of poverty alleviation through digital technology. The targets also include exceeding 190 million rural broadband access users, achieving basic coverage of 5G networks in areas above the township level and qualified administrative villages, reaching a 26.5 per cent informatization rate of agricultural production, and exceeding 580 billion yuan in retail sales of agricultural	https://opengovasia.com/accelerating-rural-digital-transformation-chinas-priorities-for-2023/

				products through e-commerce networks.	
2.	China	Specific measures taken to promote digital villages (2023)	• Agricultural technology • Digital village	Besides the heavy investment in agricultural technology, agriculture in the digital village is arguably an industry that is more than just applying new advances in technology — villagers' lives are central pillars of rural vitalization and the digital village's development.	https://www.chinadaily.com.cn/a/202303/17/WS6413c521a31057c47ebb502b.html
3.	China	China releases report on development of digital villages	• Digital infrastructure in villages • Digital economy in villages • Policy support • Social services • Smart agriculture	1. Improvements in digital village infrastructure 2. Progress in smart agriculture 3. Digital village new economy 4. Rural governance 5. Rural internet culture 6. Assisted social services 7. Digital green villages 8. Policy support for digital village development	https://www.dcz-china.org/2023/03/16/china-releases-report-on-development-of-digital-villages/

An overview of broadband programs

	Jurisdiction	Article title	Theme(s)	Summary
2021				
	Programs in Canada			
1.	Canada	Universal Broadband Fund (UBF)	• Broadband infrastructure • Accessibility • Indigenous connectivity	With the proposed Budget 2021, the now $2.75 billion Universal Broadband Fund will support high-speed Internet projects across the country. Budget 2021 proposes to provide an additional $1 billion over six years, starting in 2021-22, to the Universal Broadband Fund to support a more rapid rollout of broadband projects. The Universal Broadband Fund has been designed to fund broadband infrastructure projects that will bring high-speed Internet at 50/10 Megabits per second (Mbps) to rural and remote communities. In addition to funding a diversity of high-speed Internet projects to connect Canadians, there is: • Up to $50 million available to support mobile Internet projects that primarily benefit Indigenous peoples, including projects along highways and roads where mobile connectivity is lacking • Up to $750 million available for large impact projects • Up to $150 million available as part of our Rapid Response Stream The Universal Broadband Fund is part of the Government of Canada's coordinated plan to connect all Canadians: *High Speed Access for all: Canada's Connectivity Strategy*.
2.	Canada	Connect To Innovate	• Broadband infrastructure • Indigenous connectivity	In budget 2016 and 2019, the federal government had invested $585 million in broadband funding for back bone and last mile connectivity including microwave and satellite. In 2018, the auditor general marked ISED as unsuccessful in delivering this program because they did not maximize taxpayers' dollars. Since this program was initiated in 2016, the maximum speeds this program supports are 5/1 Mbps and is considered outdated.

3.	Canada	Investing in Canada Infrastructure Program - Rural and Northern Stream	• Broadband infrastructure • Inclusiveness	The federal government has developed a $2 billion funding program stream to improve broadband (mobile, cellular and wireline) connectivity for small, rural and remote communities.
	Canada	CRTC Broadband Fund	• Broadband infrastructure • Indigenous connectivity	The CRTC Broadband Fund is investing $750M in expanding 50/10 Mbps broadband service or LTE or 5G coverage at premises, businesses and major road networks in Ontario.
4.	Canada	Telesat's Lightspeed LEO satellite systems	• Broadband infrastructure • Broadband equality • Indigenous connectivity	The Federal government has invested $1.44 billion in Telesat's Lightspeed Connectivity project that will bring high speed internet to remote areas in northern Canada. This project aims to target connectivity to those last five per cent who cannot get coverage.
5.	Ontario	Ontario Connects	• Broadband infrastructure	Provincial government has allocated $4 billion for digital connectivity for household and businesses in Ontario. The RFP process involves reverse auction bidding and the endorsement of *Supporting Broadband and Infrastructure Expansion Act, 2021* to accelerate the development of broadband projects.
	Ontario	Improving Connectivity in Ontario	• Broadband infrastructure	The provincial government has invested $1 billion in 50/10 Mbps fixed or mobile broadband, specifically last mile, backbone, cellular and satellite.
	International programs			
6.	United States	Rural Development Broadband ReConnect Loan and Grant Program. USDA. (n.d.).	• Accessibility • Affordability • Rural economic development	• The ReConnect Program offers loans, grants, and loan-grant combinations to facilitate broadband deployment in areas of rural America that currently do not have sufficient access to broadband. In facilitating the expansion of broadband services and infrastructure, the program will fuel long-term rural economic development and opportunities in rural America • $350 million U.S, in grants for Tribal Governments and Socially Vulnerable communities

				• $200 million U.S. USD in loans • Or a combination of grants and loans
7.	United States	Emergency Broadband Benefit. U.S. Federal Communications Commission. (n.d.).	• Accessibility • Affordability • Broadband for development	About the Emergency Broadband Benefit: • The Emergency Broadband Benefit is an FCC program to help families and households struggling to afford internet service during the COVID-19 pandemic. This new benefit will connect eligible households to jobs, critical healthcare services, virtual classrooms and so much more • The Emergency Broadband Benefit will provide a discount of up to $50 per month towards broadband service for eligible households and up to $75 per month for households on qualifying Tribal lands. Eligible households can also receive a one-time discount of up to $100 to purchase a laptop, desktop computer, or tablet from participating providers if they contribute more than $10 and less than $50 toward the purchase price • The Emergency Broadband Benefit is limited to one monthly service discount and one device discount per household
8.	United Kingdom	U.K. Gigabit Broadband Voucher Scheme (n.d.).	• Accessibility • Affordability	• The U.K. Government is providing up to £210 million worth of voucher funding as immediate help for people experiencing slow broadband speeds in rural areas • Vouchers worth up to £1,500 for homes and £3,500 for businesses help to cover the costs of installing gigabit broadband to people's doorsteps