

MARTIN  
**Prosperity***Institute*

# Toronto's performance on the 3Ts of Economic Development

**Benchmarking Project: Ontario Competes**  
Ontario in the Creative Age

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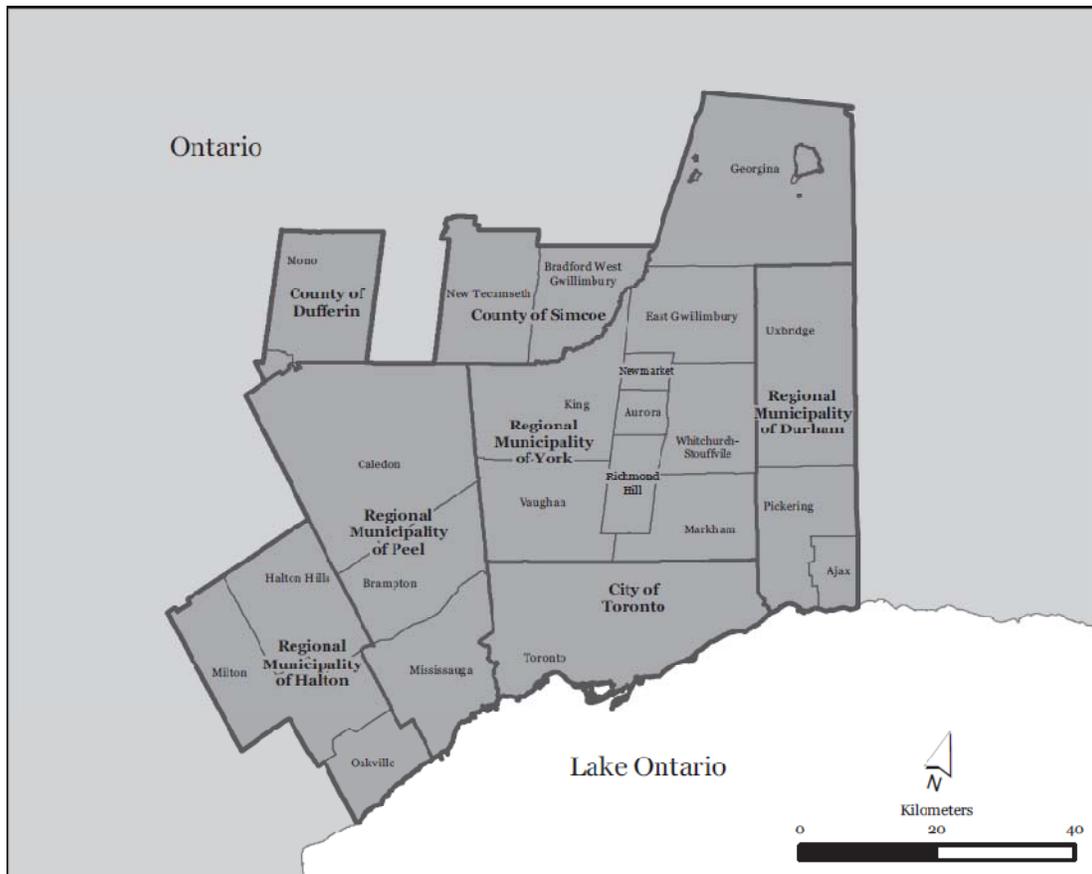
## Introduction

Having just celebrated its 175<sup>th</sup> birthday the City of Toronto is undergoing significant structural changes with the large planned expansion of public transportation and the highest rate of condominium construction anywhere in North America. At the same time, the province aims to restrict the sprawl of the City with “The Places to Grow Act”, an initiative to promote increased densities and urban growth. This redesign of the urban space of Toronto will only accelerate as the newly announced infrastructure stimulus package funds large public works projects. The changing physical environment of the Toronto Census Metropolitan Area (CMA) causes the economic institutions and occupational mix of the city to adapt as the region transitions from a manufacturing based Fordist economy, into a creativity-driven knowledge economy. These changes are forcing government, businesses and individuals to reconsider priorities and rise to new challenges.

Changes are not occurring in the urban centre, but to a much larger, integrated region of 5.1 million people, known as the Toronto CMA. It is this larger region that is the focus of this report. The Toronto CMA defined by Statistics Canada is smaller than Toronto’s commuter basin which extends beyond the CMA border and includes municipalities as far east as Clarington. The Toronto CMA includes the municipalities of: Toronto with a population of 2,480,000; Mississauga population of 670,000, Brampton population of 433,000; Markham population of 261,000 and a few others. (Figure 1)

As of 2006, these municipalities together formed the 10<sup>th</sup> largest metropolitan region by population and the 12<sup>th</sup> largest economy by GDP in North America. In 2006 Toronto produced an estimated \$262 billion (CAD) in GDP or \$51,000 per capita. Its population growth of 9% (2001-2006) is among the highest of all regions with a population of 2 million or more. As Ontario’s and Canada’s largest region it is a multicultural place in which to live and work, and a major gateway to the global economy. Its mixture of civic, corporate and natural assets makes the Toronto CMA a diverse region, but according to the 3Ts of economic development, *not* a leader among the group of highly competitive peer regions it was benchmarked against.

**Figure 1: Toronto CMA**



Source: MPI. Statistics Canada, 2006

When benchmarking Toronto on the 3Ts, which will be briefly explained below, normative claims are made based on current economic and social trends as to what assets regions should be attempting to maximize if they are to achieve economic growth. The 3Ts of economic development: Technology, Talent, or Tolerance provides a means to judge the performance of Toronto relative to other jurisdictions and their future socio-economic prosperity. Toronto’s peers were selected based upon their population size, geographic location, and interest (importance to the North American economic system); they include Detroit, MI, Montreal, QC, Boston, MA, New York, NY, Chicago, IL, Atlanta, GA, Dallas, TX, Seattle, WA, Vancouver, BC and Los Angeles, CA.

The selected regions are important components of the North American economic system, which is broadly defined by national borders, provincial/state divisions, municipal and county boundaries, but more importantly by actual integrated regions of economic activity. These peers are what Allen Scott would call “global city-regions”

(Scott, 2001). Global city-regions are an extension of the global city theories of Sassen (1991), Knox (1995) and Friedmann and Wolff (1982). They are the centres of multinational corporations, knowledge transfer and a particularly unequal distribution of wealth. (Scott, 2001). Entities that resemble city states are emerging, demanding political power and autonomy over economic and social activities. These regions are not defined by pre-existing jurisdictional divisions. They are real in that the borders between those jurisdictions are porous allowing the free flow of people and commerce. This free flow between municipalities is based primarily on geographic proximity and the use of highway and rail infrastructure to move people efficiently and cost effectively across space. As the density of people and the velocity of activity increases, direct economic benefits are accrued in the form of higher wages and improved access to public goods such as health care, education, arts and culture. The organization of people in and around urban centres reduces the systematic and structural costs associated with the flow of knowledge. The global city-region becomes more international and more linked to the global network of commerce as it intensifies its use of space.

### **3Ts Background Information**

It is not a coincidence that certain global centres tend to be hotbeds of innovation and activity. Places like Paris, London, New York and more recently San Jose, home to Silicon Valley, are all prosperous. These regions inevitably produce a continuous infusion of new ideas, exporting of new products, services and or cultural fads in fashion, literature, computers or finance industries around the world. The global-city regions defy the old division between manufacturing centres and cultural/service centres. These large multifunctional regions are not absorbing manufacturing processes; rather manufacturing is declining as a share of the North American economy. The individuation and specialization that characterized cities in a manufacturing based economy have become obsolete. Just as the industrial revolution brought to an end the rural community, the rise of the creative economy is bringing about an end to the industry town and the large cities built upon single industries. Places like Pittsburgh and Detroit are struggling to survive in a world that has passed them by. Once pillars of American capitalism, these regions have been downgraded to second or third tier

regions. The Ontario regions of Windsor, Oshawa and Hamilton are experiencing the same shock as they struggle to maintain employment and their old standards of living that were tied to specific industrial sectors.

The centrality of knowledge in global cities allows individuals to redefine and create new markets. Scattered knowledge is of little use; when focused in specific nodes it becomes accessible for those who can reconfigure it into creative output. The creative activities of today's economy require a workforce that is educated but their agglomeration in a region does not come about by chance. All regions must organize their resources to align incentives and pull capital from all around the globe. Capital can be defined as factors of production that are not significantly altered by productive activities available for future finite uses. Examples of capital are financial (monetary), physical, social and human capital. These forms of capital are used to both reproduce and expand the current stock of capital in a society.

Physical capital like factories, large equipment, and various forms of real-estate remains rooted in place while human and financial capital have been largely freed to move without friction in the economy. The relocation of human and financial capital requires an alteration of its social function as it must adapt and become part of the new regional system. While the qualities inherent to any form of capital remain constant across geographies, the organization and structure that embodies it alters its social function. The relation of various forms of new capital inter-jurisdictionally provides opportunities for economic growth in both relative and absolute terms. In absolute terms the movement of capital requires resources that are committed to its reproduction and therefore necessitates an expansion of the economic "pie". The movement also causes relative economic growth, resulting from capital put to more productive uses, decreasing costs or creating competitive advantages that result in large returns – either wages or profits. All of which raise GDP per capita.

The 3Ts of economic development are part of a theory that gives primacy to the attraction and retention of a specific type of capital – *creative capital*. Creative capital differs from human capital by identifying the Creative Class as key to economic growth and its focus on the underlying factors that determine their location decisions (Florida, 2002). In the creative economy, brawn and the ability to mass produce goods is subordinate to the innate human capability to generate new ideas, concepts, products

and processes. The Creative Class is defined as people in occupations paid to think. Regions that attract and retain this group of workers are best positioned to succeed in the future. The global city hierarchy of the creative age will be determined not by access to natural resources, but by how and which is able to attract this class of worker. With the concentration of Talent and the multitude of perspectives that comes with people being able to carve out their own space in a new community (Tolerance), come new technologies and innovations that support continued growth (Technology). Each of the 3Ts plays an important role in the ability of regions to attract the Creative Class. As a result regions should not choose to focus on any one ‘T’; each is necessary but not sufficient for economic growth. In the creative age, regions will continued to be judged by their GDP per capita and other traditional measures, but it will be their overall creative output that determines their sustained success.

For more information on our terminology refer to the [Understanding our Terminology](#) section on our website. For an in depth explanation of the 3T’s see “Ontario Competes” (Martin Prosperity Institute, 2009).<sup>1</sup>

## **Toronto: 3Ts of Economic Development**

The following is a look at how the Toronto CMA is positioned relative to its peers to compete in the creative age. The 3Ts are used to gauge how Toronto’s Talent, Technology and Tolerance assets are measuring up to their peer regions. This paper will begin with a look at Toronto’s occupational composition, specifically its Creative Class. It will then examine at how the Toronto CMA performs on Technology, Talent and Tolerance. The conclusion will discuss an aggregate of the 3Ts, the Creativity Index, and an indicator of how Toronto is performing overall.

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<sup>1</sup> “Ontario Competes” is the first document released as part of the Martin Prosperity Institute’s benchmarking analysis for the *Ontario in the Creative Age* project. This document acts as a primer for all subsequent benchmarking releases; therefore, we highly recommend that one read this first. Follow this path to do so: [http://martinprosperity.org/media/pdfs/Ontario\\_Competes.pdf](http://martinprosperity.org/media/pdfs/Ontario_Competes.pdf)

## Toronto's Creative Class

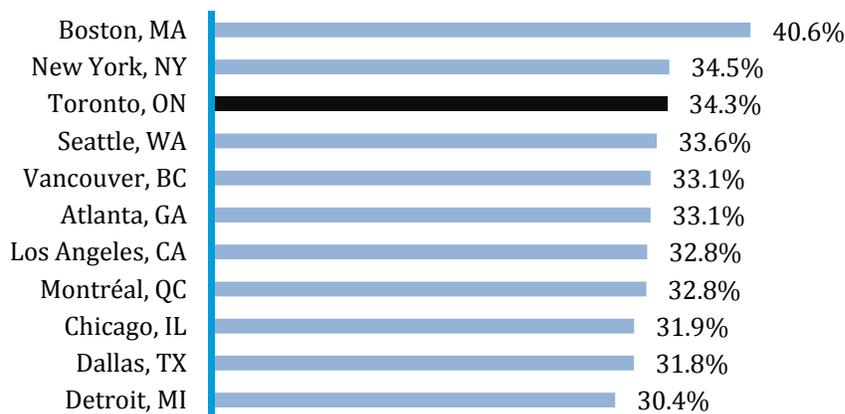
As mentioned, the Creative Class is composed of people who are paid to think for a living, including people working in Technology, Arts and Culture, Professional and Education and Health (TAPE) occupations. In Ontario, occupations in the Creative Class have an average total income is \$64,100 compared to an average of \$42,600 for all occupations.

As a group the Creative Class is 34.3% of Toronto's labour force or approximately 950,000 people. This is the 3<sup>rd</sup> highest share amongst the peer regions, trailing only Boston (40.6%) and New York (34.5%) each of which only slightly bests Toronto. Of the peers Detroit ranks the lowest with 30.4% of its workforce in the Creative Class. Toronto ranks 27<sup>th</sup> out of 374 North American metro regions. Boston leads the way amongst Toronto's peers with its Creative Class share of the workforce 6% higher than New York and Toronto. In absolute numbers New York's workforce is three times the size of Toronto's and has twice as many Creative Class workers. Past research by Florida (Florida, 2002) has revealed that increased levels of innovation, high-tech business formation and economic growth are positively correlated with a larger Creative Class. In our capstone report "Ontario in the Creative Age" (Martin Prosperity Institute, 2009) we set the goal of 50% of the workforce in the Creative Class by 2030. For the Toronto CMA this will require significant growth in Technology and Professional occupations. Toronto is already Ontario's centre of Arts and Culture, Education and Health occupations and therefore it would appear that there is less potential for growth in these areas. The rationale behind this lies in the fact that the later two occupational groups tend to work predominantly in local industries. Local industries<sup>2</sup> are more dependent on local markets than traded clusters<sup>3</sup> which tap into foreign markets.

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<sup>2</sup> Local industry clusters provide goods and services almost exclusively for the area in which they are located, which explains why they must spread across the country. Indeed, dispersed industries show employment in every region, regardless of the natural or competitive advantages of a particular location. As a result, their regional employment are typically roughly proportional to regional population, so that the most highly populated states like California, New York, Texas, and Florida will figure as the top local employment states.

<sup>3</sup> Clustered industries sell products and services across economic areas, so they are concentrated in the specific regions where they choose to locate production due to the competitive advantages afforded by these locations. Employment levels in traded industries thus vary greatly by region, and have no clear link to regional population levels.

**Figure 2: Toronto's Creative Class, 2006**

Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

### **Technology: Innovation and High-tech Production**

Robert Solow, Paul Romer, Robert Lucas among others, have shown in different ways that technology is the driving force behind economic growth (e.g. Solow, 1956; Romer, 1990). Regions cannot access the global economy (let alone compete in it) without technologies that connect and provide high speed information processing. Global city-regions like Toronto, Seattle, Los Angeles (all too varying degrees) have highly sophisticated technology sectors and consumers. Success in the creative age is determined by regions able to gain first mover advantages. Regions that are able to introduce innovations and that have well developed high-tech industrial complexes are able to reap significant benefits in the form of sustainable growth and the production of new wealth.

The Overall Technology Ranking is based on three equally weighted separate measures that reflect a region's innovativeness and the size of their high-tech producing industries. The three measures are: the North American Tech-Pole Index based on the share of employment in high-tech industries relative to the North American average, and innovation measures: 1) total patents and 2) the year over year growth in patents for a five year period. The former is based on information from US County Business Pattern and Statistics Canada. All patent data is based on utility patent data from the United States Patent and Trade Office (USPTO). Utility patents are granted for the discovery of a process, machine, article of manufacture, or composition of matter that is new, useful and non-obvious.

Table 1 ranks Toronto and its peer regions according to the composite technology index. Figures 3-5 rank Toronto against its peers on the North American Tech-Pole Index, Patents per 10,000, and Patent Growth. Figure's 6 and 7 show the relationship between the technology indicators and the Creative Class.

## Results

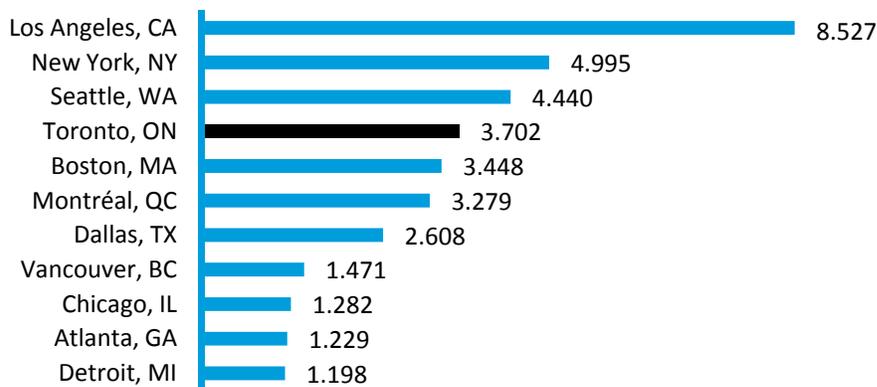
- Toronto shows strength in the area of Technology by ranking 4<sup>th</sup> on the North American Tech-Pole Index amongst its peer regions. The North American Tech-Pole shows that the Toronto CMA has a relatively large cluster of employment in a specific group of representative high-tech industries. Some of the industries included are: Computer systems design and related services; Pharmaceutical and medicine manufacturing; Internet service providers, Web search portals Software publishers and others. (See Appendix A, p 27 for the complete list). The peer regions range from Los Angeles (8.5) to Detroit (1.2) showing that there is quite a difference between these regions in the levels of employment in high-tech. With a Tech-Pole of 3.7, Toronto's cluster of high-tech industries is ahead of Boston (3.5) and Montreal (3.3).
- On measures of innovation, the Toronto region ranks 9<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup> in Total Patents, Patents per 10,000 and Patent Growth respectively. There are systemic and cultural reasons why Canadian regions perform so poorly on these measures. Our small domestic market limits the scope of market competition limiting the levels of innovation and there is under-investment in R&D (Institute for Competitiveness and Prosperity, 2004). Looking at Patents per 10,000 the median region amongst the peers is Chicago with 2.4 patents per 10,000. Toronto generated 1.3 fewer patents per 10,000 or 1,700 fewer than Chicago in 2005. This difference is small compared to Boston which produced 6.09 patents per 10,000 in 2005.

- In the 5 years from 2000-2005 Toronto has seen an average yearly decline in patent output of 8.3%.

**Table 1: Overall Technology Ranking**

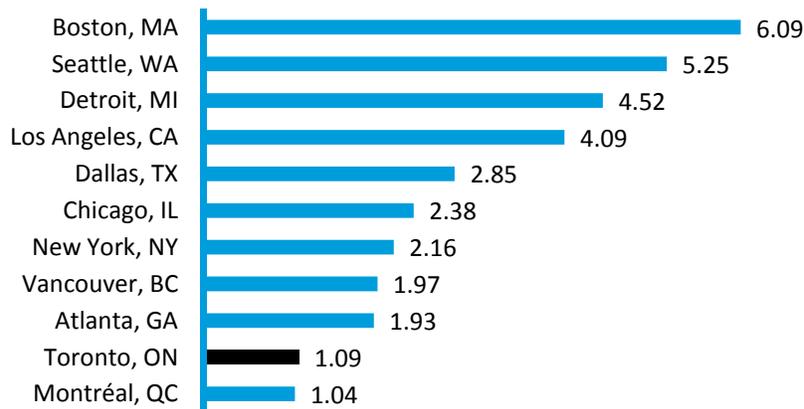
	Overall Technology Ranking	North American Tech-Pole	Patent Count	Patents per 10,000	Patent Growth
1	Seattle, WA	4.44	1,713	5.25	5.5%
2	Los Angeles, CA	8.53	5,298	4.09	0.4%
3	Vancouver, BC	1.47	418	1.97	0.8%
4	Atlanta, GA	1.23	993	1.93	-0.4%
5	Boston, MA	3.45	2,711	6.09	-1.1%
6	Detroit, MI	1.20	2,022	4.52	-0.9%
7	Montréal, QC	3.28	378	1.04	-1.5%
8	Dallas, TX	2.61	1,710	2.85	-4.1%
9	Chicago, IL	1.28	2,267	2.38	-6.1%
10	New York, NY	4.99	4,062	2.16	-6.9%
11	<b>Toronto, ON</b>	<b>3.70 (4th)</b>	<b>555 (9th)</b>	<b>1.08 (10th)</b>	<b>-8.3% (11th)</b>

**Figure 3: North American Tech-Pole Index, 2006**



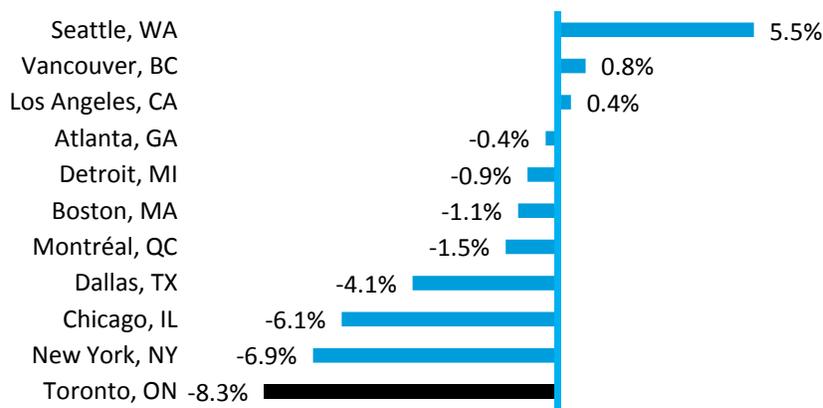
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-559-XCB2006009. County Business Patterns, 2006

**Figure 4: Patents per 10,000, 2005**



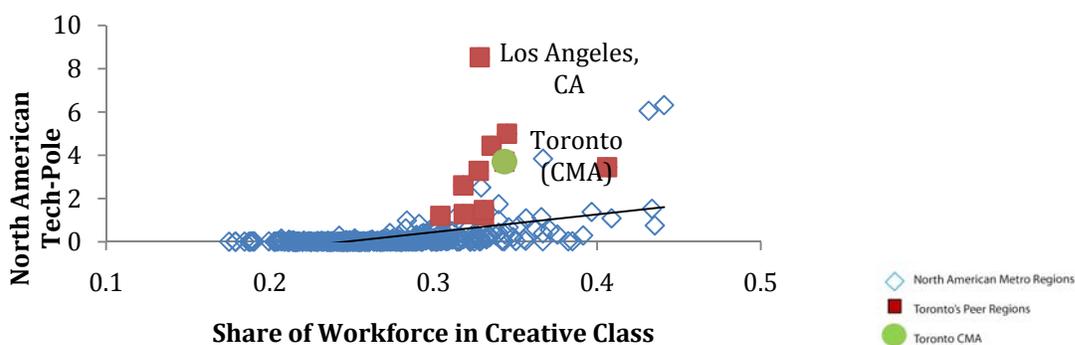
Source: MPI and Dieter Franz Kogler Analysis. USPTO (1975-07).

**Figure 5: Average Annual Patent Growth, 2000-2005**



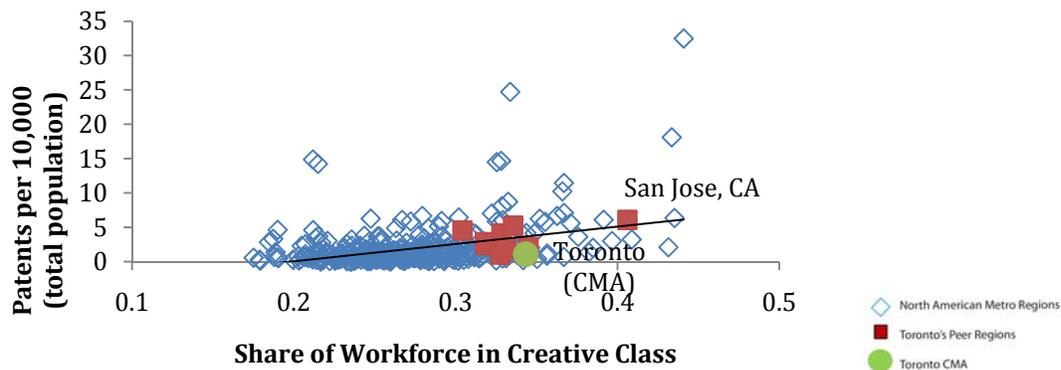
Source: MPI and Dieter Franz Kogler Analysis. USPTO (1975-07).

**Figure 6: North American Tech-Pole Index and Creative Class**



Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006). Statistics Canada Catalogue no. 97-559-XCB2006009. County Business Patterns, 2006. Note:  $R^2 = 0.2041$

**Figure 7: Patents per 10,000 and the Creative Class**



Source: MPI and Dieter Franz Kogler Analysis. USPTO (1975-07). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. Note:  $R^2 = 0.1474$

### Talent: Human Capital and the Creative Class

The indicators that we use for Talent combine an examination of the Creative Class with other, more traditional measures of human capital. Using both an occupational measure and educational measures better captures the creative capital of a region but due to the high correlation we chose to only use the Creative Class to determine the Overall Talent Ranking. Human capital became a major theme in economics with the work of Jacob Mincer (1958), Gary Becker (1964), and most recently Ed Glaeser (2001). Their work has demonstrated the importance of investing in personal productivity as a way to generate growth for firms and regions. Due the high correlation between the Talent Index, population greater than 25 years of age with a Bachelor’s Degree or above and the Creative Class, only the later is used to rank the peer regions on Talent in Table 2. The Creative Class reflects the ability of individuals to transfer their abilities as measured by the Talent Index into high value economic activities manifested in occupations.

Table 2 shows how Toronto performs on the various indicators of Talent relative to its peer regions. Figures 8 and 9 help to visualize the information, showing how Toronto scores on each measure. Figure 10 matches the Talent Index with the Creative Class to show the relationship between these two indicators.

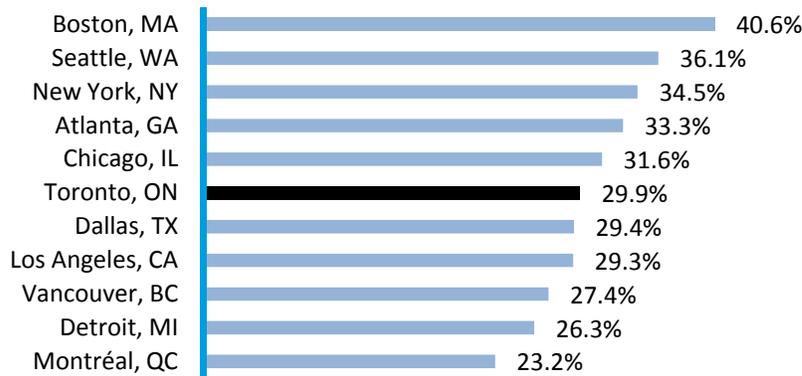
## Results

- The top performers amongst Toronto's peers on the Talent Index are Boston (40.6%) and Seattle (36.1%). Toronto is the median region, ranking 6<sup>th</sup> with 29.9% or approximately 1 million people 25 years or older having at least a BA. Toronto finds itself in a grouping of four regions that score between 29% and 32% (Chicago, Toronto, Dallas, and Los Angeles) on the Talent Index.
- Toronto is the leading region amongst its peers on the Brain Drain/Brain Gain Index (BDGI). The Toronto CMA has 160,000 students enrolled in its three major universities and the Ontario College of Art & Design according to the Association of Universities and Colleges of Canada (AUCC). A brain gain indicates that the Toronto region is increasing its stock of highly educated people.
- The data for all North American metro regions shows that there is a positive correlation between the Creative Class and the Talent Index. Toronto falls slightly below the trend line. Using the relationship between Creative Class and the Talent Index, Toronto should have an estimated Talent Index of 31.4%.

**Table 2: Overall Talent Ranking**

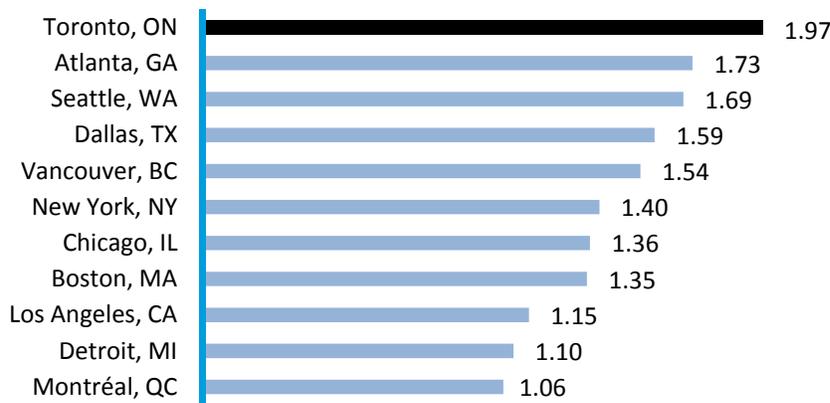
	Overall Talent Ranking	Creative Class	Bachelor's Degrees	Graduate Degrees	Talent Index	Brain Drain/Brain Gain
1	Boston, MA	40.6%	23.0%	17.6%	40.6%	1.35
2	New York, NY	34.5%	20.4%	14.1%	34.5%	1.40
<b>3</b>	<b>Toronto, ON</b>	<b>34.3% (3rd)</b>	<b>18.4% (8th)</b>	<b>11.6% (6th)</b>	<b>29.9% (6th)</b>	<b>2.20 (1st)</b>
4	Seattle, WA	33.6%	23.5%	12.6%	36.1%	1.69
5	Vancouver, BC	33.1%	17.3%	10.3%	27.4%	1.69
6	Atlanta, GA	33.1%	22.2%	11.1%	33.3%	1.73
7	Los Angeles, CA	32.8%	19.4%	10.0%	29.3%	1.15
8	Montréal, QC	32.8%	14.6%	8.8%	23.2%	1.16
9	Chicago, IL	31.9%	19.7%	12.0%	31.6%	1.36
10	Dallas, TX	31.8%	20.1%	9.3%	29.4%	1.59
11	Detroit, MI	30.4%	16.3%	9.9%	26.3%	1.10

**Figure 8: Talent Index (Pop > 25, BA and above), 2006**



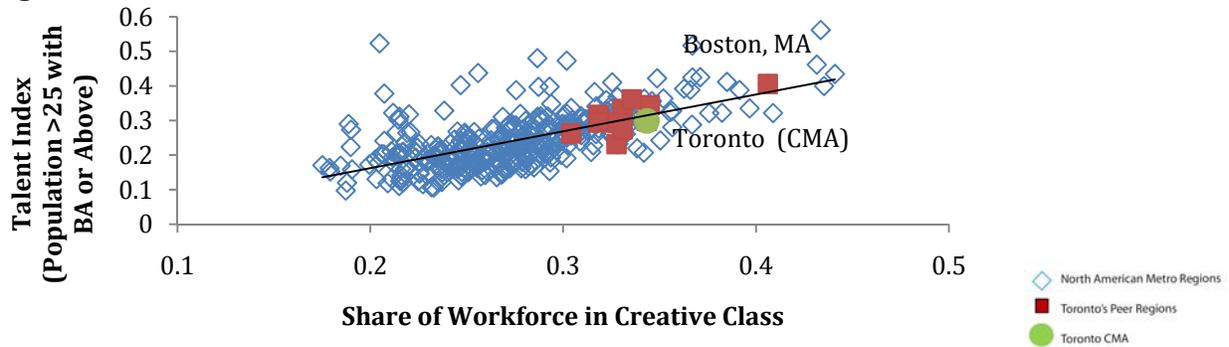
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

**Figure 9: Brain Drain/Gain Index, 2006**



Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007 and AUCC Enrollment numbers 2007. US Census Bureau, American Community Survey. (2006)

**Figure 10: Talent Index and the Creative Class**



Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).  
 Note:  $R^2 = 0.4162$

## **Tolerance: Openness and Diversity**

Tolerance is often overlooked. As the 3<sup>rd</sup> T of economic development, Tolerance is necessary to the ability of regions to act as magnets of creative capital. The collection of Tolerance indicators does not indicate that regions with high levels of gay and lesbians, bohemians, or immigrants cause economic growth. Rather, these indicators go deeper, reflecting cultural elements that are difficult to capture empirically. Regions that are receptive to different types of people have a more open-minded culture, which is conducive to creativity. The creative process that leads to innovation needs space in the social system for ideas to form. When regions are open to new ideas and tolerant they become attractive as places where people can easily network and connect. The ability to tap into the rich diversity of a region is a great competitive advantage that all regions should aspire to.

The Overall Tolerance Ranking is based on four of the five measures that reflect the openness and diversity of the peer regions. The four measures are: 1) the Bohemian Index, which compares the share of regional employment in a select group of occupations against the North American share; 2) the Gay and Lesbian Index which measures the share of a region's same sex marriages relative to the North American average; 3) The Mosaic Index, or the percent of the population that is foreign born; and 4) the Integration Index, which uses neighbourhood and regional data to determine how racially mixed the peer regions are.

Toronto ranks 5<sup>th</sup> overall on the composite Tolerance Index which is made up of the Mosaic Index, Integration Index, the Bohemian Index and the Gay and Lesbian Index. Each of these indicators is given equal weighting when considering the overall ranking. The Visible Minority Index is not included in the overall ranking but is shown in Table 3 and demonstrates how Toronto and the peer regions rank on each of the indicators. Figures 11-15 show how Toronto ranks on each of the variables individually. Figures 16-17 show how the various indicators correlate with the Creative Class.

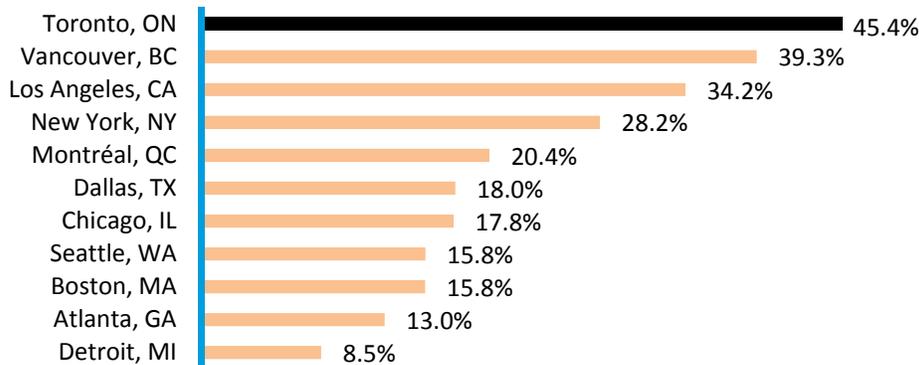
## Results

- Toronto is one of the most multicultural cities in the world. 45% of the city's population is a first generation immigrant. Among the peer regions only Vancouver (39.3%) comes close to Toronto. The large multicultural presence in Toronto and the continued migration to the region has been the main source of population growth. Between 2001 and 2006, 280,000 immigrants moved to the Toronto CMA, accounting for 66% of all population growth over the same time period.
- On the two indicators that best describe openness, the Gay and Lesbian Index and the Bohemian Index, Toronto does very well- ranking 4<sup>th</sup> on the former and 3<sup>rd</sup> on the later. Seattle is highly integrated mosaic of people of different visible minorities and backgrounds and as such ranks 1<sup>st</sup> overall among the peer regions.
- One of the more troubling aspects of Toronto is the growing segregation of cultural groups in and around the city. The Toronto CMA ranks 6<sup>th</sup> on the Integration Index. The Integration Index is an aggregate statistic of all the neighborhoods in each region to determine if visible minorities are mixing together or living in distinct locations. The data aligns with the Centre for Urban and Community Studies report "Three Cities within Toronto" (Hulchanski, 2007). In that report, the City Centre used data from the last 30 years to show that the city of Toronto's core is becoming gentrified with visible minorities moving to the fringes along major transportation arteries.

**Table 3: Overall Tolerance Ranking**

Overall Tolerance Ranking	Mosaic Index	Integration Index	Bohemian Index	Gay and Lesbian Index	Visible Minorities
1 Seattle, WA	15.8%	0.72	1.35	1.53	24.1%
2 Montréal, QC	20.4%	0.68	1.54	1.79	16.2%
3 Vancouver, BC	39.3%	0.49	1.82	1.64	41.4%
4 Boston, MA	15.8%	0.63	1.28	1.24	18.6%
<b>5 Toronto, ON</b>	<b>45.4% (1st)</b>	<b>0.43 (5th)</b>	<b>1.75 (3rd)</b>	<b>1.42 (4th)</b>	<b>42.5% (2nd)</b>
6 Los Angeles, CA	34.2%	0.29	1.81	1.33	49.0%
7 New York, NY	28.2%	0.23	1.75	1.24	40.4%
8 Atlanta, GA	13.0%	0.38	0.94	1.38	41.9%
9 Dallas, TX	18.0%	0.43	0.79	1.17	31.7%
10 Chicago, IL	17.8%	0.25	0.93	0.99	36.4%
11 Detroit, MI	8.5%	0.34	0.80	0.71	29.6%

**Figure 11: Mosaic Index (% Pop), 2006**



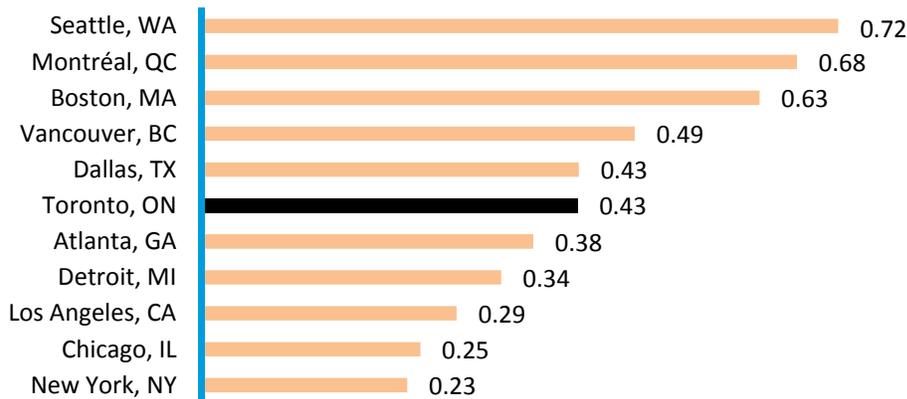
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey, (2006).

**Figure 12: Bohemian Index, 2006**



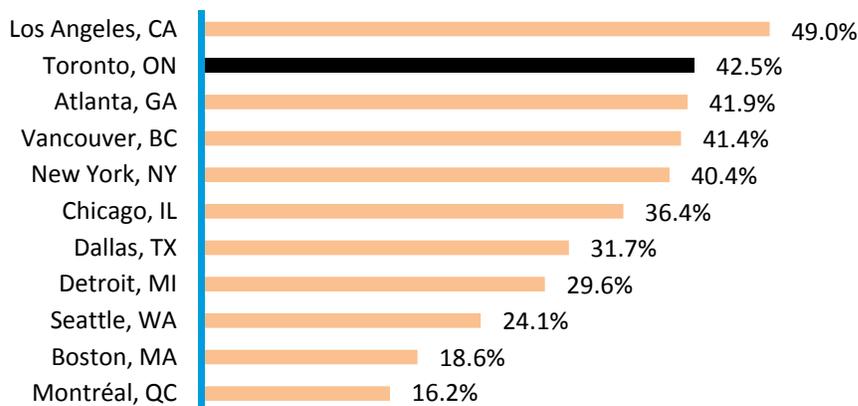
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-559-XCB2006011 and 97-F0012-XCB-01049. US, County Business Patterns, 2006

**Figure 13: Integration Index, 2006**



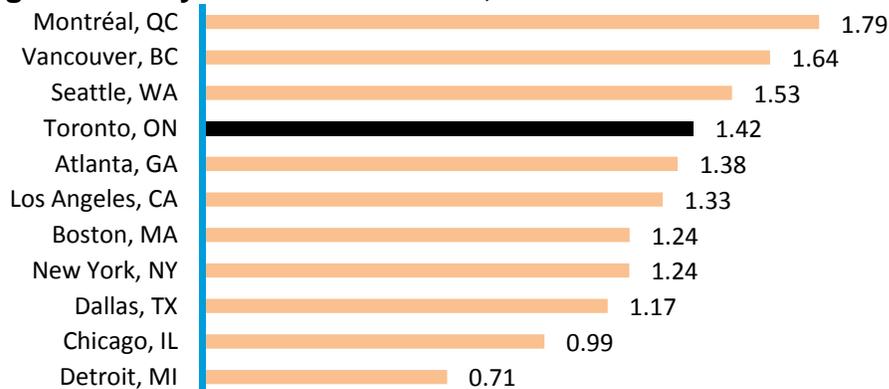
Source: Statistics Canada Catalogue no. 94-581-XCB2006007 and 94-580-XCB2006005. US Census Bureau, American Community Survey. (2006).

**Figure 14: Visible Minorities (% Pop), 2006**



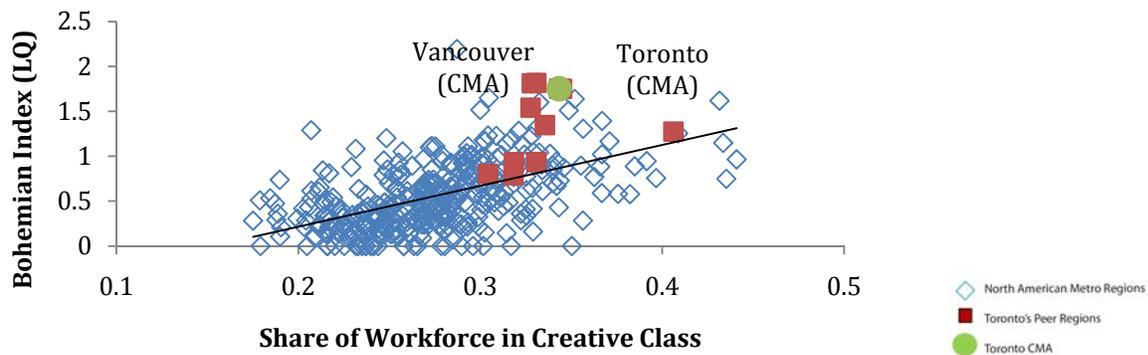
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

**Figure 15: Gay and Lesbian Index, 2006**



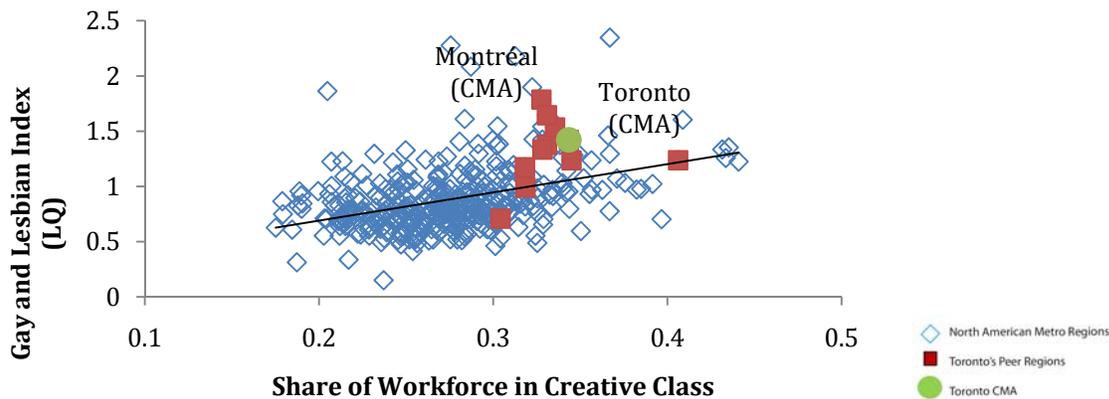
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-553-XWE2006002 and 97-552-XCB2006007. US Census (2006).

**Figure 16: Bohemian Index and the Creative Class**



Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-559-XCB2006011 and 97-F0012-XCB-01049. US, County Business Patterns, 2006. Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006). Note:  $R^2 = 0.2901$

**Figure 17: Gay and Lesbian Index and the Creative Class**



Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-553-XWE2006002 and 97-552-XCB2006007. US Census (2006). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006). Note:  $R^2 = 0.1595$

## Conclusions for Toronto

The Toronto region has certain strong cultural and economic assets that it can leverage to achieve future economic growth according to the Creativity Index, our aggregate measure of the 3Ts. First, the Creativity Index demonstrates just how competitive a group of peers Toronto was benchmarked against. Every peer region included ranks in the top 100, with Seattle and Boston ranking in the top five of all 374 metro regions. Toronto ranks 27<sup>th</sup> in North America and 7<sup>th</sup> amongst its peers - supporting the claim made earlier that Toronto is *not currently* a leader within its group of competitive peers.

**Table 4: Creativity Index**

	Overall Creativity Ranking	Creativity Index	Overall Technology Ranking	Overall Talent Ranking	Overall Tolerance Ranking
1	Seattle, WA	0.88	1	4	1
2	Boston, MA	0.85	5	1	4
3	Vancouver, BC	0.83	3	5	3
4	Montréal, QC	0.82	7	8	1
5	Los Angeles, CA	0.82	2	7	6
6	New York, NY	0.79	10	2	7
<b>7</b>	<b>Toronto, ON</b>	<b>0.79</b>	<b>11</b>	<b>3</b>	<b>5</b>
8	Atlanta, GA	0.78	4	6	8
9	Dallas, TX	0.74	8	10	9
10	Chicago, IL	0.72	9	9	10
11	Detroit, MI	0.67	6	11	11

Improved economic performance is never felt equally amongst all strata of society, but Toronto with its strong social safety net is better positioned than its peers to redistribute prosperity. Based on the 3T analysis there are 3 main findings of note about the Toronto CMA:

### 1. Talent

Nearly 34% of the Toronto CMA is in the Creative Class, and the region as a whole has become better educated. While not a leader on either metric, Toronto ranks 3rd in Talent (See Table 4) amongst its peers. The city is gaining Talented individuals - both from its post secondary system and from foreign jurisdictions. In the past, regions were judged by population growth and the brawn of their economy; today regions are judged by their brains. Toronto's ranking on the BDGI demonstrates that the region will not remain in the middle of its peer group on the Talent Index (% of population 25 years of age or older with at least a BA) for long. The culture in the region has evolved. Families and individuals in the Toronto region are recognizing that investments in human capital are required to maintain or improve on the current standard of living. The future of Toronto depends on the development of these new minds that will be generating the creative ideas of tomorrow. It is incredibly important that these people stay employed within the region.

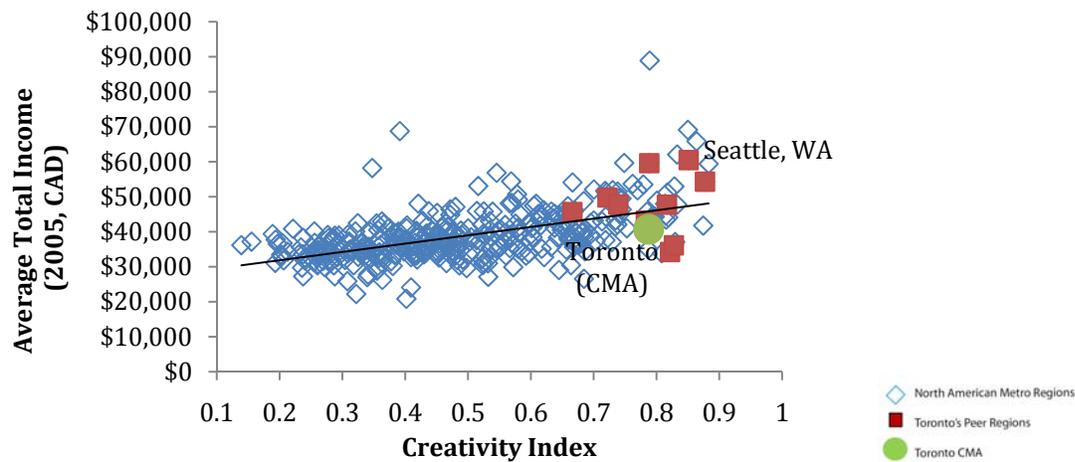
## **2. Technology**

The Toronto region is not as innovative as it could be. There are clearly impediments and systemic issues preventing the talented individuals and firms in the region from commercializing ideas. Toronto has had the worst year over year growth in patents of all the peer regions. On average, patent production has fallen 8.3% per year during the 5 years prior to 2006; when combined with the already low patent production per 10,000 where Toronto ranks 10<sup>th</sup> amongst the peers, there is a serious weakness in the area of technology. These two indicators suggest that institutions in the Toronto CMA must take a long hard look at regions such as Boston and Seattle who appear to have removed some barriers to commercialization. Federal, provincial and municipal governments must work together to provide the proper incentives. The integration and size of the region can be leveraged to influence the political establishment required to enact the changes that are needed.

## **3. Tolerance**

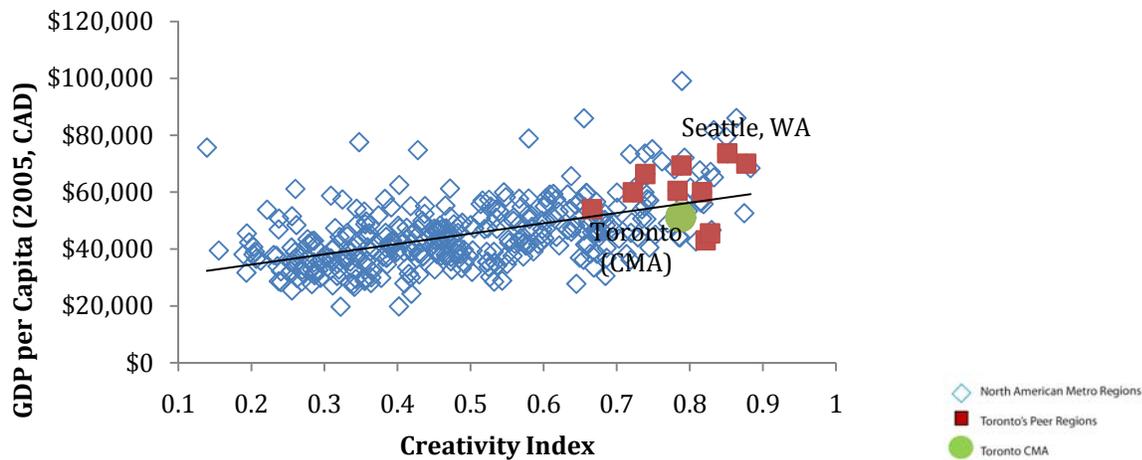
Finally, Toronto is the most diverse city amongst its peer regions. Ranking 5<sup>th</sup> on the Composite Tolerance Index may suggest otherwise, but the individual components speak for themselves. The Toronto CMA is a place where 42% of the population is a visible minority and 46% of the population was born in a country other than Canada. These numbers give Toronto a competitive advantage that it must learn to harness more effectively. The globalization of the economy and the movement of creative capital is an ongoing trend. Regions such as Toronto that have a long history of openness and diversity are a more attractive destination for individuals abroad looking to maximize their individual welfare.

**Figure 1811: Average Total Income and the Creativity Index**



Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006). Note:  $R^2 = 0.3129$

**Figure 1912: GDP per Capita and the Creativity Index**



Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-553-XWE2006002 and 97-552-XCB2006007. US Census (2006). Note:  $R^2 = 0.298$

Toronto in the creative age must continue to build on its strengths- its multiculturalism and talented workforce- while it becomes more innovative. The stronger the Toronto CMA can perform on each of the 3Ts, the more creative it will be. Increased levels of creativity as measured by the Creativity Index tend to increase both average total income and the GDP per capita of the region. All of this has the effect of creating a virtuous circle that will draw capital from around the world to its most productive means. Figure's 18 and 19 show broad indicators of overall regional performance against the Creativity Index.

## Appendix A: Metric Definitions for Ontario Project Benchmarking

Summary Statistics	
Population	Population Counts from ACS and Statistics Canada, 2006
Median Age	Median Age from ACS and Statistics Canada, 2006
Overall Cost of Living Index	Composite measure that uses CPI data from both the US and Canada.

Overall Statistics	
Population Growth (2000-2005)	$(Population(2005) - Population(2000)) / Population(2000)$
Job Growth (2000-2005)	$(Labor\ Force, Total\ Employment(2005) - Labor\ Force, Total\ Employment(2000)) / Labor\ Force, Total\ Employment(2000)$
GDP per Capita, 2006	GDP/Population, PPP adjusted. Canadian GDP numbers are calculated based on the relationship between the Bureau of Economic Analysis regional GDP numbers and average total income.
Change in Average Wage (2000-2005)	$(Average\ Wage(2005) - Average\ Wage(2000)) / Average\ Wage(2000)$
Creativity Index	State and Province: Technology (North American Tech Pole, Patent Growth (00-05) and Total Patents, Tolerance ( Bohemian Index, Integration Index, Gay Index and Mosaic Index), Talent (Creative Class) each account for 1/3 of index

Technology Measures	
Total Patents, 2005	Total number of patents issued to primary inventors in region 2005; US Patent & Trademark Office (USPTO)
Patents per 10,000, 2005	Total patents issued per 10,000 residents 2005; USPTO & U.S. Census
Patent Growth, Short Term (00-05)	Average annual growth in number of patents issued 2000-2005; USPTO
North American High Tech LQ, 2006	A location quotient captures the difference between a specific regions concentration of a characteristic and the average concentration across the entire country or larger regions. The high tech LQ measures the concentration of high technology among employment for a region against the concentration of high technology among employment for the US and Canada combined.
North American Tech Pole Index	Combination of two factors (1) the share of a region's employment that is high-tech and (2) the high tech location quotient (below) for U.S and Canada combined. High Tech includes software, electronics, biomedical products, and engineering

Talent Measures	
Creative Class, 2006	Percentage of the employed population in the region in the Super Creative occupations (see below) or occupations in the following categories: Management, Business/Finance, Law, Healthcare(does not include Healthcare support)
Super Creative Core, 2006	Percentage of the employed population in the region in occupations in the following categories: Computers, Architecture/Engineering, Science, Education, Arts and Design
Pop > 25, Above High School Below BA, 2006	Percentage of the population aged 25 and above in the region that has a high school diploma or equivalent and Percentage of the population aged 25 and above in the region that has a college certificate (associate's degree for U.S.)
Talent Index (Pop >25, BA and Above)	Percentage of the population aged 25 and above with a bachelor's degree or higher
Graduate and/or Professional Degree	Percentage of population aged 25 and above with a graduate and or professional degree
Brain Gain/ Brain Drain Index	Percentage of the population, age 25 and above, with at least a bachelor's degree divided by the percentage of the population age 18 to 34 currently attending university

Tolerance Measures (Inclusiveness)	
Visible Minorities (% Pop)	Percentage of Non-white population
Mosaic Index (% Pop)	Percent of population that is foreign born
Gay and Lesbian Index	Location quotient that is the ratio of same sex unmarried partners to total partners in the region over same sex unmarried partners to total partners for the entire U.S. (from 2000); Census
Bohemian Index	Bohemian Index; Location quotient that measures whether a region has more or fewer professional artistically creative people than the average region 2006; estimated from Census, ACS
Integration Index	$Integration\ Index = 1 - \left( \frac{Total\ Visible\ Minority_{region}}{Total\ Population_{region}} \right) \sum \left  \frac{VGroup_{DA,G}}{VGroup_G} - \frac{VGroup_{DA,H}}{VGroup_H} \right $ <p>Where VGroupDA,G is the population of group G in the dissemination area .                      And where VGroupDA,H is the population of group H in the dissemination area                      Where VGroupG is the total population of group G in the CMA.                      Where VGroupH is the total population in group H in the CMA.                      The integrations index measure the degree to which a cities visible minority population is intermixed with non-visible minorities.</p>

## Appendix B: High-Tech Industries – NAICS

Computer systems design and related services
Architectural, engineering and related services
Other professional, scientific and technical services
Wired telecommunications carriers
Scientific research and development services
Motion picture and video industries
Pharmaceutical and medicine manufacturing
Aerospace product and parts manufacturing
Semiconductor and other electronic component manufacturing
Communications equipment manufacturing
Navigational, measuring, medical and control instruments manufacturing
Wireless telecommunications carriers (except satellite)
Software publishers
Medical equipment and supplies manufacturing
Computer and peripheral equipment manufacturing
Internet service providers, web search portals
Telecommunications resellers

## Appendix C: Research Methods

The process of benchmarking the Province of Ontario and its 15 Census Metropolitan Areas (CMAs) against peer regions in both the United States and Canada was conducted as part of the *Ontario in the Creative Age* project commissioned by the government of Ontario. In order to better understand the competitiveness of Ontario and its CMAs we conducted a quantitative analysis of North America by collecting data from national statistical agencies on over 30 different indicators that have been shown to influence regional economic prosperity. These collections of indicators developed by Florida (2002) are representative of the 3Ts of economic development (Technology, Talent and Tolerance) and are part of his larger Creative Class theory.

In selecting the North American regions for the benchmarking, the main determinate of peers for Ontario's CMAs was population. Population is a highly important variable to control for because each of the following factors is size and density dependent: the division of labour, economies of scope, agglomeration and scale. In total we compared the province to 20 peer states and provinces, selecting sub-national regions with a population of 6 million or more (17 states) and the 3 largest provinces (Quebec, British Columbia and Alberta). For the CMAs which range from Toronto with a population of 5.1 million to Peterborough with just under 120,000 people, we subdivided the 15 regions into five class categories (Population >2 million, 1-2 million, 0.5-1 million, 250,000-500,000 and 100,000-250,000) for which 10 peer regions having a similar population were selected. In total 50 peer regions were selected from the 20 peer states and provinces.

The indicators used to inform this report were based on previous research conducted by Richard Florida (2002) which showed that Technology, Talent, and Tolerance are key elements for the success and continued development of a region. A region needs substantial but balanced performance across ALL of the "Three Ts" to grow and be prosperous.

In order to maintain objectivity, the analysis involved in this benchmarking process was entirely quantitative. This may lead to results that seem odd when discussed out of context or by an individual with specific regional knowledge. For example, our analysis found that Ottawa-Gatineau is incredibly competitive on certain occupation measures which are a result of the large federal government presence in the CMA. When viewing the results it is important to remember that they have not been informed by specific knowledge that is local to the regions.

## Works Cited

Becker, G. S. (1964). "Human Capital: A theoretical and empirical analysis with special reference to education". New York, National Bureau of Economic Research.

E. L. Glaeser and D. C. Mare, "Cities and skills," *Journal of Labor Economics* 19, no. 2 (2001): 316-342.

Florida, R. (2002). *Rise of the Creative Class*. New York: Basic Books.

Friedmann, J. and Wolff, G. (1982) World city formation: an agenda for research and action, *International Journal of Urban and Regional Research*, 6, pp. 309–344.

Hulchanski, J. D. (2007). *3 Cities within Toronto: Income polarization among Toronto's neighbourhoods, 1970–2000*. Toronto: Centre for Urban and Community Studies: University of Toronto.

Institute for Competitiveness and Prosperity. (2004). *Re-inventing innovation and commercialization policy in Ontario*. Toronto: Institute for Competitiveness and Prosperity.

Knox, P.L. (1995) World cities and the organization of global space, in R.J. Johnston, P.J. Taylor

Martin Prosperity Institute. (2009). *Ontario Competes: Performance overview using the 3Ts of economic development*. Toronto: Martin Prosperity Institute.

Mincer, J. "Investment in Human Capital and Personal Income Distribution," *The Journal of Political Economy* 66, no. 4 (August 1958): 281-302.

M.J. Watts (Eds) *Geographies of Global Change: Remapping the World in the Late Twentieth Century*, pp. 232–247. Oxford: Blackwell.

Romer, P. M., (1990), "Endogenous Technological Change", *Journal of Political Economy*, 98/5: S71-102

Sassen, S. (1991). *The Global City: New York, London, Tokyo*. Princeton: Princeton University Press.

Scott, A. (2001, April). Globalization and the Rise of City Regions. *European Planning Studies*, pp. 813-826.

Solow, Robert M. (1956), "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics*, 70:65-94.

## Research Team

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## Benchmarking Project

This paper is part of the *Ontario in the Creative Age* series, a project we are conducting for the Ontario Government. The project was first announced in the 2008 Ontario Budget Speech, and its purpose is to understand the changing composition of Ontario's economy and workforce, examine historical changes and projected future trends affecting Ontario, and provide recommendations to the Province for ensuring that Ontario's economy and people remain globally competitive and prosperous.

The purpose of the benchmarking papers in this series was to gather and analyze data on Ontario's CMAs and assess how well they compete with similar jurisdictions across North America our 3Ts of Economic Development. The assessments are intended to inform a constructive discussion on what factors contribute to regional economic development. They are not intended to be all encompassing.

## Disclaimer

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Any omissions or errors remain the sole responsibility of the research team. Any comments or questions regarding the content of this report may be directed to [info@martinprosperity.org](mailto:info@martinprosperity.org).