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INTERNATIONAL
ECONOMIC DEVELOPMENT
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Kathleen Wynne
Premier

welcome to ontario

Premier of Ontario - Première ministre de l'Ontario

A Personal Message From The Premier

On behalf of the Government of Ontario, I am delighted to extend warm wishes to all the delegates of the International Economic Development Council (IEDC) Annual Conference.

Ontario is a place where the world meets – to do business, to launch new ideas and to find opportunities. We are leaders in the knowledge economy, with a highly skilled and educated workforce, and have a large and globally connected investor community.

I am pleased to know that IEDC has chosen Toronto as the venue of its first conference outside the United States.

In our increasingly connected world, it is vital that we work toward regional collaboration in order to create opportunities and wealth for our businesses and communities. Conferences such as this bring economic developers, elected officials and public servants, and other stakeholders to exchange ideas on how to build a sustainable prosperity that brings jobs and opportunities to all.

Please accept my best wishes for an informative and productive conference.

Kathleen Wynne
Premier

welcome to toronto

John Tory
Mayor of Toronto

Message From The Mayor

It gives me great pleasure to extend greetings and a warm welcome to everyone attending the International Economic Development Council's 2017 IEDC Annual Conference.

As Canada's largest city with a population of more than 2.8 million, Toronto is a global centre for business, finance, arts and culture and is dedicated to being a model of sustainable development.

The City of Toronto is honoured to be hosting this conference, IEDC's first outside of the United States.

This conference hosts members of the IEDC, the largest membership organization for economic developers in the world, and presents a wonderful opportunity to gather in a setting designed for professional development and presents an exceptional networking and learning forum.

I welcome everyone to our city and encourage you to enjoy all that Toronto has to offer.

On behalf of Toronto City Council, please accept my best wishes for an informative and enjoyable conference.

Yours truly,

John Tory
Mayor of Toronto

The IEDC
Economic Development Journal

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INTERNATIONAL ECONOMIC DEVELOPMENT COUNCIL

building high calibre

CITY DATA

By Dr. Patricia McCarney

INTRODUCTION

Cities are a defining phenomenon of the 21st century. For the first time in history, the majority of the global population lives in cities. With cities now responsible for greater than 70 percent of global GDP, cities are quickly becoming economic powerhouses, taking centre stage in the development and prosperity of nations. Alongside these global demographic and economic trends, comes a new set of challenges for city leaders on the ground.

Now more than ever, a stable and sustained trajectory for economic development in cities, is dependent upon effective management and evidence-based policy making. Cities need data – to drive economic development, inform investment decisions, benchmark progress, and moreover, to drive a culture of innovation in their cities. City leaders are being tasked with a wider and deeper set of challenges – from youth employment, to efficient mobility, to creating healthier environments, to security and emergency preparedness. Cities need indicators to measure performance in delivering services and improving quality of life, all at the core of a successful economic development platform. Cities need to talk to each other for peer to peer learning – hence the need for globally comparable and standardized city data has never been greater. If cities are measuring the same way, then the ability to compare data across cities locally and globally, using a globally standardized set of indicators, is essential for comparative learning and progress in a city's economic planning, regardless of size or level of economic development.

While cities are the economic drivers of global production, so also are global challenges increasingly finding expression in the world's cities. Whether climate change, poverty alleviation, cultural tolerance, the global financial crisis, or global risk and conflict, cities are sites where these global challenges are most symptomatic, where the greatest concentrations of individual citizens and communities are affected, and where informed responses can be most strategic. In addressing these challenges and the global opportunities for economic growth and prosperity, the need for globally comparable data, strategic analytics and comprehensive knowledge on cities has never been greater.

City leaders worldwide want to know how their cities are doing relative to their peers. Standardized indicators allow city leaders to measure their performance and compare it with other cities. For instance,

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A CRITICAL TOOL TO DRIVE ECONOMIC DEVELOPMENT AND INCLUSIVE PROSPERITY IN CITIES

The role of an innovative city with an entrenched knowledge-economy has long been seen as a key drive of investment in cities, resulting in inclusive prosperity. However, until very recently, many of the metrics used to qualify these terms are either anecdotal, or unclear from a methodological standpoint. This article explores the importance of leveraging high calibre, internationally comparable and standardized city data as a tool to make wise investment decisions in cities, driving economic development.

comparable city level data can help build collaboration and understanding by fostering information exchange and sharing of best practices across cities. Comparative analysis and knowledge sharing is vital in the face of rapid urbanization and the associated demand for larger scales of infrastructure investment and city services as well as the emergent global challenges including climate change and risks associated with resilience and emergency preparedness. City metrics guide more effective city governance for economic progress.

BUILDING AND TESTING A CORE SET OF CITY INDICATORS – Standardizing Definitions and Methodologies

Policy responses to today's most pressing challenges and opportunities for sustained prosperity are hindered by a set of core weaknesses in current research and information at the city level. To date, no city data has conformed to a standardized methodology that can ensure sound global comparison and learning across cities, making globally comparative research and exchange impossible.

The evolving world of international standards has only very recently begun to address the need for standardization in cities, and in particular the need for standardized data across cities. A new international standard was published in 2014 by the International Organization for Standardization (ISO) titled ISO 37120 *Sustainable Development of Communities – Indicators for City Services and Quality of Life* (ISO, 2014) which is the first international standard to offer support to cities for building more reliable data with standardized definitions and methodologies. Most cities produce metrics and measure their core service delivery and their quality of life across almost all of the same themes but the problem has been that there has been no standardized way that this data is being collected and reported. Definitions on what is being measured and methodologies on that measurement are uneven and differ despite very similar objectives. For example, many cities are measuring "emergency response time" but without a standard definition of what is included in this measure and how it is collected, such as, whether response time being measured is from time of call or from time of dispatch, will cause unevenness in the data, an inability to compare and an inability to improve from peer cities experiences. This holds true for all sorts of data points across transit, recreation, education, housing, safety, air quality and other city services and quality of life data that affect a city's planning and economic policy.

Sound metrics collected according to a global standard for comparability across cities builds a vital information base which describes the forces that are reshaping the global landscape and positioning cities as critical nodes for competitive prosperity.

WORLD COUNCIL ON CITY DATA ISO 37120 – The First International Standard for City Indicators

ISO 37120 includes a comprehensive set of 100 indicators – of which 46 are required for conformity – that measures a city's social, economic and environmental performance. The 100 indicators with definitions and methodologies published in ISO 37120 are divided into 17 themes representing key performance management fields in city services and quality of life.

Schematic Themes for ISO 37120

Economy	Governance	Telecommunication and Innovation
Education	Health	Transportation
Energy	Recreation	Urban Planning
Environment	Safety	Wastewater
Finance	Shelter	Water and Sanitation
Fire and Emergency Response	Solid Waste	

ISO 37120 helps cities build a reliable foundation of globally standardized data and core knowledge for city decision-making, and enabling comparative insight and global benchmarking. Benefits of ISO 37120 Indicators include:

- More effective governance and delivery of services
- Local and International benchmarking and targets
- Informed decision making for policy makers and city managers
- Comparative learning and sharing of informed practice across cities
- Leverage funding and recognition with senior levels of government and international entities
- Demonstrate transparency and open data for investment attractiveness
- Improve a city's credit and bond rating

With the publication of ISO 37120, the World Council on City Data (WCCD) was created in Toronto, Canada to facilitate the adoption and implementation of ISO 37120 for cities worldwide. The WCCD hosts the Global Registry™ and a system for certification of cities for ISO 37120. The WCCD now hosts an online open data platform www.dataforcities.org.

CITIES AND PROSPERITY – A Distinct Role for Cities

Prosperity agendas are most oft framed by economists and directed to the realm of global policy makers (prescribing policy levers aimed at global financial institutions) and national and provincial/state policy makers (levers aimed at senior levels of government). These typically include critical structural characteristics and economic policies including trade and tariff policies, state versus private ownership, currency controls and the regulatory/legal system affecting monetary instruments; confidence in property rights, rates of taxation, faith in the judicial system; macroeconomic stability or instability; intellectual property rights; market support for new inventions, government support for scientific research, the state of higher educational facilities, amongst others.

How are cities framing economic development policy? There is an apparent macro vs micro divide as well as an economic centric versus multi-disciplinary, multi-sectoral divide. Senior levels of government are able to target funding and support to cities but cities themselves are less able to initiate action in these macro policy realms and control such support. Cities may not compete in the way that nation-states compete, by restrictive trade practices, or by adjusting interest rates, or by vying for a greater share of world trade. Cities however do have strategic advantage in implementing an agenda for economic development since economic prosperity is also a function of the level of services provided in a city, the quality of the business environment and the quality of life enjoyed by residents within the city's boundaries. If improvements in these dimensions cannot keep pace with the population growth of a city, that city may not boast as large an economy in the future as predicted by its size. In pursuit of strategy at the city level, actions move away from a more singular focus of economics and necessarily involve planners and engineers, designers, environmentalists, housing specialists, and a cadre of urban leaders in both the public and private sectors.

What can cities do?

Cities engage in proactive strategies when it comes to prosperity – ones that recognize cities as strategic spatial platforms upon which local firms and households can prosper and others that recognize cities as competing locally and globally for competitive advantage in building prosperity.

Cities compete by, for example, assembling a skilled and educated labour force through education and training. They develop efficient modern infrastructure to support households and businesses to be healthy, productive and to gain wealth. Cities are also responsible for building strong and responsive systems of local governance that are inclusive and recognize and support entrepreneurial development in their locales. Cities are pivotal in developing flexible land and property markets and housing markets that are a basis of wealth and prosperity within their boundaries. Cities are also increasingly proactive in creating high environmental standards and a high quality of life for their citizens.

INDICATORS FOR UNDERSTANDING THE MULTIPLICITY OF FACTORS THAT influence ECONOMIC DEVELOPMENT AND PROSPERITY IN CITIES

There is no doubt that cities are growing in economic importance on a regional, national and global scale, yet some cities thrive economically while others do not, and the driving force behind this difference is difficult to pinpoint. The OECD has argued that a city's economic success is not merely a function of its population size: for a city to be both economically attractive and prosperous, simply having more people producing more is not enough.

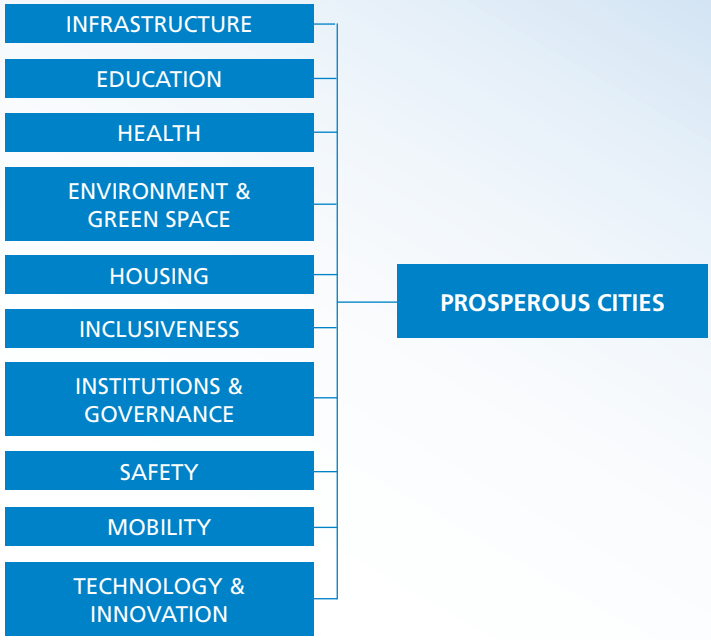
Cities such as WCCD Foundation City Melbourne are home to a highly-educated population, as measured by number of higher education degrees per 100,000 population.

While it is appealing to believe that the discovery of one key solution will drive a city's wealth, the complexity of cities on the ground suggests otherwise. City leaders, academics and professional think-tanks have attempted to discover the key to city prosperity, and many argue for magic bullets that will drive the engine of growth, including offerings of fiscal incentives to promote growth in the industrial sector, or the centrality of young talent in the so-called creative sectors, or developing locational incentive packages to invite and attract new businesses in the technology and innovation sectors. While all valuable, the strength of a city's economy is more nuanced and hence requires a multi-layered strategy for sustained success.

While the success of one economy over another may be easily explained in some cases, it is often the result of a more intricate web of influences. Despite this, and the fact that city economies are becoming increasingly important, there continues to be little standardized and global data collected on city economies or the various influences on economies at the city level. PricewaterhouseCoopers, among others, has recognized the need for "systematic global data" on city economies (PwC,

HOW DO WE MEASURE AND EXPLAIN A CITY'S SUCCESS IN BUILDING PROSPERITY?

CITY ATTRIBUTES AND CITY ASSETS - Foundations For Prosperity



Citizens and Investors are increasingly asking: How safe is our city? How does our level of safety compare to our peers? How many police officers do we have per capita? What are the levels of crime (number of homicides or violent crimes for example) in our city? How is our health support system (how many medical doctors as well as hospital beds do we have relative to our peers?)? What is our voter turnout for municipal elections relative to our peer cities? How clean is our air?

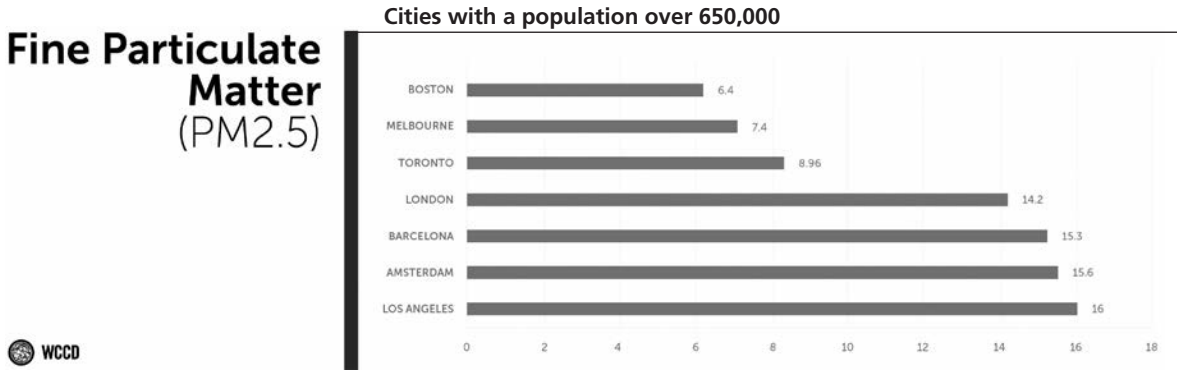
Standardized city indicators that address these very issues become increasingly relevant both to city leaders in promoting economic development and attractiveness of their city as well as to companies of all sizes that leverage this city level data to decide where to locate new business operations to ensure both business continuity and quality of life for employees. With globally standardized city data, it is now possible to look at the opportunity cost of moving a business to a larger city with poor measurements of – for example - air quality, as opposed to a smaller city with clean air. Globally, as cities like London, where the mayor is openly calling for action on air quality and showing the health risks associated with London's air quality, cities and businesses are examining the importance of a healthier environment for citizens and employees alike, resulting in increased overall health and a decrease in revenue loss due to environmental advisories or sick days. The following charts offer an internationally standardized, and comparable look at the air quality of cities of varying sizes across the globe.

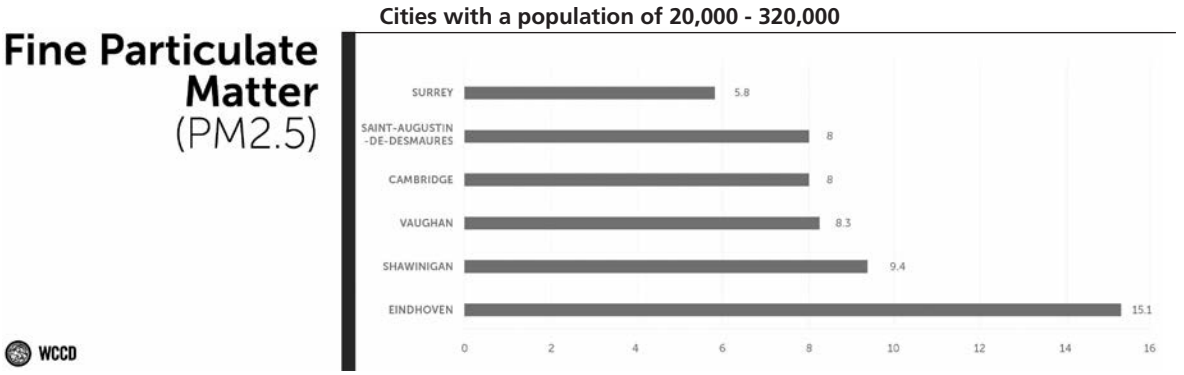
2009), and companies such as MasterCard™ have also begun to rank major global cities on various indications in terms of the "ease of doing business" within those cities. However, cities are still largely only ranked – based on the size of their population and economy – without reference to important contextual or supporting data that could help unearth why cities succeed at varying levels, according to different trajectories and to varying degrees and timeframes.

Investments in physical and social infrastructure and the delivery of city services create city assets that are the foundation for sustainable prosperity. Investments in education – primary and secondary schools and universities; in health – hospitals and health care services; in transport infrastructure – roads, ports, trains and transit services; in safety – strong police and fire services that create a safe place to live and work; in environmental infrastructure and services – safe drinking water, waste disposal, a safe and high quality of air and safe food; in housing – protection of property and safe housing for city residents; all create critical attributes and a city asset base, that create the foundation for prosperity in cities. Further, building prosperity in cities that is ultimately sustainable is dependent upon a local governance system characteristic of deep citizen involvement and inclusiveness. When city governance frameworks are politically accountable and ensure safe, inclusive and diverse cities to live in, and efficient, economically vibrant places to work in, then cities become platforms for sustainable prosperity. A city rich in such assets and attributes retains and grows its skilled labour, enhances its business attractiveness and expands its economic base for innovation and prosperity.

Considered by many to be one of the most multi-cultural cities in the world, WCCD Foundation City Toronto has one of the most highly educated populations, as well as a high population of foreign born residents.

HOW IS OUR AIR QUALITY RELATIVE TO OTHER PEER CITIES?





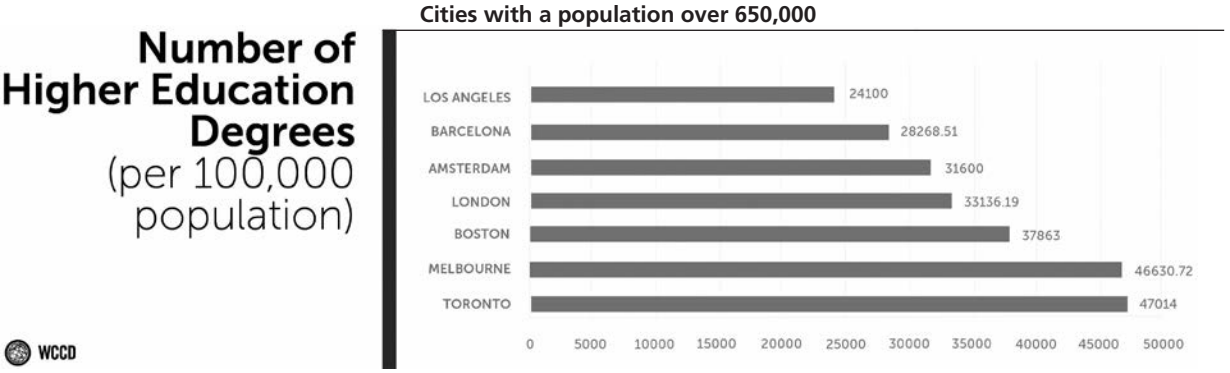
HIGH CALIBRE DATA INFORMING AND DRIVING A ROBUST ECONOMIC DEVELOPMENT IN CITIES

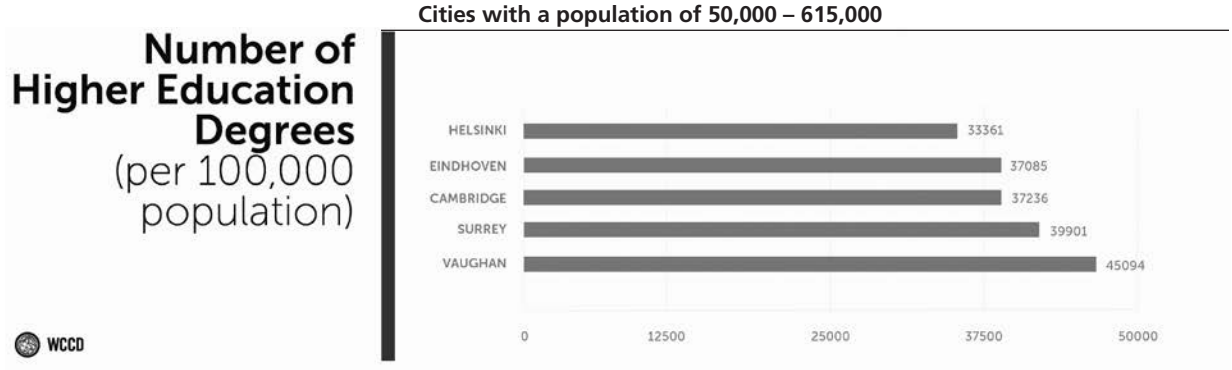
ISO37120 indicators may be used to perform analysis on cities' prosperity and economic attractiveness over a broad range of indicators individually by cities, globally across the entire network, or with a focus on a particular region or peer grouping of cities. This analysis can be carried out by city officials and planners within cities, by universities and research centres across the globe, or by interested companies to identify opportunities or to select cities that meet their needs for location and doing business.

The primary objective behind these ISO indicators is to enable smart, evidence-based policy, through the analysis of standardized information and the sharing of best practices across a global network of ISO certified cities. In the case of prosperity and economic attractiveness, this might unfold like this: WCCD indicators first outline a city's general economic profile based on population size, socio-economic factors, demographics, and other city profile indicators, so as to identify peer or target cities within the global network. From here, the analysis of a standardized set of data – internally and across peer or target cities globally, over a broad range of indicators – provides an opportunity for cities to identify their inherent or existing competitive economic advantages as well as areas that should be targeted for improvement. From this enhanced understanding of a city's present economic landscape, with short- and long-term goals in mind, a strategy for improved prosperity and economic attractiveness can be designed and translated into evidenced-based policy, whose effects can be tracked over time once implemented.

The primary objective behind these ISO indicators is to enable smart, evidence-based policy, through the analysis of standardized information and the sharing of best practices across a global network of ISO certified cities.

A core asset for cities in building prosperity is the skilled and educated workforce that the city produces within its region and also that it attracts in from outside. For instance, a city could look at its education indicators in an effort to understand how the education system and skills base contributes to the ability to propel business and attract investment in the city, compare it to that of peer cities, turn to peer groups or target cities in the network with strong performance in the relevant indicators to learn alternative models and practices, and pose key policy questions such as: how is our high school completion rate relative to our peers? Our class size (student-teacher ratio)? Or, how many university degrees do we have per capita in our region?





WCCD Foundation City London leverages a well-connected transit network as well as a walkable city to discourage the use of personal automobiles.

The concentration of higher education degrees in cities are increasingly accepted as a characteristic of an innovative (and therefore, investable) city. One only has to look at the charts above to notice that global cities such as Toronto, Melbourne and Boston – considered by many measures to be both innovative and investable destinations – house highly educated populations, measured by number of higher education degrees per 100,000 population. Similarly, smaller cities in Canada such as Surrey (Vancouver-adjacent), or Vaughan (Toronto-adjacent), are, in addition to being innovative destinations in and of themselves, also communities from which highly-educated individuals reside.

Or, in addition to the educated workforce that the city produces within its region, cities are increasingly interested in measuring how attractive it is globally. Attraction and retention of talent are also reflected in the number of foreign born population in cities, relative to other local and global peers.

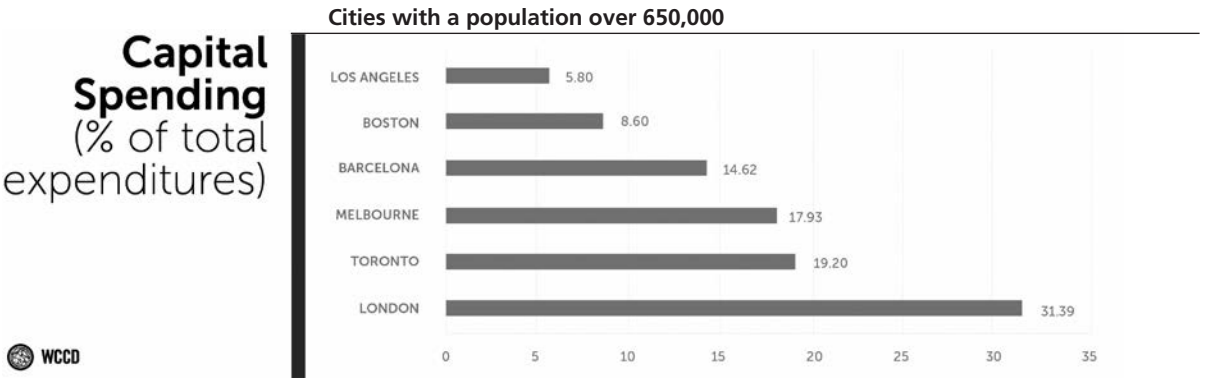
The attraction of skilled workers to any city will depend on the job potentials, the ability to accumulate wealth while there and the quality of life offered by the city. While labour and capital are generally seen as more footloose in our current era of globalization than in the past, a key role for cities in building attractiveness and economic prosperity lies in offering critical city services for efficient and cost effective and time effective mobility and transport. Cities can be regarded as logistics platforms, the places where major highways, port facilities, international airports, finance, marketing and distribution centres converge. They perform as marketing and distribution centres for moving people and produce by planes, trains and high-speed rail, light rapid transit, and by road and inter-regional freight corridors for transport rail and trucks and through increasingly sophisticated ports for global container ships. New "logistic supply megaregions" have been identified by the public policy group, America 2050 (Pisano 2012). The group for example examines the role of high speed rail in megaregion corridors such as California and in the proposed New Haven-Hartford-Springfield Rail project to connect new business, educational, and cultural opportunities along what is referred to as the "Knowledge Corridor." Such initiatives highlight the importance of three way partnerships – educational institutions, government and business partnerships for local leadership alliances.

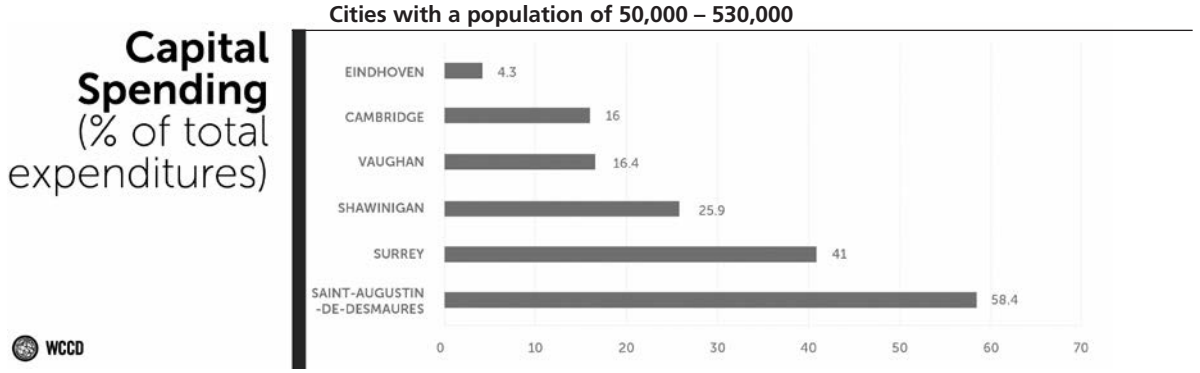
As noted in the charts below, capital spending as a percent of total expenditures – while considered one important indicator on a city's development and lead

WCCD Foundation City Boston stands out as an investable and an innovative city due to its highly educated population.

commitment to sustainable prosperity – is only one part of the calculation in understanding what goes into an investable and innovative city. Key metrics such as public transit (both light and high capacity transit) support essential movement of labour, while bicycle paths offer alternative forms of transportation and a commitment to a more healthy lifestyle and liveable cities for all. In looking at the following data it is quite clear that some of the most innovative global cities (London and Barcelona for example) have a population that clearly prioritises public transit and cycling as a commute method. All of this contributes to an increased quality of life, and moreover creates an urban space that is healthier, cleaner, and almost inevitably, more attractive and therefore more prosperous.

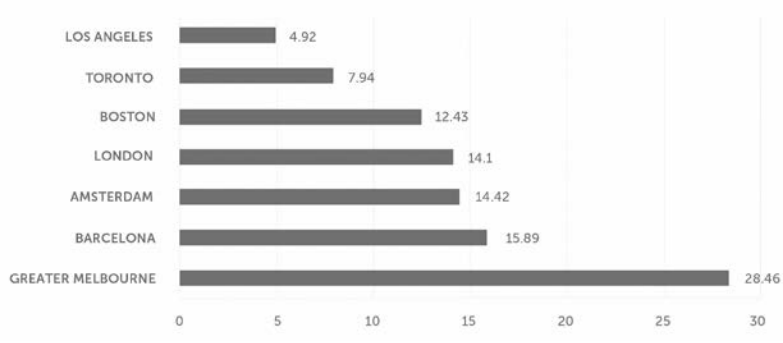
CITIES AS LOGISTICS PLATFORMS: Investment Driving Prosperity





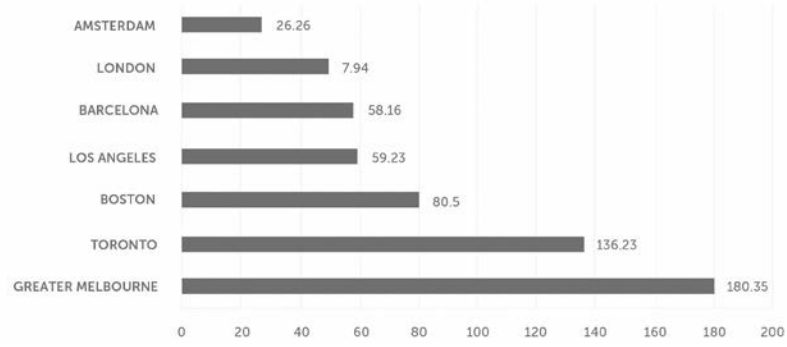
INVESTING IN CITY SERVICES FOR MOBILITY AND CONNECTIVITY IS BUILDING CORE ASSETS FOR PROSPERITY

High-capacity Public Transit (km/100,000 population)



WCCD

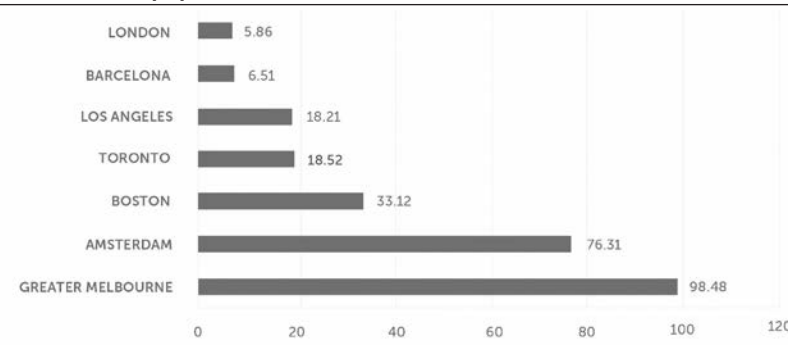
Light Passenger Public Transit (km/100,000 population)



WCCD

Bicycle Paths (km/100,000 population)

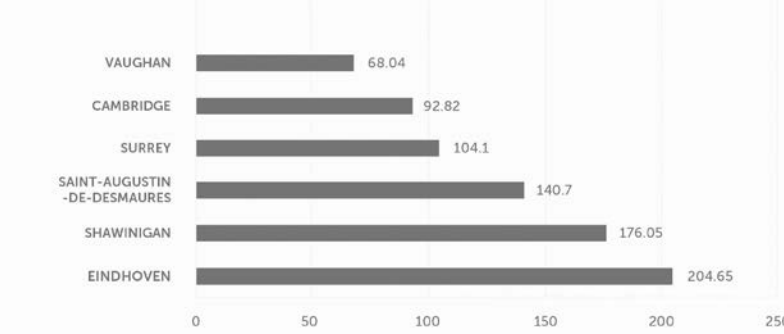
Cities with a population over 650,000



WCCD

Bicycle Paths (km/100,000 population)

Cities with a population of 19,000 – 530,000



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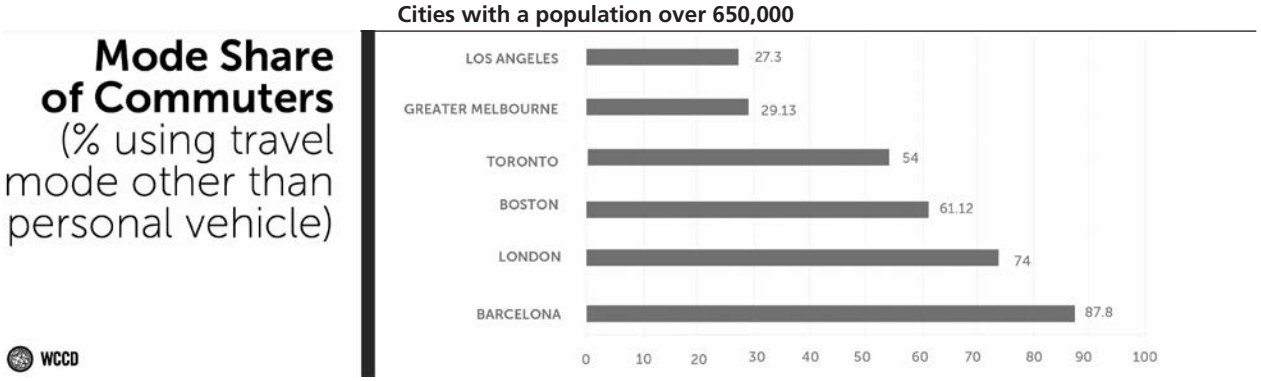

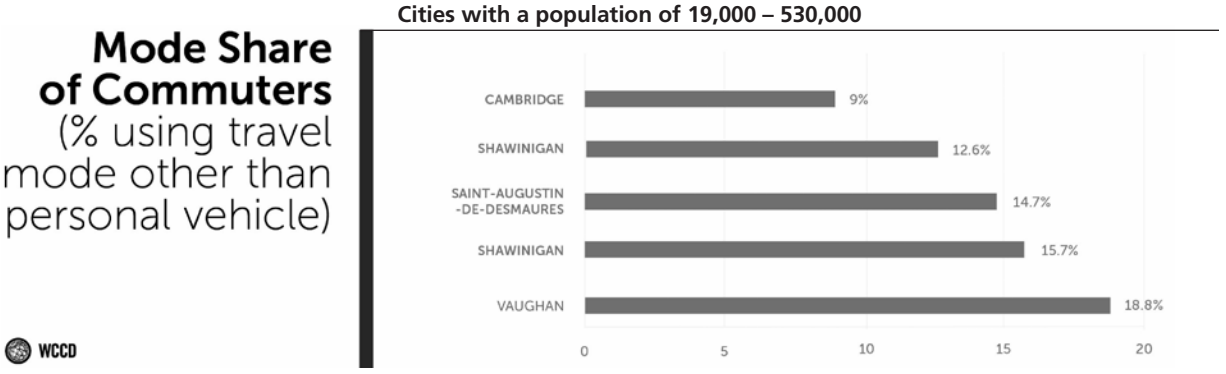

Bicycle paths facilitate alternative forms of transportation and a commitment to more healthy lifestyles and liveable cities for all.

WCCD Foundation City Barcelona prioritises a well integrated system of bike lanes and public transit to decrease automobile traffic.

As the United States and Canada also take up the smart cities agenda, it is important for cities to consider their city level data as driving a smart economy in order to take full advantage of this growing smart and innovative ICT market nationally and globally.

Cities equipped with internationally standardized and comparative data are able to drill down into comparative case studies to understand and most importantly, learn from other cities. City to city learning, propelled by data informed conversations, support innovation. For example, in the case of London, this comparative data indicates that 74 percent, a high proportion of Londoners, commute to work outside of a personal vehicle. It can then be asked – how did London achieve this? What does it mean for Londoners in terms of economy and well-being for example? And for other cities, how can we target improvements by learning from this case?

HIGH-QUALITY DATA SUPPORTED BY ICT IS THE DEFINING CHARACTERISTIC OF A SMART CITY

The smart cities movement is growing rapidly in cities across the globe and represents enormous economic development potential. The smartness of a city is usually described by how Information and Communications Technologies (ICT) and high quality data is used, as part of a wider approach, to help the city function more effectively, both in its individual systems, and as a whole. Without high quality, standardized data the smart city system simply cannot deliver. ICT and high quality data allow city and system managers to gain clear insights on how to optimize performance and create efficiencies across the complex city systems. Cities are making significant investments in smart technologies and infrastructure to improve mobility, health care, education, social well-being and for more effective governance, all core elements for smart city development.

The global scope of the smart city market varies widely as do the predictions on its growth over the next decade. China's 12th Five-Year Plan (2011-2015) called for a strengthening of the smart city sector, with over 100 cities pledged to become smart cities and investment in smart cities was expected to exceed USD $159 billion by 2015, and reach USD $320 billion through to 2024 (McKinsey Global Institute, 2009). Similarly, in 2014, India announced plans to build 100 smart cities to respond to the country's growing population and

pressure on urban infrastructure. The smart city agenda in India aims to drive economic growth; increase government transparency; improve quality of life, services, and infrastructure; and harness technology that leads to smart outcomes (Government of India, 2015). Recognizing the enormous potential of the smart city model, the European Innovation Partnership on Smart Cities & Communities has put smart cities at the center of the European agenda – to improve quality of life, increase competitiveness and improve contributions to sustainability. As the United States and Canada also take up the smart cities agenda, it is important for cities to consider their city level data as driving a smart economy in order to take full advantage of this growing smart and innovative ICT market nationally and globally.

CONCLUSION

In the not so distant past, and certainly in a global context, cities were often negatively regarded as a drain on budgets, and places where growth should be limited. Today most nations understand that it is their cities that are the instruments to both drive and revive economic development. Cities drive prosperity, support critical infrastructure development, provide jobs, boost investment, are centres of learning and innovation, and serve as centres for diversity and multicultural tolerance in a changing global order. Cities are now a positive and potent force for addressing sustainable economic growth, development and prosperity, and for driving innovation, consumption and investment. The last 20 years signifies a global transformation that positions cities at the core of economic development agendas. The shift towards an increasingly urbanized world constitutes a transformative force which can be harnessed for a more sustainable economic trajectory, with cities taking the lead to address many of the global challenges of the 21st century, including poverty, inequality, unemployment, environmental degradation, and climate change. Cities are positioned to drive a dynamic economic transition; to galvanize the power of density and the economies of scale and agglomeration through planning and design for efficient spatial form in cities; to initiate more sustainable and resilient futures; and, to capture the opportunities of connectivity that are at the core of innovation, economic performance and quality of life.

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urban economic

DEVELOPMENT IN A RURAL CONTEXT

By Ian Bromley

Practitioners tend to think of rural economic development and urban economic development as distinctly different. Large cities (such as Toronto and the Greater Toronto Area) can even be viewed as the enemy of rural economic developers. After all, major global cities are magnets for talent, capital, investment and jobs, all of which often seem to be flowing away from rural economies. The past 20 years in North America have been marked by the consolidation of so much economic activity and innovation in a dozen or so major cities and city regions. In the U.S., these city regions (such as Boston, New York, Seattle and the Bay Area) are generally located on the east and west coasts. In Canada, these are concentrated on the "south coast" (most particularly Toronto but also Vancouver and Montreal).

Certainly, there are differences between how economic development is approached in a major city (purely urban) and in a truly remote community (purely rural). But the focus of this article is on the in between areas – small urban centres, surrounded by rural townships, within approximately 100 miles of major metropolitan areas. For such places, such as my own City of Orillia, the amazing growth that has taken place in the major metros (in our case Greater Toronto) is admittedly a challenge but also presents important opportunities. These urban-rural communities can succeed if they can blend traditional urban and rural development approaches to harness the power of their geographic realities.

The City of Orillia is an interesting case study in that regard. Orillia is a city of approximately 32,000 people, in a Census Area (including surrounding townships) of about 75,000. Because Orillia is located between two beautiful lakes in Ontario's "cottage country," the seasonal population for the Census Area is a little over 100,000.

Shopping in Orillia's heritage downtown.

The city itself has a mid-sized regional hospital, a small college and a branch campus of a university. Its largest employers are the Ontario Provincial Police Headquarters (@1100 employees), Casino Rama (in an adjacent township), a number of manufacturers in the 100+ employee range, the health, education and social services sectors.

The city, celebrating its 150th anniversary, grew where it did originally because of the lumber trade and later, when the railways came through, as a manufacturing centre. The railways also brought tourists, many from Toronto, who wanted to escape the summer heat of the city, and many of whom eventually built summer homes in the area. Up until the early 1970s, Orillia and the City of Barrie (about 20 minutes' drive south) were approximately the same size and were the two largest cities in Simcoe County (immediately north of York Re-

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PREPARING FOR THE FUTURE IN ORILLIA

Over the past couple of decades, North America's largest city regions have experienced dynamic growth that has seemed to leave smaller urban and rural economies in the dust. Economic development practitioners working in smaller cities and more rural regions can either raise the white flag, or think carefully about how they fit in the larger system of cities they exist within and build on the assets that larger cities offer. Orillia is a small city in a rural region, part of a rapidly growing metropolitan area, which is itself a satellite of an even larger metro area – the Greater Toronto Area. Orillia's economic strategy focuses on building connections to the larger economies and focusing on quality of place.

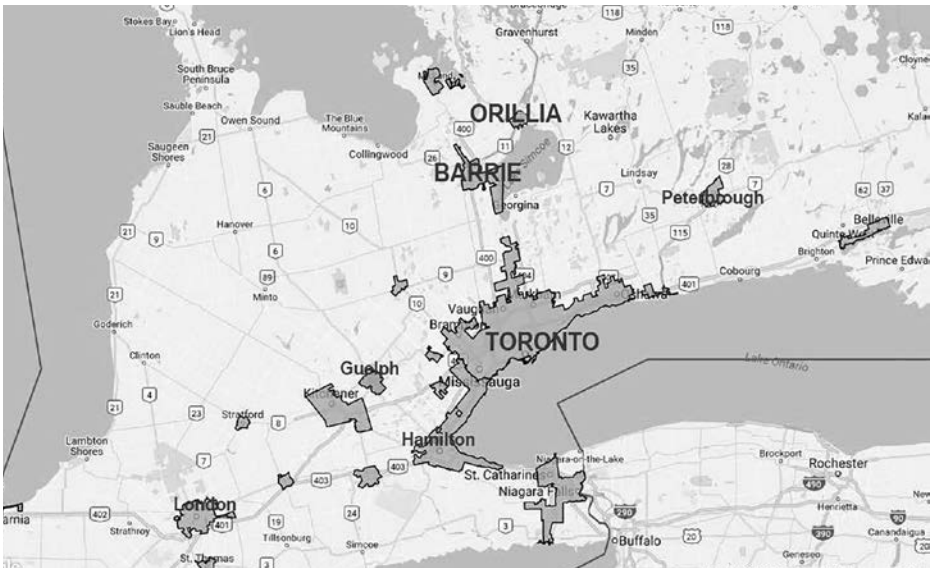
gion, part of the Greater Toronto Area). With the construction of Highway 400, a major highway north from Toronto, directly through Barrie, and with the northward expansion of the Greater Toronto Area, Barrie began to grow much faster than Orillia (it now has about four times the population of Orillia). In fact, in the past decade, Barrie has been Canada's fastest growing city as it has emerged as a viable option for commuters working in Toronto.

The City of Orillia is a small city, surrounded by rural townships, located in what may soon be an emerging metropolitan area (Greater Barrie), which is itself a satellite of the larger GTA (one of the fastest growing major metros in North America). In this situation, it is difficult to say where rural ends and urban begins.

Orillia is unlikely to build its future on securing large scale manufacturing investment for three reasons: these investments are increasingly rare, at least in Ontario; when these investments do come to Ontario they most often locate along Highway 401 in the Oshawa-Toronto-Windsor corridor; when large scale manufacturers do look north of the GTA they are likely to choose the southern Barrie/Simcoe County area (closer to the GTA); and finally, if only temporarily, because Orillia itself does not currently have adequate serviced industrial land.

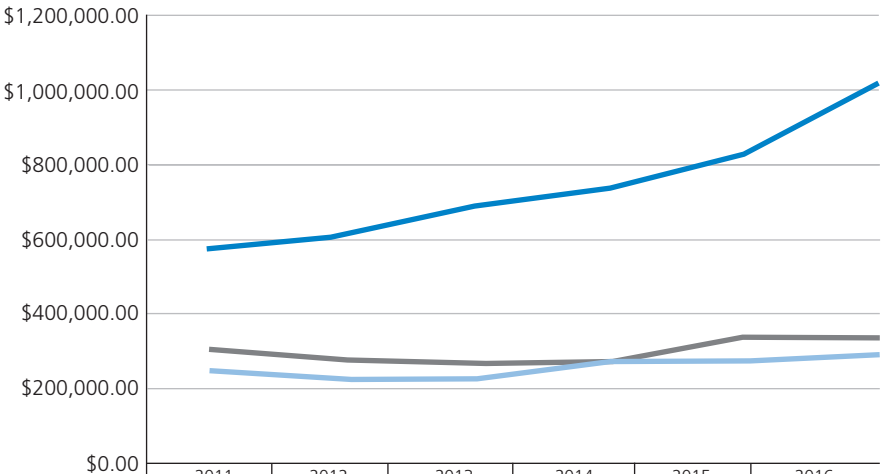
Orillia could decide to compete for "knowledge industries", but educational attainment in the city is generally below Ontario averages and few native Orillians have managerial experience in knowledge sectors.

Orillia's greatest assets are physical and locational. It is situated on two lakes and has a charming heritage downtown. But what makes Orillia special is that those physical assets are located adjacent to Canada's fastest growing city (Barrie), and proximate to the GTA, one of North America's fastest growing major metro areas. Orillia's small city/rural setting assets are made much more valuable by its proximity to larger urban economies.



Urban and rural economies in Central Ontario.

Average Residential Sales Price Comparison - Single Family Dwelling (SFD)



	2011	2012	2013	2014	2015	2016
Orillia	$245,412.57	$224,483.00	$228,064.00	$275,116.00	$276,947.00	$289,090.00
Barrie	$299,375.00	$276,789.00	$267,218.00	$274,087.00	$334,030.00	$336,030.00
Toronto	$574,351.00	$609,678.00	$686,787.00	$738,334.00	$825,470.00	$1,016,145.00

Sources: **Orillia** (Lakelands Real Estate Association), **Barrie** (Barrie & District Real Estate Association), **Toronto** (Toronto Real Estate Board)

The cost of housing in Toronto is creating opportunities for baby boomers and millennials in smaller communities near Toronto.

Despite the "brain drain" of youth to the big city, Toronto's phenomenal growth nonetheless creates many opportunities for smaller cities in its orbit.

Proximity to the GTA creates a number of opportunities: tourists and seasonal visitors mainly come from the GTA; some of those seasonal residents bring strong connections to social and business networks in Toronto; rapidly rising housing costs in the GTA are creating opportunities for near-retirees to consider selling their Toronto houses and moving to a less expensive location and are also forcing many millennials to consider where they want – and can afford – to raise their families. Despite the "brain drain" of youth to the big city, Toronto's phenomenal growth nonetheless creates many opportunities for smaller cities in its orbit.

Orillia's proximity to Barrie is more of a mixed blessing. Viewed from the GTA, Orillia is tucked behind its larger southern neighbour. Barrie has recently annexed a great deal of industrial land on its southern border, making it difficult for Orillia to compete for large scale industrial projects, When Orillia does get a large employer (such as the Ontario Provincial Police General HQ), many of those employees may choose to live in Barrie, which is clos-

er to Toronto and job opportunities for spouses, etc. In fact, commuting between Barrie and Orillia has grown rapidly going north and south, just as commuting between Barrie and Toronto (mainly going south in the mornings) has grown rapidly.

Given growth rates in Toronto/GTA and in Barrie, in 20 years, it would not be a surprise to see Barrie essentially become the northern anchor of the GTA and for Orillia to essentially have become further integrated into Greater Barrie. What challenges and opportunities does that pose for Orillia?

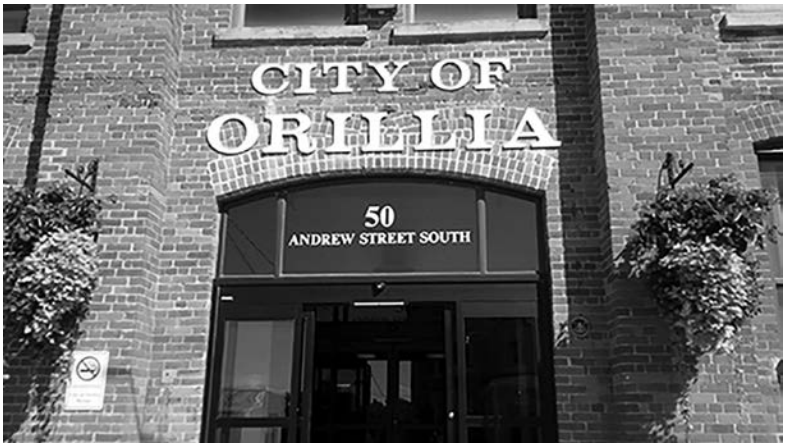
WHAT IS ORILLIA DOING?

Given its geographic position, the northward growth of the GTA and the emergence of a regional Greater Barrie, Orillia is beginning to understand its competitive position and is undertaking a range of actions to capitalize on its opportunities. These actions are a mixture of traditional economic development with a strong focus on quality of place.

Of course, the city undertakes many of the traditional "bread and butter" economic development activities such as business retention and expansion, managing the city's property transactions, supporting business start-ups and expansions and helping businesses navigate City Hall.

Currently, the city competes for some large scale and many smaller scale industrial uses. Two years ago, the city completed a new 60-acre business park which was expected to meet the needs for business accommodation for the next decade. However, Hydro One, Ontario's largest electrical distribution utility has recently absorbed nearly all of that land for a new grid control centre, provincial warehouse, and regional operations centre. Interestingly, it was partly Orillia's proximity to Barrie (where the current, much smaller grid control centre is located) that made Orillia attractive for these projects. While this investment will bring hundreds of new, middle to high income, technologist and engineering jobs, it does mean that the city is now left with very little industrial land. Orillia is also a tightly-bounded city, so future industrial lands development will likely involve land/servicing swaps or annexations of lands in the surrounding townships.

Adaptive re-use of a former gas station.



Adaptive re-use of a former car factory.

The growth of Barrie has also created a number of retail and light industrial/service opportunities for Orillia. Barrie's major expansion in recent decades has been in its south end, closer to Toronto. Many retailers and light service/industrial businesses located in southern Barrie from where they could service the northern GTA as well as Barrie and points north. With the growth of Barrie, the city itself has become a barrier to servicing points north, and Orillia is now an attractive place to reach those northern markets from. Perhaps the best evidence of this is that Costco is opening an outlet in Orillia this year to service a market area of 400,000 people to the east, north, and west of the city.

The really big opportunity for Orillia, and for other small cities in rural areas close to major metropolitan centres that can offer a high quality of life, lies in demographic change. The biggest "coastal" cities in North America have experienced huge growth in the past decade at least partly driven by the two big post-War demographic bulges – the baby boomers who built their careers in the biggest cities and still live there in houses worth many times what they originally paid for them. The millennials who have flooded to the cities as singles, often living in small apartments downtown. Both of these demographic cohorts are coming to important decision points in their lives. For the baby boomers: do they cash in on their expensive big city real estate and move to a less expensive, slower-paced community where they can still have some of the urban amenities and yet be close enough to the big city to go in for a baseball game or symphony concert? For the millen-

nials: where do they want to live, and where can they afford to live, as they consider families and mid-career options? Can they find affordable places to build their careers and their lives, where they can access some of the urban amenities they enjoy (coffee shops, walkable streets, interesting retail and entertainment/hospitality), while also being close enough to the big city to enjoy big city culture and entertainment?

Orillia is already having success with the baby boomer cohort. Led by a Toronto artist named Charles Pachter, a group of artists and writers are starting to take interest in Orillia, buying up older houses, and in one case a former gas station to set up art studios. In terms of appealing to millennials, the city is starting to gear its tourism offer and other marketing efforts to appeal to this group. We are particularly interested in reaching those young adults who work in sales, graphic design, web development, app development and consulting – in other words, people who can operate independently from a place like Orillia and still travel to Toronto perhaps once a week to touch base with clients.

In tourism, a strong sector for Orillia, the city is served by a regional (Orillia and surrounding townships) Destination Marketing Organization. A recently adopted tourism strategy for the city recommended a stronger focus on destination management (i.e. visitor information, downtown and waterfront animation, training front line tourism staff, new and strengthened festivals and events). The city will also be looking to re-shape the region's tourism marketing and tourism offer to appeal to millennials (with emphasis on paddling and cycling) to introduce them to the area. Our hope is that some of these young adult visitors will consider Orillia as a place to settle and build their lives.

The City of Orillia has become active in catalyzing development on its waterfront, in a way that would be familiar to many urban economic developers.

Urban amenities appealing to baby boomers.

Under-utilized areas along Orillia's waterfront have been identified as key properties for intensification and growth.

Orillia's heritage downtown is charming, offering a number of local retail options as well as specialty retail that draws customers from a wider area. The downtown entertainment and hospitality (food and beverage) offer has been improving steadily, with a number of new bars, restaurants, cafes, and bakeries opened. Committing to a Downtown Tomorrow strategy, the city recognizes that its future is to intensify and particularly, to grow residential population in and near the downtown and waterfront, which will provide a major boost for downtown retailers. The city has also commissioned a retail mix analysis, working with the Downtown Orillia Management Board (BIA/BID) and the local real estate board on a focused business attraction campaign to bolster the retail offer in specific segments (independent restaurants, specialty food retailers, and entertainment venues). The city is also introducing a Downtown Community Improvement Plan this year to financially support façade and signage improvements, the creation of residential units on the second floors of retail/commercial spaces and store fit-outs.

Probably Orillia's most outstanding physical asset is its downtown waterfront. The waterfront is an odd mixture: on its north side, this area boasts two major parks with beaches, bandstands, playgrounds and the Port of Orillia (recreational boating); on the south side are a number of long-empty lots, former industrial sites with unknown environmental issues and multiple (often absentee) ownerships. The central part of the waterfront lies at the bottom of the main shopping street/BIA, but is cut off from the downtown by a 1970s mall that (because rail tracks once ran between it and the waterfront) was developed with its back turned to the water.

The City of Orillia has become active in catalyzing development on its waterfront, in a way that would be familiar to many urban economic developers. The city has bought the previously mentioned waterfront mall to drive a street through it connecting the downtown and water. The city will work with the supermarket tenant on the north side of the property to re-orient their store onto the new through street and toward the waterfront. The city is also currently considering a $20 million in-

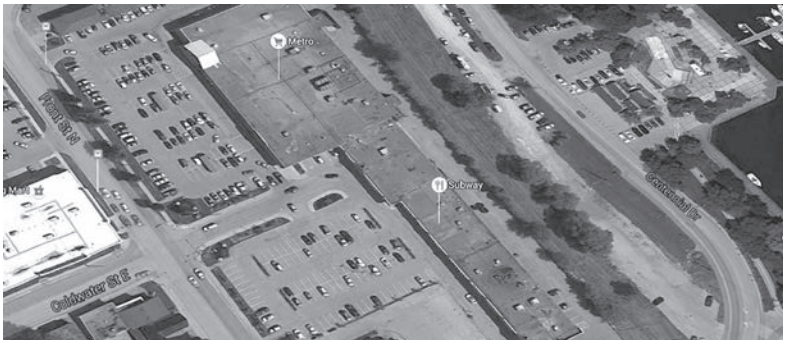
Music festival at the waterfront.

vestment in infrastructure to re-align Centennial Drive (the lakeshore boulevard), and to move and upgrade water and sanitary sewer to open up more development opportunities. When all of that is accomplished, the city will be seeking a development partner or buyer for the southern portion of the mall to build mixed retail and residential properties oriented to the waterfront. Finally, the city is beginning to actively de-risk some of the derelict properties on the southern end of the waterfront by offering to purchase properties with a long closing date (which provides time to do environmental and geotechnical testing), potentially buying the properties and undertaking remediation to bring them to market.

The City of Orillia, a small city surrounded by rural townships, increasingly part of a rapidly growing mid-sized metropolitan area, and reasonably close to the Greater Toronto Area is using a mixture of traditional rural economic development tools and more leading-edge urban economic development tools to prepare for its future.

CONCLUSION

Through the case study of Orillia, this article has tried to make the case that rural economic development and urban economic development are not the two solitudes they are sometimes made out to be. Close proximity to a major metropolitan area poses challenges for smaller cities and rural areas – the brain drain of young people and the "giant sucking sound" as so much economic activity is drawn to the big city. But proximity to a major metro area also brings opportunities – capital, visitors, potential residents, expertise – that smaller cities should be incorporating into their economic strategies.



Actively driving development on its waterfront through strategic land purchases and investments in infrastructure.

digital disruption

By Jordann Thirgood and Sunil Johal

While it is difficult to know exactly what lies ahead, the labour markets of the future are likely to see a great deal of churn and leave many people facing significant risks on their own. Governments at all levels have a vital role to play in ensuring inclusive prosperity by pooling the risk faced by individuals through the modernization of their social safety net policies, broadening coverage of core programs and investing in workforce development for the future.

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INTRODUCTION

The future of work looks increasingly uncertain in the face of technological advances in automation and artificial intelligence, which are poised to reshape large swaths of sectors and eliminate many jobs within them. Labour markets in most industrialized countries are soon likely to face enormous disruption, and few governments have taken adequate steps to prepare.

Over the past few decades, industrialized economies have increasingly been characterized by rising income inequality, a growth in non-standard (or precarious) work and declining unionization. More recently, and in rapid fashion, technological developments have begun to accelerate the impact of these longer-term trends on workers.

The unique characteristics of digital enterprises, advancements in automation and artificial intelligence (AI) and on-demand expectations from consumers have further transformed the way we think about work. People are significantly less likely to be working in a standard employment relationship and more likely to be engaged in multiple non-standard jobs and short-term, informal work arrangements. Technology threatens to upend entire sectors in the near future, and it is unclear what skills will be required to succeed in the new economy.

While it is difficult to know exactly what lies ahead, the labour markets of the future are likely to see a great deal of churn and leave many people facing significant risks on their own. Governments at all levels have a vital role to play in ensuring inclusive prosperity by pooling the risk faced by individuals through the modernization of their social safety net policies, broadening coverage of core programs and investing in workforce development for the future.

Policymakers' ability to develop and deliver these responses will be critical in shaping whether their jurisdictions are poised to reap the benefits of the technological revolution or see many of their citizens swept aside in its wake.

LONG-TERM TRENDS

In order to understand the new economy, it is important to understand the longer-term trends – such as income inequality, increasing work precarity and declining unionization rates – that have been influencing labour markets over the past several decades.

Income Inequality

The extent to which income is unevenly distributed across a population has become a growing concern, as the gap between the highest earners and the rest of the population has been increasing for roughly 30 years.

JOBS AND SOCIAL POLICY IN THE NEW ECONOMY

Industrialized economies around the world are facing increasing pressure to modernize their understanding of the world of work and associated social programs. Despite the many economic benefits of technological advances, rapid innovation could accelerate income inequality, the rise in precarious work and declining unionization rates. New business models often unbundle work into less stable gigs and tasks, and advances in artificial intelligence and automation place millions of existing jobs at risk. Governments must address these changes swiftly and adopt policies geared for inclusive growth to ensure their citizens are properly supported in the transition to the new economy.

Thomas Piketty's *Capital in the Twenty-first Century* (2013) highlighted a key driver behind this trend: since returns on capital outstrip economic growth, wealth will, over time, increasingly become concentrated in the hands of a select few. The resulting unequal prosperity has damaging implications on various indicators of both economic and social well-being, ranging from slower economic growth to higher rates of crime and poor mental health outcomes.

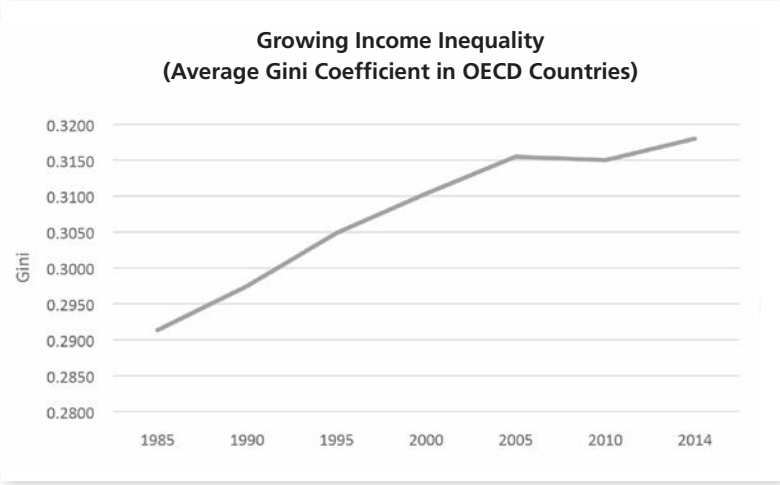
Income inequality has been on the rise, and reached historical peaks, in many countries within the Organization for Economic Cooperation and Development (OECD) and has been a persistent feature in both good economic times and bad.[1] Income inequality is most commonly measured by the Gini coefficient; a statistical representation of a nation's income distribution. The Gini coefficient compares the distribution of income in societies by assigning a value between 0 and 1, with 0 representing a society where all members have the exact same level of wealth (perfectly equal), and 1 represents a society where all income is held by a single individual (perfectly unequal).

Since the mid-1980s, the Gini coefficient increased in 16 of 21 OECD countries for which longer-term data is available. The average Gini coefficient in OECD member countries has increased from 0.29 in 1985 to 0.32 in 2014 (see figure 1).[2]

This story of unequal prosperity also bears out when one takes a closer, disaggregated look at economic growth. While overall growth and wages have historically grown in tandem, this no longer seems to be that case. While most modern economies have seen both real per capita and productivity growth, this has not translated into real wage increases. The decoupling of the two halves of economic prosperity has instead translated in widespread stagnation of wages.

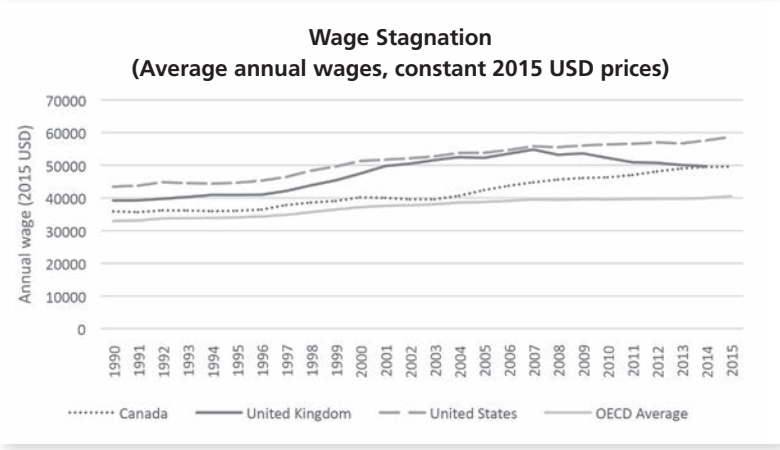
In the United States, Canada, and United Kingdom, for example, average adjusted earnings grew steadily until the late 1970s and have seen only marginal gains since that period (see figure 2).[3] There has been a downward trend in the labour share of national income in most countries, evident in the portion of a country's Gross Domestic Product (GDP) that is paid out in wages and salaries.[4] Even in prosperous economies, increases in wealth do not flow in equal measure to workers but instead are held in the form of corporate profits.[5]

FIGURE 1



Source: OECD Database on Household Income Distribution and Poverty.

FIGURE 2



Source: OECD Labour Force Survey, Average annual wages
https://stats.oecd.org/Index.aspx?DataSetCode=AV_AN_WAGE

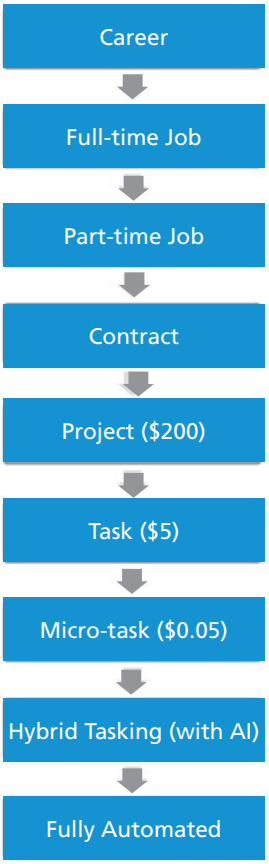
> Throughout the 1990s and 2000s, the evolution of technology made it easier to facilitate informal and flexible work arrangements and new ways to connect people seeking short-term jobs.

Precarious Work

The 1970s also sparked the rise of a phenomenon that is now commonly referred to as precarious work: part-time, temporary or contract jobs that are less stable, lower wage, and tied to few or no benefits. Corporations began to outsource various tasks involving human resources and information technology to instead focus on their core competencies, cutting costs and improving productivity by contracting a large portion of staff on an as-needed basis.[6]

Throughout the 1990s and 2000s, the evolution of technology made it easier to facilitate informal and flexible work arrangements and new ways to connect people seeking short-term jobs. This "unbundling" of work – deconstructing a job and outsourcing its constituent tasks – can also be understood as part of a progression towards automation (see figure 3). As a job moves from full-time to part-time and contract work, to eventually hybrid tasking with AI and full automation, it simultaneously becomes less stable and less well-paying.[7]

FIGURE 3



Source: Policy Horizons Canada (May 2016) "Canada and the changing nature of work" http://www.horizons.gc.ca/eng/content/canada-and-changing-nature-work

Precarious work is also on the rise in the developed world: between the mid-1990s and the Great Recession, 60 percent of jobs created in OECD countries were in the form of non-standard work.[8] When this type of work is associated with low pay, inconsistent hours, and a lack of benefits and supports, it has damaging impacts on workers. There is evidence that such instability increases anxiety, weakens social cohesion, and makes it difficult for workers to make ends meet, feed their families or pay for child care.[9]

Declining Unionization Rates

In the past, collective bargaining has played a key role in establishing decent wages, reasonable work hours, and ensuring fair treatment of workers. However, unionization rates have been declining across advanced economies for several years due to factors ranging from structural economic changes and the decline of traditionally union-dominated sectors like manufacturing, to globalization and legislative reforms to mandate minimum wages.[10]

As the relationship between employee and employer has changed over time, the responsibilities of each party have become less clear. This uncertainty can often leave workers vulnerable to mistreatment, particularly given the rising popularity of alternative classifications that do not address workers as employees. As the prevalence of these non-standard jobs increases, we may soon see a revival of labour unions or similar alternatives aimed at improving workers' livelihoods.[11]

EMERGING ISSUES

The pace of disruptive change that we are now witnessing may be faster than ever before. Advancements in technology have provided better access to goods and services, revolutionary medical discoveries, and the ability to personally connect with others all over the world. For all its benefits, however, technology has begun to reshape the labour market and accelerate a shift away from the traditional standard employment relationship. Three emerging issues in particular merit attention: the unique nature of the digital economy, technology's impact on jobs, and the new realities of living in an on-demand society.

The unique nature of the digital economy

Firms that operate in today's economy are inherently different than they once were. Digital enterprises are increasingly characterized by smaller physical infrastructure footprints, new methods of revenue generation, and multi-sided business models. Low costs of replication and high levels of mobility allow for rapid scalability – often at a global level – and network effects that generate value from a critical mass of users. However, low barriers to entry and constant new developments can lead to an increased overall volatility of markets, while the higher productivity enabled by technological advancements means firms need fewer employees to get the job done.[12]

Many have branded this recent wave of technological change as the Fourth Industrial Revolution, subsequent those emerging from steam, electricity, and digital innovations. Unlike previous revolutions however, new developments in AI are not only replacing human muscle power in the workplace but also brain power. Disruptive and innovative times have historically always been associated with fears of technological unemployment, but the ability of machines to out-think humans has

For all its benefits, however, technology has begun to reshape the labour market and accelerate a shift away from the traditional standard employment relationship. Three emerging issues in particular merit attention: the unique nature of the digital economy, technology's impact on jobs, and the new realities of living in an on-demand society

FIGURE 4

Automation Estimates		
Study	**Jurisdiction**	**Percentage of Workforce at Risk**
Brzeski & Burk (2015)	Germany	59%
Bowles (2014)	European Union	54%
Frey & Osborne (2013)	United States	47%
NZIER (2015)	New Zealand	47%
Lamb (2016)	Canada	42%
CEDA (2015)	Australia	40%
Pajarinen & Rouvinen (2014)	Finland	35%
OECD (2016)	OECD Countries	9%
World Economic Forum (2016)	Global	<1%

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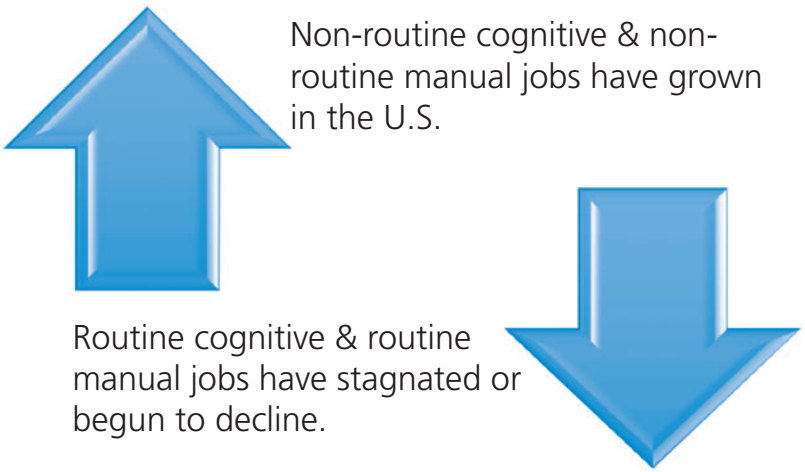
led economists to worry that the consequences may be different this time.

Technology's impact on jobs

There have been numerous studies that attempt to estimate job loss due to automation across various jurisdictions (see figure 4).[13] Many of these have replicated an influential report from Oxford University that takes an occupation-based approach, generally finding that around half of existing jobs are at high risk over the next 10 to 20 years (47 percent in the US, 42 percent in Canada, and 54 percent in the European Union).[14] Others have taken issue with this method, noting that very few jobs will be automated to the point of redundancy but will instead have select tasks automated that still require a degree of human interaction. The OECD for example uses a task-based methodology in their estimates, finding only 9 percent of jobs on average across member states are at high risk (ranging from 6 percent in Korea to 12 percent in Austria). Even at the low end, however, these estimates mean the loss of millions of jobs in many countries around the world.

The types of jobs at highest risk tend to be those comprised of mostly routine tasks that can easily be performed by a computer or machinery. In fact, the extent to which a job is premised on routine tasks is a more relevant factor to understand US job growth than the extent to which it is premised on cognitive functions. Both non-routine cognitive and non-routine manual jobs have been steadily increasing over time, whereas cognitive routine and manual routine jobs have been stagnant or slightly declining since the 1980s (see figure 5).[15] In other words, automation and AI have reached a level at which cognitive human functions can be easily replicated and replaced, even in traditionally white-collar cognitively based careers (see case study).

FIGURE 5



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Living in an on-demand society

These developments will cause the nature of work to change drastically in a number of industries. While some sectors may be entirely upended and disappear, others may require employees to share their traditional tasks with automated processes or AI. An employer may then only need that person on a part-time, temporary or as-needed basis. If they choose to stay in that job, economics tells us that their wages will, over time, be depressed.[16] If the wage is not livable, that employee may need to work multiple jobs or "gigs" to make ends meet, none of which are likely to provide adequate employer benefits. If the gigs are performed through an on-demand platform, they may not be considered an employee at all.

The booming popularity of on-demand platforms has further eroded the relationship between employer and employee. Business models used by digital enterprises tend to rely on alternative worker classifications such as "independent contractor" in North America and "self-employed" in the United Kingdom.[17] These categorizations are common within new firms like Uber and TaskRabbit and imply that the worker is not in an employment relationship at all. Not only does this eliminate their opportunity to receive workplace-provided benefits, but also leaves them without many important legal protections such as minimum wage floors.

We can expect to see a continued shift away from the standard employment relationship and towards a labour market in which nearly all burden of risk is placed on the individual employee. It is becoming increasingly uncommon for workers to be engaged in full-time permanent work, receive support from a labour union or be eligible for employer-provided benefits. Technological advancements present further challenges to the way we think about work: while new jobs will undoubtedly emerge from new innovations, it is difficult to forecast what these jobs will be, and in which sectors.

There is evidence to believe that new jobs emerging as a result of technological change will be higher paying and require high levels of education.[18] Furthermore, if robotics and AI become the primary forms of capital which embody innovation, we can expect to see an acceleration of the income distribution shift from labour to capital in nearly all developed countries.[19] This implies that while economies will continue to thrive and unemployment may not necessarily spike, inequality will likely continue to increase.

Taken together, these trends translate into a complex and uncertain future. The employment landscape already looks dramatically different than it once did and will continue to transform in the coming years. Governments around the world have an important role to play in this transformation – to reap the benefits of technological progress, to diminish the negative impacts on workers, and to prepare workers for a labour market in which they can thrive.

MOVING FORWARD

Governments facing an uncertain, turbulent future must begin strategically planning for the future of work and industry. Automation and AI are unlikely to lead to a job-free world as new uses for human labour emerge – but no existing sector or job is completely immune to disruption. Many of the jobs of the future seem destined to be characterized by more short-term, non-standard work arrangements with little support from their employers, and large-scale temporary displacements seem likely to become the new order of the day within particular sectors.

Against this backdrop of churn, governments should consider bolstering their suite of policies for workers and broadening access to other important social supports. Given the unpredictability around which specific sectors and jobs are likely to be impacted next, we are

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CASE STUDY: IBM'S WATSON

Many are familiar with Watson: the IBM supercomputer that successfully beat human participants in Jeopardy! Watson's technology combines artificial intelligence with analytical software, processing 200 million pages of information against six million logic rules at unbelievable speeds, closely replicating a human's ability to think and answer questions.[20] The supercomputer is beginning to embody the fear of technological unemployment felt by many in advanced economies.

Beginning this year, Japanese firm Fukoku Mutual Life Insurance will replace 34 workers with IBM Watson's cognitive search and content analysis that will use machine learning and language processing to assess medical insurance claims over the phone. While the company insists that final decisions will still be made by human supervisors, other corporations are taking it a step further. Bridgewater Associates – the world's largest hedge fund, managing USD 160 billion – plans to have 75 percent of all management decisions made by an AI unit headed by IBM Watson's development lead David Ferrucci in five years.[21] Claiming that software can eradicate the human emotional volatility involved with decisions such as hiring and firing, the goal is not to have remaining employees make individual choices but rather design the criteria by which the supercomputer makes important decisions.[22]

FIGURE 6

Source: Sunil Johal and Jordann Thirgood (2016) "Working without a net: Rethinking Canada's social policy in the new age of work" Mowat Centre.

likely to see a broader constituency of support for more generous and universal social programs, as people from all rungs of the income ladder realize that their jobs too could be swept aside by technological progress. This provides a unique window of opportunity for governments to rethink their role as social insurer and leverage a base of support for renewal from all corners of society.

Broadly speaking, eligibility requirements and access to important social supports should not operate on the assumption of one's engagement in a standard employment relationship. In countries such as Canada and the US, crucial components of the social safety net were established during a time in which the labour market was characterized by males working in a unionized environment, earning a full-time wage that was sufficient to support a family along with benefits to cover unexpected costs, and some form of retirement savings. Consequently, various programs were tied to conventional ideas of employment that are no longer relevant.

Unemployment insurance schemes certainly demonstrate the effects of this shift. Both Canadian and American programs are experiencing record-low rates of coverage for income supports for the unemployed. Fewer than one in three unemployed Americans now receive benefits and for those who qualify, benefits replace a smaller percentage of wages than before.[23] Similarly, only 39 percent of unemployed Canadians receive regular benefits, down from over 80 percent in 1978.[24] As more workers are engaged in part-time, temporary or contract work, fewer workers are completing enough hours to pass eligibility thresholds. Those who do qualify often do not receive payments for very long. If the future of work is characterized by longer spells of unemployment, we can expect that many will require financial support for longer periods of time as they attempt to transition back into the labour market.

As the nature of work changes, there are also fewer workers that are eligible for workplace-provided benefits. For example, employer-provided pension coverage has been on a steep decline in industrialized countries like Canada, the US, and the UK – particularly in the private sector.[25] When these options become unavailable and workers do not have alternative savings vehicles, they are often left to rely on the state as the primary provider of retirement income. Similarly, those who are engaged in non-standard work are less likely than those in a standard employment relationship to receive benefits such as vision, dental, drug or life insurance.[26] These are areas in which the state can consider bolstering contributory public pension schemes or providing universal drug coverage in jurisdictions that require more comprehensive coverage.

Governments can also support workers in a more indirect manner by investing in public programs that provide stability amidst an uncertain employment landscape. For example, as private market rental prices

Governments can also support workers in a more indirect manner by investing in public programs that provide stability amidst an uncertain employment landscape. For example, as private market rental prices continue to outpace stagnant incomes – particularly in large cities – governments should commit to ensuring affordable housing options for those at the bottom of the income distribution scale. Similarly, investments into creating regulated childcare spaces and subsidizing related services can ease the financial squeeze that workers are feeling during times of stagnant wages and increasing costs of living.

continue to outpace stagnant incomes – particularly in large cities – governments should commit to ensuring affordable housing options for those at the bottom of the income distribution scale. Similarly, investments into creating regulated childcare spaces and subsidizing related services can ease the financial squeeze that workers are feeling during times of stagnant wages and increasing costs of living.

Finally, governments must think strategically about how to best prepare workers for the jobs of the future. Although it is difficult to forecast which sectors will be most prosperous or where new jobs will be created, there are some transferrable skills that have been highlighted as promising for the future.[27] For example, social and emotional intelligence are skills that have not yet been mastered by AI; adaptability, creativity, and a desire for constant learning will be beneficial in a rapidly changing environment; and computational and analytical thinking will be necessary to design and complement new technologies. Governments, post-secondary education institutions, and employers all need to re-think their investments in, and approaches to, skills development and adapt their schemes for the new age of work.

IMPLEMENTATION CHALLENGES

Preparing for this new world of work will of course be challenging. Investments will be costly and reforms will face a resistance to change both internally and from stakeholders. Governments can be slow and bureaucratic, often face a bias towards the status quo, and cross-cutting issues touching on skills, social schemes, and technology will be inherently complex and difficult to tackle (see figure 6). In order to overcome cultural and institutional barriers to change, governments should consider some of the following key steps to transform their systems effectively and efficiently:

1. Deploy pilot projects and have a clear understanding of what success looks like
2. Work collaboratively across levels of government
3. Collect more robust and granular data on employment
4. Carefully consider which universal programs could serve as the best basis for success
5. Introduce a technology lens on all major government programs and policy decisions.[28]

CONCLUSION

A number of key issues are rapidly changing the world of work as we know it. For all its benefits, technology may be accelerating longer-term trends of income inequality, precarious work, and declining unionization. The digital economy, advancements in automation and AI, and the nature of our on-demand society have further eroded the standard employment relationship and the crucial supports associated with it. Governments that face these challenges should begin to strategize how to update their social safety net policies to best reflect the jobs of the next economy.

While it may be difficult to predict what exactly the future of work looks like, governments have a vital role in preparing for, and deploying, strategies that will ensure their citizens reap the full benefits of technology while mitigating the risks associated with disruptive change. By bolstering supports for workers, increasing access and generosity of core social programs and training workers with essential transferrable skills, governments can ensure that the economic growth and prosperity generated from new innovations is widely shared.

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In many rural areas, local elected leaders have to do economic development without training in the field. In 2015, in partnership with the Delta Regional Authority (DRA), IEDC developed a two-day boot camp course on the system of economic development, and another on fundamentals for developing economic resiliency, to support these leaders. IEDC and DRA conducted 31 trainings in the eight-state Delta region in 2015 and 2016 under DRA's *Leading Economically Competitive and Resilient Communities* program.

With funding from the U.S. Economic Development Administration, IEDC continues these offerings for an additional 21 communities. Members and member organizations support these courses by volunteering instruction time and providing host course locations. IEDC is striving to make these courses available to other rural communities at cost where needed. For details visit the registration page at IEDC's website.

AEDO PROGRAM ACCREDITS THREE NEW MEMBERS

The Accredited Economic Development Organization (AEDO) program accredited three new members: The Blount Partnership, Maryville, Tennessee; New Orleans Business Alliance, New Orleans, Louisiana; and the City of Alpharetta Office of Economic Development, Alpharetta, Georgia. IEDC also reaccredited two AEDO members: Ponca City Development Authority (Ponca City, Oklahoma) and the Town of Gilbert Office of Economic Development (Gilbert, Arizona).

With 57 current members, IEDC hopes to reach the 60-member mark in the near future. For details visit www.iedconline.org/AEDO.

2017 FED FORUM ATTRACTS OVER 200

The 2017 Fed Forum was held in Washington, D.C. on April 9-11. This Forum was the highest attended in years with over 200 paid registrants from 43 states and Canada. Session topics included timely issues such as manufacturing, workforce development, and rural development, among many others. The first day of programming was extended this year to allow for a full day of workshops on incentives, elected-officials and grant writing training.

Keynote speakers included three cabinet-level officials: Secretary of Commerce Wilbur Ross, Secretary of Housing & Urban Development Ben Carson, and Small Business Administration Administrator Linda McMahon.

INTERNATIONAL ECONOMIC DEVELOPMENT COUNCIL

cultural economies

By Greg Baeker

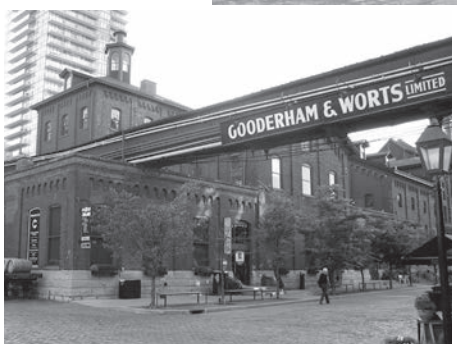
"If creative cities are the end, cultural planning is the means."[1]

INTRODUCTION

This article explores the increasingly significant role being played by creativity, culture, and quality of place in the development of local and regional economies. To leverage these assets and to realize their full potential, there is a need to clarify how these terms are defined and relate to one another in planning and economic development practice. One element is resisting the trend in many jurisdictions to equate creative industries and occupations with cultural industries and occupations, conflating two different albeit related economic sectors.

The Distillery District

Cultural resources are proposed as a more encompassing term that captures a broad range of place-based cultural assets, activities, and amenities. Cultural resources make it possible to think in more holistic ways about culture's contributions to economic development and prosperity in cities today, and a range of other policy and planning goals. The article concludes by describing systematic and integrated approaches to cultural planning building on the broad definition of cultural resources and leveraging these resources to advance economic and broader community development agendas.



UNTANGLING CREATIVITY AND CULTURE

Charles Landry, a pioneering cultural planner and one of the leading figures in the creative cities movement today, identifies the emergence of cultural planning in the late 1980s and early 1990s as a cornerstone of the creative cities movement internationally.[2] Today the idea of creative cities has come to represent a much larger set of ideas related to creativity as a driver across a wide range of planning and governance issues in cities. Culture remains part of this agenda, but a far less prominent one than had previously been the case. While Landry's vision has broadened, many in the cultural sector continue to equate creative cities with culture and culture development. However, sustaining these connections is motivated more by advocacy opportunities aimed at promoting and advancing cultural sector needs and aspirations.

Greg Baeker is Director of Cultural Development for MDB Insight, a management consulting firm that helps people and places prosper in the 21st century economy. The firm specializes in economic development, workforce development, cultural development, and research and analytics work for North American and international clients.

All the photos in this article show cultural resources in Toronto.

WHAT ARE THEY AND HOW DO WE BUILD THEM?

A prominent academic once wrote "culture is one of the 2 or 3 most complicated words in the English language."[3] *For many years economic development has acknowledged the contribution cultural assets of various kinds make to local and regional economies. This article explores these contributions but argues a more integrated understanding of culture and cultural economies in cities and communities can leverage greater economic outcomes. It unpacks some of the confusion surrounding our understanding of creative cultural industries and proposes a definition of cultural resources and cultural planning that have gained widespread attention in recent years in Canada and internationally.*

This conflating of creativity and culture can be traced to the emergence of the term *creative industries* in many jurisdictions over the past two decades. The idea of creative industries first emerged in the United Kingdom in 1998 as an early policy initiative of Tony Blair's new Labour government. Creative industries were defined as "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property."[4] In 1998 creative industries included:

- Advertising
- Antiques
- Architecture
- Crafts
- Design
- Fashion
- Film
- Leisure software
- Music
- Performing Arts
- Publishing
- Software
- TV and radio

The categories of creative industries in the United Kingdom have evolved since 1998 but remain largely true to the domains set out above.[5] While the motivation for introducing creative industries drew in part on a desire to give greater profile to the rapidly expanding forms of electronic or digital cultural products, a clear policy objective was to give a stronger economic "brand" to what until then had been called the cultural sector. This economic brand in turn bolstered the case for increased attention and investment by government. The new policy discourse was quickly taken up by countries such as the United States, Canada, Australia and others, and by international agencies such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations Development Programme (UNDP).[6]

Aga Khan Museum

Creativity as a rebranding for cultural development was adopted in a significant way in the United States due to an influential report produced by the New England Foundation for the Arts (NEFA) entitled *The Creative Economy: A New Definition.*[7] The report set out a statistical framework that replaced cultural organizations and occupations with creative industries and occupations and, going further, laying claim to the entire creative economy.[8]

FIGURE 1: Dimensions of the Creative Economy

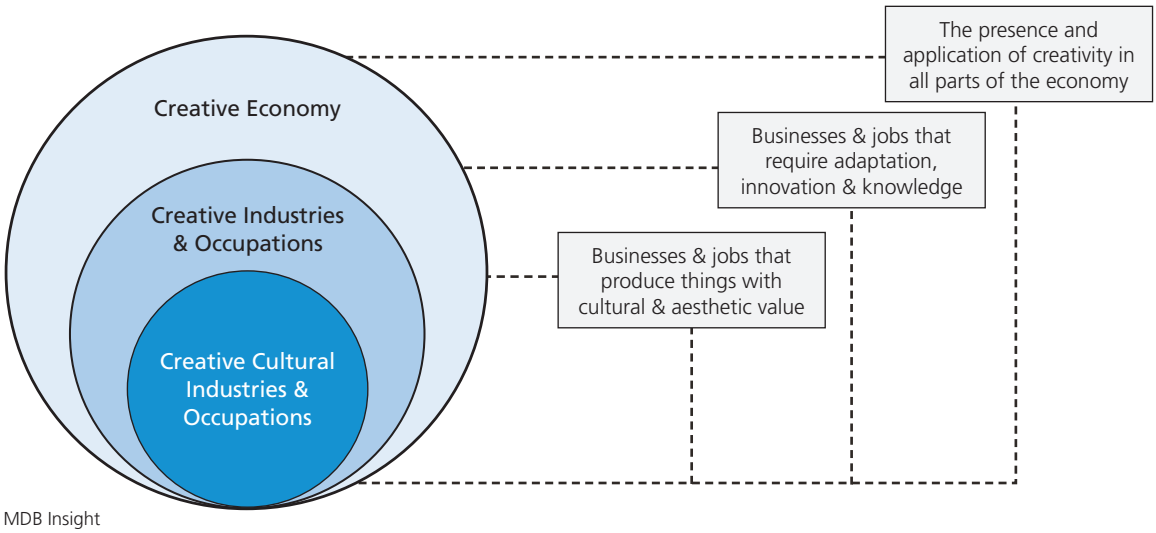


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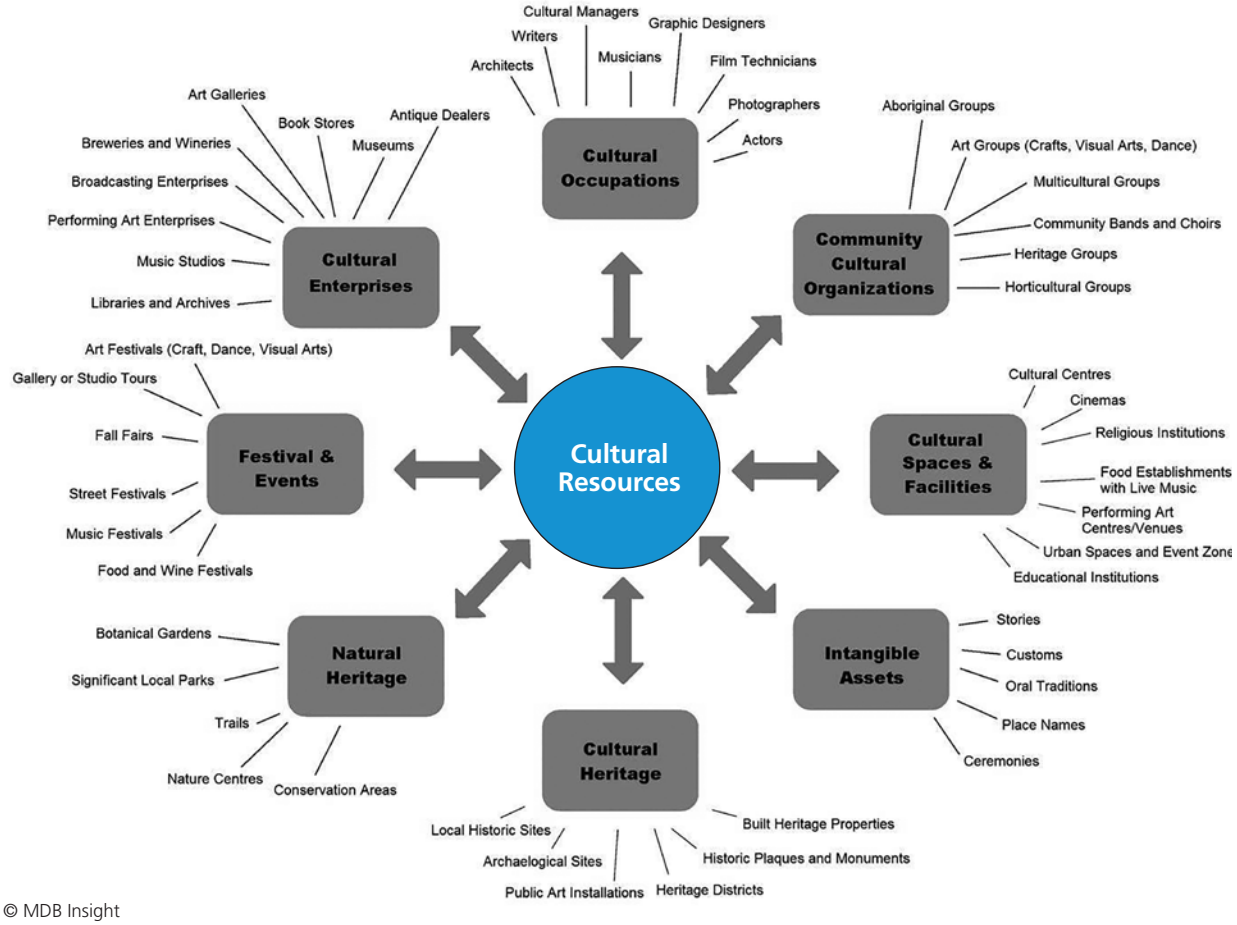
FIGURE 2: Cultural Resource Framework



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Further confusion about how the creative industries were defined emerged due to the influential – if much contested – work of Richard Florida. Here the creative industries were a much larger sector of the economy that could be equated broadly with knowledge-based industries and occupations. In Florida's schema, cultural industries and occupations were included in this larger sphere but with far less status and profile than in the United Kingdom, the United States, and elsewhere. Figure 1 seeks to map different spheres of the creative economy while still differentiating and providing a profile for cultural activity. Seeking a similar outcome, the United Kingdom has turned to the phrase "cultural and creative industries."

Figure 1 seeks to map different spheres of the creative economy while still differentiating and providing a profile for cultural activity. Seeking a similar outcome, the United Kingdom has turned to the phrase "cultural and creative industries."

FROM INDUSTRIES AND OCCUPATIONS TO CULTURAL RESOURCES

A broader and more powerful conversation regarding the place of culture in city building and economic development[9] is possible by embracing the idea of *cultural resources*. Cultural resources trace their origin to Australia in the mid-1990s and the work of Colin Mercer and others.[10] While defined in different ways in different countries the adoption of the term over what had been referred to as "the arts and culture" was an unapologetic embracing of culture as a resource for economy, social and other planning and development objectives.

Another advantage in how the term was defined was that it was fundamentally *place-based* rather than the sectoral frame of reference that had dominated until that time. This opened up opportunities for the inclusion of a great many more resources.

One definition and mapping of cultural resources is illustrated in Figure 2 and referred to as the Cultural Resource Framework (CRF). The CRF is built on eight major categories, each with a range of sub-categories or disciplines. The various "spokes" emanating from the major categories are not definitive but rather examples

of the range of assets in that category. The full CRF sets out a comprehensive set of categories. It is a framework that is in use in many municipalities across Canada.

CULTURAL RESOURCES AND THE CULTURAL ECONOMY

Although not part of the common parlance of economic development officers, the cultural economy is a well-established field of teaching and research.[11] It takes a holistic view of the various ways in which culture impacts the economy. Drawing on the identification of cultural resources illustrated in Figure 2, it is possible to identify various dimensions of the cultural economy, as noted in the chart below.

CULTURAL PLANNING: Planning Culture and Planning Culturally

Parallel to the emergence of cultural resources was a new perspective on cultural development called *cultural planning*. Cultural planning emerged in the late 1970s and early 1980s in the United States with leadership coming from Robert McNulty and Partners for Liveable Places (now Partners for Liveable Communities). Australia moved into a leadership position in advancing the practice of cultural planning in the 1990s. Canada came somewhat later to the game but has made up lost time and is now looked to as a leader in the field.[15]

ECONOMIC OUTCOMES	CULTURAL RESOURCES
Growth in Small Business	• Rapid expansion of *cultural enterprises* especially those working at the crossroads of arts, culture, business and technology – e.g. film and video, music and sound recording, interactive digital media, computer games • Most of these enterprises have relatively low start-up costs, opening up opportunities for young people and entrepreneurs to launch businesses
Expanded Employment Possibilities	• Growth *cultural enterprises* bring with them employment and self-employment opportunities • Acknowledging an expanding jobs market in the sector, a range of universities and colleges are establishing programs in the creative (cultural) industries that equip students with knowledge of several art disciplines or cultural enterprise along with entrepreneurial and management skills.[12] Many of these "new economy" skills are transferable outside the sector
Enhanced Quality of Place as a Magnet for Talent and Investment	• Contributing resources here include distinctive *cultural and natural heritage features, quality in architecture and urban design and public a*rt • The idea of "urban aesthetics" is used to speak about the collective contribution of these resources. A study found that urban aesthetics was one of the highest rated elements of community satisfaction and appeal to new residents and businesses[13]
Tourism	• Cultural tourism is one of the fastest-growing segments of the global tourism industry. Cultural tourists are affluent and well-educated compared to many other tourism segments; they are known to stay longer and spend more if given things to see and do • It is widely accepted that the motivation of people to travel is bound up in a desire to experience what is unique about a place. This emerges from a wide range of cultural resources including *natural and cultural heritage, cultural amenities (museums, art galleries, etc.), festivals and events connected with community history and culture, and even the stories of place – the intangible cultural resources of customs, local traditions in dance and music, etc.*
Place Branding	• Establishing brand strategies to communicate what is unique about a community is an increasingly important element of economic development strategies • Place branding draws on cultural resources to communicate a particular "cultural offer" of commercial and non-profit amenities including *museums, galleries, festivals, unique heritage or architectural features and even place-based stories and narratives* (such as Toronto's tremendous cultural diversity)
The Digital Imperative: for Infrastructure and Content	• Expanding business and employment opportunities stemming from *cultural enterprises* profiled at the top of this chart drives local government, economic development agencies, post-secondary institutions among others to ensure this expanding part of the economy is supported by necessary technologies

"A 'cultural turn' is occurring in the world's towns and cities."[14] – Colin Mercer

One definition that has taken hold in Canada is:

> An inclusive community process for identifying and leveraging a community's cultural resources, strengthening the management of those resources, and integrating those cultural resources across all facets of local government planning and decision-making.
>
> Cultural planning is part of an integrated, place-based approach to planning and development that takes into account four pillars of sustainability: economic prosperity, social equity, environmental responsibility, and cultural vitality.[16]

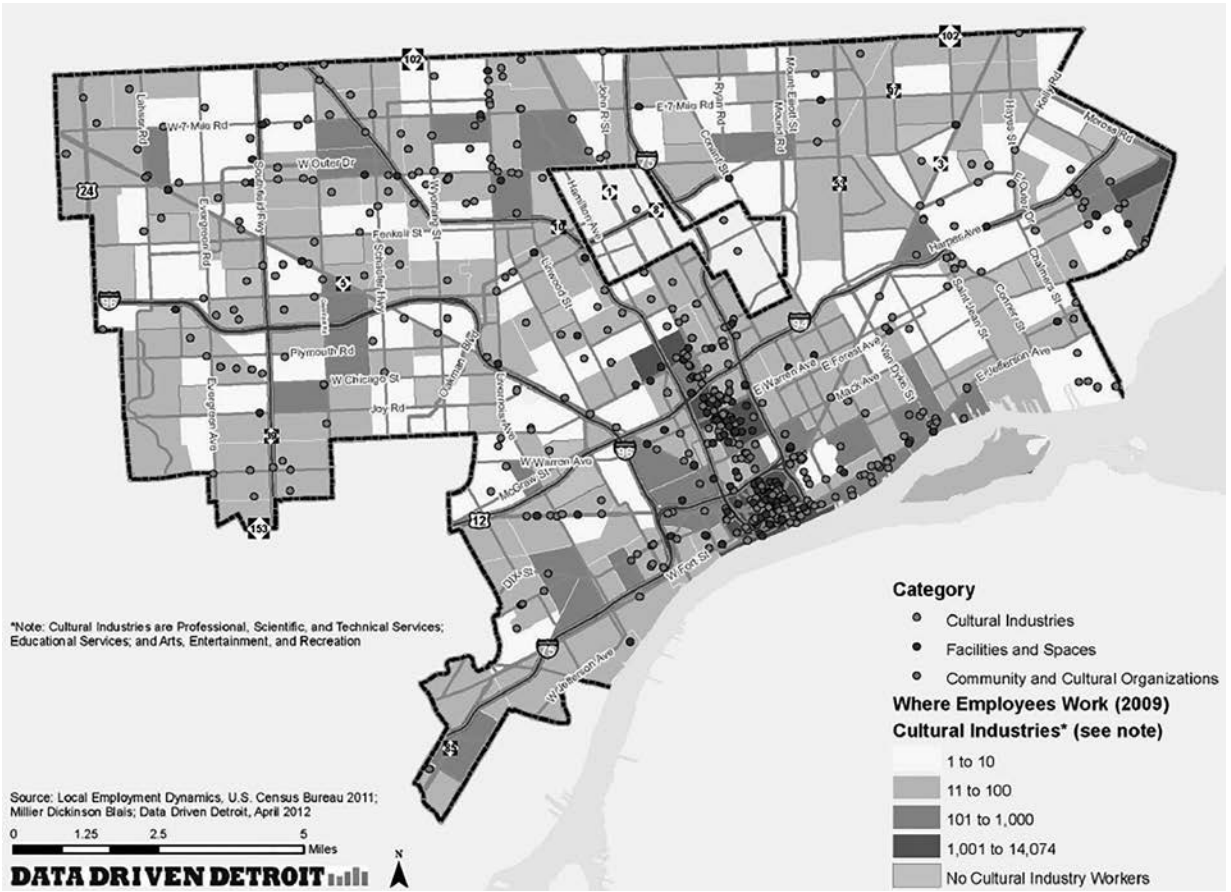
Cultural planning is grounded in cultural mapping, a systematic approach to identifying, recording, classifying, and illustrating a community's cultural resources. Geocoding and mapping cultural resources makes it possible to visualize cultural resources in a community regarding links to other planning issues such as land use, zoning, economic development, demographics, social development, and neighbourhood development, among others.

Mapping can also be used to reveal patterns of usage of cultural resources. Figure 3 provides an example of cultural mapping completed as part of a *Creative Vitality in Detroit: The Detroit Cultural Mapping Project*. The project examined how the arts and wider creative cultural industries were contributing to regeneration in the city. The area of concentration in the middle of Figure 3 represents the downtown Woodward Avenue corridor where a density of cultural resources would be expected. But significant concentrations were also found in a range of surrounding neighbourhoods. Equally important from a planning perspective was what the map revealed about parts of the city *without* access to cultural resources and activities.

Cultural planning takes a holistic, place-based approach to strengthening and developing cultural resources in a community. While it is about planning for culture and cultural resources, cultural planning is also

Luminato Festival

FIGURE 3: Location of Detroit's Cultural Resources in the Downtown Woodward Avenue Corridor



Roy Thomson Hall

about "planning culturally." This refers to better integrating and aligning cultural resources, priorities, goals, and opportunities among local government departments, external partners, and community organizations. Planning culturally also involves assessing the impact (positive or negative) of any proposed action by local government or its external partners on a city's identity and cultural vitality. It means "applying a cultural lens" to planning and decision-making. Implementing planning culturally requires cross-departmental teams equipped with a set of assumptions and understanding about principles and practices underpinning cultural planning and development. Conversely, it requires cultural staff in local government to acquire knowledge in economic development, land use planning, neighbourhood development, and other areas where culture can be a supporting resource.

Sugar Beach

CRITIQUES AND SOME WAYS FORWARD

Looking ahead, what are the "next generation" advances needed in cultural planning?

- **"Operationalizing" planning culturally** – a deeper and more precise understanding of how cultural resources can be integrated into city planning across a wide range of areas is needed. Implementing planning culturally in many cities is proving a larger challenge than simply identifying the opportunity. The process must become institutionalized as part of the planning process with a requirement that as planning decisions go forward, cultural impacts – both positive and any potential negative implications – have been considered and documented.
- **Better data** – cultural plans must draw on the best data available about the full range of planning and development issues, including economic development, where connections are being sought.
- **Facilities and services** – while integrating culture across planning systems presents cities with new opportunities, there is still a need for attention to more traditional questions of planning for cultural facilities and funding for organizations to deliver programs and services in the community. Cultural planning can bring insights into areas of cities where cultural opportunities do exist and where they do not, drawing attention to barriers of geography, ethnocultural origins, or socio-economic background.
- **"Less culture, more planning"** – while it has claimed to be place-based, most cultural plans are not well integrated with land use planning. This includes the incorporation of cultural resources and opportunities in planning for the public realm, placemaking, and urban design. Knowing patterns of pedestrian and vehicle traffic can provide insights into the placement of public art. Planners also have many relevant skills in analysis and in community engagement that they can bring to cultural plans.

Compared to many areas of city planning and administration, cultural planning is a relatively young area of practice. However, undergraduate and graduate programs in cultural planning have emerged in several countries, preparing people for work in the field. A sizeable body of research has emerged that is also pushing thinking and practice forward. In addition to standalone programs in cultural planning, core ideas are beginning to enter the curriculum of schools of planning and in programs in economic development.

Patrick Geddes, the urban visionary and founder of "town planning" (urban planning) in the United Kingdom in the early 20th century, argued that to be effective, planners had to be experts in three areas. They needed to be geographers to understand place, economists to understand economic development, and anthropologists to understand culture. Effective planning took place at the intersection of *place, economy and culture*. Attention to the first two has dominated thinking about city planning and development. Culture is now claiming a place at the table.

Toronto Jazz Festival

ENDNOTES

[1] Jan Verwijnen and Panu Lehovuori (ed's) (2002). *Creative Cities: Cultural Industries, Urban Development and the Information Society*. Helsinki: University of Art and Design.

[2] Charles Landry (2005). *The Lineage of Creative Cities*. Comedia.

[3] Raymond Williams (1983). *Key Words*. Oxford University Press. Pg. 89.

[4] Department of Culture, Media and Sport (2001). Creative Industries Mapping Documents.

[5] They now include: Advertising and marketing; Architecture; Crafts; Design - product, graphic and fashion design; Film, TV, video, radio and photography; IT, software and computer services; Publishing; Museums, galleries and libraries; Music, performing and visual arts.

[6] UNESCO and UNDP (2010). *The Creative Economy*. United Nations Publishing.

[7] New England Foundation for the Arts (2007) *The Creative Economy: A New Definition*.

[8] In formal statistical terms and categories in the United States, the language of "the arts and culture" industries and occupations remains firmly in place and sanctioned by the Bureau of Economic Analysis (BEA), an agency of the U.S. Department of Commerce and the National Endowment for the Arts. For many in the sector this traditional language perpetuates perspectives regarding the sector and a more marginal place in the economy. In Canada, Statistic Canada's Framework for Cultural Statistics retained cultural industries and occupations as the language to describe the sector. Formal statistical regimes in both countries did nothing to dissuade the cultural sector from embracing creativity as a powerful tool for rebranding.

[9] I am aware that economic outcomes are only one of the ways in which cultural resources contribute to the quality of life, social cohesion and inclusion among many other non-economic outcomes. However, it is not possible to do justice to all these outcomes in one paper, particularly one prepared in the context of IEDC.

[10] David Grogan, Colin Mercer and David Engwicht (1995).The Cultural Planning Handbook: An Essential Australian Guide. Alen and Unwin.

[11] Cultural economics is a well-established field of teaching and research. The Journal of Cultural Economics was founded in 1973 and was followed by the first international conference in Edinburgh in 1979 and shortly thereafter by the founding of the Association for Cultural Economics.

[12] Ryerson University in Toronto launched a Creative Industries program in 2012 and was overwhelmed with applications from across Canada and internationally

[13] The study involved a sample of communities across the United States. Community aesthetics ranked higher than economic security, schools, social interaction and community demographics. Richard Florida, Kevin Stolarick, Charlotta Mellendar (2010). "Beautiful Places: The Role of Aesthetic Beauty in Community Satisfaction". *Journal of Regional Studies*. Volume 45, 2011, Issue 1.

[14] Colin Mercer." A Global View: Urban Planning Takes a Cultural Turn" in Greg Baeker (2010). *Rediscovering the Wealth of Places: A Municipal Cultural Planning Handbook for Canadian Communities*. Municipal World

[15] Colin Mercer commented: Australia led the way in integrated and strategic planning in the 1990s: a baton that is now admirably being taken up by Canada. Colin Mercer. "A Global View: Urban Planning Takes a Cultural Turn" in Greg Baeker (2010). *Rediscovering the Wealth of Places: A Municipal Cultural Planning Handbook for Canadian Communities*. Municipal World

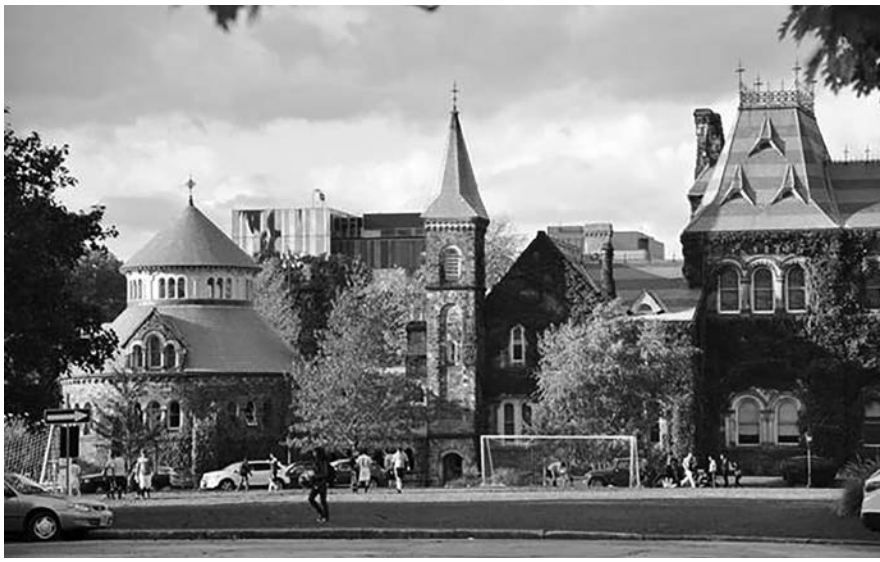
[16] Greg Baeker (2010). A Toolkit for Municipal Cultural Planning. Ministry of Tourism and Culture.

driving a prosperous FUTURE

By Cecilia Brain

This article is adapted from Driving a Prosperous Future: Economic Analysis of the Lasting Impact of Ontario Universities by the Council of Ontario Universities

Photo Credit: Diana Tyszko



University of Toronto, Toronto, ON

INTRODUCTION

Ontario universities offer a world-class education to the next generation of leaders and highly skilled workers and perform groundbreaking research that creates new products, fosters technological and social innovation, and leads to process improvements in manufacturing, health care, and the provision of public and private services. These efforts generate an economic impact in the province of Ontario. This study estimates that economic impact from: (1) spending related to university activities; (2) human capital development; and (3) increases in total factor productivity due to research and development.

The existence of universities generates spending. This includes spending by universities themselves, students and visitors, and alumni spending from the additional income they earn as a result of their university education. This spending has ripple effects through the provincial economy, increasing the demand for goods and services and generating employment. The economic impact of spending associated with university activities is $42.4 billion.

Graduates of these universities are a fundamental part of Ontario's highly skilled workforce. The skills and knowledge they gain through their studies prepare them for fruitful careers. The full economic impact of this human capital cannot be calculated, but a partial estimate is the premium income that university graduates receive as a result of their education, which for all Ontario university graduates working in the province totals $48.7 billion.[1]

Ontario universities also perform world-class research that leads to breakthroughs in medicine, creates new technologies, helps build a sustainable economy, and fosters innovation. The knowledge developed through this research, above and beyond its social benefits, has an economic impact of $24.7 billion.

The total economic impact of universities to the province's GDP is $115.8 billion. It's part of the vital and lasting role universities play in shaping Ontario's future. As the province prepares to face numerous challenges and disruptions in the years ahead, the impact of universities shown in this report – the strong communities; economic growth; and talented leaders, workers, and entrepreneurs – will be needed more than ever to ensure all Ontarians thrive in an inclusive economy.

Cecilia Brain is an economist and senior policy analyst for the Council of Ontario Universities. (cbrain@cou.on.ca)

ECONOMIC ANALYSIS OF THE LASTING IMPACT OF ONTARIO UNIVERSITIES

This article estimates the impact of Ontario universities in the Ontario provincial economy using three different methodologies to measure three different economic impacts: the impact of spending, the impact of human capital, and the impact of research. The results show that Ontario universities contribute $115.8 billion to the Ontario economy. This economic impact demonstrates that investing in universities has impacts beyond those accrued to the individual student. Research and advanced education lead to growth that affects businesses, governments and other members of society.

ECONOMIC IMPACT OF SPENDING

Spending related to the activities of Ontario universities generates more than 478,000 full-time-equivalent (FTE) jobs and contributes $42.4 billion in GDP. Figure 1 and Figure 2 show the breakdown of economic impacts from spending.

FIGURE 1: Summary of Impact on Ontario's GDP from Spending Related to Universities' Activities, 2014-15 [2]

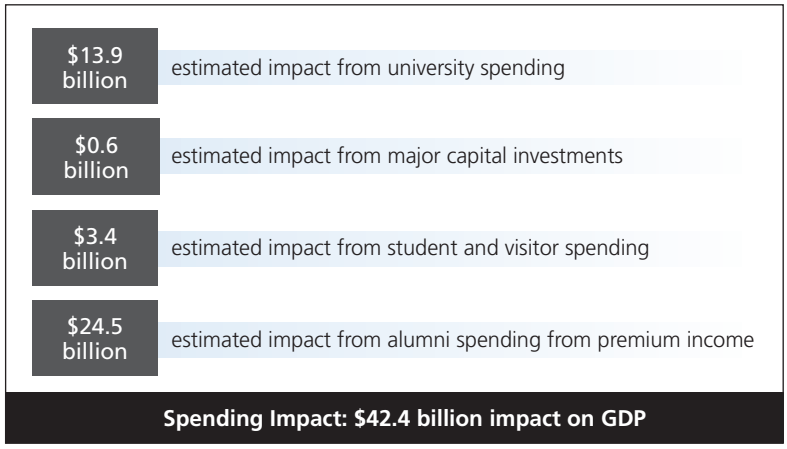
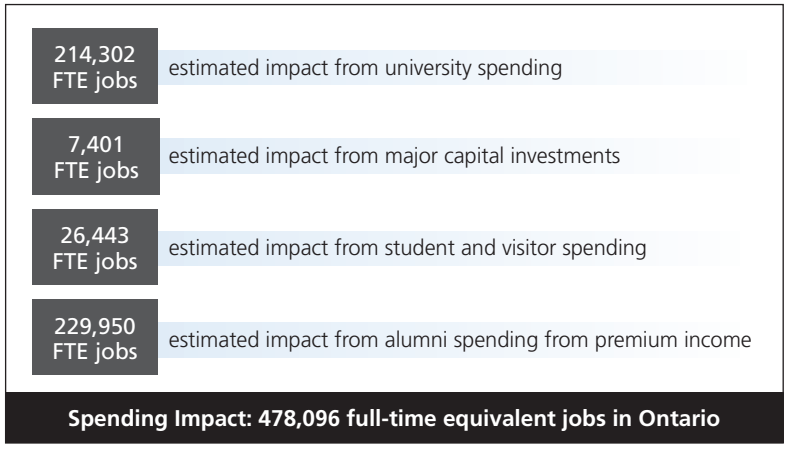


FIGURE 2: Summary of Impact on Ontario's Employment from Spending Related to Universities' Activities, 2014-15 [3]



Methodology

The economic impact to Ontario of spending associated with the activities of Ontario's universities was estimated by Statistics Canada using the 2010 Statistics Canada Input-Output Model.[4] The model is a representation of the flows of economic activity within the Canadian economy, including activity at the provincial level. It explains the behaviour of our economic system and is widely used in Canada as a standard approach to estimating economic impact.

The model measures economic impact in terms of value-added GDP, employment and labour income. Labour income (salaries, wages and benefits) is included in GDP. Employment is measured in terms of FTE positions. FTE positions are defined as total hours worked divided by the average annual hours worked by individuals in full-time jobs in a year.[5]

Measures of economic impact are value added. For example, the impact on GDP that accrues to Ontario from the purchase of a computer manufactured outside of Canada might include the retail mark-up and the transportation costs that can be attributed to Ontario. The economic impact of manufacturing the computer would not directly impact Ontario's GDP or the number of jobs created, and so it is excluded.

The Input-Output Model estimates three types of impact from an economic activity:

Direct impact: measures changes that result directly from the operation of universities, and from the initial spending by students, visitors and alumni. In the case of university spending, it includes the wages, salaries and benefits of faculty and staff.

Indirect impact: measures changes due to inter-industry purchases as they respond to the demands of universities and the initial spending by students, visitors and alumni. This includes all the purchases up the production stream, since each layer of supplier requires additional supplies.[6]

Induced impact: measures changes in the production of goods and services in response to consumer expenditures that result from the increase in household income generated through direct and indirect effects.[7]

Economic impacts of spending related to university activities[8]

TABLE 1: Impact of University, Student, Visitor, Capital and Alumni Spending on Ontario's GDP[9] ($M), 2014-15

	University Spending[10]	Major Capital Spending	Student and Visitor Spending	Alumni Spending	Total Impact on Ontario's GDP
Direct impact	$8,295	$319	$2,035	$14,992	$25,641
Indirect impact	$1,679	$171	$874	$5,568	$8,292
Induced impact	$3,885	$138	$455	$3,962	$8,440
Total impact on GDP	$13,859	$628	$3,364	$24,522	$42,373

TABLE 2: Employment Impact of University, Student, Visitor, Capital and Alumni Spending on the Ontario Economy (FTE Jobs), 2014-15

	University Spending[11]	Major Capital Spending	Student and Visitor Spending	Alumni Spending	Total Employment
Direct impact	157,178	4,291	12,100	132,855	306,424
Indirect impact	20,984	1,835	10,121	60,327	93,267
Induced impact	36,140	1,275	4,222	36,768	78,405
Total impact	214,302	7,401	26,443	229,950	478,096

TABLE 3: Impact of University, Student, Visitor, Capital and Alumni Spending on Labour Income in Ontario ($M), 2014-15

	University Spending[12]	Major Capital Spending	Student and Visitor Spending	Alumni Spending	Total Labour Income
Direct impact	$8,206	$264	$668	$6,363	$15,501
Indirect impact	$1,120	$113	$576	$3,520	$5,329
Induced impact	$1,866	$66	$219	$1,906	$4,057
Total impact	$11,192	$443	$1,463	$11,789	$24,887

Economic Impact of Ongoing Expenditures and Capital Investments by Ontario Universities

Ontario universities spent approximately $13.3 billion in 2014-15. Figure 3 provides a summary of these expenses by category.

The following university expenditures were used to estimate the economic impact of Ontario universities:

- $11.7 billion in ongoing expenses (excludes major capital spending and scholarships and bursaries)[14]; and
- $688 million of spending in major capital spending (building, land and site services).

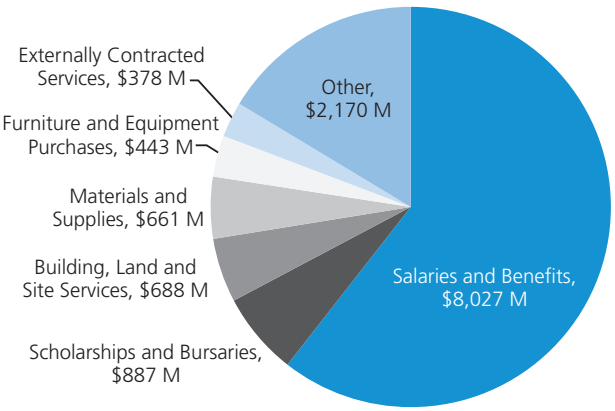
Ongoing university expenditures are responsible for 214,302 FTE jobs and contribute $13.9 billion in value-added GDP to the Ontario economy.

Capital spending totaled $688 million in 2014-15. This spending includes new building construction, major renovations, sewers and roads, and other capital projects. Capital spending generated 7,401 FTE jobs and contributed $628 million in GDP to the Ontario economy.

Economic Impact of Non-Local Student and Visitor Spending

Students who move to attend university generate an economic impact for the province through their living expenditures (accommodation, food, books, supplies, computers, transportation, telecommunications and leisure). Local students, by contrast, are assumed to generate no additional economic impact for Ontario because they spend the same amount for living expenses before and after they start university, adding no new economic impact to the community or the province.

FIGURE 3: Summary of Ontario Universities' Expenditures, 2014-15 ($M)[13]



The original residence of non-local students affects how much of their spending can be used to estimate economic impact. Students from Ontario who move within the province to attend university have the lowest economic impact because a significant amount of their spending would have taken place in the province even if they had not chosen to move to attend university. International students and Canadian students who move from other provinces have the highest economic impact because all or most of their spending is new to the province.

Friends and family who visit university students spend money in the local economy, creating an additional economic impact.

Spending by students and visitors generates $3.4 billion in GDP and is responsible for the creation of 26,443 FTE jobs.

Queens University campus, Kingston, ON

Economic Impact of Alumni Spending

Ontario university students gain knowledge and develop skills that increase their human capital. This increases their productivity and leads to higher paying jobs. In 2010, the average employment income of Ontario university graduates was $37,397 higher than the average for all Canadian high school graduates. Part of this income is taxed and some of it is saved, but the remainder is spent in the economy, creating an economic impact that can be calculated using the Input-Output tables. The effect of this spending is 229,950 FTE jobs and $24.5 billion in GDP.

Economic impact of knowledge and human capital development

The economic impact of universities goes beyond the spending they generate. Universities educate students for the workforce, increasing their human capital, boosting the province's productivity and creating profit for employers. Universities also produce research that leads to innovation. Both these university activities have impacts throughout the province's economy that are integral and necessary for the economic development of Ontario.

Economic Impact of Human Capital

Ontario universities increase the human capital of students, making them more productive members of society. Universities are main contributors to the province's highly skilled workforce. They educate Ontario's engineers, doctors, business people, teachers, architects, social scientists, artists and many other professionals. Companies, government and non-for-profit organizations that hire university graduates benefit from the knowledge and skills these workers bring to the workplace. Graduates are lifelong learners with critical thinking and complex problem-solving skills who can adapt to the changing needs of the labour market and who contribute to the social fabric of the province.

The economic impact of human capital is the additional income that is generated as a result of the skills developed at universities. This includes the premium employment income of university graduates and the additional revenue – company profit and expenses (excluding the labour income of alumni) – that can be attributable to the higher skills of university graduates. We cannot estimate the total impact of human capital development because there is no recognized methodology to estimate the profit and additional expenses of companies that result from the additional skills of university employees. We can, however, estimate the premium income of university educated employees. (Table 4)

Trent University campus, Peterborough, ON

TABLE 4: Partial Estimate of the Impact of Human Capital, Based on Increased Employment Income, 2010[15]

Ontario university graduates working in Ontario	A	1,303,130
Average employment income of Ontario university graduates	B	$68,194.20
Average employment income of Canadian high school graduates	C	$30,796.84
University employment income premium	D = B-C	$37,397.36
Premium income from a university education	E = A*D	$48,733,621,736.80

Lakehead University, Thunder Bay, ON

In 2010, the average graduate of Ontario universities working in Ontario earned $68,194 in employment income. The average high school graduate in Ontario earned $30,797. On average, Ontario university graduates earn a premium of $37,397 over high school graduates. The partial economic impact of human capital development by universities is $48.7 billion.

The impact of human capital also includes all the income generated through spending of revenue attributable to the higher skills of graduates in the workplace. The impact that results from alumni spending from premium income was estimated in the Economic Impact of Spending section and is therefore not included in this section.

Economic Impact of Research

University researchers work behind the scenes, steadily progressing toward ambitious new ideas – new ideas that improve public policies and private practice; advance technology; foster a healthier, happier, more prosperous society; and build communities.

Statistics Canada estimates that Ontario's higher education sector performs 37 percent ($5.3 billion) of all research in the province, based on expenditures. In the natural sciences and engineering alone, the higher education sector in the province accounts for 32 percent ($4 billion) of all research.[16] See Figure 4 and Figure 5.

Universities are fundamental to all innovation in society. According to Slater and Martin, universities increase the stock of useful knowledge, provide skilled graduates, create new scientific instrumentation and methodologies, form networks of innovation and increase the capacity of scientific and technological problem-solving in society.[19]

Firms rely on the stock of knowledge generated by universities to conduct their own research activities. According to Narin, 50 percent of scientific papers cited on industrial patents were publically available academic papers.[20] In addition, private sector research would come to a standstill without university-trained scientists to conduct research. These graduates transfer knowledge from universities to their employers and are trained to solve complex problems, do research and develop new ideas.

FIGURE 4: Gross Domestic Expenditures, Total R&D, by Performer of Research, Ontario, 2013 (In $M)[17]

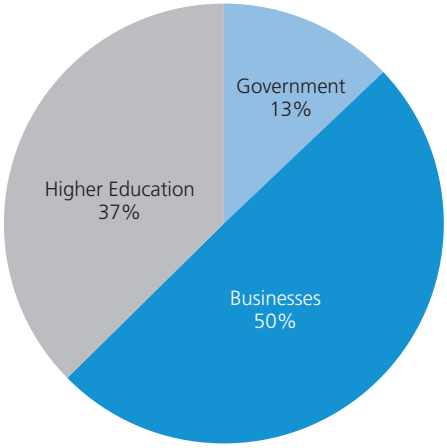
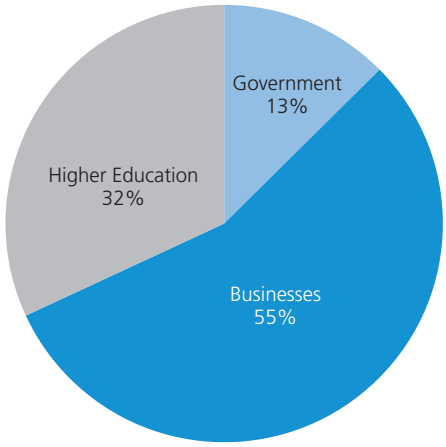


FIGURE 5: Gross Domestic Expenditures on Natural Science and Engineering R&D, by Performer or Research, Ontario, 2013 (In $M)[18]



THE IMPACT OF BASIC RESEARCH AT ONTARIO UNIVERSITIES

Universities conduct both basic and applied research. While applied research can also happen in private institutions, universities are the main contributors to basic research. This type of research is curiosity-driven exploratory research that increases human knowledge and understanding of phenomena in the world. Researchers who engage in basic research do not necessarily have in mind a practical application for their results, but their fundamental discoveries pave the way for applied research and applications in the public and private sectors. For example, chemist and Nobel Laureate John Polanyi researched a specific category of chemical reactions and his research became crucial to developing and powering chemical lasers. This exploratory research had tremendous practical implications for precise industrial cutting and drilling.

Universities create new scientific equipment, laboratory techniques and methodologies to conduct research, some of which are adopted by industry. According to Rosenberg, "much, perhaps most, of the equipment that one sees today in an up-to-date electronics manufacturing plant had its origin in the university research laboratory."[21] Small and medium enterprises also benefit from access to university resources, including labs, equipment and students, which they would otherwise not be able to afford.

Many of the benefits of university research are localized near universities. Companies are attracted to the knowledge and talent pool that stems from university activities and often form technology clusters in proximity to universities.[22]

Ontario university research not only contributes to the private sector, it also improves processes and policies in the public and non-profit sectors. Research on teaching, for example, leads to changes to curriculums and to the ways we teach different types of students. Often research impacts all sectors of society. For example, the development of a new mental health program increases the quality of life of individuals, decreases health costs and decreases absenteeism at work.

Measuring the economic impact of research

The economic impact of research and innovation by Ontario universities can be estimated using a methodology developed by Martin (1998) for the effects of Canadian university R&D on the economy.[23] This methodology has been adapted by various Canadian universities to estimate the economic impact of research at the provincial level.[24]

Martin estimates that 20 percent of all economic growth is based on increases in total factor productivity that results from research. He then excludes the effects of foreign R&D, which he calculates to be 31 percent based on the results of various econometric analyses on this topic for Canada and other industrialized countries. The result is the total effect of R&D in the Ontario economy. Ontario universities account for 37 percent of all research in Ontario. The economic impact of research at universities is therefore estimated at $24.7 billion.

TABLE 5:
The Economic Impact of Research at Ontario Universities[25]

Change in real GDP in Ontario since 1971	$	484,503,720,000
Growth attributable to total factor productivity (TFP)		20%
TFP = 1 * 2	$	96,900,744,000
Exclusion of foreign R&D effects @ 31%[26]		69%
	$	66,861,513,360
Share of R&D by Ontario Universities @ 37%[27]		37%
TOTAL FACTOR PRODUCTIVITY	$	24,738 ,759,943

Western University campus, London, ON

Impacts Not Included in This Report

As noted here, this report does not include the increased profits and revenue (excluding wages for university graduates) that is generated to companies as a result of the higher human capital of employees with university degrees. This company income has additional repercussions throughout the economy that are not captured by this report.

The economic impact calculations in this report do not include estimates of taxes paid to various levels of government as a result of spending generated from the activities of universities (university, student, visitor and alumni spending). For example, income taxes and taxes on products are excluded from the calculations. Taxes are used to provide services and infrastructure within the province and generate jobs and increase consumer demand, leading to higher GDP.

Excluding this company revenue and taxes underestimates the economic impact of universities in the Ontario economy.

Not all beneficial impacts of universities' activities are quantifiable or contribute to GDP. For example, a less expensive and less intrusive medical procedure – with better outcomes – might decrease health care costs and improve the quality of life of patients. This might decrease the GDP generated from treating these patients, but it nonetheless results in positive outcomes for the province and its residents. Similarly, there are many benefits that accrue to the province from having an educated population, including a more participatory and better informed citizenship.

Comparing Economic Impact Reports

This report on the economic impact of Ontario universities was developed in collaboration with Statistics Canada. Statistics Canada follows a United Nations standard international methodology for estimating economic impact and uses consistent definitions of direct,

indirect and induced impacts. The Statistics Canada model is conservative. Reports prepared by private consulting companies might not use the Statistics Canada Input-Output Model and cannot be compared to this report. The economic impact of a sector is also dependent on the assumptions used to calculate spending impact and on the types of impacts that are measured. Economic impact reports are only comparable if they share the same methodology.

Economic impact reports of Ontario universities

Ontario universities have commissioned and published economic impact reports. The methodologies used for these reports have many similarities (most rely on Statistics Canada's Input-Output Model) but there are also differences among them and with this sector-wide report. Individual universities, for example, often include university-specific impacts for which they have data that is not available for the sector as a whole. Because of these differences, this sector-wide economic impact report should not be read as the sum of the economic impacts reported by individual universities.

CONCLUSION

Ontario's universities make many lasting contributions to individual, community and provincial economies, helping to build a strong, inclusive economy that makes Ontario an attractive place to live and to invest.

Spending generated as a result of the activities of Ontario universities spurs regional economic and social development. It is responsible for the creation of 478,096 FTE jobs and contributes $42.4 billion to Ontario's GDP.

But the impact of universities also goes well beyond the ripple effects of spending. The two primary goals of universities – educating students and conducting groundbreaking research that improves lives – are important investments in society that have an even greater impact on economic output.

Ryerson University, Toronto, ON

Universities produce the highly skilled workforce that allows Ontario to support an array of competitive and innovative companies, as well as vibrant public and non-profit sectors. The total economic impact of this increase in human capital, which would include all revenues derived from a university education and their ripple effects throughout the economy, is not captured by this report. The premium income of university graduates offers a partial estimate, and in 2010 it totaled $48.7 billion.

Research at Ontario universities also drives innovation, and contributes to the creation of new products and the improvement of social services while pushing the province toward new frontiers in science and technology. In 2014, the economic impact of this work was $24.7 billion.

Carleton University, Ottawa, ON

Taking all of these elements into account, the economic impact of Ontario universities is $115.8 billion a year – which is just one expression of the countless ways that universities are future makers, helping to shape Ontario and pave the way for a better future for all.

This economic impact demonstrates that investing in universities has impacts beyond those accrued to the individual student. Research and advanced education lead to growth that affects businesses, governments and other members of society.

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ENDNOTES

1 See Table 4 in this report.

2 GDP impact is for 2014-15 university (including capital) and student and visitor spending. Alumni spending data is for 2010.

3 Employment impact is for 2014-15 university (including capital) and student and visitor spending. Alumni spending data is for 2010.

4 The 2010 Input-Output Model was the most recent model available at the time that we modelled the impact of Ontario universities.

5 The model estimates FTE jobs based on the results of the Labour Force Survey (LFS) and the Survey of Employment, Payrolls and Hours (SEPH).

6 For example, universities require food for their cafeterias and these are provided by distribution companies, which purchase goods from food processing companies, which in turn require machinery and raw materials from wholesalers, and so forth.

7 Definitions of direct, indirect and induced impacts are from Statistics Canada, Interprovincial Input-Output model, 2010, and from conversations with Statistics Canada consultants.

8 Scholarships and major capital expenditures were subtracted from "Ontario universities spending" because capital expenditures are modelled separately and scholarships and bursaries are already captured in student spending.

9 All data on economic impact of spending on GDP is at basic prices. Basic prices are the amount receivable by the producer from the purchaser for a unit of a good or service produced as output, minus any tax payable, and plus any subsidy receivable by the producer as a consequence of its production or sale. It excludes any transport charges invoiced separately by the producer.

10 University Spending excludes major capital spending and scholarships.

11 University Spending excludes major capital spending and scholarships.

12 University Spending excludes major capital spending and scholarships.

13 Council of Ontario Finance Officers.

14 Scholarships and major capital expenditures were subtracted from this amount because capital expenditures are modelled separately and scholarships and bursaries are already captured in student spending.

15 Data on the number of graduates in Ontario and employment income is from Statistics Canada, National Household Survey and corresponds to the 15 years old and over population

16 Statistics Canada, CANSIM Table 358-0001. Data is for 2013.

17 Statistics Canada, CANSIM Table 358-0001. Data is for 2013.

18 Statistics Canada, CANSIM Table 358-0001. Data is for 2013.

19 Slater, Ammon J. and Ben R. Martin, "The economic benefits of publically funded basic research: a critical review." Research Policy 30 (2001), 520.

20 Narin, F., K.S. Hamilton, D. Olivastro, "The increasing linkage between US technology and public science." Research Policy 26.3 (1997), 317-330.

21 Rosenberg, N., "Scientific instrumentation and university research." Research Policy 21 (1992), 384.

22 Slater, Ammon J. and Ben R. Martin, "The economic benefits of publically funded basic research: a critical review." Research Policy 30 (2001), 518.

23 Fernand Martin. "The Economic Impact of Canadian University R&D." Research Policy 27 (1998): 677-687.

24 The following Economic Impact Reports of Canadian universities include this methodology: University of Toronto (2013); Western University (2015); University of Ottawa (2016); University of British Columbia (2009); University of Victoria (2012); University of Alberta (2012); Simon Fraser University (2014); and University of Calgary (2013).

25 Data is from Statistics Canada, CANSIM Table 384-0038 and from Statistics Canada, System of National Accounts, Provincial Economic Accounts, 1967-1982. 1971 data adjusted to 2014 dollars using the Bank of Canada inflation calculator.

26 Martin derives the 31% effect of foreign R&D from different econometric analysis on this topic for Canada and other industrialized countries.

27 Statistics Canada, CANSIM Table 358-0001. Share of R&D performed by universities is for 2013.

urban tech sector

GROWTH DRIVES ECONOMIC RESILIENCE

By Jaxson Khan and Olivia Labonté

Jen Lee Koss and Kena Paranjape – Co-Founders of Brika, an online marketplace for crafts

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Leaders in the Toronto tech scene appear in all the photos.

Note: this article is based on "How Technology Is Changing Toronto Employment," a report by TechToronto.org.

Acknowledgements from the TechToronto report, a collaboration between TechToronto, PwC, Emsi, and the Innovation Policy Lab at University of Toronto's Munk School of Global Affairs:

TechToronto: Alex Norman, Jason Goldlist; PwC: Jesse Albiston, Adam Thorsteinson, Burzin Contractor, Cassandra Ruggiero, Laura Hildebrand; Emsi: Jordan Vukanovich, Brendan O'Neill, Josh Wright; Innovation Policy Lab at University of Toronto's Munk School of Global Affairs: Travis Southin, David Wolfe

INTRODUCTION

In recent years, technology and entrepreneurship have been promoted as the future of economies. Technology and entrepreneurship are expected to create the prosperity and jobs that major cities, such as Toronto, need to stabilize and grow their economies after the economic crisis of 2008 and anemic economic growth of the last decade. As the economic hub of Canada, Toronto houses major parts of the country's economy, and sectors within it have a growing percentage of technology-driven employees. Recently, Toronto has emerged as having one of the fastest growing technology-driven sectors among cities in the world, in the top 20 of the Compass Global Startup Ecosystem Ranking.

Technology has already transformed the economy. The Internet, mobile technologies, wearables, big data and machine learning are included in technologies that have created thousands of new companies and jobs in Toronto alone. This study demonstrates the impact of technology sector growth on urban economic resilience, as demonstrated by the Toronto economy. Resilience can be defined as an economy's vulnerability to crises and its capacity to absorb and overcome shocks while supporting strong growth (Sunley and Martin, 2014; OECD, 2016). It also suggests ways to help technology ecosystems to prosper and grow. The study defines the Toronto tech ecosystem and measures the ecosystem's resilience, robustness and impact on the economy. The first section provides a quantitative overview of the Toronto economy at large and the growing tech ecosystem within it. The second section outlines policy recommendations and considerations for growth.

EXAMINING RESILIENCE IN THE TORONTO TECH ECOSYSTEM

The growth of the technology sector is driving economic resilience in urban centres. Toronto is a city that has one of the world's fastest growing technology sectors and its high economic resilience correlates to the growth of that sector. Economic resilience is improved by diversification, decentralization, and proportional income inequality, all factors which are positively influenced by the growth of tech sectors. Toronto's tech sector growth also has strong implications for education and training, including gender/race equality, towards maintaining the velocity of the sector and furthering its economic resilience.

This report uses data about jobs and industries available from Statistics Canada and through Emsi's Analyst tool to chart the dimensions of the tech ecosystem in Toronto. This study was inspired by the methodology of The New York City Tech Ecosystem Report: Generating Economic Opportunities for All New Yorkers, which included all jobs from tech industries, as well as tech jobs in non-tech industries (HR&A Advisors, Inc, 2014). Using this methodology, the report identifies the ecosystem and shows how it drives a significant part of the economy.

Since 2010, the Toronto tech ecosystem has grown faster than the general economy and tech ecosystem in the rest of the country combined, adding 25,000 jobs beyond what was expected. But this Toronto-centric growth isn't uniform across the entire ecosystem. Since 2010, there's been no growth in the number of non-tech jobs in tech industries, (in fact non-tech jobs in tech industries declined by 1.1 percent). Tech jobs in non-tech industries grew by 15.7 percent, while tech jobs in tech industries saw the largest percentage growth, at 27.1 percent.

METHODOLOGY

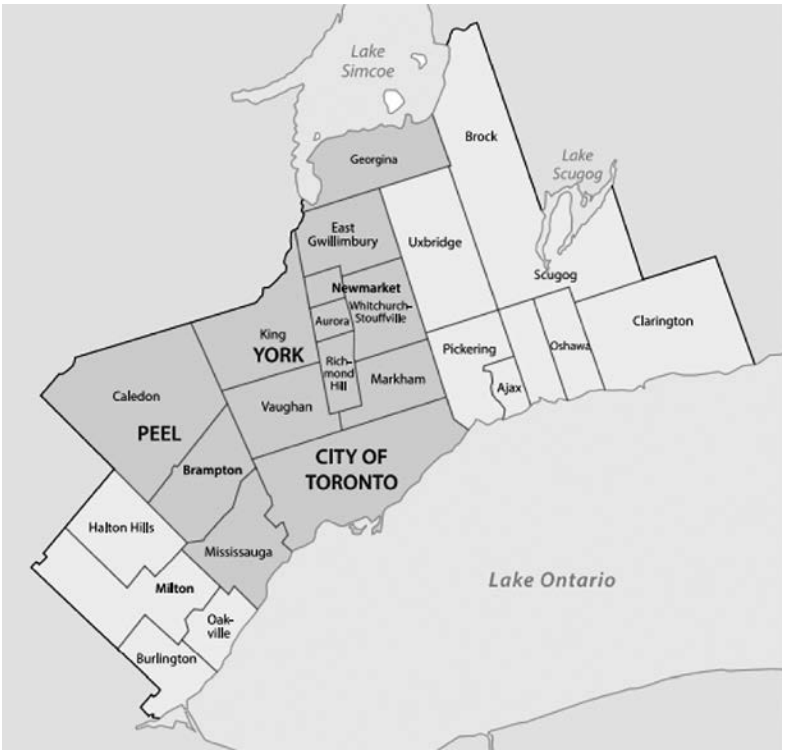
Economies have always been prone to major disruptions. It is within regional, urban, and local economies and communities that such shocks and disturbances work out their effects and consequences. The notion of resilience is highly pertinent for analyzing how regions and localities react to and recover from shocks, and for understanding how such shocks might impact important macroeconomic indicators (Martin and Sunley, 2014). This study combines the literature on economic resilience and its interdependencies to study the possible impacts of the tech ecosystem within the local economy of the city of Toronto.

As of 2015, there were 2.7 million people employed in Toronto (City of Toronto, 2015) (See Figure 1). For the purpose of this study, "Toronto" is defined as comprising the Toronto, Peel, and York census divisions. This region housed a diverse population of 5.4 million people in 2015 – with 49 percent of the population composed of immigrants (Ibid).

A "tech ecosystem" is defined in this study as "a network of organizations that enable the provision of goods or services rather than an isolated, independent industry. For example, a computer systems administrator employed by a hospital's information technology department is directly employed by the healthcare sector but also needs to be considered in evaluating the complete tech ecosystem" (NYC Tech Ecosystem Report, 2014).

An ecosystem for the purposes of this article is classified by the amount of employment and economic benefits which are generated within a specific region. Furthermore, "Tech" is defined in the same manner by both The New York City Tech Ecosystem Report (Ibid) and other similar analyses which define "tech" as the collection of techniques, abilities, and processes that are employed in the production of goods or services or in the accomplishment of goals.

FIGURE 1 - Map of Toronto and Surrounding Area



Source: City of Toronto (2015)

Additionally, this study was facilitated in part by Emsi, which collects and reports on over 12 data sources from Canada. Other data sources collected for this report include Statistics Canada, the City of Toronto, and Toronto-related reports.

Table 1 shows the criteria used to determine whether an industry should be classified as tech.

If all factors are confirmed, then the industry/occupation is qualified as "tech" in this study. It is important to note that both employed and self-employed labour markets were included in this study, as was done in The New York City Tech Ecosystem Report (Ibid) to better capture the breadth of the tech ecosystem.

The use of the North American Industry Classification System (NAICS) codes used in Canada, as approved by Statistics Canada, allowed a thorough categorization

TABLE 1 – Tech Industry and Occupation Classification Criteria

Industry factor (1)	Is this industry enabled by tech?
Industry factor (2)	Does this industry produce tech?
Occupation factor (1)	Does this occupation directly produce tech?
Occupation factor (2)	Does this occupation facilitate the use of tech by others?
Occupation factor (3)	Would this occupation cease to exist without the presence of tech?

Source: NYC Tech Ecosystem Report, 2014

TABLE 2 – Tech Industry and Occupation Classification

NAICS for Toronto Used in Report

Description	NAICS
Computer and peripheral equipment manufacturing	3341
Communications equipment manufacturing	3342
Semiconductor and other electronic component manufacturing	3344
Navigational, measuring, medical and control instruments manufacturing	3345
Other electrical equipment and component manufacturing	3359
Software publishers	5112
Wired telecommunications carriers	5171
Wireless telecommunications carriers (except satellite)	5172
Satellite telecommunications	5174
Other telecommunications	5179
Data processing, hosting and related services	5182
Other information services	5191
Computer systems design and related services	5415
Scientific research and development services	5417

NOCS for Toronto Used in Report

Description	NOCS
Architecture and science managers	0212
Computer and information systems managers	0213
Data entry clerks	1422
Electrical and electronics engineers	2133
Chemical engineers	2134
Industrial and manufacturing engineers	2141
Aerospace engineers	2146
Computer engineers (except software engineers and designers)	2147
Other professional engineers, n.e.c.	2148
Information systems analysts and consultants	2171
Database analysts and data administrators	2172
Software engineers and designers	2173
Computer programmers and interactive media developers	2174
Web designers and developers	2175
Chemical technologists and technicians	2211
Biological technologists and technicians	2221
Forestry technologists and technicians	2223
Civil engineering technologists and technicians	2231
Mechanical engineering technologists and technicians	2232
Industrial engineering and manufacturing technologists and technicians	2233
Electrical and electronics engineering technologists and technicians	2241
Electronic service technicians (household and business equipment)	2242
Industrial instrument technicians and mechanics	2243
Aircraft instrument, electrical and avionics mechanics, technicians and inspectors	2244
Architectural technologists and technicians	2251
Industrial designers	2252
Computer network technicians	2281
Information systems testing technicians	2283
Medical laboratory technologists	3211
Medical laboratory technicians and pathologists' assistants	3212
Respiratory therapists, clinical perfusionists and cardiopulmonary technologists	3214
Medical radiation technologists	3215
Cardiology technologists and electrophysiological diagnostic technologists, n.e.c.	3217
Other medical technologists and technicians (except dental health)	3219
Library and public archive technicians	5211
Film and video camera operators	5222
Broadcast technicians	5224
Audio and video recording technicians	5225
Other technical and co-ordinating occupations in motion pictures, broadcasting and the performing arts	5226
Graphic designers and illustrators	5241
Customer and information services supervisors	6314
Customer services representatives - financial institutions	6551
Contractors and supervisors, electrical trades and telecommunications occupations	7202
Industrial electricians	7242
Electrical mechanics	7333
Electronics assemblers, fabricators, inspectors and testers	9523
Assemblers and inspectors, electrical appliance, apparatus and equipment manufacturing	9524
Assemblers, fabricators and inspectors, industrial electrical motors and transformers	9525
Mechanical assemblers and inspectors	9526
Machine operators and inspectors, electrical apparatus manufacturing	9527

Source: Statistics Canada (2016) and NOCS (2011)

of all industries beyond the use of the established criteria. The use of the NAICS allows the identification of all employees in an industry class, using publicly available data. For example, a company that falls in the NAICS class of Software Publishers would be included in the total count for the tech ecosystem. In this research, 14 tech industries were selected in Toronto that support 170,000 jobs in tech companies that include both tech and non-tech jobs but are all part of the tech ecosystem (Statistics Canada, 2016).

The North American Industry Classification System (NAICS) is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing and publishing statistical data related to the Canadian business economy. The National Occupational Classification System (NOCS) 2011 is the authoritative resource on occupational information in Canada. Thousands of people use it daily to understand the jobs found throughout Canada's labour market.

Table 2 identifies how tech industries and occupations were classified in the study, using both classification systems – NAICS and NOCS.

All tech jobs in Toronto were identified using the National Occupational Classification System (NOCS) for Canada, which is used to categorize jobs. A specific position, such as a computer programmer or interactive media developer, can now be counted across all industries, whether in a tech industry or not. The full list of jobs considered as tech in Toronto (outlined below) enables the identification of all tech jobs from all industries.

The NOCS determined 329,000 tech jobs in Toronto. A cross-reference of the NAICS (170,000 jobs found in tech industries) and the NOCS (329,000 jobs in tech jobs) removed the overlap, as the count of tech jobs in tech industries is included in both. The total count of tech jobs within tech industries was located, or the tech NOCS within the tech NAICS (the breakdown is shown in Table 3). An overlap of 98,000 jobs was identified. An overlap example would be a computer programmer in a tech company. Experts in HR, economics, and demographic data analysis were consulted to confirm findings and methodology for this report.

Table 3 encompasses the most common jobs from all tech jobs in the tech industry e.g. Computer Programmer at Nascent Digital, all non-tech jobs in tech industries e.g. Sales Representative at SoapboxHQ, and all tech jobs in non-tech industries e.g. Technical Support job at RBC.

Another indicator used in this report is the Economic Complexity Index (ECI). The metric developed by Cesar Hidalgo of MIT and Ricardo Hausmann of Harvard University in 2014 uses data about a country's diversity of exports to assess the sophistication of its economy. This study applies it analogously to assess the sophistication of a city's economy by examining the diversity of industries it employs. Roughly speaking, a city has a more complex economy if it employs not only a diverse range of industries, but also industries that are relatively rare when compared to other cities in the country.

To measure the ECI of Toronto, the study examined 2015 industry employment data from Emsi's Analyst tool for all 33 Census Metropolitan Areas in Canada, broken down by 4-digit NAICS code. Each city is measured by diversity through counting the number of industries employed at levels above national averages. Then, the commonality of industries across the country is taken into account by calculating their ubiquity (a count of how many cities employ this industry).

Both values – diversity and ubiquity – are used to mutually correct one another. For each city, the average ubiquity of the industries that it employs is calculat-

Virginia Block – President of Amego Electric Bikes, an electric bicycle retailer.

TABLE 3: The Most Common Jobs in the Tech Ecosystem

NOCS	Description	Employed in industry Group 2015	Median Hourly Earnings
2171	Information Systems Analysts & Consultants	26,980	$34.99
2174	Computer Programmers & Interactive Media Developers	22,146	$38.77
2173	Software Engineers & Designers	8,510	$47.00
0213	Computer & Information Systems Managers	6,423	$47.97
2281	Computer Network Technicians	4,408	$30.88
2175	Web Designers & Developers	4,181	$38.21
2147	Computer Engineers (except software engineers and designers)	2,986	$16.01
9523	Electronics Assemblers, Fabricators, Inspectors & Testers	2,881	$32.52
2172	Database Analysts and Data Administrators	2,082	$28.12
2242	Electronic Service Technicians (household & business equipment)	1,980	$26.49

Source: Statistics Canada (2016) and NOCS (2011)

Ray Reddy – Founder of Ritual, a mobile app for restaurant loyalty.

ed, then the average diversity of the cities that employ those industries, and so on, until the numbers converge to a final value. These final values for each city are then adjusted so that their mean is 0 and their standard deviation is 1. The adjusted final value becomes the city's ECI.

Another important indicator used in this study is the Gini coefficient. It is important to note that since individuals in the tech ecosystem are by definition employed, when calculating the Gini coefficient for Toronto overall, this study only included the employed population for a more meaningful comparison. The overall Toronto Gini coefficient would have been higher if the unemployed population had been included as well.

Gini coefficients are calculated using the average annual income per occupation, which obscures inequality slightly because it averages out some of the income variance within jobs. Gini coefficients would likely have been slightly higher had the values not been averaged. All of this being said, when these values are considered relative to one another they can still be used for a meaningful comparison.

Compensation and GDP are great indicators of economic performance, but the recent financial crisis and recession have demonstrated that scale is not the only important metric. The resilience of an economy is a measure of growing importance to business owners and policy makers.

KEY ECONOMIC/FISCAL IMPACTS

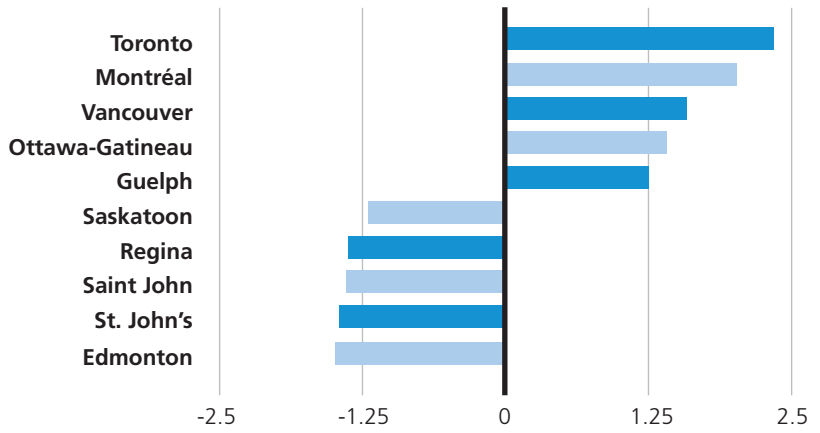
This section elaborates on the key impacts of a vibrant tech sector on improving the resilience of an urban economy. It highlights three factors and their relation to the tech sector. The first is diversification, which is recognized as the existence of jobs across multiple industries, which increases economic resilience by avoiding overreliance on a single or few industries. The second is decentralization, which entails the existence of innovation across multiple companies and institutions. This improves the chances that technology will continue to grow in an area, for example if a company moves. The last factor is low or proportional income inequality, a significant factor and marker of economic resilience. A relative balance of wealth improves the durability of an economy and the ability of citizens, especially the middle class, to create new ventures and generate new sources of wealth.

Diversification

One of the key findings of this study is the impact of the tech sector on diversification. Diversification is defined as the degree to which jobs are spread out across multiple industries. An economy where jobs are spread across multiple industries carries less economic risk. Conversely, when jobs are heavily concentrated in a few sectors, then the economy is more susceptible to booms and busts in these industries and is thus quite fragile. For example, Detroit demonstrated this phenomenon through over-reliance on a single industry – the auto sector. It failed to diversify, while "places such as Chicago and Pittsburgh relied on other areas – like banking or education – beyond the industries that started their success" (New York Times, 2013). This section looks at the diversity of Toronto's economy overall and explores the role that tech plays in diversified economies.

In order to better gauge the diversity of Toronto's employment profile, it is important to first establish a robust measure. This study uses the Economic Com-

FIGURE 2 – Top and Bottom Five Canadian Cities by Diversification



Source: Hausmann et al, 2011

plexity Index (ECI) as a way to measure the economic diversity of a city in the context of the entire country. It counts the number of industries in a city and assesses the uniqueness of the city's industry profile in comparison to other regions.

An ECI above zero is a sign that a city employs a diverse range of industries, including ones that are relatively rare when compared to other regions. An ECI below zero suggests that a city employs relatively few industries, tending towards ones that are more common across regions. ECI is a strong predictor of future GDP-per-capita growth (Hausmann et al, 2011). At 2.36, Toronto has the highest ECI of all cities across Canada (See Figure 2) which argues that the city has a relatively diverse and unique employment profile.

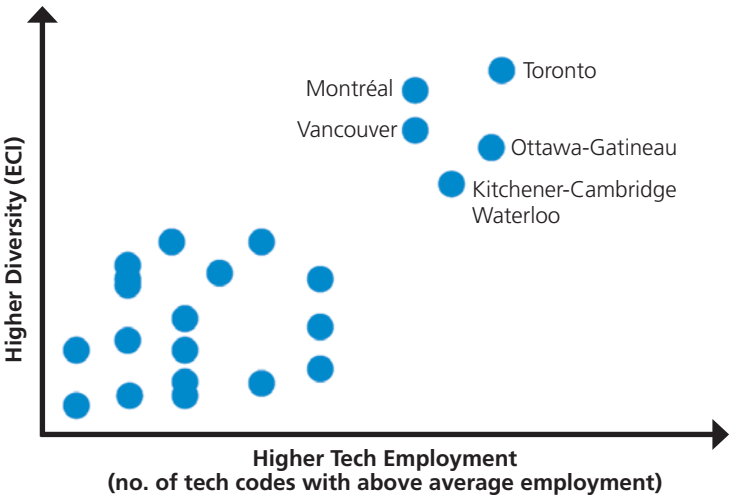
ECI analysis can also demonstrate that the tech industry is likely strongly associated with diverse city economies (Hausmann et al, 2011). For example, Canadian cities with above-average levels of tech industry employment tend to have a much higher ECI. The average ECI of cities with high tech employment is 1.68, while cities with lower tech employment have an average ECI of -0.30. According to many authors, economies more reliant on natural resources and primary industries tend to have lower ECIs, whereas economies weighted towards complex products and services tend to have higher ECIs (Hausmann et al., 2011; Martin and Sunley, 2014). Interestingly, while the ECI is calculated using industry diversification, the metric can also be seen as an indicator of the amount of knowledge embedded in a society due to the strong linkages between knowledge and diversification of the economy. Figure 3 demonstrates the diversity of a city's residents relative to its tech employment.

Decentralization

Another key finding is the impact of decentralization on the tech industry. In this study, decentralization is defined similarly to diversification but narrows the scope to look at specific industries. To determine a city's decentralization, the concentration of companies within a single industry is observed. For example, if an industry has only one company, then this industry is highly centralized and not particularly resilient. If that company were to fold, be acquired or leave town, then the industry's economy would be decimated. A multitude of organizations of different sizes and complexities make for an industry that's more adaptable to change and more robust to failure. Toronto as a tech ecosystem, based on the number of companies and types of industries, is already relatively decentralized (Figure 4).

The spread of tech into non-tech industries is highly beneficial for the resilience of the ecosystem. There are no less than 18 different incubators and accelerators across Toronto's universities and colleges, so there will be continued opportunities for young entrepreneurs if any one of them were to enter a crisis (City of Toronto, 2015). The wide range of startups, mid-sized, and large enterprises is a sign that Toronto's economy can support tech organizations at scale. But there are some red flags

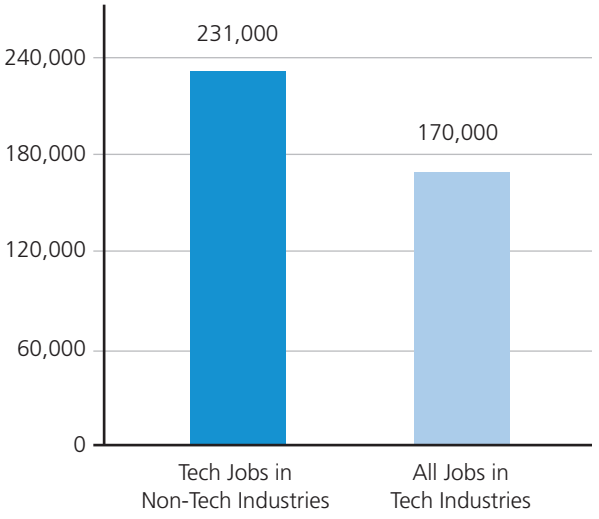
FIGURE 3 – Diversity vs. Tech Employment by City



Source: How Technology Is Changing Toronto Employment, 2016

Lily Tse – Founder of ThinkDirty, a skincare product comparison app.

FIGURE 4 – There Are More Tech Jobs Outside of the Industry Than There Are Within It



Source: How Technology Is Changing Toronto Employment, 2016

in the Toronto economy when it comes to centralization. Government support is being disproportionately concentrated into large organizations (Report of the Expert Panel Examining Ontario's Business Support Programs, 2016).

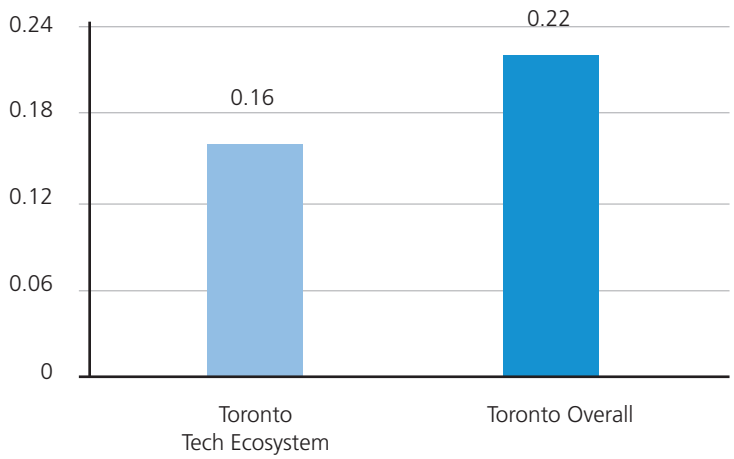
Income Inequality

The average 2015 salary for Toronto tech ecosystem employees was $61,000. This figure is 11 percent higher than the average Toronto salary of $55,000 (City of Toronto, 2015). Tech jobs in tech industries have the highest average hourly wage in the ecosystem at $36.79 per hour. The lowest average wages in the ecosystem go to non-tech jobs in tech industries at $29.35. But all of these are higher than the average Toronto wage of $25.66. In total, the tech ecosystem in Toronto paid out over $24 billion in salaries. This represents 17 percent of all the compensation paid in the city in 2015, compared to 15 percent of the city's employment (City of Toronto, 2015; Statistics Canada, 2016).

Income equality is the final measure of economic resilience that is considered in this study as income inequality is intrinsically linked to resilience. The more equal a region's distribution of economic resources, the more cohesive and widespread the response can be to a disturbance (Cutter et al., 2010). If a crisis were to strike a city's economy but only the elite could afford to weather the storm, then the overall economy would struggle to recover. A population with more balanced wealth is more adaptable. Societies with more equal income distributions tend to have more durable growth (IMF, 2011).

The most common measure of income inequality is the Gini coefficient. Ranging from zero to one, a Gini coefficient of zero represents perfect equality, where every citizen earns the exact same amount, while a Gini coefficient of one represents extreme inequality, where all of the wealth is concentrated into a single individual.

FIGURE 5 – Gini Coefficients in Toronto



Source: How Technology Is Changing Toronto Employment, 2016

Meeting this significant demand for ICT workers will require policy action in increasing and diversifying enrollment in tech-related post-secondary education. Supporting Toronto's tech workforce are the city's many prominent universities, including the University of Toronto, York University and Ryerson University.

When we compare the Toronto tech ecosystem to the broader Toronto economy, we see lower levels of inequality within tech. This means that average salaries within tech are more evenly distributed, and this is a good thing when considering the resilience of the ecosystem (Figure 5).

But it's important to note that this analysis only scratches the surface of income equality. The wage gap between men and women has increased since the recession, with women now earning only 72 percent as much as men for the same type of work – and this issue persists across all industries, including tech (Lambert and McInturff, 2016).

CHALLENGES FOR THE FUTURE

The following section highlights avenues of further research, including the need to give further consideration to gender and minority representation within the tech ecosystem.

Education and Training

While this report has shown that Toronto's tech sector workforce is large and dynamic, research indicates that demand will continue to grow significantly. A 2015–2019 labour market outlook by the Information and Communications Technology Council surveyed over 1,000 firms and found that by 2019, Toronto will experience cumulative hiring requirements (combination of employment growth and replacement requirements) of 52,741 (24 percent) above 2015 levels of ICT workers. Toronto's ICT workforce demand accounts for much of provincial and national requirements, with Toronto's growth expected to account for 69 percent of Ontario's expected hiring requirements of 76,263 and 29 percent of Canada's expected hiring requirements of 182,700.

Meeting this significant demand for ICT workers will require policy action in increasing and diversifying enrollment in tech-related post-secondary education. Supporting Toronto's tech workforce are the city's many prominent universities, including the University of Toronto, York University and Ryerson University. These universities have more than 470 faculty members in teaching and research positions in ICT and related technologies programs such as computer sciences, includ-

Mike Katchen – Founder of Wealthsimple, an automated investment platform.

TABLE 4 – STEM Education and Employment in Canada By Gender, Immigrant Status, Aboriginal Identity, 2011

	Total	Women % of Total	Immigrants % of Total	Aboriginal % of Total
Population aged 25-54	14,044,940	51.1%	24.5%	3.9%
Post-secondary credential	9,340,495	52.5%	26.1%	2.5%
Post-secondary credential in a STEM field	1,814,075	29.6%	39.9%	1.4%
Post-secondary credential in a STEM field and employed in a STEM-intensive occupation	606,520	18.9%	37.5%	N/A
% of those with a STEM credential employed in a STEM-intensive occupation	38.9%	26.9%	39.1%	N/A

Data Source: StatCan (2013a, 2013i, 2014n) and Panel calculations
Source: Some Assembly Required, Council of Canadian Academies

ing computer systems and game design. (The Information and Communications Technology Council, City of Toronto, 2015). As for postsecondary education in Toronto, 85 percent of Toronto students are enrolled in undergraduate programs, 7 percent in master's programs, and 8 percent in doctoral programs (Toronto Employment, 2016). In addition, Toronto's four colleges – Seneca College, Humber College, Centennial College, and George Brown College – had 5,935 students in the 2011/2012 academic year in programs such as software systems, computer engineering, health informatics technology, computer animation, and enterprise database management. (The Information and Communications Technology Council, City of Toronto, 2015)

Gender/race equality

Despite the region's strength in postsecondary education, groups such as women and aboriginals remain underrepresented in the tech labour force. Women (51 percent of the population) represent just 29.6 percent of individuals with a post-secondary science, technology, engineering and mathematics (STEM) credential and 26.9 percent of those employed in a STEM-intensive occupation. Aboriginals (3.9 percent of the population) represent just 1.4 percent of individuals with a post-secondary STEM credential (Ibid) (See Table 4).

The Information and Communications Technology Council views these types of early outreach programs as essential to addressing the labour shortage and diversity problems in the ICT workforce. Similarly, the Council of Canadian Academies' Expert Panel of STEM Skills for the Future concluded that "support for early interventions that build on children's informal knowledge" and the development of "strong foundations in STEM literacy (enabled by effective teachers, research-based pedagogical methods, and engaging instruction and curricular materials)" is essential to preventing future labour supply bottlenecks. (Ibid, Council of Canadian Academies)

The Information and Communications Technology Council views these types of early outreach programs as essential to addressing the labour shortage and diversity problems in the ICT workforce.

Evgeny Tchebotarev – Founder of 500px, a global photography community.

CONCLUSION

The growth of the technology sector is driving economic resilience in urban sectors. Toronto's technology sector is rapidly growing and advancing a strong urban economic resilience. This technology sector growth is diversifying Toronto's industries, decentralizing its centers of innovation, and increasing average wages. While the sector's growth has been strong, in order to maintain its positive effects and spread them across the broader populace, inclusive STEM-focussed education and training must be offered to people of all backgrounds, including marginalized groups. Cities seeking to improve economic resilience should invest in the inclusive growth of their technology sectors, of which Toronto's case study is a prime example.

Toronto's technology sector is rapidly growing and advancing a strong urban economic resilience.

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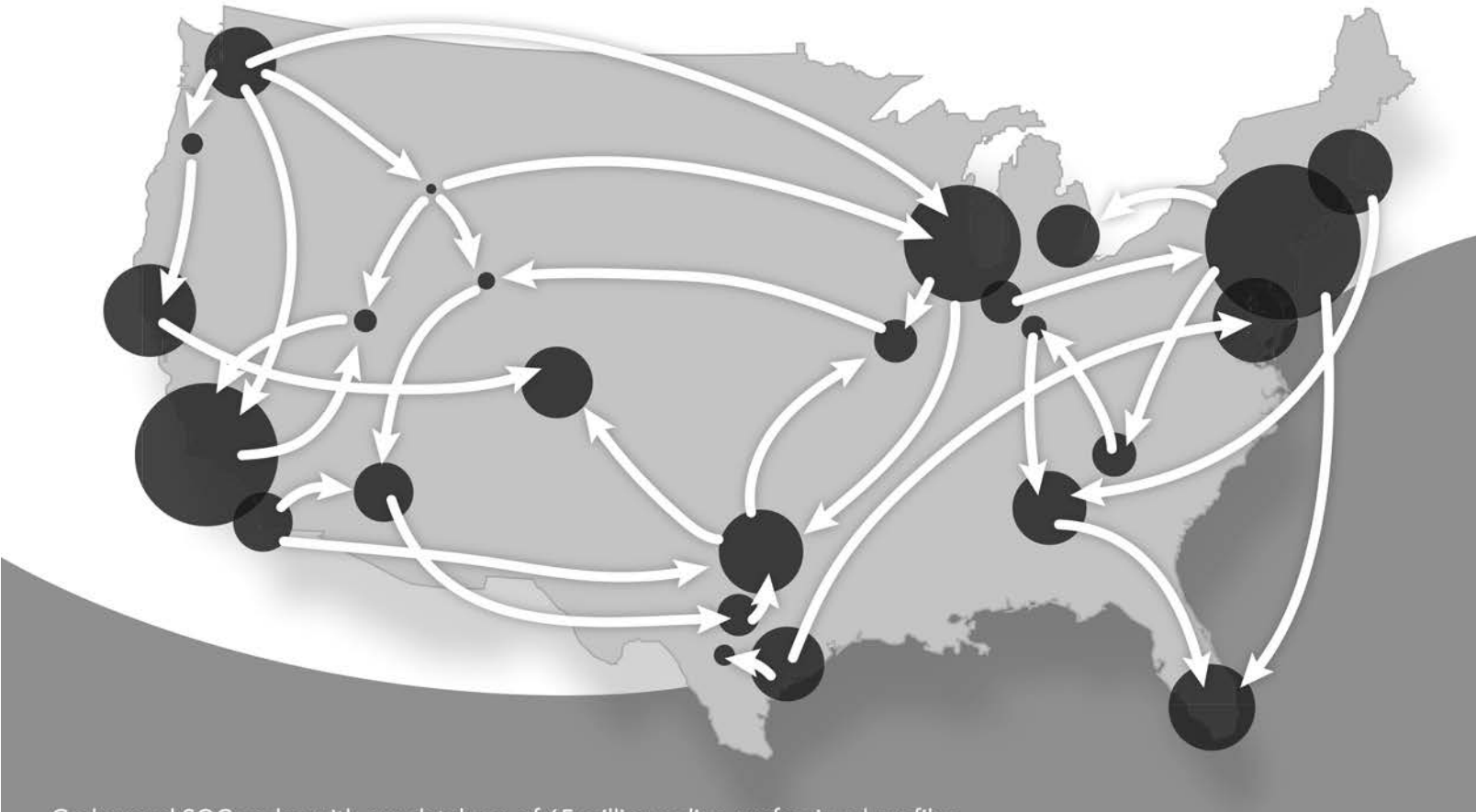

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