

MARTIN  
**Prosperity***Institute*

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

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

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## Introduction

It is no secret that Hamilton, once a major industrial centre was dependent upon the processing of natural resources using physical labour to create value, where autonomy was replaced by bureaucracy and control, needs to diversify its industry base. This now outdated mode of production which made the Hamilton region the leading centre of heavy industry in Canada is showing its age; like Pittsburgh, Scranton, Cleveland, Detroit, Windsor and Oshawa it is seen to be in decline. These regions and others in the Midwest are part of the continued deindustrialization that started in the post-war era. As of 1998 the Hamilton region accounted for half of all steel production in Canada or \$5.5 billion in annual sales. The region has the ability to produce 6.6 billion tons of steel per year of which two thirds was consumed by the Greater Golden Horseshoe of Southern Ontario and Pittsburgh, Detroit and Cleveland all within 500 Km<sup>2</sup>.

It is difficult to see beyond the steely exterior of the Hamilton Census Metropolitan Area (CMA) and view it as a complete community that supports a wide range of social, arts and culture functions. With a population of 690,000 Hamilton is part of the densest corridor of people and economic activity in Canada. Made up of the municipalities of Hamilton, Burlington and Grimsby the CMA is the 81<sup>st</sup> largest metro region in North America out of 374 regions with a population of at least 100,000. It is also the 9<sup>th</sup> largest regional economy in Canada with a GDP per capita of approximately \$48,000 (2006, CAD). From 2001 to 2006 the population of Hamilton expanded by 4.6% placing it among the slowest growing regions with a population between 500,000 and 1 million<sup>1</sup>.

Given the challenges that Hamilton faces as it transitions from an industrial centre based on mass production into the knowledge based creative economy, the region does surprisingly better on the 3Ts of economic development than was anticipated. It should be noted that none of the data used in this report incorporates the closure of Stelco or the current economic events over the last few years. While benchmarking

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<sup>1</sup> 50 regions in North America have a population between 500,000 and 1 million

Hamilton 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 to promote economic growth. The 3Ts of economic development, Technology, Talent and Tolerance provide a means to assess the performance of Hamilton relative to other jurisdictions. The jurisdictions chosen as Hamilton's peer regions were selected based upon their population size (500,000-1 million), geographic location, and interest (importance to the North American economic system). Hamilton's peer regions are Akron, OH, Bakersfield, CA, Grand Rapids, MI, Knoxville, TN, El Paso, TX, Quebec City, QC, Sarasota, FL, Scranton, PA, Springfield, MA and Syracuse, NY.

Regions in this size range face greater challenges in the creative age as economic activity is becoming more concentrated in larger centers. The peer regions located in the North-East and Mid-West of Canada and the United States all developed on the basis of a few highly specialized industries in which they had a competitive advantage. Often the transition is difficult as labour is unable to acquire the skills necessary in the economic structure and as a result many people are left behind when traditional occupations disappear. Scranton, for example, was once a major coal producer but as the steel industry declined in Pittsburgh and Allentown demand fell. Scranton performs the worst on the 3Ts among Hamilton's peer regions.

### **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 examples 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

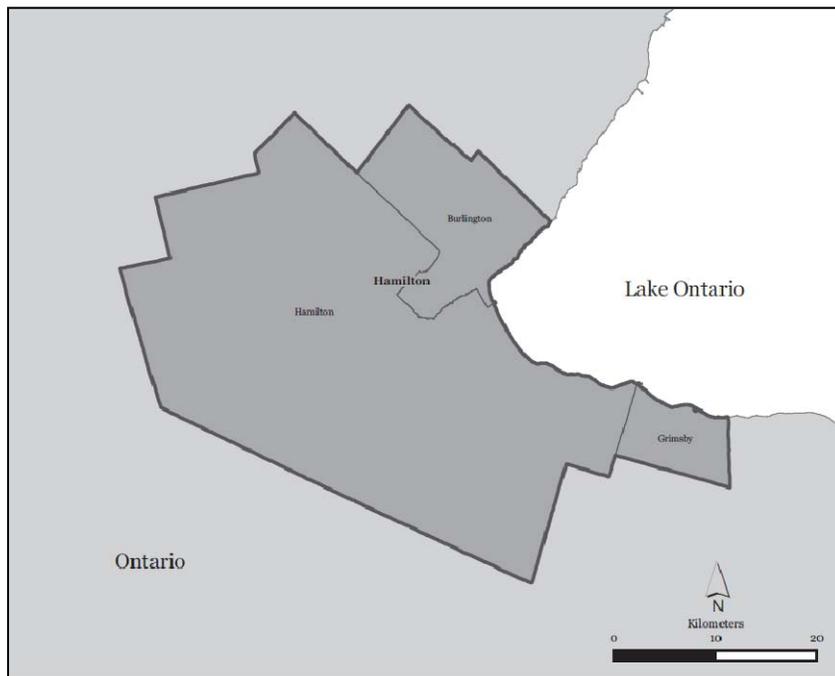
differs from human capital by identifying the Creative Class as key to economic growth and its focus on the underlying factors that determine their location decisions (Florida, 2002). In the creative economy, brawn and the ability to mass produce goods is subordinate to the innate human capability to 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 who 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 continue 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>2</sup>

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<sup>2</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)

**Figure 1: Hamilton CMA**



Source: MPI. Statistics Canada, 2006

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

The following is an examination of how the Hamilton CMA is positioned relative to its peers to compete in the creative age. The 3Ts are used to gauge how Hamilton's Talent, Technology and Tolerance assets are measuring up to their peer regions. Combined the 3T indicator variables form the Creativity Index, a measure of how Hamilton is performing overall. The paper will begin with a look at Hamilton's occupational composition, specifically its creative class. It will then look at how the Hamilton CMA performs on Technology, Talent and Tolerance. The conclusion will discuss an aggregate of the 3Ts, the Creativity Index.

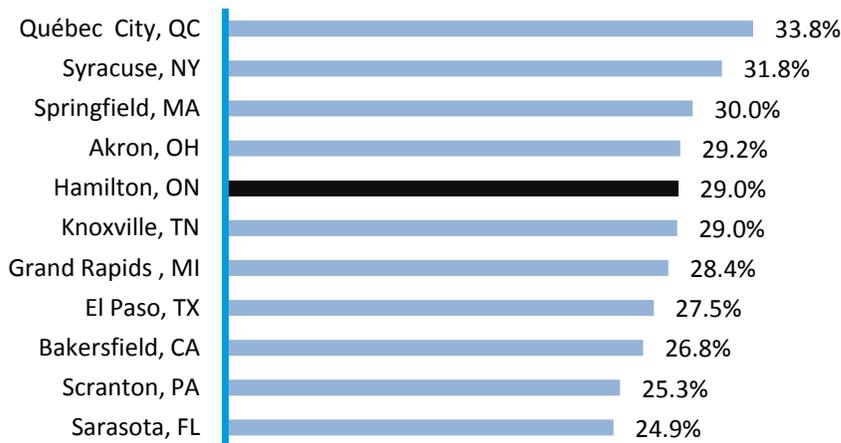
### **Hamilton's Creative Class**

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 of \$64,100 compared to an average of \$42,600 for all occupations.

As a group the Creative Class is 29% of Hamilton’s labour force or approximately 100,000 people. This is the 5<sup>th</sup> highest share among the peer regions trailing Quebec City (33.8%), Syracuse (31.8%), Springfield (30%) and Akron (29.2%). Of the peers Sarasota ranks the lowest with 24.9% of its workforce in the Creative Class. Against all the North American metro regions Hamilton ranks 134<sup>th</sup> out of 374. Past research by Florida (2002) has revealed 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 a goal of 50% of the workforce in the Creative Class by 2030. For the Hamilton CMA this will require growth in all TAPE occupations.

**Figure 2: Hamilton Creative Class**



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 Hamilton, Seattle and Los Angeles all too varying degrees have

highly sophisticated technology sectors and consumers. Determining success in the creative age is not the difference between have and have not. Rather, the dichotomy that matters between highly competitive regions such as Hamilton and its peers is that of leader and follower. First movers that introduce innovations and 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 separate measures equally weighted 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, 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 Patterns 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 Hamilton and its peer regions according to the composite technology index. Figures 3-5 ranks Hamilton against its peers on the North American Tech-Pole Index, Patents per 10,000 and Patent Growth. Figures 6 and 7 show the relationship between the two technology indicators and the Creative Class.

### **Results:**

- The North American Tech-Pole is the only variable in the 3T analysis of Hamilton that directly favours larger regions. The peer group as a whole does not compare well to larger regions such as Los Angeles or San Jose because these regions and others both have a larger concentration and share of North American employment than the Hamilton peer regions. Among its peer regions, Hamilton ranks 3<sup>rd</sup> on the North American Tech-Pole Index. The peer regions range from Quebec City (0.28) to Springfield (0.03) showing that there is quite a difference between these regions in the levels of high-tech industry employment that they support. With a North American Tech-Pole Index

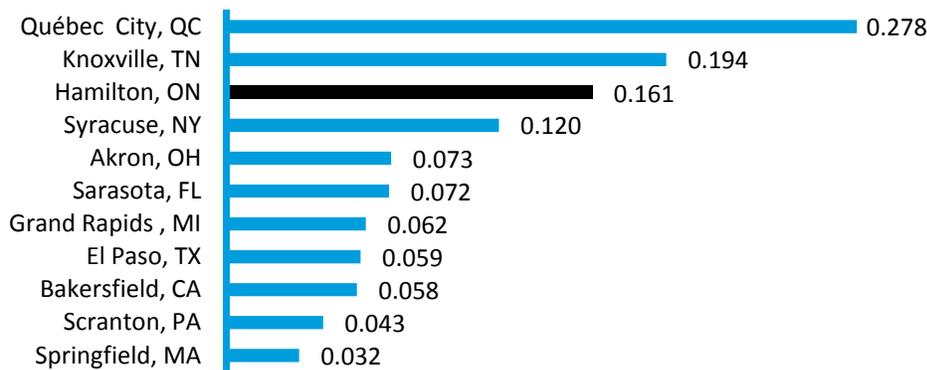
number of 0.16 Hamilton's cluster of high-tech industries is ahead of Syracuse (0.12) and Grand Rapids (0.06).

- On measures of innovation the Hamilton region ranks 8<sup>th</sup>, 9<sup>th</sup> and 11<sup>th</sup> respectively in Total Patents, Patents per 10,000 and Patent Growth. 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 among the peers is Springfield, MA with 1.33 patents per 10,000. Hamilton generated only 0.84 patents per 10,000. This is below what is expected based on the correlation between Patents per 10,000 and the Creative Class. That correlation suggests that Hamilton a region with a Creative Class share of 29% should be producing approximately 2.33 patents per 10,000 – a material variance.
- In the 5 years from 2000-2005 Hamilton has seen an average yearly decline in patent output of 8.1%. El Paso had an average patent Growth of 8% over the same the period. The patent growth numbers tend to be greater for regions with fewer total patents.

**Table 1: Overall Technology Ranking**

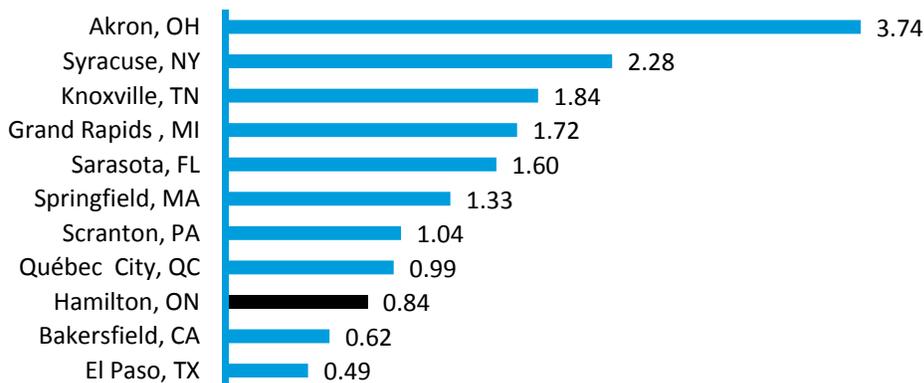
Overall Technology Ranking	North American Tech-Pole	Patent Count (2006)	Patents per 10,000	Patent Growth
1 Québec City(CMA)	0.28	71	0.99	5.4%
2 Sarasota, FL	0.07	109	1.60	2.7%
3 El Paso, TX	0.06	36	0.49	8.0%
4 Akron, OH	0.07	262	3.74	-2.6%
5 Syracuse, NY	0.12	148	2.28	-3.3%
6 Knoxville, TN	0.19	123	1.84	-6.0%
7 Springfield, MA	0.03	91	1.33	-0.3%
8 Grand Rapids, MI	0.06	133	1.72	-4.4%
<b>9 Hamilton (CMA)</b>	<b>0.16 (3rd)</b>	<b>58 (8th)</b>	<b>0.84 (9th)</b>	<b>-8.1% (11th)</b>
10 Bakersfield, CA	0.06	48	0.62	-6.4%
11 Scranton, PA	0.04	57	1.04	-6.9%

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



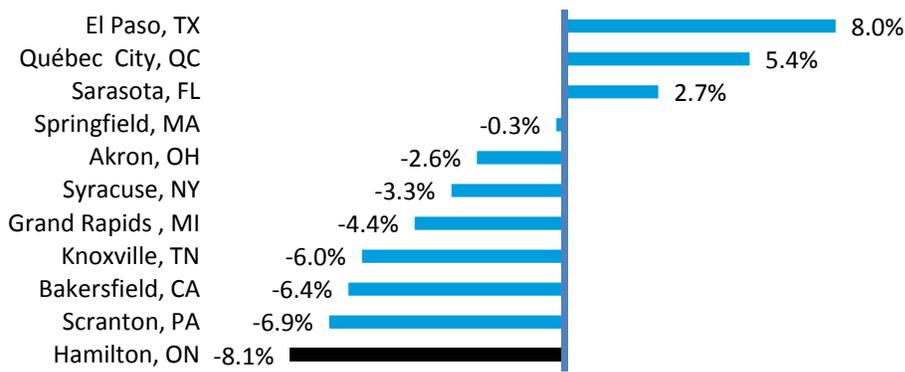
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-559-XCB2006009. County Business Patterns, 2006

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



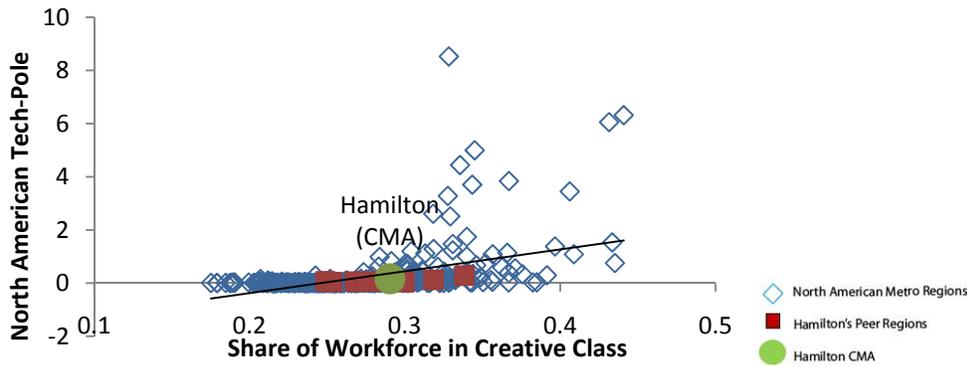
Source: MPI and Dieter Franz Kogler Analysis. USPTO (1975-07).

**Figure 5: Patent Growth, (2000-2005)**



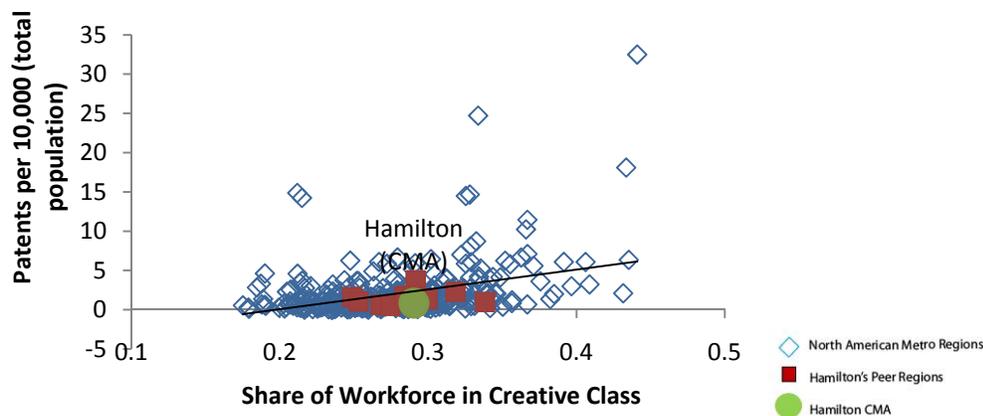
Source: MPI and Dieter Franz Kogler Analysis. USPTO (1975-07).

**Figure 6: North American Tech-Pole 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. 97-559-XCB2006009. County Business Patterns, 2006  
 • $R^2 = 0.2041$

**Figure 7: Patent 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  
 • $R^2 = 0.1474$

## 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.

Hamilton ranks 5<sup>th</sup> overall on Talent among its peer regions which is based on the share of the workforce in the Creative Class. A more traditional measure of human capital such as the Talent Index is not included in the overall ranking because of its high correlation with the Creative Class. Table 2 shows how Hamilton performs on the various indicators of Talent relative to its peer regions. Figure 8 and 9 visualizes the information showing how Hamilton scores on each measure. Figures 10 crosses the Talent Index the Creative Class to show the relationship between these indicators.

### Results:

- The three top performers among Hamilton’s peers on the Talent Index are Springfield (29.1%), Syracuse (27.7%) and Knoxville (27.4%). Hamilton trails Springfield by almost 10% ranking 9<sup>th</sup> among the peer regions with a Talent Index of 19.3%. At 19.3% Hamilton is below the Ontario average of 22.7% and the peer average of 23.4%
- The Hamilton CMA in 2006 ranked 3<sup>rd</sup> on the Brain Drain/Gain Index among its peer regions. The region’s retention is modest with a score only slightly greater than 1. For a region with below average talent numbers it would be a good sign to

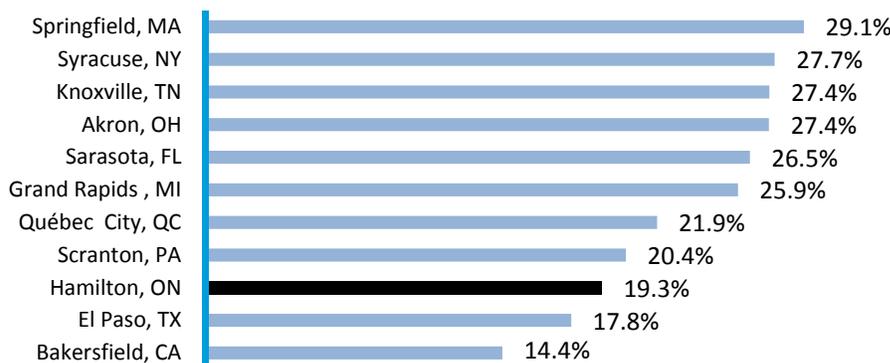
see stronger Brain Gain numbers as this would indicate that Hamilton was increasing its human capital relative to its peer regions. Rather, it appears that the talent numbers for Hamilton are remaining constant as the region is failing to attract and retain people with a BA or above.

- Using the data for all North American metro regions there is a positive correlation between the Creative Class and the Talent Index. Hamilton falls slightly below the trend line. Using the relationship between Creative Class and the Talent Index, Hamilton should have an estimated Talent Index of 31.1%.

**Table 2: Overall Talent Ranking**

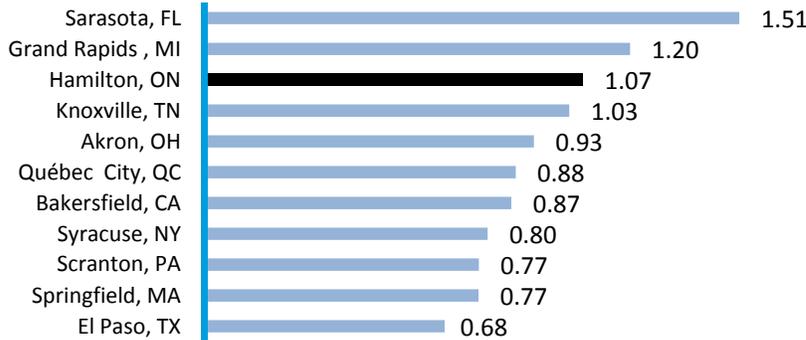
Overall Talent Ranking	Creative Class	Bachelor's Degree's	Graduate Degrees	Talent Index	Brain Drain/Brain Gain
1 Québec (CMA)	33.8%	13.8%	8.4%	21.9%	0.88
2 Syracuse, NY	31.8%	16.0%	11.7%	27.7%	0.80
3 Springfield, MA	30.0%	17.1%	12.0%	29.1%	0.77
4 Akron, OH	29.2%	18.2%	9.2%	27.4%	0.93
<b>5 Hamilton (CMA)</b>	<b>29.0% (5th)</b>	<b>12% (9th)</b>	<b>7.5% (8th)</b>	<b>19.3% (9th)</b>	<b>1.07 (3rd)</b>
6 Knoxville, TN	29.0%	17.4%	10.0%	27.4%	1.03
7 Grand Rapids, MI	28.4%	16.9%	8.9%	25.9%	1.20
8 El Paso, TX	27.5%	11.9%	5.9%	17.8%	0.68
9 Bakersfield, CA	26.8%	9.7%	4.7%	14.4%	0.87
10 Scranton, PA	25.3%	13.0%	7.4%	20.4%	0.77
11 Sarasota, FL	24.9%	16.4%	10.0%	26.5%	1.51

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



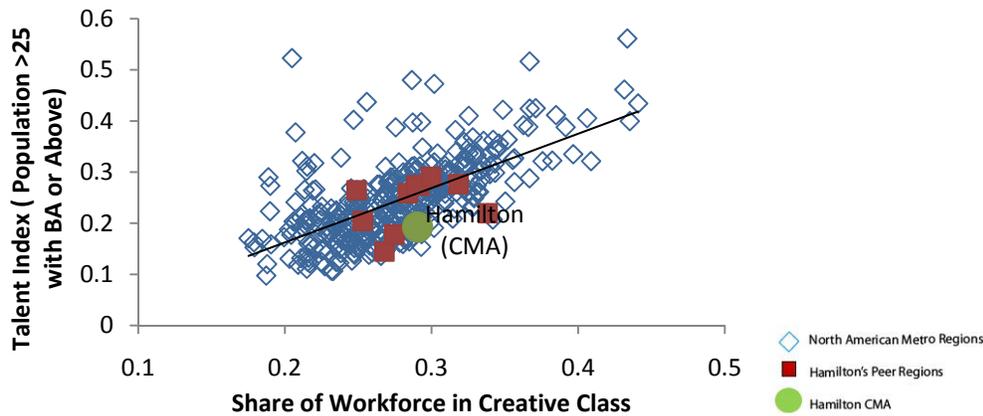
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

**Figure 9: Brain Drain/ Brain 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 Indicators 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).  $R^2 = 0.4162$

## Tolerance: Openness and Diversity

Tolerance is often overlooked in the study of economic development. As the 3<sup>rd</sup> T, Tolerance is necessary for regions to act as magnets of creative capital. The collection of Tolerance indicators is not meant to suggest that regions with high levels of gay and lesbians, bohemians, or immigrants cause economic growth. Rather, these indicators go deeper to 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. When regions are open to new ideas and tolerant of different views, it acts as a signal to others that the creative ecosystem of the region is a place

where people can be successful. 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.

Hamilton ranks 2<sup>nd</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 in the overall ranking. The Visible Minority index is not included in the overall ranking but is shown in Table 3 deconstructing how Hamilton and the peer regions rank on each of the indicators. Figure 12-16 show how Hamilton ranks on each of the variables individually. Figures 17-20 show how the various indicators correlate with the Creative Class.

### **Results:**

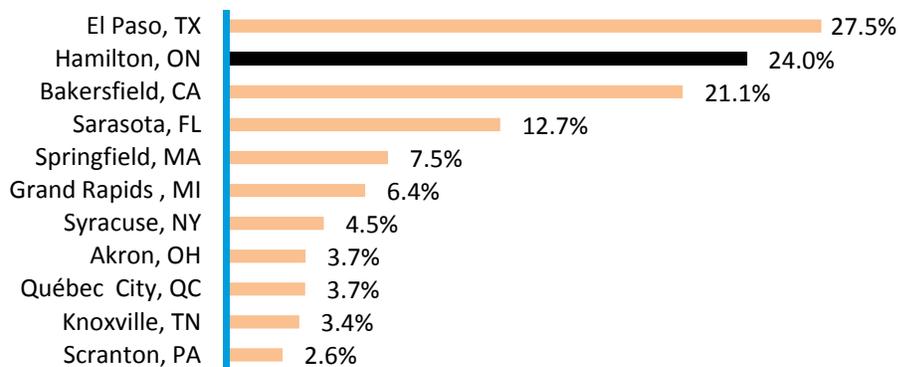
- The Hamilton regions is heavily influenced by a strong immigrant culture with almost one quarter of the population being foreign born according to the Mosaic Index. In the peer group there appears a clear division between the regions, with Hamilton, El Paso and Bakersfield all above 20% and the rest having a foreign born population between 13% and 3%. From 2001 to 2006 the foreign born population increased by 8% accounting for 31% of the total growth in population of Hamilton over that time period.
- On the two indicators that best describe openness, the Gay and Lesbian Index and the Bohemian Index, Hamilton does very well ranking 5<sup>th</sup> on the former and 2<sup>nd</sup> on the latter.

- Québec City, the number one region among the peers, does very well on 3 of the 5 indicators of Tolerance – the Integration Index, Bohemian Index and Gay and Lesbian Index.

**Table 3: Overall Tolerance Ranking**

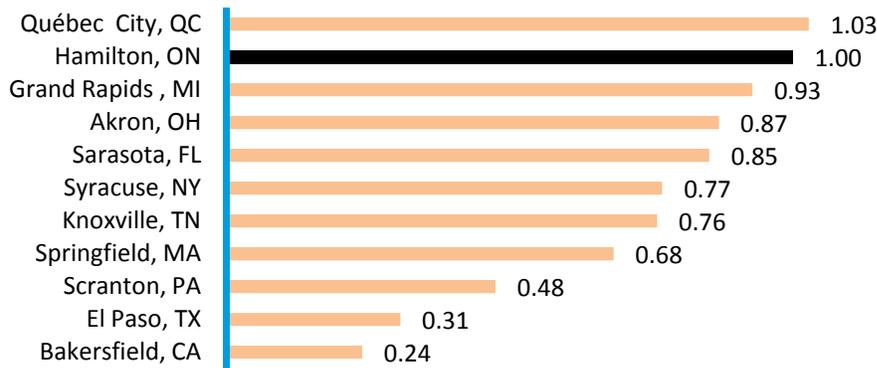
Overall Tolerance Ranking	Mosaic Index	Integration Index	Bohemian Index	Gay and Lesbian Index	Visible Minorities
1 Québec City (CMA)	3.7%	0.91	1.03	1.38	2.3%
<b>2 Hamilton (CMA)</b>	<b>24.0% (2nd)</b>	<b>0.77 (4th)</b>	<b>1.00 (2nd)</b>	<b>0.88 (5th)</b>	<b>12.2% (8th)</b>
3 Sarasota, FL	12.7%	0.73	0.85	1.04	12.3%
4 Springfield, MA	7.5%	0.60	0.68	1.42	16.6%
5 Knoxville, TN	3.4%	0.82	0.76	0.85	10.0%
6 Grand Rapids, MI	6.4%	0.68	0.93	0.76	15.3%
7 El Paso, TX	27.5%	0.64	0.31	0.83	24.4%
8 Syracuse, NY	4.5%	0.74	0.77	0.82	12.7%
9 Bakersfield, CA	21.1%	0.42	0.24	0.97	41.0%
10 Akron, OH	3.7%	0.70	0.87	0.74	15.5%
11 Scranton, PA	2.6%	0.92	0.48	0.67	4.9%

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



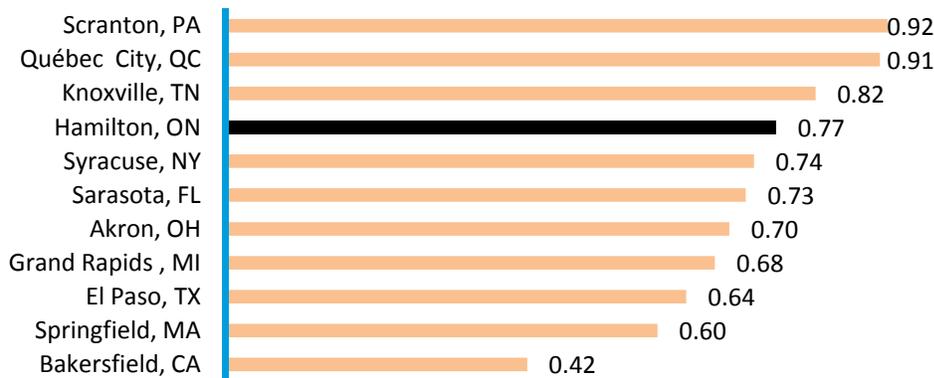
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

**Figure 12: Bohemian Index, 2006**



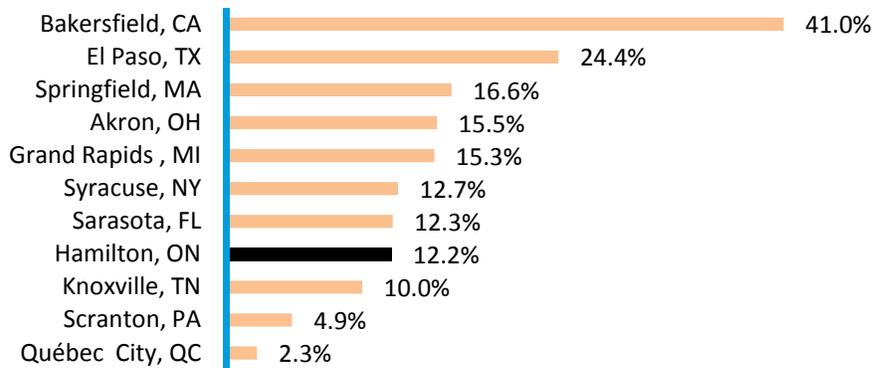
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-559-XCB2006011 and 97-F0012-XCB-01049. US, County Business Patterns, 2006

**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**



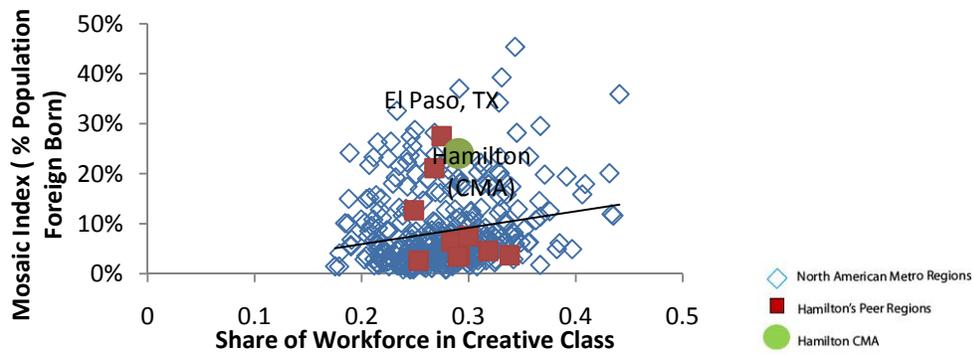
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

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



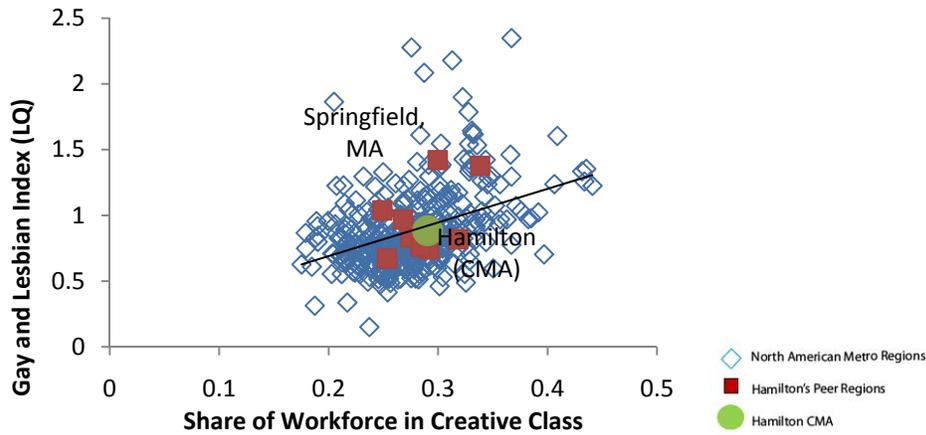
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-553-XWE2006002 and 97-552-XCB2006007. US Census (2006).

**Figure 16: Mosaic 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).  
 • $R^2 = 0.0407$

**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).  
 •R<sup>2</sup>= 0.1595

## Conclusions for Hamilton

Overall Hamilton ranks 4<sup>th</sup> among its peer group on the Creativity Index and 97 out of 374 metro regions in North America. This ranking can be understood by summarizing the key finds for Hamilton on the 3Ts of economic development by using our Creativity Index. In combining the 3Ts together we see that Hamilton ranks 4<sup>th</sup> among its peer group overall but significantly behind Québec City.

**Table 4: Creativity Index**

	Overall Creativity Ranking	Creativity Index	Overall Technology Ranking	Overall Talent Ranking	Overall Tolerance Ranking
1	Québec City (CMA)	0.81	1	1	1
2	Syracuse, NY	0.67	5	2	8
3	Springfield, MA	0.65	7	3	4
4	<b>Hamilton (CMA)</b>	<b>0.64</b>	<b>9</b>	<b>5</b>	<b>2</b>
5	Knoxville, TN	0.60	6	6	5
6	Akron, OH	0.60	4	4	10
7	Grand Rapids, MI	0.58	8	7	6
8	Sarasota, FL	0.57	2	11	3
9	El Paso, TX	0.57	3	8	7
10	Bakersfield, CA	0.47	10	9	9
11	Scranton, PA	0.42	11	10	11

## 1. Technology

Hamilton ranks 9<sup>th</sup> overall among its peers on Technology. Its economy is based on older forms of production and does not rely as heavily on high-tech industries and innovation. On the North American Tech-Pole Hamilton ranks 3<sup>rd</sup> among its peers, but relative to larger regions its rank is insignificant. Adding to this is the decreasing rate of patent production in a region already near the bottom of its peer group. The Hamilton CMA's performance on the innovation indicators pulls down its overall Technology rankings as Patent Growth and Total Patent Count determine two thirds of the ranking. Levels of innovation are closely linked with human capital levels and the Creative Class.

## 2. Talent

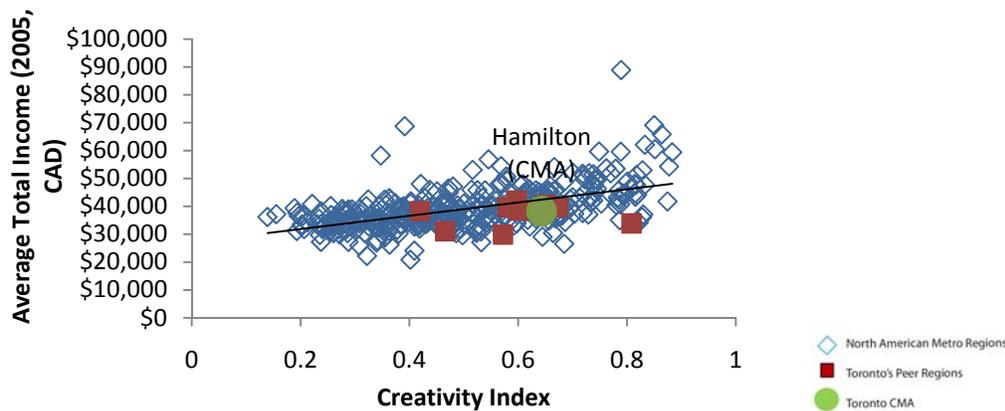
As shown in the Talent section, Hamilton ranks 5<sup>th</sup> among its peer group. The CMA has 29% of its workforce in the Creative Class but only 19% of the population greater than 25 has a BA or above. Creativity is an inherent quality that each and every individual in Hamilton, and Ontario, possesses to some degree. It can lead to new innovation and the creation of new firms. Without education and the knowledge that comes with that experience it is more difficult to compete in a global economy. When regions such as Boston or Springfield have an educated workforce it signals to firms that there is: a) a supply of quality labour and; b) that the region has other qualities that caused the conglomeration of talent in the first place. Populations receiving a BA or a higher degree provide positive signals that can influence the decisions of firms looking to relocate. The Hamilton regions' focus should be on attracting and retaining more talent if it is going to compete with regions in its peer group. McMaster University plays an important part in building the type of ecosystem that will make Hamilton able to attract and retain talented individuals.

## 3. Tolerance

Finally, Hamilton's performance on the Tolerance indicators (2<sup>nd</sup>) is a positive sign for the region. Regions that are diverse are better able to attract creative capital. Hamilton's proximity to Toronto and other centers can be attractive to individuals moving into the area. With 24% of the population as foreign born it signals to others that relocation to Hamilton can be successful. However, if a region is not offering jobs

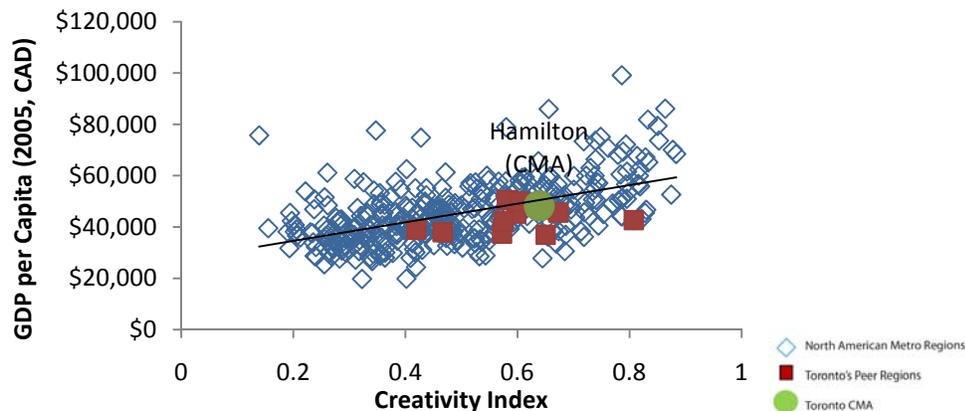
and economic opportunity they will move on. Hamilton's Gay and Lesbian Index and Bohemian Index scores indicate that the region could perform better when it comes to creating a culture that is open to different life styles and ways of life.

**Figure 18: Average Total Income and the Creativity Index**



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

**Figure 19: 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).  
 •  $R^2 = 0.298$

Recognizing that it is not alone in this transformation Hamilton needs to utilize the fact that it is part of a much larger region that extends from Toronto all the way to Buffalo, Detroit and Pittsburgh. All these regions are facing similar problems and have a long history of mutual cooperation as they were all part of the same industrial

production system. Hamilton can leverage the ties that it built with these regions over the last 100 years to increase the speed of its economic transformation. Located at the centre of this region Hamilton is uniquely connected to North American markets by rail, road, and water via the Great Lakes. In the age of mass production Hamilton was able to use its geographic location to its advantage. Today geography plays an important role in the flow of knowledge and ideas. Regions able to be hubs rather than spokes instantly become important to the economic success of the larger region.

The region must work hard to pull creative capital into the area so that it can generate innovation and new firms to replace the industries that have been disappearing. It can no longer rely on the mass production of steel and manufactured goods. The integrated system of production that relied on the automobile is struggling for survival. Higher levels of creativity as shown in Figure 21 and 22 are highly correlated with higher regional average total income and GDP per capita. Hamilton in the creative age must continue to build on its strengths, its multicultural and talented workforce while becoming more effective at creating and commercializing its innovations. The stronger the Hamilton CMA can perform on each of the 3Ts, the more creative it will be.

## 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)	$(\text{Population}(2005) - \text{Population}(2000)) / \text{Population}(2000)$
Job Growth (2000-2005)	$(\text{Labor Force, Total Employment}(2005) - \text{Labor Force, Total Employment}(2000)) / \text{Labor Force, Total Employment}(2000)$
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)	$(\text{Average Wage}(2005) - \text{Average Wage}(2000)) / \text{Average Wage}(2000)$
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	$\text{Integration Index} = 1 - \left( \frac{\text{Total Visible Minority}_{region}}{\text{Total Population}_{region}} \right) \sum \left  \frac{V_{GroupDA,G}}{V_{GroupG}} - \frac{V_{GroupDA,H}}{V_{GroupH}} \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.

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## Research Team

This work was jointly supervised by Dr. Kevin Stolarick, Research Director and David Smith, Project Leader. They would like to acknowledge the tremendous efforts of researchers Ronnie Sanders and Michael Wolfe for their countless hours dedicated to gathering, analyzing and processing the wide range of data used during this benchmarking project. They would also like to acknowledge the early contributions from researchers Scott Pennington and Yousuf Haque.

## 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).