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Ottawa's performance on the 3Ts of Economic Development

Benchmarking Project: Ontario Competes

Ontario in the Creative Age

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Contents

Tables and Figures

Introduction

Ottawa may not be one of Canada's oldest cities, but its rich history and economic and political importance to the country should not be understated. What began as a lumber town is now Canada's capital city and high-tech centre (often referred to as Silicon Valley North). Ottawa began as modest Bytown, but recast in 1857 by Queen Victoria to be the capital of Canada. For years planning efforts in the city were aimed at improving the quality of place in order to transform it from a rough lumber town to something suitable for a nation's capital. As is often the case with city planning, there were unintended outcomes from this transformation, and Ottawa over the years began to attract creative workers, eventually becoming a highly concentrated technology centre. This was because Ottawa developed into the type of city Richard Florida describes as 'creative', (2002) with amenities and a 'quality of life' that entices talented workers to the region.

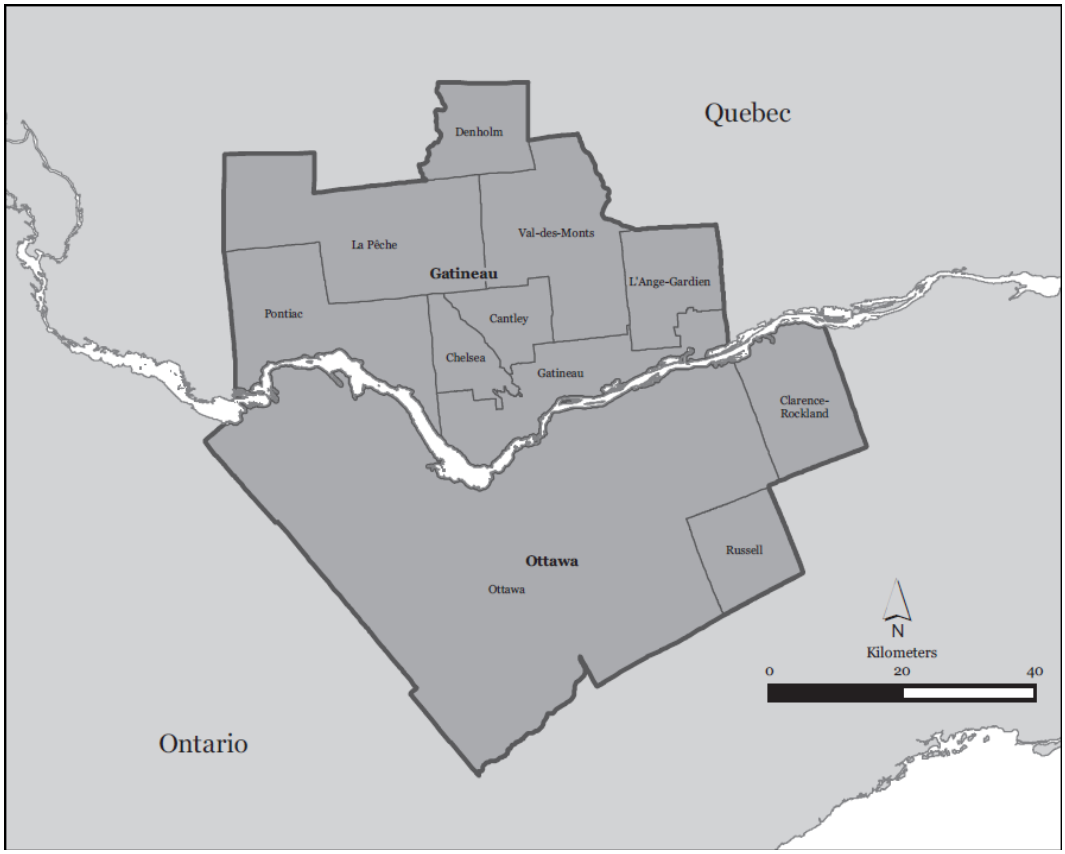
Ottawa benefited immensely when it was chosen to become the nation's capital. Over the years Ottawa has become a hot bed of technology employment, in part because of the National Research Council (NRC) research centers that fund scientific research and employ a large number of scientists in the region. In 2001 there was a provincial directive for reorganization of municipalities which amalgamated 11 local governments into one unit similar to the 'Megacity' amalgamation within Toronto. The city has also recently implemented an impressive growth plan titled "Ottawa 20/20", which covers a number of aspects involved in the city's plans for the future including: the economy, transportation, the environment, infrastructure and green space. All of this culminates in building a growth management strategy for the region, with an expected population increase of 50% by the year 2020. (Gordon and Donald 2007).

The city of Ottawa is part of the larger Ottawa-Gatineau Census Metropolitan Area (CMA), currently home to 1.1 million people. (Figure 1) The region experienced modest growth at a rate of 5.9% between 2001 and 2006. As the capital of Canada, Ottawa-Gatineau is home to the federal government which is responsible for a high percentage of employment in the CMA. The CMA has close to 125,000 people or a third of the federal government's total employment. This number has been steadily

increasing over the years, and the percentage of people federally employed in Ottawa-Gatineau is approaching 20% of the total workforce. Many government jobs are classified as 'creative' occupations in our Creative Class indicator, as they require one to think and produce based on their own skills.

Often, Ottawa-Gatineau's success is criticized as merely being a result of the federal government entrenchment. While true that the federal government does provide a large number of opportunities and advantages to the region, it is not the only contributor to its success. In the long run, Ottawa-Gatineau must be cautious of over reliance on federal government employment to avoid stagnation and decline in competitive industries.

Figure 1: Ottawa CMA



Source: MPI. Statistics Canada, 2006

The quality of life, high concentration of technology occupations, and the advantages of being the nation's capital help make Ottawa a highly competitive region.

We have benchmarked Ottawa against ten other peer regions, chosen on the basis of size, competitiveness and geographic diversity. These regions are: Austin, TX, Birmingham, AL, Buffalo, NY, Calgary, AB, Indianapolis, IN, Jacksonville, Fl, Memphis, TN, Raleigh, NC, Richmond, BC and San Jose, CA. We benchmarked these regions on a number of indicators which fall into three diverse but complementary categories: Technology, Talent and Tolerance, or what we call the 3Ts of economic development.

When benchmarking Ottawa-Gatineau on the 3Ts, normative claims are made based on current economic and social trends as to what assets regions should attempt to maximize if they are to achieve economic growth. The 3Ts of economic development provide a means to assess the performance of Ottawa-Gatineau relative to other jurisdictions and their future socio-economic prosperity.

3Ts Background Information

It is not a coincidence that certain global centers tend to be hot beds 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 centers and cultural/service centers. 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 to 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 come 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).[1]

Ottawa-Gatineau: 3Ts of Economic Development

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

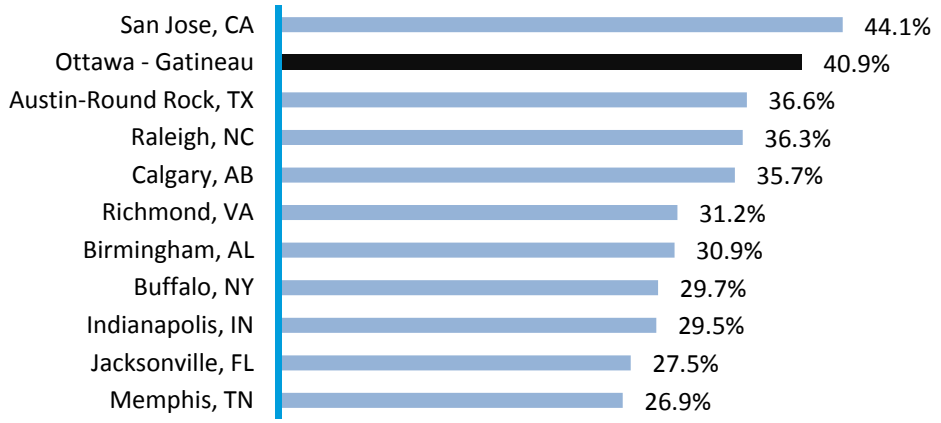
[1] "Ontario Competes" is the first document released as part of the Martin Prosperity Institute's benchmarking analysis for the *Ontario in the Creative Age* project. This document acts as a primer for all subsequent benchmarking releases; therefore, we highly recommend that one read this first. Follow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

Ottawa-Gatineau'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.

The Creative Class makes up 40.9% of Ottawa-Gatineau's labour force. This equates to just below 256,000 workers, from a workforce of approximately 627,000. Among Ottawa-Gatineau's peers only San Jose has a larger share of its workers in the Creative Class at 44.1%. San Jose, home to Silicon Valley, has an extremely high proportion of workers in technology related fields and most of these jobs are considered Creative Class occupations. The fact that Ottawa-Gatineau is only slightly below San Jose is a testament to how competitive it is in this dimension. It should be noted, however, that Ottawa-Gatineau does benefit significantly from the high proportion of federal government jobs in the region. Against all the North American metro regions Ottawa-Gatineau ranks 5th out of 374, an impressive feat which demonstrates how significant a 40.9% Creative Class share is. If we look at the actual number of workers in the Creative Class, Ottawa-Gatineau has the 4th largest Creative Class workforce among its peers only slightly below Indianapolis and Austin. San Jose has around 390,000, whereas Ottawa-Gatineau has only 256,000. 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. While Ottawa-Gatineau is closer than most regions to this goal, recent events may make this an upward battle for the CMA. Certain areas of the technology sector are experiencing adversity as of late, and it will be difficult for Ottawa-Gatineau to increase its Creative Class percentage while its largest technology firm, Nortel, declines. However, the National Research Council (NRC) has many of its research centers located in Ottawa-Gatineau, which should help mitigate the negative effects of recent setbacks in the technology sector.

Figure 2: Ottawa'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. Determining success in the creative age is the dichotomy between highly competitive regions such as Ottawa-Gatineau and its peers in terms 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 sustainable growth and the production of new wealth. This can be seen in Ottawa-Gatineau where most outputs from the technology cluster are export oriented. The minor exception is the firms that rely heavily on government contracts. (Lucas, Sands et al. 2009).

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 two 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). We have counted utility patents, which 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 Ottawa-Gatineau and its peer regions according to the composite technology index. Figures 3-5 rank Ottawa-Gatineau 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 technology indicators and the Creative Class respectively.

Results

- Ottawa-Gatineau performs well on the North American Tech-Pole Index, ranking 4th among its peers. This demonstrates that the Ottawa-Gatineau 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 B for complete list). With the exception of San Jose, Ottawa-Gatineau performs only slightly below the peers above it (Austin and Calgary). Surprisingly Ottawa-Gatineau outperforms Raleigh, whose Tech-Pole is only 0.58, and is on par with Calgary at 1.08.

- Ottawa performs strongly on measures of innovation as well. Ranking 4th on both Patent Count and Patents per 10,000. Typically, Canadian regions do not perform well on patent indicators. 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 Competitivness and Prosperity, 2004). Given this, it is all the more impressive that Ottawa-Gatineau performs well against a competitive set of peer regions. It is likely that the universities, technology cluster, and NRC

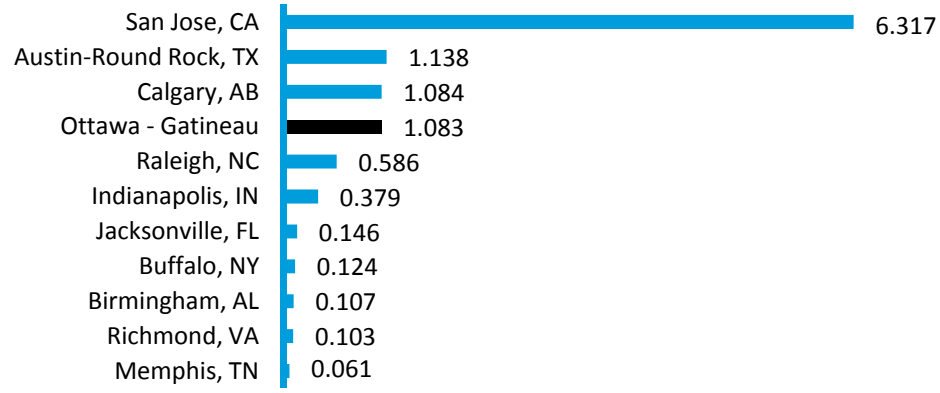
research centers all combine to provide enough innovative research to overcome the barriers that many other Canadian regions suffer from. While Ottawa-Gatineau does well on patent output with 3.23 patents per 10,000 people, this is dwarfed by San Jose's performance of 32.49 patents per 10,000 people. While it is unrealistic to expect Ottawa-Gatineau to ever be as competitive as San Jose, a world renowned high-tech region, it shows the level of success that is possible.

- From 2000-2005 Ottawa-Gatineau has seen an average yearly increase in patent output of 2.2%, placing it 3rd among its peers. The increase is especially impressive given that the majority of peer regions are experiencing a decline in patent output. It is important to remember that the time period used here is relatively short, and may be missing longer term trends.

Table 1: Overall Technology Ranking

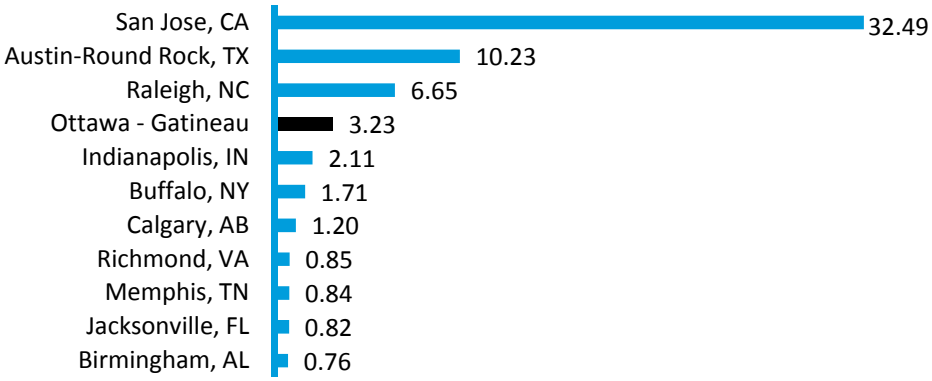
	Overall Technology Ranking	North American Tech-Pole	Patent Count (2006)	Patents per 10,000	Patent Growth
1	San Jose, CA	6.32	5799	32.49	2.5%
2	**Ottawa - Gatineau**	**1.08 (4th)**	**365 (4th)**	**3.23 (4th)**	**2.2% (3rd)**
3	Austin-Round Rock, TX	1.14	1541	10.23	-0.8%
4	Raleigh, NC	0.59	662	6.65	-0.5%
5	Birmingham, AL	0.11	83	0.76	7.6%
6	Calgary, AB	1.08	129	1.20	-3.5%
7	Jacksonville, FL	0.15	105	0.82	-0.5%
8	Indianapolis, IN	0.38	352	2.11	-8.4%
9	Richmond, VA	0.10	102	0.85	-6.1%
10	Buffalo, NY	0.12	194	1.71	-9.5%
11	Memphis, TN	0.06	106	0.84	-6.8%

Figure 3: North American Tech-Pole Index, 2006



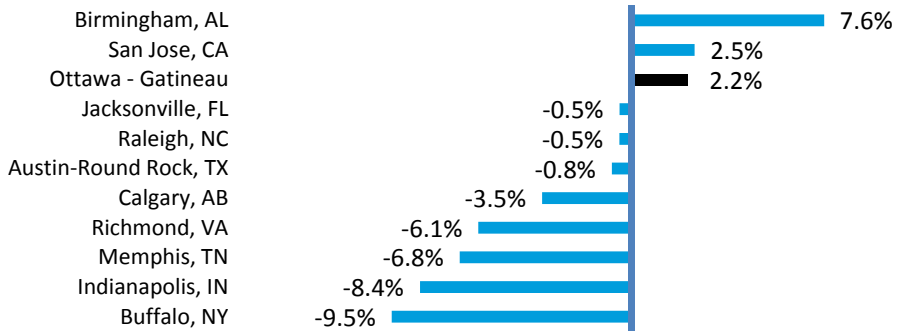
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-559-XCB2006009. County Business Patterns, 2006

Figure 4: Patents per 10,000, 2005



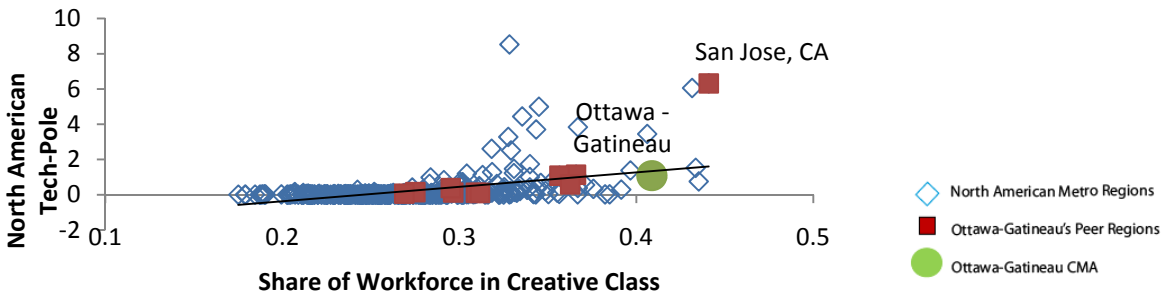
Source: MPI and Dieter Franz Kogler Analysis. USPTO (1975-07).

Figure 5: Patent Growth, Short Term, 2000-2005



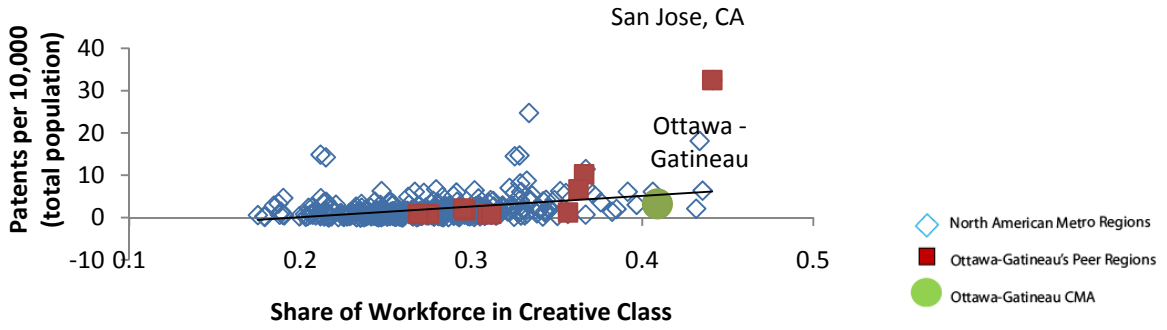
Source: MPI and Dieter Franz Kogler Analysis. USPTO (1975-07).

Figure 6: North American Tech-Pole 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. 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 latter 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 Ottawa-Gatineau performs on the various indicators of Talent relative to its peer regions. Figures 8 and 9 visualize the information showing how Ottawa-Gatineau scores on each measure. Figures crosses the Talent Index and the with the Creative Class to show the relationship between these two indicators.

Results

- Ottawa-Gatineau continues its strong performance by ranking highly on most of our Talent indicators. Ottawa-Gatineau ranks 4th on the Talent Index with 32.5% of its population having a Bachelor's Degree or above, not surprisingly, San Jose, Raleigh, and Austin ranked higher. Ottawa-Gatineau also performs quite well on the Graduate and Professional Degree Indicator, with 13.5% of its population having advanced degrees. It ranks 2nd among its peers, which puts it slightly above both Austin and Raleigh.

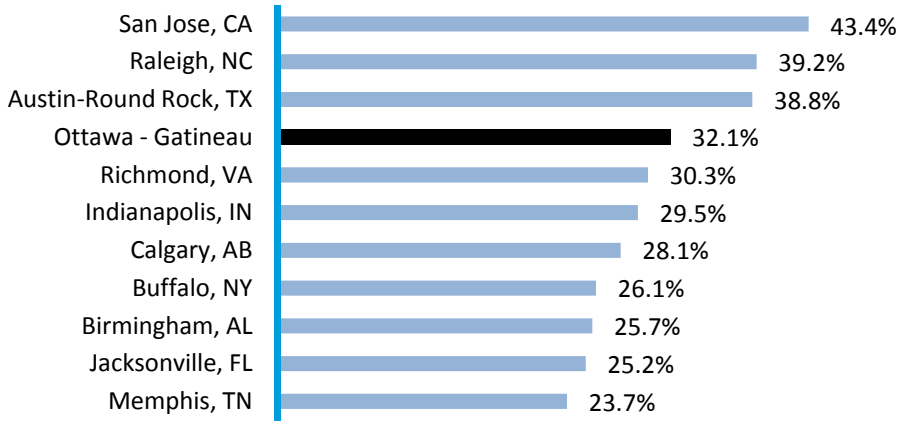
- The biggest area of weakness for Ottawa-Gatineau is on the Brain Drain/Gain Index, where the region ranks 8th among its peers. Although the region is experiencing a net gain, if it does not gain talent as quickly as its peers it will be left behind.

- Using the data for all North American metro regions there is a positive correlation between the Creative Class and the Talent Index. Ottawa-Gatineau falls slightly below the trend line. This is slightly surprising given the region's strong performance on both indicators, but may have to do with the fact that on average the US regions outperform their Canadian counterparts on the Talent Index, which creates a stronger correlation in the US than in Canada.

Table 2: Overall Talent Ranking

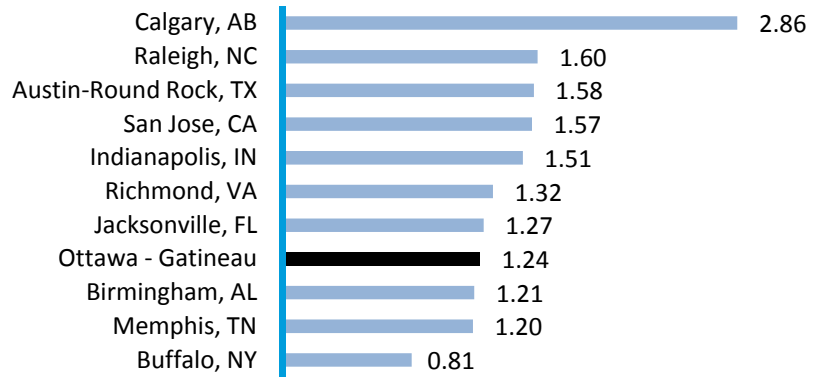
	Overall Talent Ranking	Creative Class	Bachelor's Degrees	Graduate Degrees	Talent Index	Brain Drain/Brain Gain
1	San Jose, CA	44.1%	24.8%	18.6%	43.4%	1.57
2	**Ottawa - Gatineau**	**40.9% (2nd)**	**18.9% (6th)**	**13.5% (2nd)**	**32.5% (4th)**	**1.24 (8th)**
3	Austin-Round Rock, TX	36.6%	25.7%	13.2%	38.8%	1.58
4	Raleigh, NC	36.3%	26.2%	13.0%	39.2%	1.60
5	Calgary, AB	35.7%	19.5%	8.8%	28.3%	2.86
6	Richmond, VA	31.2%	19.5%	10.8%	30.3%	1.32
7	Birmingham, AL	30.9%	16.8%	9.0%	25.7%	1.21
8	Buffalo, NY	29.7%	15.0%	11.1%	26.1%	0.81
9	Indianapolis, IN	29.5%	18.8%	10.7%	29.5%	1.51
10	Jacksonville, FL	27.5%	16.7%	8.5%	25.2%	1.27
11	Memphis, TN	26.9%	15.2%	8.4%	23.7%	1.20

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



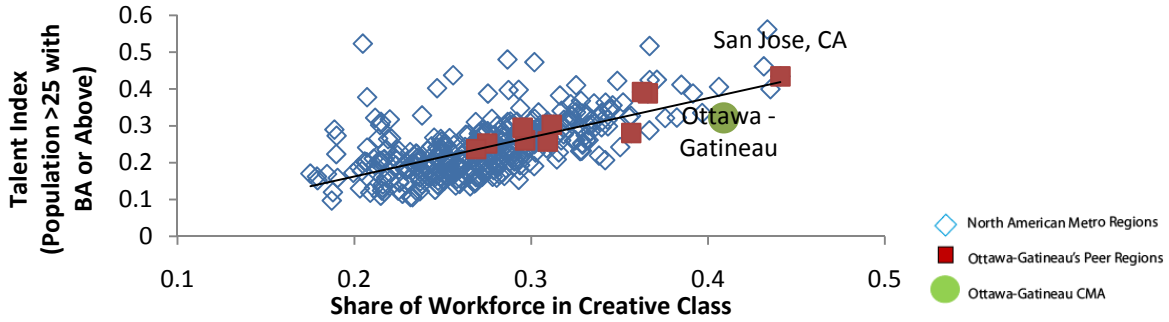
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

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 3rd 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 gays 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. That the region is a place where ideas are able to take shape and be produced. 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.

Ottawa-Gatineau performs well in this regard, ranking 1st 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, which features how Ottawa-Gatineau and the peer regions rank on each of the indicators. Figures 11-15 show how Ottawa-Gatineau ranks on each of the variables individually. Figures 16 and 17 show how the Bohemian Index and Gay and Lesbian Index correlate with the Creative Class.

Results

- Ottawa-Gatineau does quite well on our Tolerance indicators ranking in the top three of its peers on all indicators except for Visible Minorities. 17.9% of its population is made up of first generation immigrants, measured by the Mosaic Index. This is impressive when looked at in relation to the peer regions for Ottawa-Gatineau, but when compared to a region such as Toronto with 45% on the Mosaic Index, it demonstrates opportunity for improvement.

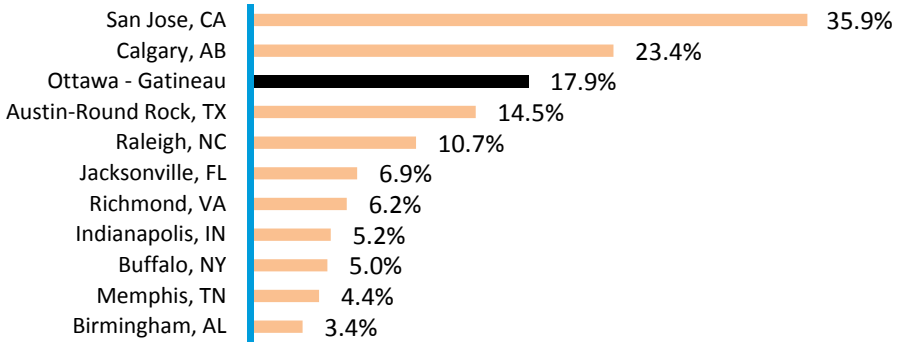
- On the two indicators that best describe openness, the Gay and Lesbian Index and the Bohemian Index, Ottawa-Gatineau does very well, ranking 1st and 2nd, respectively.

- One problem that can occur in regions with large numbers of cultural groups is neighbourhood segregation. The Integration Index measures all of the neighborhoods in each region to determine if visible minorities are mixing or living in distinct locations. Ottawa-Gatineau ranks 1st on this indicator. Thus, while the region may not be as multicultural as Toronto, it does not have the same segregation issues. However, this may also be due to the smaller proportion of visible minorities (15.9%) within Ottawa-Gatineau.

Table 3: Overall Tolerance Ranking

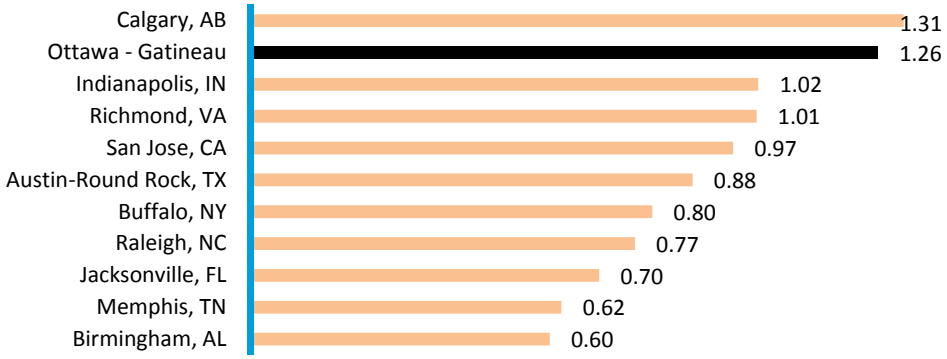
Overall Tolerance Ranking	Mosaic Index	Integration Index	Bohemian Index	Gay and Lesbian Index	Visible Minorities
1 Ottawa - Gatineau	**17.9% (3rd)**	**0.68 (1st)**	**1.26 (2nd)**	**1.60 (1st)**	**15.9 (11th)**
2 Calgary, AB	23.4%	0.66	1.31	0.97	22.0%
3 San Jose, CA	35.9%	0.46	0.97	1.22	49.0%
4 Austin-Round Rock, TX	14.5%	0.53	0.88	1.46	32.3%
5 Raleigh, NC	10.7%	0.64	0.77	0.97	29.9%
6 Indianapolis, IN	5.2%	0.60	1.02	1.00	20.1%
7 Jacksonville, FL	6.9%	0.59	0.70	0.98	28.8%
8 Richmond, VA	6.2%	0.49	1.01	0.87	35.5%
9 Memphis, TN	4.4%	0.32	0.62	0.93	50.1%
10 Buffalo, NY	5.0%	0.60	0.80	0.61	17.0%
11 Birmingham, AL	3.4%	0.40	0.60	0.94	31.5%

Figure 11: Mosaic Index (% Pop), 2006



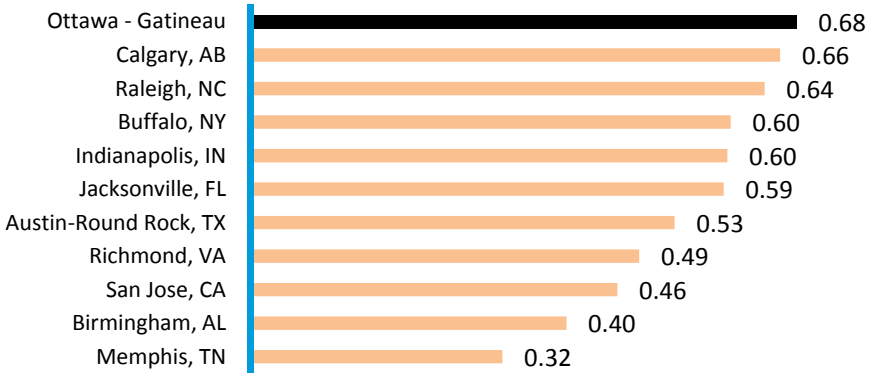
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

Figure 12: Bohemian Index, 2006



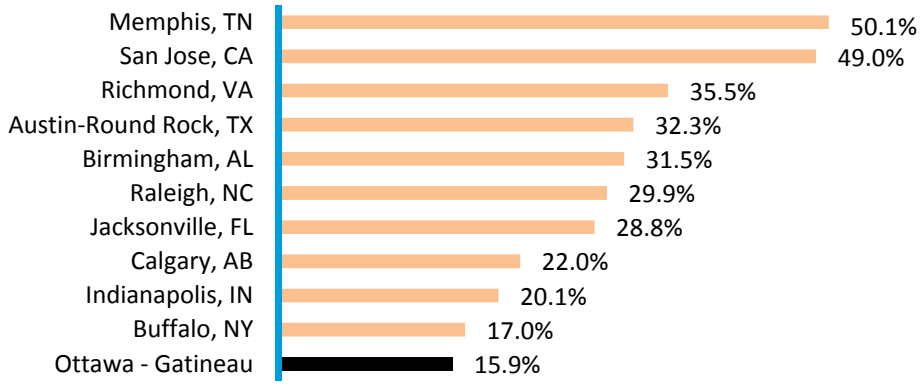
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-559-XCB2006011 and 97-F0012-XCB-01049. US, County Business Patterns, 2006

Figure 113: Integration Index, 2006



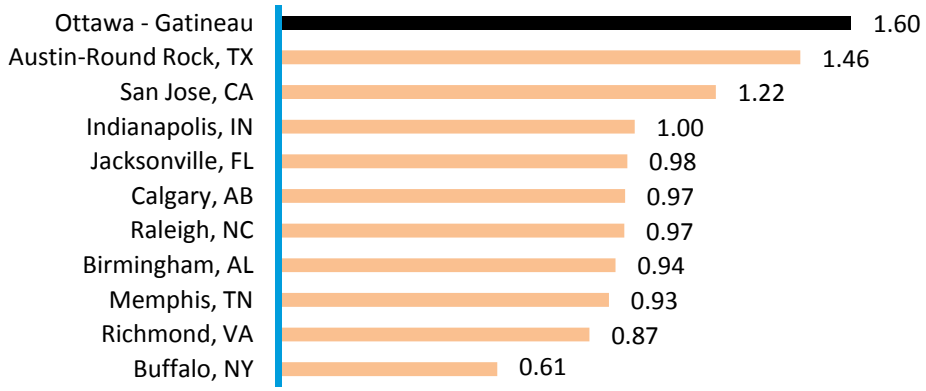
Source: Statistics Canada Catalogue no. 94-581-XCB2006007 and 94-580-XCB2006005. US Census Bureau, American Community Survey. (2006).

Figure 14: Visible Minorities (% Pop), 2006



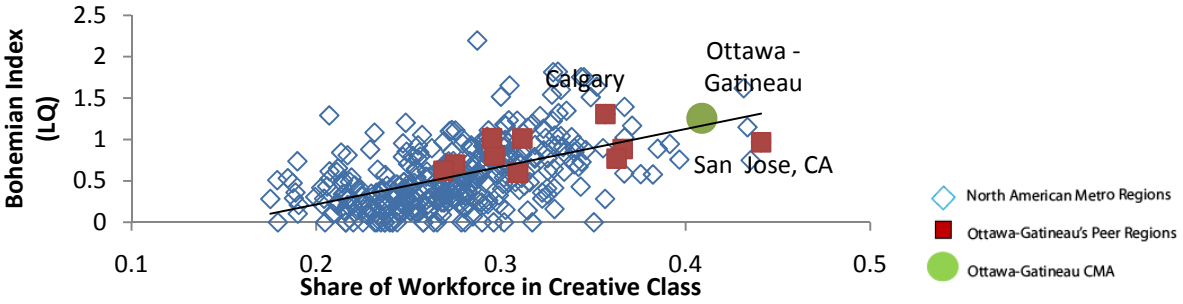
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 94-581-XCB2006007. US Census Bureau, American Community Survey. (2006).

Figure 15: Gay and Lesbian Index, 2006



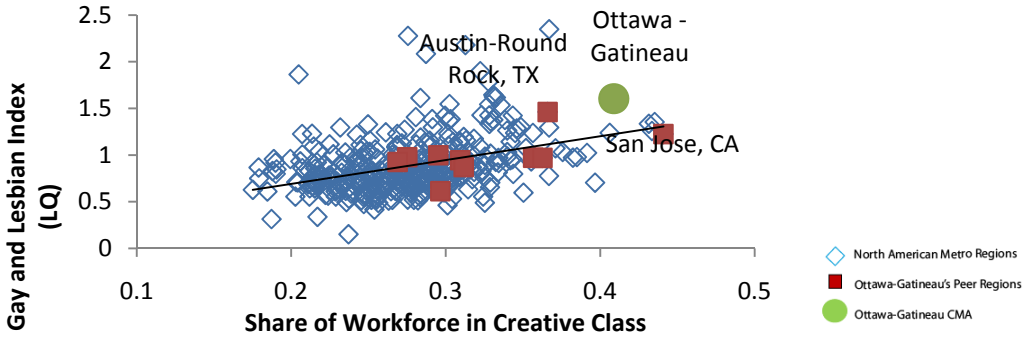
Source: MPI Analysis (2008). Statistics Canada Catalogue no. 97-553-XWE2006002 and 97-552-XCB2006007. US Census (2006).

Figure16: 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 1712: 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 Ottawa-Gatineau

The Ottawa-Gatineau CMA is well positioned to compete in the creative age. The region performs well on all 3Ts, ranking 2nd on Technology and Talent among its peers, and 1st on Tolerance. This means that according to our Creativity Index, the aggregate measure of the 3Ts, the region has a number of strong economic assets that it can leverage to achieve future economic growth. Ottawa-Gatineau ranks 3rd out of all 374 North American regions on the Creativity Index. (Table 4) Figures 18 and 19 show broad indicators of overall regional performance against the Creativity Index.

Table 4: Creativity Index

	Overall Creativity Ranking	Creativity Index	Overall Technology Ranking	Overall Talent Ranking	Overall Tolerance Ranking
1	**Ottawa - Gatineau**	**0.87**	**2**	**2**	**1**
2	San Jose, CA	0.86	1	1	3
3	Austin-Round Rock, TX	0.82	3	3	4
4	Calgary, AB	0.80	6	5	2
5	Raleigh, NC	0.79	4	4	5
6	Birmingham, AL	0.64	5	7	11
7	Indianapolis, IN	0.64	8	9	6
8	Richmond, VA	0.63	9	6	8
9	Jacksonville, FL	0.58	7	10	7
10	Buffalo, NY	0.55	10	8	10
11	Memphis, TN	0.47	11	11	9

Based on the 3T analysis we have identified major points of note for each T.

1. Talent

With 32.5% of its population 25 years of age and older having a BA or above, and 40.9% of its workforce in the Creative Class, the region has a well educated workforce employed in many creative occupations across the region. These numbers are surely inflated by the large number of positions created and filled by the federal government, but this alone does not account for Ottawa-Gatineau's success. The one negative side to Ottawa-Gatineau's performance on Talent is its score on the Brain Drain/Gain Index,

where it ranks 8th among its peers. While this does not affect its overall Talent ranking significantly, it could prove troublesome in the future as the creative age demands talented workers, and Ottawa-Gatineau has been less able to attract and retain these people at the same rate as its competitors. In the past, regions were judged by population growth and the brawn of their economy, but today regions are judged by their brains.

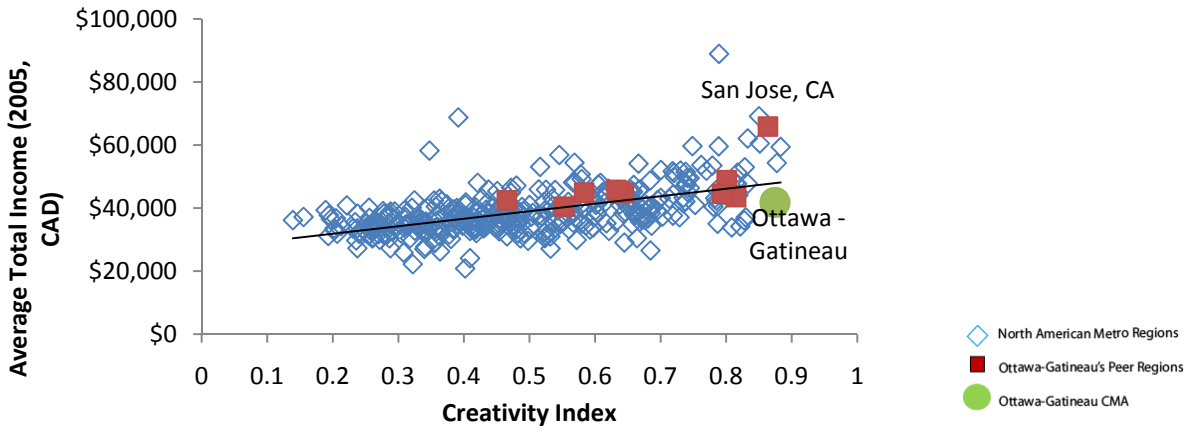
2. Technology

Despite obstacles to innovation that many Canadian CMAs face, Ottawa-Gatineau has overcome these and does well on all Technology indicators. Most impressive is Ottawa-Gatineau's performance on patent indicators. Strong performance in this area is unique for a Canadian CMA, and this is an advantage Ottawa-Gatineau has over many of its competitors. In other Canadian CMAs there are clearly impediments and systemic issues preventing talented individuals and firms in the region from inventing and commercializing their ideas. 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. On top of patent performance, Ottawa-Gatineau has a strong cluster of high-technology firms. While recent events may have weakened this cluster, it is still a significant source of technology occupations in Ontario.

3. Tolerance

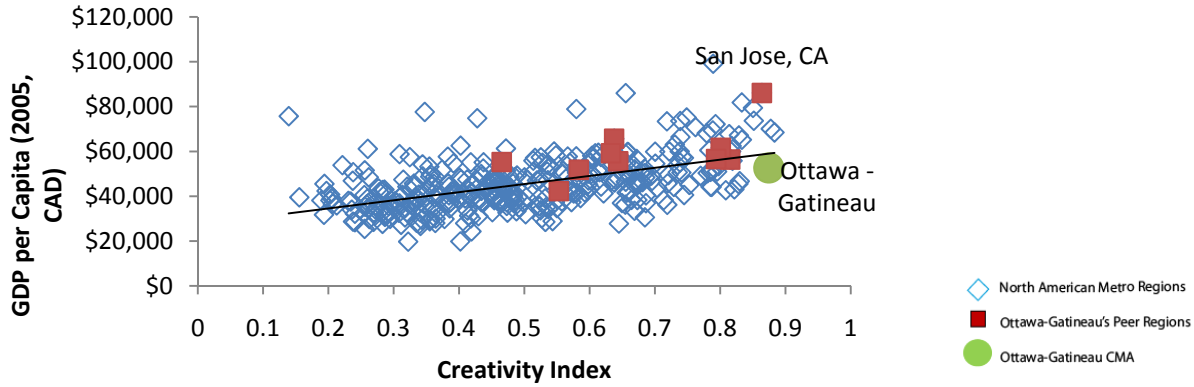
Finally, Ottawa-Gatineau is also an extremely "tolerant" region. There is not much that Ottawa-Gatineau can improve upon on this 'T'. However, its peer group does obscure some of the region's minor weaknesses, particularly the small percentage of immigrants in relation to a region like Toronto. This represents an area where Ottawa could improve and would most likely benefit. Immigrant attraction has become a policy directive for many Canadian regions due to projections of significantly decreasing numbers of people available for the workforce.

Figure 13: 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 19: GDP per Capita and the Creative Class



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

In order to continue to be competitive in the creative age, Ottawa-Gatineau must build on its strengths, but also ensure that its weaknesses are improved upon. Particularly, improving its performance on the Brain Drain/Gain Index, and reducing its reliance on federal employment. 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. (Figures 18 and 19). The stronger the Ottawa-Gatineau 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)	(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	$\text{Integration Index} = 1 - \left(\frac{Total\ Visible\ Minority_{region}}{Total\ Population_{region}}\right) \sum \left| \frac{VGroup_{DA,G}}{VGroup_{G}} - \frac{VGroup_{DA,H}}{VGroup_{H}} \right|$ 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.

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

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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.

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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.