Competing on Creativity:

Placing Ontario's Cities in North American Context

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Ontario Ministry of Enterprise, Opportunity and Innovation
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Meric S. Gertler
Richard Florida
Gary Gates
Tara Vinodrai

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Executive Summary

Creativity has replaced raw materials or natural harbours as the crucial wellspring of economic growth. To be successful in this emerging creative age, regions must develop, attract and retain talented and creative people who generate innovations, develop technology-intensive industries and power economic growth. Such talented people are not spread equally across nations or places, but tend to concentrate within particular city-regions. The most successful city-regions are the ones that have a social environment that is open to creativity and diversity of all sorts. The ability to attract creative people in arts and culture fields and to be open to diverse groups of people of different ethnic, racial and lifestyle groups provides distinct advantages to regions in generating innovations, growing and attracting high-technology industries, and spurring economic growth.

This report examines the relationship between talent, technology, creativity and diversity in city-regions in Ontario – and Canada more generally – and compares these to the relationships found to exist in American metropolitan regions.

Our findings strongly indicate that the relationships first captured for US city-regions in the work of Florida and colleagues are also evident in Canadian city-regions. If anything, the relationships in Canada are stronger than those found in the United States. In particular, we find that a vibrant local creative class and openness to diversity attract knowledge workers in Ontario and Canada. We also find that, in general, Ontario city-regions have a solid foundation in these areas to compete against US city-regions. In summary, there appears to be a strong set of linkages between creativity, diversity, talent and technology-intensive activity that are driving the economies of Ontario's – and Canada's – city-regions.

For policy makers, this work confirms the importance of urban centres in the knowledge economy and the need to investigate further the importance of higher education in this knowledge economy. At the municipal level, this work points to the importance of collaborative efforts between local governments, firms, and individuals to reinforce and strengthen the unique urban character of their city-regions. For all Ontarians, this work underscores the importance of immigration and settlement, as well as the nurturing of arts and creativity.

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A distinct advantage of city-regions is their ability to produce, attract and retain those workers who play the lead role in knowledge-intensive production and innovation – those who provide the ideas, know-how, creativity and imagination so crucial to economic success. Because value creation in many sectors of the economy rests increasingly on intangible assets, the locational constraints of earlier eras – for example, access to natural harbours or proximity to raw materials and cheap energy sources – no longer exert the same pull they once did. Instead, what matters most now are those attributes and characteristics of particular places that make them attractive to potentially mobile, much sought-after talent.

Traditional theories of economic growth and development emphasized the role of natural resources and physical assets. Such theories were used to inform strategies typically based on various incentives to try to alter the location decisions of *firms*. In recent years, several more robust theories have emerged. The first, associated with the work of Michael Porter (2000) and others, emphasizes the role of *clusters* of related and supporting industries. According to this work, clusters operate as geographically concentrated collections of interrelated firms in which local sophisticated and demanding customers and strong competition with other firms in the same industry drive the innovation process. A second view associated with Robert Lucas (1988) and Edward Glaeser (1998) focuses on the role of human capital – that is, *highly educated people*. It argues that places with higher levels of human capital are more innovative and grow more rapidly and robustly over time. A third view, associated with Richard Florida (2002), emphasizes the role of creative capital, arguing that certain underlying conditions of places, such as their ability to attract *creative people* and be open to diversity, inform innovation and growth. Further independent research by Robert Cushing (2001) of the University of Texas at Austin provides a good deal of support for the creative capital view.

In the current creative age, the ability to attract and retain highly skilled labour is therefore crucial to the current and future prosperity of city-regions, provinces and states, and entire nations. The most recent research on this question indicates strongly that talent is attracted to and retained by city-regions, but not just *any* city-regions. In their analysis of American metropolitan areas, Richard Florida and Gary Gates have shed new light on those characteristics of urban regions that seem to be most important in this process (Florida 2001, 2002a, 2002b; Florida and Gates 2001). The central finding of this work is that the social character of city-regions has a very large influence over their economic success and competitiveness. In particular, Florida and colleagues have found that those places that offer a high quality of life and best accommodate diversity enjoy the greatest success in talent attraction/retention and in the growth of their technology-intensive economic activities.

This research demonstrates that 'quality of place' must be understood in broader terms than we have traditionally been accustomed to: while the attractiveness and condition of the natural environment and built form are certainly important, so too is the presence of a rich cultural scene and a high concentration of people working in cultural and creative occupations ('bohemians' or the 'creative class').

Diversity is another key aspect of successful places. There are several dimensions to this.

The first dimension concerns entry barriers facing newcomers: city-regions with great diversity are understood as places "where people from different backgrounds can easily fit in ... reflecting a high degree of openness" (Florida 2001: 20). Several quantitative indicators used by Florida and colleagues capture this. The most influential variable was found to be a city's 'gay index', measuring the prevalence of gay males in the local population (Florida and Gates 2001). This index has been shown to reflect openness to newcomers of diverse backgrounds: "Places that are open to and supportive of a gay population are likely to be open and supportive of other groups. ... Simply put, the gay index reflects an environment that is open to diversity, high in urban oriented amenities, and characterized by low entry barriers" (Florida 2001: 20). Another indicator of diversity is the 'Melting Pot Index', reflecting the proportion of a city-region's population that is foreign-born.

The objective of the current study is to conduct a similar analysis of quality of place for a group of city-regions in Ontario and the rest of Canada, in order to see how well they perform relative to other city-regions in North America. To get at these issues, this report looks at the role of human capital, creative capital, and diversity in technology-based economic development in Ontario's and Canada's city-regions. It compares Ontario's city-regions to others in Canada and the US. It uses two novel new measures, the Bohemian Index to reflect creative capital, and the Mosaic Index to reflect openness and diversity. It suggests that there will be a relationship between openness to creativity and diversity and the ability to support high-tech industries and economic development based on talented workers.

This kind of analysis has not yet been performed for Canadian city-regions, and has the potential to shed important new light on the role of quality of place in shaping the competitiveness of city-regions in Ontario.

2 Data and Methods

The data for this analysis are derived from a variety of sources. Most of the Canadian data are taken from the 1996 Census of Canada.[1] The 1990 Census of Population and Housing for the United States is used to create comparable measures for American city-regions.[2] In Canada, employment in high-technology industry (for 1999) is derived from special tabulations from the Small Area File (SAF) of the Longitudinal Employment Analysis Program (LEAP) provided by Statistics Canada (see McVey et al. 2002). Comparable data for the United States (also for 1999) are drawn from County Business Patterns.

2.1 Key Variables

The key variables for this analysis are the Talent Index, the Bohemian Index, the Mosaic Index, and the Tech-Pole Index. These mirror variables employed in previous research by Florida (2001, 2002a, 2002b) on the geography of talent and the rise of the creative class. The variables used in this analysis have been designed to maximize consistency between the United States and Canada, important for comparative analysis and benchmarking. The variable definitions for the Canadian data are described in detail below.

Talent Index – Talent is defined as the proportion of the population over 18 years of age with a bachelor's degree or higher. Canadian data are taken from the 1996 Census of Population. US data are taken from the 1990 US Census of Population and Housing.

Bohemian Index – The Bohemian Index is defined using employment in artistic and creative occupations. It is a location quotient that compares the region's share of the nation's bohemians to the region's share of the nation's population. Canadian data are taken from the 1996 Census of Population. US data are taken from the 1990 US Census of Population and Housing (see Florida 2002a; Appendix A).

Mosaic Index – The Mosaic Index is the Canadian counterpart of Florida's 'Melting Pot Index'. Both are calculated as the proportion of the total population that is foreign-born. Canadian data are taken from the 1996 Census of Population. US data are taken from the 1990 US Census of Population and Housing.

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[1] At the time of writing, key data from Canada's 2001 Census of Population are not yet available. Because information on same-sex couples was only collected in Canada for the first time in the 2001 Census, direct comparability with US data from the 2000 Census may be compromised. Hence, this variable is excluded from the current analysis.

[2] The 1990 data were used for two reasons. First, the original work by Florida and Gates was performed using these numbers, and second, 2000 US Census data are still not fully available.

Tech-Pole Index – This measure is based on an index created by the Milken Institute (DeVol, 1999). The Milken Institute's Tech-Pole Index is based on a city-region's high-technology industrial output. However, due to differences in data collection and availability, we have recalculated this measure for both Canadian and American city-regions using high-technology employment data. The index compares a region's share of national employment in high-technology industries to the region's overall share of national employment; this is then adjusted for city-size by multiplying by a region's share of national high-technology employment. Therefore, it reflects both the region's degree of specialization in technology-intensive activity as well as its sheer scale of employment in these sectors. Canadian data are derived from the Small Area File (SAF) of the Longitudinal Employment Analysis Program (LEAP) maintained by Statistics Canada. For Canada, high-technology industries are defined using the 1980 Standard Industrial Classification (SIC) at the 3-digit level. In the United States, data are taken from County Business Patterns for a similar set of industries. The index includes technology-intensive sectors in both manufacturing and services (see Appendix B).

3 How do City-Regions in Ontario and Canada Perform?

3.1 City-Regions in Ontario and Canada

Statistics Canada defines urban regions as Census Metropolitan Areas (CMA). These regions have a core urban population of 100,000 or more persons. The geographic extent of the area is defined on the basis of commuting flows between municipalities around the core urban area. Of the 25 CMAs in Canada in 1996, 10 are located in Ontario: Hamilton, Kitchener, London, Ottawa-Hull, St. Catharines-Niagara, Oshawa, Sudbury, Thunder Bay, Toronto, and Windsor (Table 1).

Table 1: Census Metropolitan Areas in Canada by Size

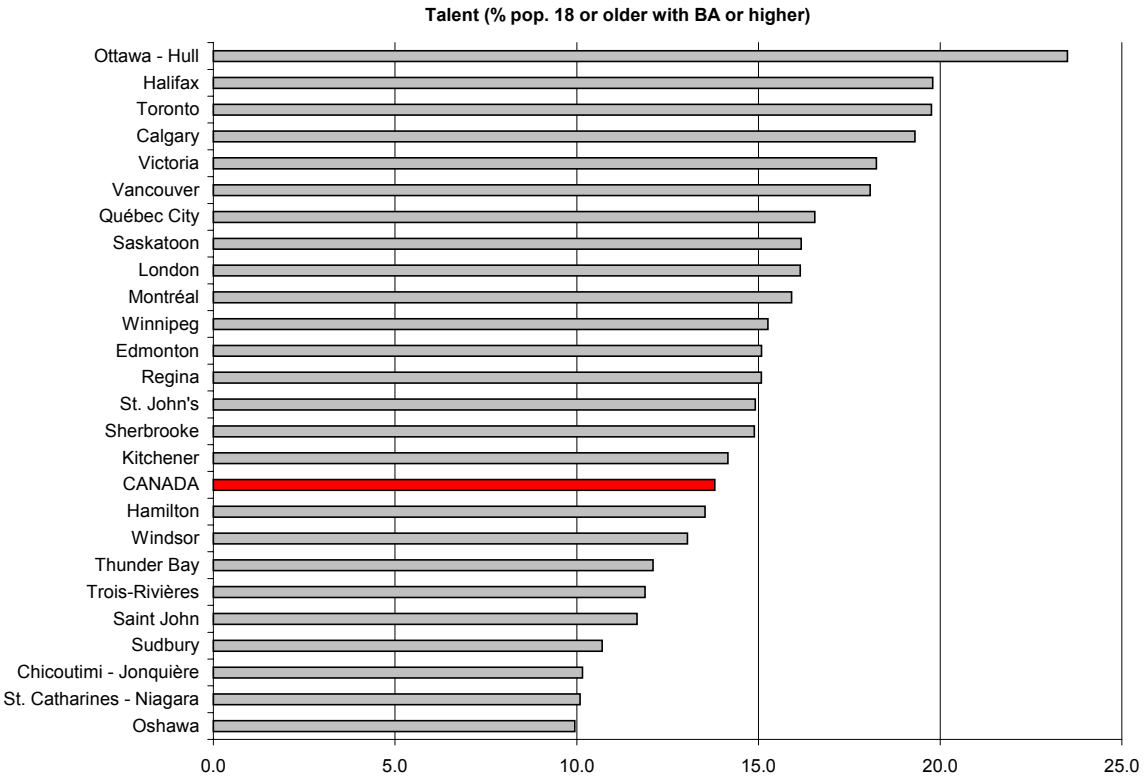
Census Metropolitan Area	1996	2001	% Growth
Toronto	4,263,757	4,682,897	9.8
Montréal	3,326,510	3,426,350	3.0
Vancouver	1,831,665	1,986,965	8.5
Ottawa – Hull	1,010,498	1,063,664	5.3
Calgary	821,628	951,395	15.8
Edmonton	862,597	937,845	8.7
Québec City	671,889	682,757	1.6
Winnipeg	667,209	671,274	0.6
Hamilton	624,360	662,401	6.1
London	398,616	432,451	8.5
Kitchener	382,940	414,284	8.2
St. Catharines – Niagara	372,406	377,009	1.2
Halifax	332,518	359,183	8.0
Victoria	304,287	311,902	2.5
Windsor	278,685	307,877	10.5
Oshawa	268,773	296,298	10.2
Saskatoon	219,056	225,927	3.1
Regina	193,652	192,800	-0.4
St. John's	174,051	172,918	-0.7
Sudbury	160,488	155,601	-3.0
Chicoutimi – Jonquière	160,454	154,938	-3.4
Sherbrooke	147,384	153,811	4.4
Trois-Rivières	139,956	137,507	-1.7
Saint John	125,705	122,678	-2.4
Thunder Bay	125,562	121,986	-2.8
Canada	*28,846,760*	*30,007,094*	*4.0*

Source: Statistics Canada, 1996 and 2001 Census of Population

3.2 Talent

The distribution of talent across Canada's 25 largest metropolitan regions is shown in Figure 1. Notably, two Ontario city-regions are among those with the highest levels of talent: Ottawa-Hull has the highest level of talent, with roughly 23 percent of the adult population having a university degree, and Toronto ranks third, with just under 20 percent of the population having at least a university degree. However, some Ontario city-regions – Oshawa, Sudbury, and St. Catharines-Niagara – also figure prominently at the other end of the spectrum.[3]

Figure 1: Talent in Canadian City-Regions

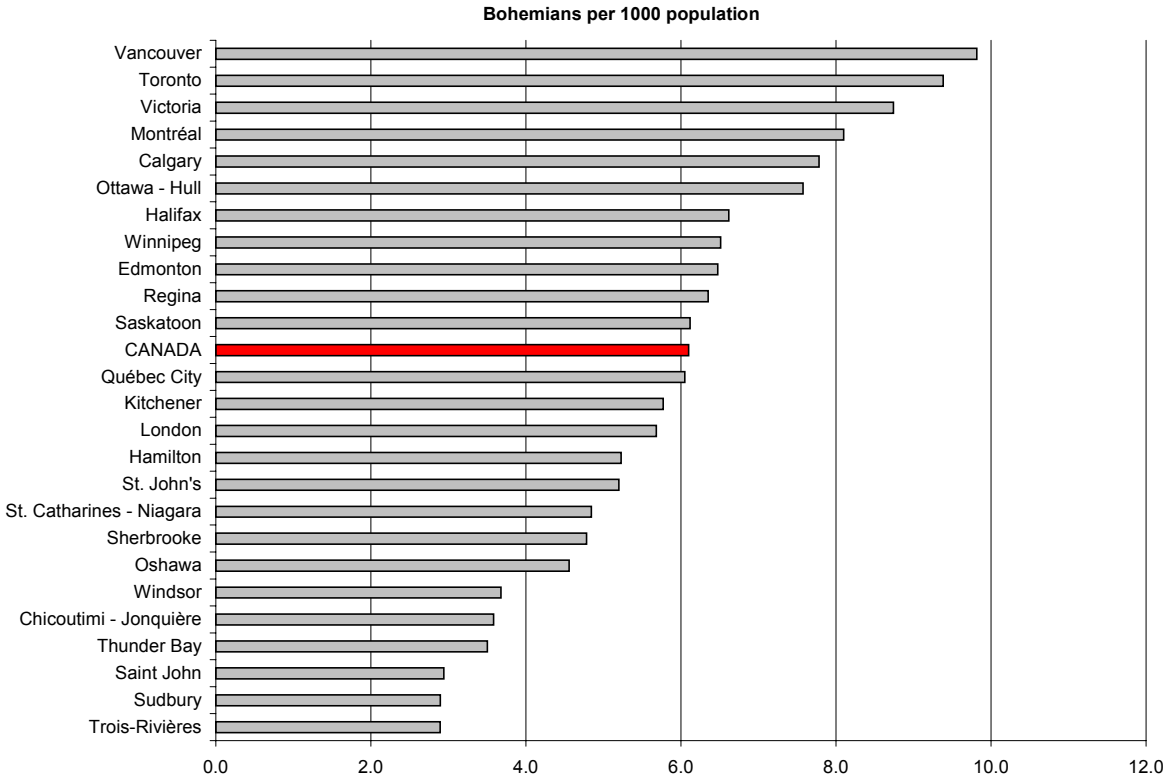


[3] Because Florida (2001) defines the Talent Index to include only bachelor's degrees or higher, it does not reflect other forms of post-secondary educational attainment such as community college certificates and diplomas. We acknowledge the important contribution of community colleges and other education and training institutions to the production of a talented and highly skilled labour force in Ontario.

3.3 Creativity and the Bohemian Index

Previous research has suggested a strong relationship between bohemians and technology-based economic growth. Figure 2 shows that Vancouver and Toronto lead all other Canadian city-regions on the Bohemian Index, followed by Victoria, Montreal, Calgary and Ottawa-Hull. Other Ontario city-regions such as Kitchener and London are marginally below the Canadian average of 6.1 Bohemians per 1000 population, followed by Hamilton, St. Catharines-Niagara, Oshawa and others. With a few notable exceptions (such as Victoria), it appears that bohemians tend to flock to the largest urban centres in the country.

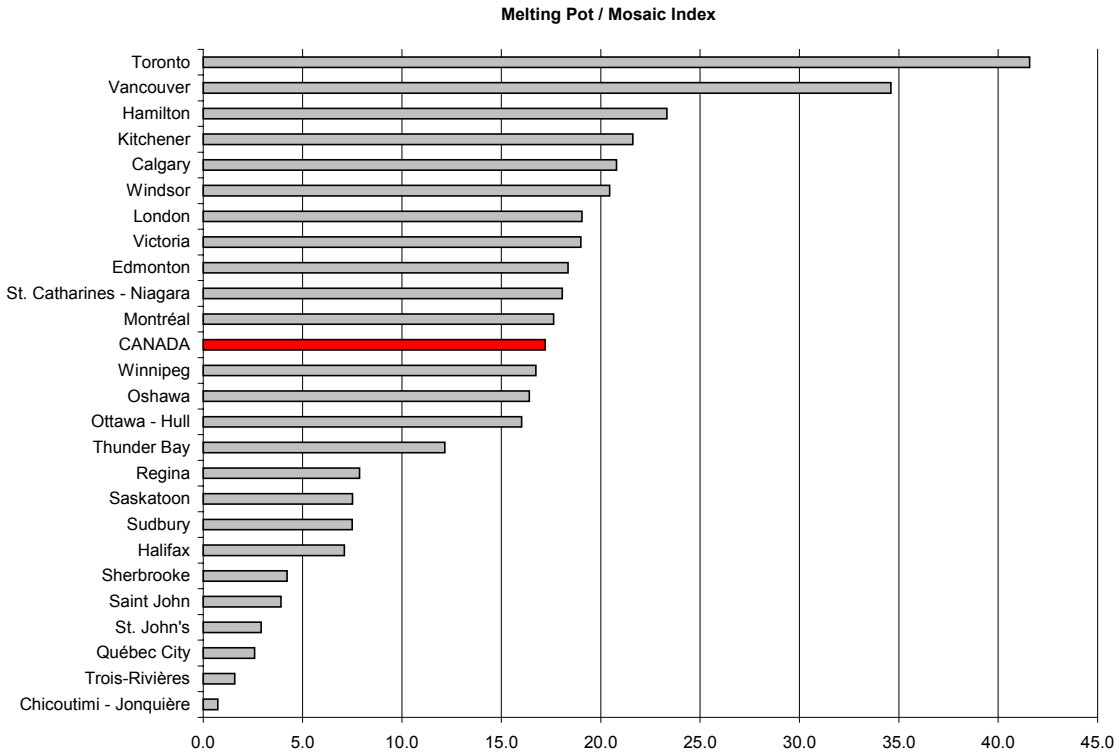
Figure 2: Bohemians in Canadian City-Regions



3.4 Diversity and the Mosaic Index

As shown in Figure 3, Toronto and Vancouver also dominate the Mosaic index ranking, leading the next group of city-regions by a large margin. But within this next group of city-regions, Hamilton, Kitchener, Windsor, London, and St. Catharines-Niagara all exceed the national average. Oshawa and Ottawa-Hull are not far below this level, while Thunder Bay and Sudbury are somewhat further back.

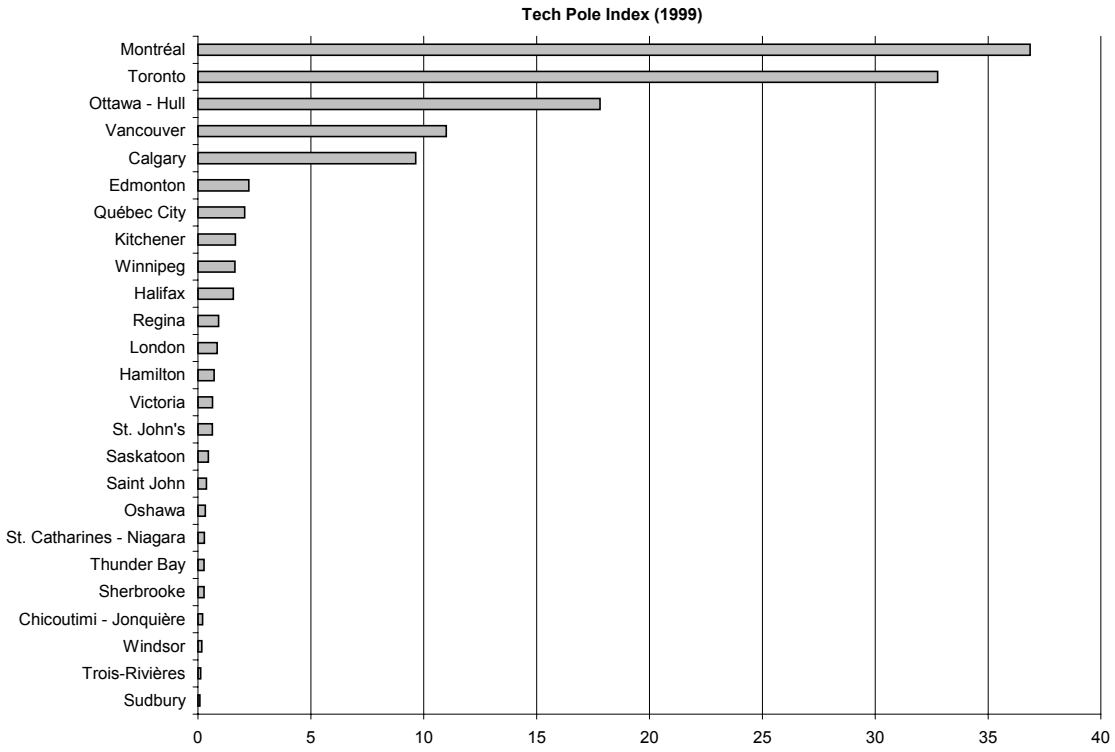
Figure 3: Mosaic Index for Canadian City-Regions



3.5 Technology

The distribution of the Tech-Pole Index (Figure 4) is strikingly different from the first three indices. Because of the size component within this indicator, Montreal and Toronto (with the two largest concentrations of technology-intensive employment in the country) dominate all other city-regions. Ottawa-Hull is a strong third, while Kitchener, London and Hamilton are well back in eighth, twelfth and thirteenth ranks respectively.

Figure 4: Tech-Pole Index for Canadian City-Regions



4 Technology, Talent, Creativity and Diversity in Canadian City-Regions

What are the relationships between technology, talent, creativity and diversity for Canada's metropolitan regions? We now extend the analysis used by Florida and his collaborators for US metropolitan regions to the Canadian context. The basic question here is: how closely are indicators such as creativity (the Bohemian Index) and diversity (the Mosaic Index) related to a city-region's ability to attract highly skilled labour (the Talent Index) or technology-intensive employment (the Tech-Pole Index)?

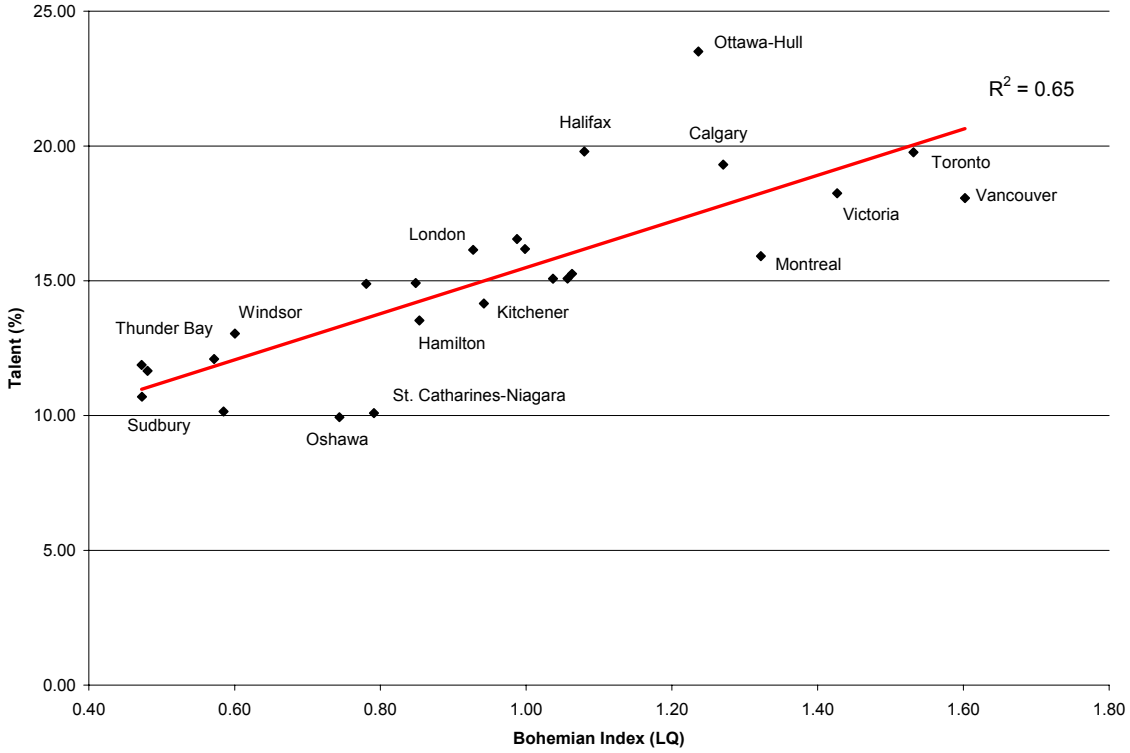
4.1 Talent and Creativity

We begin with the relationship between Talent and the Bohemian Index (Figure 5). The relationship is strong, statistically significant, and positive (i.e. the higher a city's Bohemian Index, the higher its Talent Index)[4]. In other words, it would appear that city-regions that attract creative and artistic people also attract talented workers. At the same time, Figure 5 highlights a number of Ontario city-regions that depart from this general relationship somewhat. Particularly noteworthy here is the position of Ottawa-Hull, whose score on the Talent Index is far higher than expected, given its score on the Bohemian Index.[5] Conversely, the communities of Oshawa and St. Catharines-Niagara have lower Talent Index scores than would be expected on the basis of their Bohemian Index scores. Interestingly, they share this characteristic with some much larger Canadian city-regions, most notably Vancouver and Montreal.

[4] The statistical measure of goodness of fit (R^2) for the relationship between the Talent and Bohemian indices is 0.65 and is highly statistically significant (p=0.000).

[5] This is strikingly similar to its US counterpart, Washington, DC.

Figure 5: Talent by Bohemian Index for Canadian City-Regions



4.2 Talent and Diversity

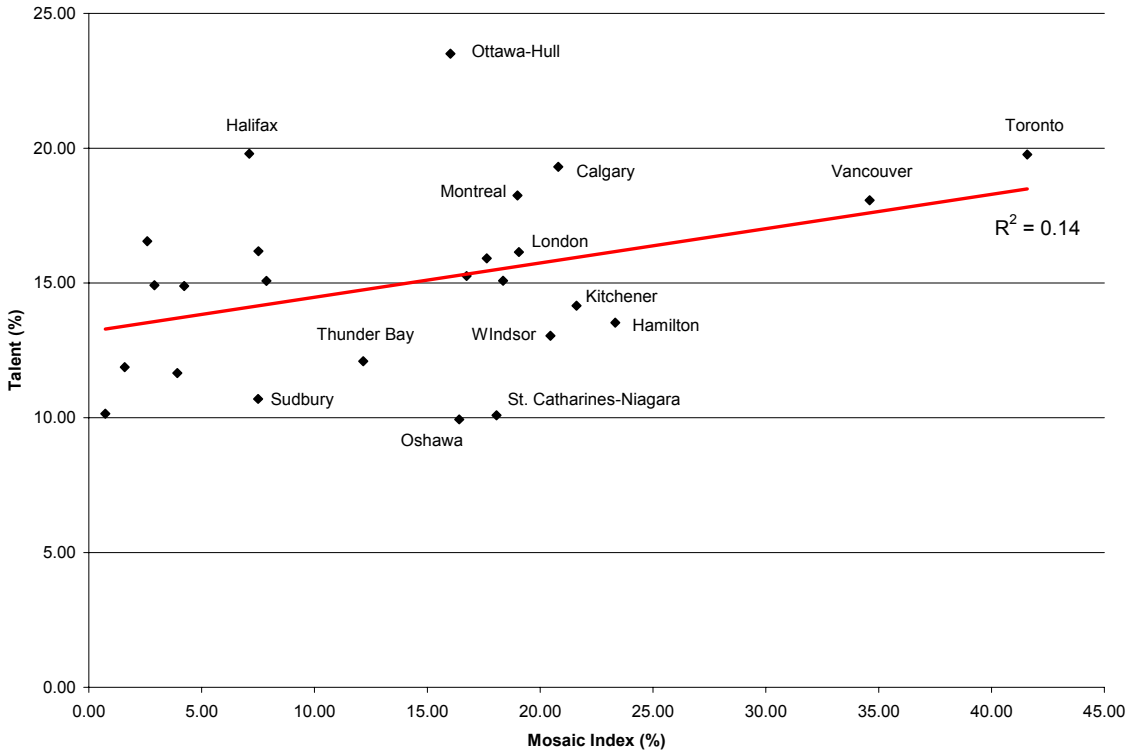
The relationship between Talent and the Mosaic Index, is also generally positive (Figure 6).[6] That is, places in which foreign-born individuals constitute a large share of the population are attractive to talented workers. However, this relationship does not appear to be as strong as the one between talent and creativity.[7] Many city-regions are scattered both above and below the line of best fit. Notable cases include Ottawa-Hull and Halifax, whose talent levels are far higher than what would be expected on the basis of their Mosaic Index scores. Conversely, Ontario centres such as Hamilton, Kitchener, Windsor, St. Catharines-Niagara, Oshawa, Thunder Bay and Sudbury all fall well below this line, indicating talent levels below those that would be expected on the basis of their percentages of foreign-born population. Furthermore, while the first four of these city-regions all have a Mosaic Index score above

[6] The R^2 for the relationship between the Talent and Mosaic indices is 0.14 and is less significant (p=0.067).

[7] The statistical measure of goodness of fit, R^2, is considerably lower than in the previous case (0.14 compared to 0.65).

the national average, their ability to attract, retain or generate talented labour is lower than levels expected according to the generally observed relationship.

Figure 6: Talent by Mosaic Index for Canadian City-Regions



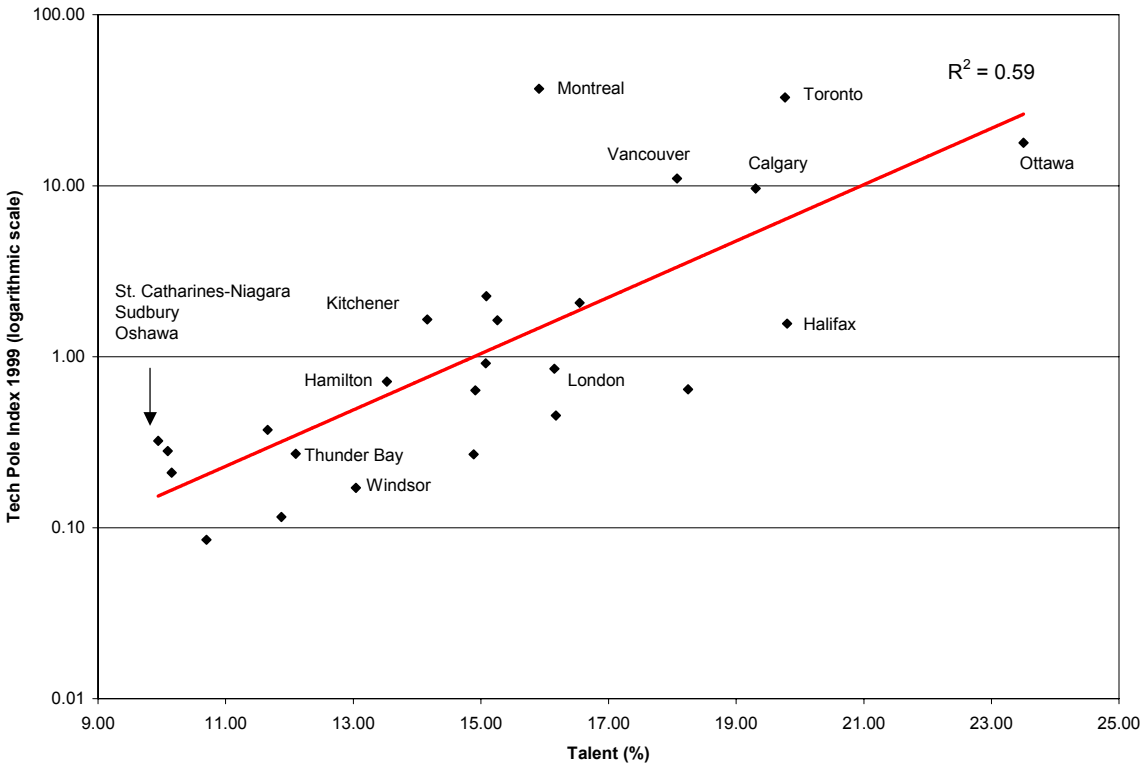
4.3 Talent and Technology

Shifting our focus to the Tech-Pole Index, we can see that this is strongly correlated with the Talent Index (Figure 7).[8] In short, city-regions with large concentrations of technology-intensive employment are places that generate, attract and/or retain talent effectively. It is important to note that the Tech-Pole Index score is shown here on a logarithmic scale. The results therefore indicate that the relationship between talent and technology-intensive employment is especially strong for those city-regions found in the upper-right hand corner of this graph. These include most of Canada's largest metropolitan regions: Toronto, Vancouver, Ottawa-Hull and Calgary. Interestingly, Montreal's position in this graph indicates that its Tech-Pole Index score is much higher than would be expected based on its

[8] The R^2 for the relationship between the Tech-pole and Talent indices is 0.59 (p=0.000). A logarithmic scale is used to illustrate the relationship between the Tech-pole index and talent, diversity, and creativity. It best represents the large gains in technology-intensive activity which are associated with relatively small increases in the other variables.

Talent Index score.[9] The Ontario city-region of Kitchener emerges as a place that has more technology-intensive employment than its Talent Index score would suggest, while for London and Windsor, the reverse is true: lower Tech-Pole Index scores than expected, based on their Talent Index scores.

Figure 7: Tech-Pole Index by Talent for Canadian City-Regions

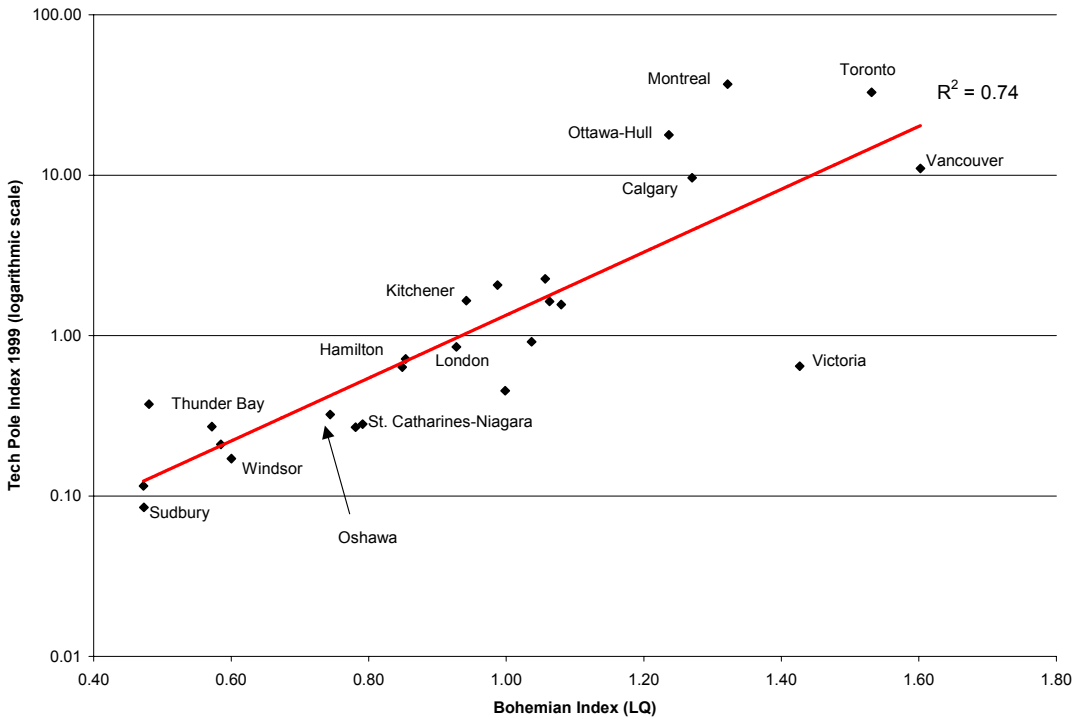


[9] This can be explained by the presence of a large aerospace industry in Montreal, led by firms such as Bombardier. While all aerospace workers would be included in the Tech-Pole Index, many of the shop-floor workers in this industry would not have a university degree: hence, high Tech-Pole Index scores and relatively low Talent Index scores.

4.4 Technology, Creativity and Diversity

The next two figures (8 and 9) show the relationship between the Tech-Pole Index and the Bohemian and Mosaic indices respectively. The results are generally consistent with the relationships between the Talent Index and the same two variables in Figures 5 and 6. In fact, the relationship between technology-intensive employment and the Bohemian Index is the strongest one uncovered in this phase of our analysis.[10] This provides evidence of the strong relationship between creativity and employment in knowledge-intensive economic activity. Furthermore, the relationship between the Mosaic Index and Tech-Pole Index is considerably stronger than the relationship between the Mosaic and Talent indices.[11] Noting again that the Tech-Pole Index scores are displayed on a logarithmic scale, we see once more the greater intensity of these relationships for the largest city-regions in the country: Toronto, Vancouver, Montreal, Ottawa-Hull and Calgary in the case of Tech-Pole Index and the Bohemian Index (Figure 8), and Toronto and Vancouver in the case of the Tech-Pole and Mosaic indices (Figure 9). As with Figure 7, Montreal's Tech-Pole Index score is considerably higher than its Mosaic Index score would indicate. This time, however, it is also joined by Ottawa-Hull and Calgary.

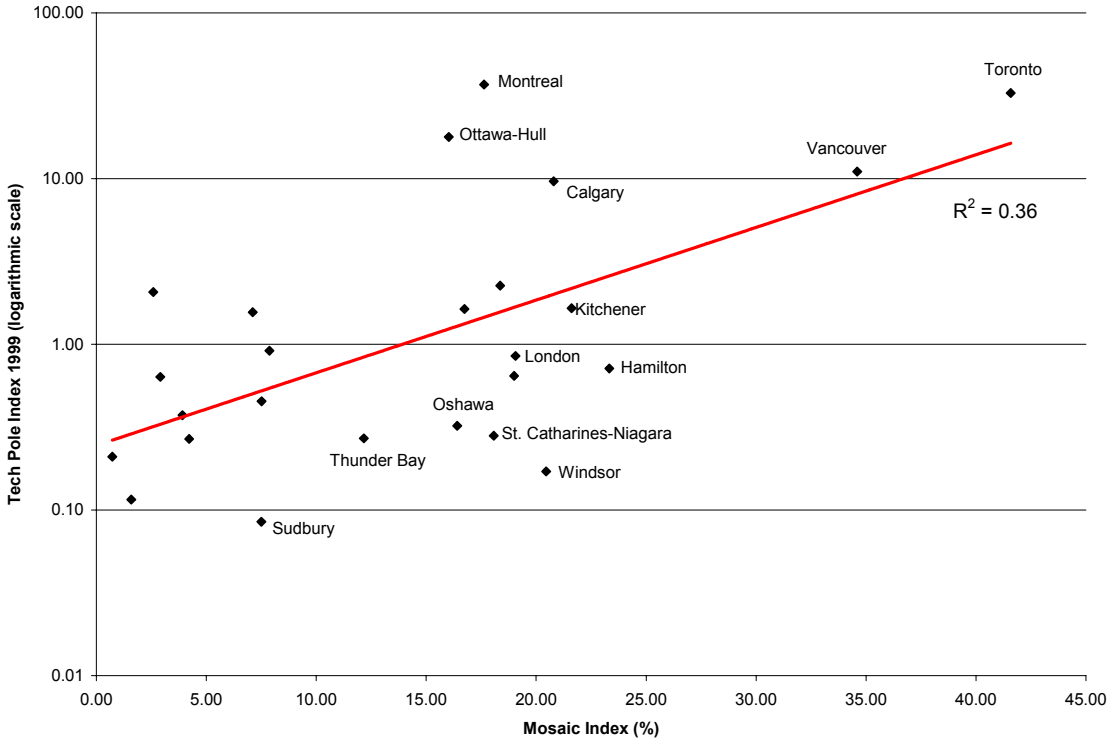
Figure 8: Tech-Pole Index by Bohemian Index for Canadian City-Regions



[10] Note the very high R^2 value (0.74) and high level of statistical significance (p=0.000) of this relationship.

[11] Compare the R^2 values of 0.36 (p=0.002) and 0.14 (p=0.067) respectively, as well as the much higher level of statistical significance in the former case.

Figure 9: Tech-Pole Index by Mosaic Index for Canadian City-Regions



5 Technology, Talent, Creativity and Diversity: Comparing Canadian and US City-Regions

5.1 Canada and the United States: National Differences

We now turn our attention to the major differences between Canadian and US metropolitan regions. Clearly, metropolitan regions in these two nations differ in size. The largest US city-regions are considerably larger than those in Canada. But there are other significant differences as well.

First, the United States has a somewhat higher overall percentage of the population with at least one university degree – that is, on the Talent Index (Table 2). The capital regions of each nation have the highest levels of talent: Washington, DC (35.2 percent) and Ottawa-Hull (23.5 percent). Second, Canada has a much higher proportion of the population that is foreign-born compared to the United States. In Canada, the city-regions of Toronto (42 percent) and Vancouver (35 percent) rank number 1 and 2, while in the United States, Miami (34 percent) and Los Angeles (27 percent) are the city-regions with the highest percentage of foreign-born population.

Third, while the proportion of bohemians in each country is relatively similar, Canada does have a slightly higher proportion of bohemians than the United States.

Table 2: Canada and the United States: Comparing key indicators

	Canada[1]	United States[2]
Population	28,846,760	248,709,873
Size of Largest Metropolitan Area[3]	4,263,757	18,087,251
% Talent	13.8	18.5
% Foreign Born	17.2	8.0
Bohemians per 1000	6.1	5.8

[1] Data for Canada are taken from the 1996 Canadian Census of Population.
[2] Data from the United States are taken from the 1990 Census of Population and Housing.
[3] Metropolitan areas are defined as Census Metropolitan Areas (CMA) in Canada and as Metropolitan Statistical Areas (MSA) and Consolidated Metropolitan Statistical Areas (CMSA) in the United States.

5.2 Comparing Canadian and US City-Regions: Key Findings

To get a better handle on the relationships between technology, talent, creativity and diversity, we present our findings for the pooled sample of all Canadian and US metropolitan regions (see Figures 10 to 14). This enables us to gauge how strong these relationships are for the entire set of North American metropolitan regions. For the most part, the results are consistent for the two countries. Our key findings are summarized below:

- There is a strong positive relationship between talent and creativity (Bohemian index) in both countries (Figure 10).[12]

- The relationship between talent and the Mosaic/Melting Pot Index is considerably weaker and less significant, for both countries (Figure 11)[13]. In the case of the United States, this is largely explained by what appears to be two rather different relationships. First, there is a large group of city-regions with lower Melting Pot Index scores, a 'middle-America' with generally low levels of diversity, but a wide range of Talent Index scores. Second, there is a smaller group of city-regions, mostly in states like California, Texas and Florida (including Miami, Los Angeles, San Diego and Houston), that show a much wider range of Melting Pot scores (see Appendix C).

- The relationship between the Tech-Pole and Talent indices is strong and positive for both Canada and the United States (Figure 12), indicating that in both countries there is a close connection between the prevalence of well-educated labour and technology-intensive employment. Once again, the strength of this relationship appears to be stronger in Canada than it is in the United States.[14]

- The relationship between the Tech-pole Index and the Bohemian Index (Figure 13) is perhaps one of the strongest and most consistent relationships in our analysis. The lines of best fit for Canadian and American city-regions are remarkably similar in slope and location, even though the strength of the relationship is stronger again for Canada than the United States[15]. The prominence of creative types seems to strongly mirror the geography of knowledge-intensive employment. This appears to be consistently true both north and south of the Canada-US border.

- The relationship between the Tech-Pole and Melting Pot/Mosaic indices[16] is considerably greater than that for the Talent and Melting Pot/Mosaic indices. The relationship in Figure 14 looks quite similar to that in Figure 11, likely for the same reasons (see above).

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[12] The R^2 values for the relationship between the Talent and Bohemian indices are 0.65 (p=0.000) and 0.61 (p=0.000) for Canada and the US respectively. The slopes are significantly different (p=0.015).

[13] The R^2 values for the relationship between the Talent and Mosaic / Melting Pot indices are 0.14 (p=0.067) and 0.01 (p=0.074) for Canada and the US respectively. The slopes are not significantly different.

[14] The R^2 values for the relationship between the Tech-Pole and Talent indices are 0.59 (p=0.000) for Canada and 0.37 (p=0.000) for the US. The slopes are not significantly different.

[15] The R^2 values for the relationship between the Tech-Pole and Bohemian indices are 0.74 (p=0.000) and 0.39 (p=0.000) for Canada and the US respectively. The slopes are not significantly different.

[16] The R^2 values for the relationship between the Tech-Pole and Mosaic / Melting Pot indices are 0.36 (p=0.002) and 0.06 (p=0.000) for Canada and the US respectively. The slopes are not significantly different.

Figure 10: Talent by Bohemian Index for North American City-Regions

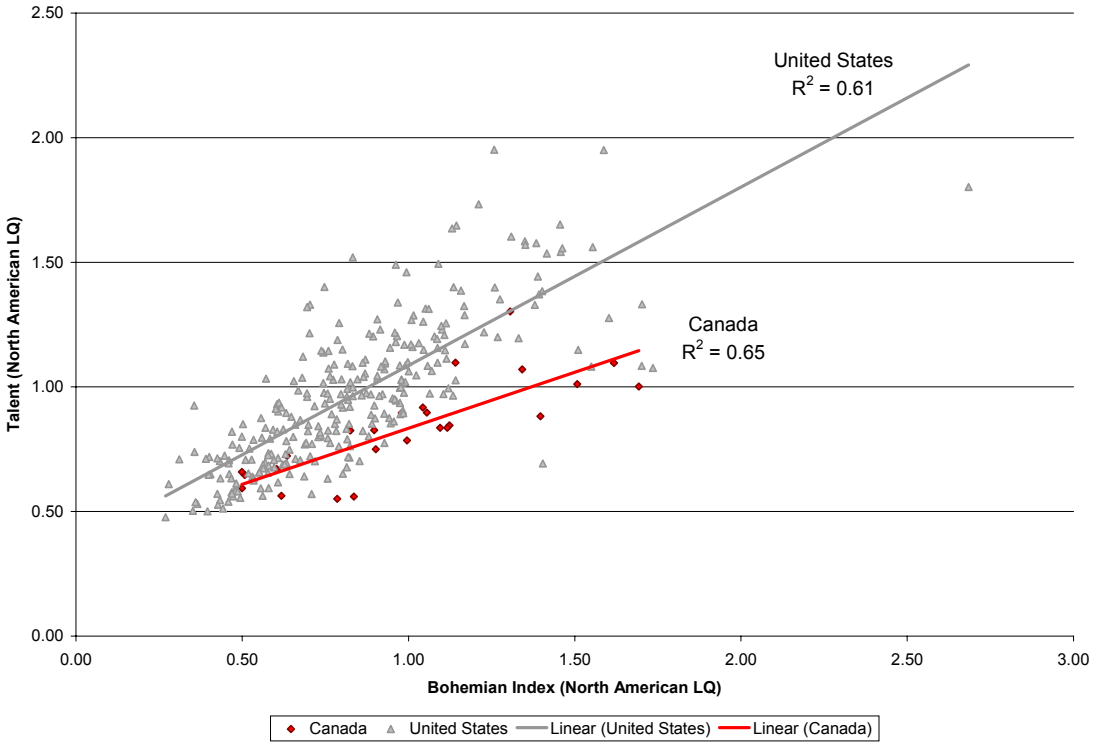

Figure 11: Talent by Mosaic/Melting Pot Index for North American City-Regions

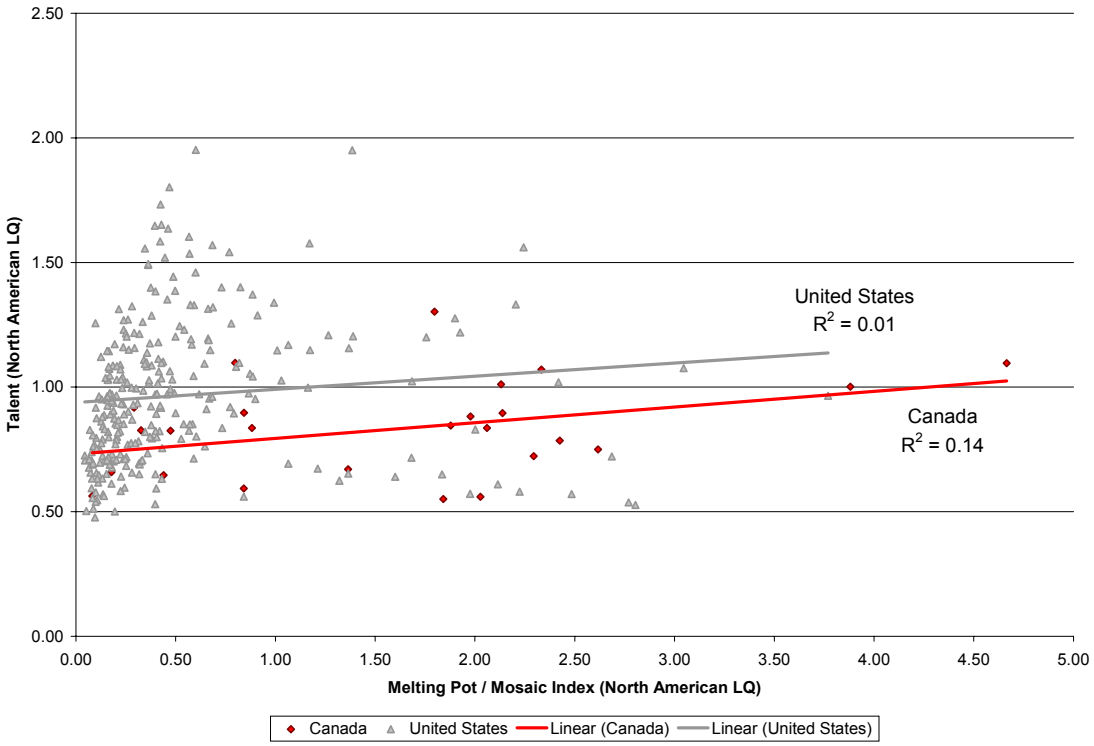

Figure 12: Tech-Pole Index by Talent for North American City-Regions

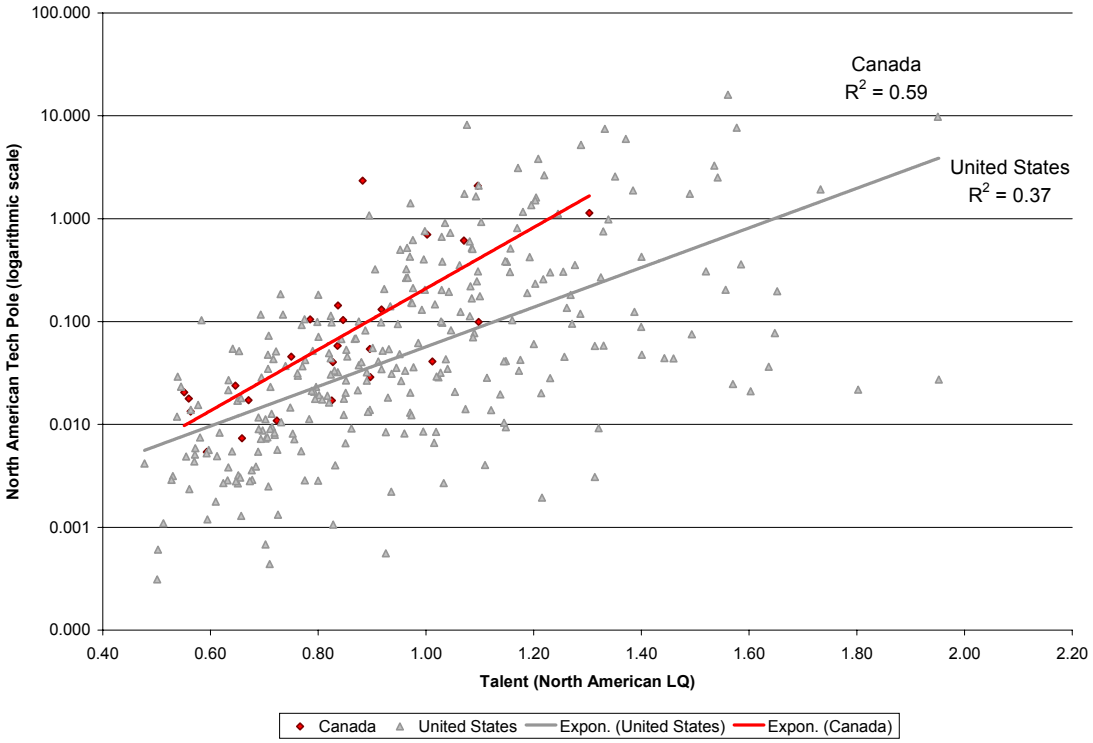

Figure 13: Tech-Pole Index by Bohemian Index for North American City-Regions

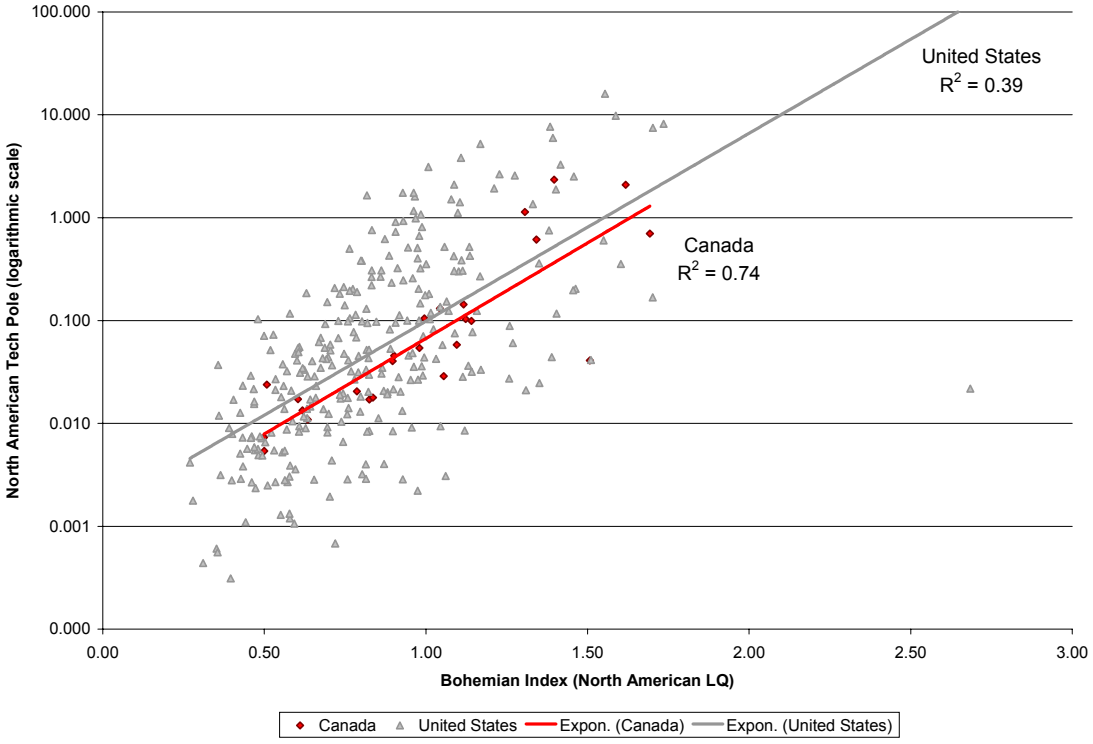

Figure 14: Tech-Pole Index by Mosaic Index for North American City-Regions

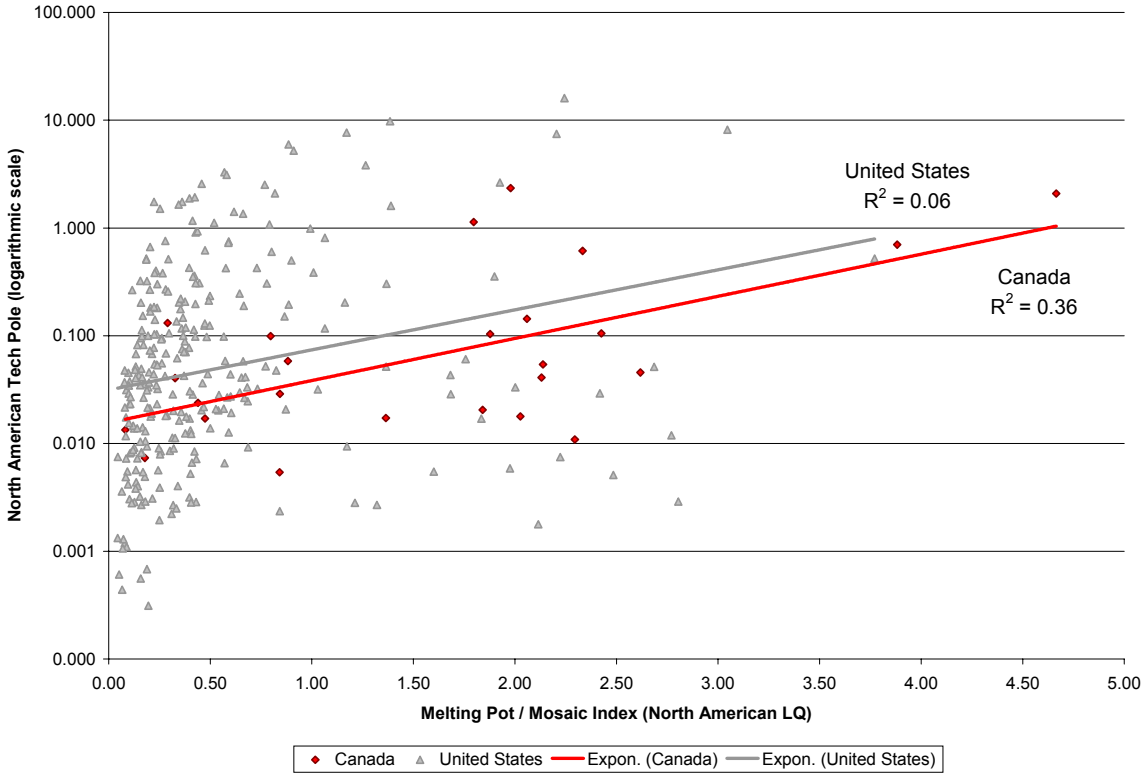

Table 3 summarizes the key rankings for Ontario's city-regions (Appendix C provides the complete rankings for all Canadian and US metropolitan regions).

Table 3: Ontario's City-Regions – North American Ranks by Population Size

	Talent	Bohemian Index	Mosaic Index	Tech Pole Index
Population more than 1 million (43 cities)				
Toronto	24	4	1	15
Ottawa	10	14	9	23
Population 500,000 to 1 million (39 cities)				
Hamilton	35	18	2	37
Population 250,000 to 500,000 (68 cities)				
Kitchener	46	15	3	15
London	28	18	6	26
Oshawa	67	36	11	54
St. Catharines-Niagara	66	27	8	58
Windsor	52	49	5	63
Population less than 250,000 (159 cities)				
Sudbury	142	128	16	120
Thunder Bay	125	103	6	76

The main area where Canadian city-regions appear to lag is talent. This is evident in the consistently low rankings on this index for Ontario's city-regions in all size categories (Table 3). Ottawa-Hull, which is a centre for both government employment and technology-intensive activity, emerges with the only top-10 North American ranking of any Ontario (or Canadian) city-region. Toronto, which ranks second in Canada, is a distant 24th out of 43 North American metropolitan regions with more than one million inhabitants. Similarly low Talent Index scores are evident for Ontario city-regions in smaller size categories. This consistently low performance relative to their counterpart city-regions in the United States likely reflects, at least in part, the somewhat divergent economic structures in the two countries. Especially in Ontario, manufacturing activity (in which even highly skilled workers may not have a bachelor's degree) remains a considerably more prominent source of employment than it does in many American city-regions.[17] Nevertheless, it also indicates a generally lower level of educational attainment across the board for residents of Canadian city-regions.

Ontario – and Canadian metropolitan regions generally – perform much better on the creativity (Bohemian Index) and diversity (Mosaic Index) measures (Table 3). Most notable here is the Mosaic Index. Although the strength of its relationship with talent and

[17] Manufacturing employment made up 14.4 percent of total employment in the United States in 2000, according to the US Bureau of Labor Statistics. The comparable figure for Canada in 2000 (from the Labour Force Survey) was 15.3 percent. By comparison, Ontario's figure for the same year was 18.7 percent.

technology-intensive employment is not as strong as other variables used in this analysis, nevertheless this indicates the high degree of openness to newcomers found in smaller and mid-sized Ontario communities. Our findings for Ontario's city-regions can be summarized as follows:

- Toronto emerges as a city-region with an excellent overall ranking of scores on at least three of these four indices, including two top-four ranks.
- Ottawa-Hull performs very well, with three top-half rankings (including two top-quartile rankings).
- London is the only city in Ontario that scores in the top half of the rankings for its size-group for all four indices.
- Kitchener has top-quartile scores in three out of four indices.
- Hamilton and St. Catharines-Niagara each have two scores in the top half of the rankings for its size group.

One thing is very clear from this analysis. The superb performance of city-regions in Ontario and Canada on the Mosaic and Bohemian indices suggests that these regions possess the underlying social and cultural assets on which to build successful local economies.

5.3 Canadian and US City-Regions: A Multivariate Analysis

We conclude our analysis by exploring the relationships between the study variables in a multivariate regression model. In this analysis, we examine the success with which a city's performance in generating/attracting technology-intensive employment (the Tech-Pole Index) can be successfully predicted by its score on the three other variables included in this investigation. We perform this analysis four different ways: once for all 25 Canadian CMAs alone, once with all 309 metropolitan areas in Canada and the United States combined, again for the 43 North American city-regions with populations above one million, and finally for the 266 North American city-regions below one million population.[18] We have also introduced a fourth explanatory variable into the statistical model: a Canada vs. United States 'dummy variable' to capture any systematic differences between the two countries' Tech-Pole scores not otherwise reflected in the first three explanatory variables.

The results of this analysis (Table 4) further confirm the general patterns and relationships already uncovered in the two-variable analyses above. We can interpret the coefficients in this table as showing the strength of the relationship between a particular explanatory

[18] Because of the small sample size (n=25) it was not possible to subdivide the Canadian analysis into smaller groups, whether defined by city size or provincial (e.g. Ontario) boundaries.

variable and the Tech-Pole Index, holding constant the influence of the other explanatory variables entered into the analysis.[19] Our findings can be summarized as follows:

- The Bohemian Index is the most consistent predictor of a city's high-technology industrial employment, no matter which subset of the 309 metropolitan regions is considered. In every case but one, it registers the strongest effect (largest coefficient) of all the explanatory variables. The only exception to this pattern is for city-regions below one million in population, for which the Talent Index has the largest effect on Tech-pole scores.

- The Talent Index is the next most consistent predictor of technology-intensive employment performance. This is not surprising given the strong relationship between these two variables noted earlier.

- While the Mosaic Index emerges as a variable with a positive and significant effect on the performance of the Tech-Pole Index for the entire sample, its effect is the weakest of the three explanatory variables. This no doubt reflects the rather unusual distribution of Melting Pot/Mosaic Index scores seen in the earlier scatterplot diagrams.

Table 4: Multivariate Regression Results – Canadian and US City-Regions

	Canadian Cities	North American Cities		
		All	1 million+	<1 million
Bohemian Index	0.54**	0.36***	0.47***	0.25***
Mosaic Index	0.14	0.14***	0.09	0.04
Talent Index	0.28	0.32***	0.43***	0.37***
Canada-US flag	n/a	-0.03	-0.16	0.05
Number of obs.	25	309	43	266
Adjusted R^2	0.73	0.45	0.59	0.33

Dependent Variable: Tech-Pole Index
Significance: *p= 0.1 **p= 0.05 ***p= 0.01

It is also worth pointing out two further patterns. First, for the three different analyses of North American city-regions, the best overall statistical performance is for the largest city-regions (with populations of more than one million).[20] This finding underscores the strong connection between city size and the key social and quality-of-place attributes at the centre of this analysis.

[19] The coefficients in Table 4 are standardized beta coefficients, in which the effect of different units of measurement has been removed, allowing for direct comparison between variables.

[20] Note the R^2 values of 0.59 for 1 million+ cities, 0.33 for <1 million cities, and 0.45 for all North American cities.

Second, it should be emphasized that this group of variables works best overall for the Canadian city-regions analysis, even though only one variable – the Bohemian Index – emerges as statistically significant.[21]

Finally, when one controls for the influence of all other explanatory variables, there is no significant difference between the Tech-Pole Index scores of Canadian and American city-regions.[22]

6 Conclusions and Implications for Ontario

The findings in this report strongly indicate that the relationships first captured for US city-regions in the work of Florida and colleagues are also evident in Ontario's and Canada's city-regions. Indeed, if anything, the relationships in Canada are stronger than those found in the United States. This is especially the case in the relationships between the Bohemian Index and both the Talent and Tech-Pole indices, as well as between the Mosaic Index and the other two indices. In other words, there appears to be a strong set of linkages between creativity, diversity, talent and technology-intensive activity that are driving the economic growth of Canada's – and Ontario's – city-regions.

In direct, head-to-head comparisons with their American counterparts in the same size groupings, Ontario's city-regions perform respectably, particularly on the Mosaic and Bohemian indices. This suggests that Ontario's metropolitan regions have a creative and diverse habitat on which to build and strengthen their knowledge-intensive economies and spur overall growth. The one consistently less impressive finding concerns educational attainment levels, where Ontario's and Canada's city-regions perform less well than their US counterparts on the Talent Index. While partial explanations for this gap may rest on suspected differences in definitions or the composition of employment, the apparently consistent spread between Canadian and US city-regions on the Talent Index merits further detailed investigation in the future.[23]

The strength of Ontario's urban economies on indicators such as cultural diversity and creativity suggest a powerful base on which to build. This also suggests that public policies at all three levels of government that support immigration and settlement, as well as

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[21] The R^2 of 0.73 is considerably higher than those associated with the other three models.

[22] This is evident in the fact that none of the Canada-US flag coefficients were statistically significant, and the size of these coefficients is quite small.

[23] For a more detailed discussion of the national differences in educational attainment between the United States and Canada, see Bowlby (2002). Since the late 1990s, Canada has led the United States in post-secondary educational attainment. However, the United States has a higher proportion of university graduates, although this gap is narrowing. Differences between the two countries are smaller amongst younger age cohorts suggesting that the gap between Canada and the United States may continue to narrow over time.

nurturing the arts and creativity, have played a critical role in creating the conditions for successful urban economic development today and into the future.[24]

These results also have wider implications for public policies related to urban development and growth management. They suggest that Ontario's and Canada's city-regions ought to reinforce and strengthen their urban character by using planning tools that encourage higher-density growth, diverse, mixed-use urban redevelopment, and the preservation and accentuation of authentic, distinctive neighbourhood character.

Finally, the findings from our investigation underscore one further key point. Our analysis has shown that the relationships between creativity, diversity, talent and technology-intensive employment are especially strong in Ontario's and Canada's largest city-regions. For this reason, it is vital that we regard such urban regions as the prime assets responsible for our provincial and national economic competitiveness, and treat them accordingly.

[24] For a more detailed discussion of these policy issues in the context of Canada's cities, see Gertler (2001). Public policies for integrating new immigrants into local social and economic systems include not only the traditional settlement programs addressing shelter, language, education and recognition of qualifications, but also include programs that ensure the delivery of high-quality public education to new Canadians, and that promote the continuing stability of neighbourhoods in Canada's largest cities.

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About the Researchers

Meric Gertler, PhD is Professor of Geography and Planning, and the Goldring Chair in Canadian Studies at the University of Toronto. He is also Co-Director of the Program on Globalization and Regional Innovation Systems (PROGRIS) at University of Toronto's Munk Centre for International Studies. Together with David Wolfe, he co-directs the Innovation Systems Research Network (ISRN) and its provincial sub-network, the Ontario Network on the Regional Innovation System (ONRIS).

Richard Florida, PhD is H. John Heinz III Professor of Regional Economic Development in the Heinz School of Public Policy and Management at Carnegie Mellon University (CMU). He is founder and co-director of the Software Industry Center at CMU – a multimillion-dollar research institute that involves leading computer scientists, software engineers, economists and social scientists across the university. He is also a member of the international Research Advisory Committee of the ISRN.

Gary Gates, PhD is a Research Associate in the Population Studies Centre at The Urban Institute, a nonpartisan economic and social policy research organization in Washington, DC. A graduate of CMU's doctoral program in Public Policy and Management, he has collaborated with Professor Florida on the analysis of talent, quality of place and diversity in US metropolitan areas.

Tara Vinodrai, MA is a doctoral student in economic geography at the University of Toronto and is a Research Associate with PROGRIS. Previously, she has worked as a research economist in the Microeconomic Analysis Division of Statistics Canada in Ottawa on issues related to the knowledge-based economy.

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Appendix A: Defining Bohemian Occupations in Canada and the United States

United States

SOC (3 digit)	Occupation Description
182	Authors
185	Designers
186	Musicians and composers
187	Actors and directors
188	Craft-Artists, painters, sculptors and artist printmakers
189	Photographers
193	Dancers
194	Artists, performers, and related workers

Source: Florida 2002.

Canada

SOC (4-digit)	Occupation Description
F021	Writers
F031	Producers, directors, choreographers, and related occupations
F032	Conductors, composers and arrangers
F033	Musicians and singers
F034	Dancers
F035	Actors
F036	Painters, sculptors and other visual artists
F121	Photographers
F141	Graphic designers and illustrating artists
F142	Interior designers
F143	Theatre, fashion, exhibit and other creative designers
F144	Artisans and craftspersons
F145	Patternmakers

Appendix B: Defining High-technology Industries in Canada and the United States

United States

SIC (3 digit)	Industry Description
283	Drugs
357	Computer and Office Equipment
366	Communications Equipment
367	Electronic Components and Accessories
372	Aircraft and Parts
376	Guided Missiles, Space Vehicles and Parts
381	Search, Detection, Navigation, Guidance, Aeronautical Nautical Systems, Instruments and Equipment
382	Laboratory Apparatus and Analytical, Optical, Measuring and Controlling Instruments
384	Surgical, Medical, and Dental Instruments and Supplies
481	Telephone Communications Services
737	Computer Programming, Data Processing, and Other Computer-related Services
781	Motion Picture Production and Allied Services
871	Engineering, Architectural, and Surveying Services
873	Research, Development, and Testing Services

Source: DeVol 1999, p. 34.

Canada

SIC (3-digit)	Industry Description
321	Aircraft and aircraft parts industry
335	Electronic equipment industries
374	Pharmaceutical and medicine industry
391	Scientific and professional equipment
482	Telecommunication carriers industry
483	Other telecommunication industries
772	Computer and related services
775	Architectural, Engineering and other scientific and technical services
868	Medical and other health laboratories
961	Motion picture audio and video production and distribution

Appendix C: Ranks of Key Variables by Size of Metropolitan Region

Ranks of Key Variables for Metropolitan Regions with Population > 1 million (n=43)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic Index	Bohemian Index	Tech Pole Index
New York NY CMSA	18,087,251	9	6	2	5
Los Angeles--Anaheim--Riverside, CA CMSA	14,531,529	27	4	1	3
Chicago--Gary--Lake County, IL--IN--WI CMSA	8,065,633	13	12	19	8
San Francisco--Oakland--San Jose, CA CMSA	6,253,311	3	5	6	1
Philadelphia PA CMSA	5,899,345	19	25	24	10
Detroit--Ann Arbor, MI CMSA	4,665,236	38	24	20	20
Toronto, ON CMA	4,263,757	24	1	4	15
Boston--Lawrence--Salem, MA--NH CMSA	4,171,643	2	13	12	4
Washington, DC--MD--VA MSA	3,923,574	1	11	5	2
Dallas--Fort Worth, TX CMSA	3,885,415	11	17	17	7
Houston--Galveston--Brazoria, TX CMSA	3,711,043	14	10	33	18
Montréal, QU CMA	3,326,510	43	7	10	13
Miami--Fort Lauderdale, FL CMSA	3,192,582	40	3	18	33
Atlanta, GA MSA	2,833,511	7	31	15	12
Cleveland--Akron--Lorain, OH CMSA	2,759,823	37	29	39	31
Seattle--Tacoma, WA CMSA	2,559,164	6	19	11	6
San Diego, CA MSA	2,498,016	12	8	16	11
Minneapolis--St. Paul, MN--WI MSA	2,464,124	5	35	9	16
St. Louis, MO--IL MSA	2,444,099	28	41	37	17
Baltimore, MD MSA	2,382,172	18	34	34	22
Pittsburgh--Beaver Valley, PA CMSA	2,242,798	32	38	40	28
Phoenix, AZ MSA	2,122,101	23	20	21	14
Tampa--St. Petersburg--Clearwater, FL MSA	2,067,959	42	22	27	24
Denver--Boulder, CO CMSA	1,848,319	4	27	8	9
Vancouver, BC CMA	1,831,665	31	2	3	29

Ranks of Key Variables for Metropolitan Regions with Population > 1 million (n=43)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic Index	Bohemian Index	Tech Pole Index
Cincinnati--Hamilton, OH--KY--IN CMSA	1,744,124	30	42	28	30
Milwaukee--Racine, WI CMSA	1,607,183	29	33	25	40
Kansas City, MO--KS MSA	1,566,280	15	39	23	19
Sacramento, CA MSA	1,481,102	20	15	26	27
Portland--Vancouver, OR--WA CMSA	1,477,895	16	23	13	21
Norfolk--Virginia Beach--Newport News, VA MSA	1,396,107	39	36	38	37
Columbus, OH MSA	1,377,419	21	37	35	34
San Antonio, TX MSA	1,302,099	41	18	42	36
Indianapolis, IN MSA	1,249,822	25	43	31	35
New Orleans, LA MSA	1,238,816	35	30	41	43
Buffalo--Niagara Falls, NY CMSA	1,189,288	36	28	43	41
Charlotte--Gastonia--Rock Hill, NC--SC MSA	1,162,093	34	40	30	39
Providence--Pawtucket--Fall River, RI--MA CMSA	1,141,510	33	14	29	42
Hartford--New Britain--Middletown, CT CMSA	1,085,837	8	16	32	25
Orlando, FL MSA	1,072,748	26	21	7	32
Salt Lake City--Ogden, UT MSA	1,072,227	22	32	36	26
Ottawa – Hull, ON CMA	1,010,498	10	9	14	23
Rochester, NY MSA	1,002,410	17	26	22	38

Note: In some cases, CMSA and CMA names have been shortened to reflect their core city.

Ranks of Key Variables for Metropolitan Regions with Population between 500,000 and 1 million (n=39)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic Index	Bohemian Index	Tech Pole Index
Nashville, TN MSA	985,026	12	31	1	20
Memphis, TN--AR--MS MSA	981,747	23	36	25	29
Oklahoma City, OK MSA	958,839	13	21	24	16
Louisville, KY--IN MSA	952,662	30	38	20	30
Dayton--Springfield, OH MSA	951,270	19	32	22	12
Greensboro--Winston-Salem--High Point, NC MSA	942,091	18	34	12	21
Birmingham, AL MSA	907,810	21	39	23	13
Jacksonville, FL MSA	906,727	26	19	34	17
Albany--Schenectady--Troy, NY MSA	874,304	5	15	19	15
Richmond--Petersburg, VA MSA	865,640	4	22	16	14
West Palm Beach, FL MSA	863,518	7	8	11	11
Edmonton, AB CMA	862,597	33	4	9	23
Honolulu, HI MSA	836,231	6	7	5	33
Calgary, AB CMA	821,628	14	3	4	3
Austin, TX MSA	781,572	2	12	2	1
Las Vegas, NV MSA	741,459	38	10	3	26
Raleigh--Durham, NC MSA	735,480	1	18	6	2
Scranton--Wilkes-Barre, PA MSA	734,175	36	29	36	19
Tulsa, OK MSA	708,954	15	28	29	6
Grand Rapids, MI MSA	688,399	17	20	15	22
Allentown--Bethlehem--Easton, PA--NJ MSA	686,688	28	17	27	28
Québec, QU CMA	671,889	27	23	13	25
Fresno, CA MSA	667,490	34	5	37	39
Winnipeg, MB CMA	667,209	32	6	8	27
Tucson, AZ MSA	666,880	9	11	10	5
Syracuse, NY MSA	659,864	10	16	21	10
Greenville--Spartanburg, SC MSA	640,861	29	33	14	9
Hamilton, ON CMA	624,360	35	2	18	37
Omaha, NE--IA MSA	618,262	8	25	28	7

Ranks of Key Variables for Metropolitan Regions with Population between 500,000 and 1 million (n=39)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic Index	Bohemian Index	Tech Pole Index
Toledo, OH MSA	614,128	31	24	30	32
Knoxville, TN MSA	604,816	20	37	17	8
El Paso, TX MSA	591,610	37	1	35	36
Harrisburg--Lebanon--Carlisle, PA MSA	587,986	24	27	33	24
Bakersfield, CA MSA	543,477	39	9	39	35
New Haven--Meriden, CT MSA	530,180	3	13	7	4
Springfield, MA MSA	529,519	22	14	26	38
Baton Rouge, LA MSA	528,264	11	30	31	31
Little Rock--North Little Rock, AR MSA	513,117	16	35	32	18
Charleston, SC MSA	506,875	25	26	38	34

Note: In some cases, CMSA and CMA names have been shortened to reflect their core city.

Ranks of Key Variables for Metropolitan Regions with Population between 250,000 and 500,000 (n=68)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic Index	Bohemian Index	Tech Pole Index
Youngstown--Warren, OH MSA	492,619	58	44	59	57
Wichita, KS MSA	485,270	15	40	30	1
Stockton, CA MSA	480,628	60	12	67	60
Albuquerque, NM MSA	480,577	2	22	5	4
Mobile, AL MSA	476,923	43	58	41	19
Columbia, SC MSA	453,331	4	46	24	21
Worcester, MA MSA	436,905	9	19	35	9
Johnson City--Kingsport--Bristol, TN--VA MSA	436,047	56	68	55	30
Chattanooga, TN--GA MSA	433,210	45	62	31	28
Lansing--East Lansing, MI MSA	432,674	10	37	11	35
Flint, MI MSA	430,459	61	51	44	25
Lancaster, PA MSA	422,822	35	48	26	27
York, PA MSA	417,848	55	60	46	42
Lakeland--Winter Haven, FL MSA	405,382	59	34	48	59
Saginaw--Bay City--Midland, MI MSA	399,320	48	53	42	41
Melbourne--Titusville--Palm Bay, FL MSA	398,978	18	24	22	5
London, ON CMA	398,616	28	6	18	26
Colorado Springs, CO MSA	397,014	8	28	9	2
Augusta, GA--SC MSA	396,809	27	45	51	24
Jackson, MS MSA	395,396	6	65	33	32
Canton, OH MSA	394,106	53	57	52	64
Des Moines, IA MSA	392,928	11	50	12	16
Mcallen--Edinburg--Mission, TX MSA	383,545	68	1	68	62
Kitchener, ON CMA	382,940	46	3	15	15
St. Catharines – Niagara, ON CMA	372,406	66	8	27	58
Daytona Beach, FL MSA	370,712	49	21	28	47
Modesto, CA MSA	370,522	62	13	60	67
Santa Barbara--Santa Maria--Lompoc, CA MSA	369,608	3	10	1	6
Madison, WI MSA	367,085	1	32	4	8

Ranks of Key Variables for Metropolitan Regions with Population between 250,000 and 500,000 (n=68)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic Index	Bohemian Index	Tech Pole Index
Fort Wayne, IN MSA	363,811	31	55	21	17
Spokane, WA MSA	361,364	21	38	19	18
Beaumont--Port Arthur, TX MSA	361,226	57	41	50	49
Salinas--Seaside--Monterey, CA MSA	355,660	23	4	17	48
Davenport--Rock Island--Moline, IA--IL MSA	350,861	29	47	39	44
Corpus Christi, TX MSA	349,894	44	27	56	53
Lexington-Fayette, KY MSA	348,428	5	49	13	10
Pensacola, FL MSA	344,406	25	43	32	56
Peoria, IL MSA	339,172	33	56	25	52
Reading, PA MSA	336,523	47	42	40	14
Fort Myers--Cape Coral, Fl MSA	335,113	36	25	38	50
Shreveport, LA MSA	334,341	30	63	47	39
Halifax, NS CMA	332,518	14	15	7	20
Atlantic City, NJ MSA	319,416	37	26	29	55
Utica--Rome, NY MSA	316,633	42	36	61	22
Appleton--Oshkosh--Neenah, WI MSA	315,121	34	54	20	31
Huntington--Ashland, WV--KY--OH MSA	312,529	63	67	64	51
Visalia--Tulare--Porterville, CA MSA	311,921	64	9	63	66
Victoria, BC CMA	304,287	24	7	3	38
Montgomery, AL MSA	292,517	19	61	45	34
Rockford, IL MSA	283,719	39	33	37	13
Eugene--Springfield, OR MSA	282,912	16	35	16	23
Macon--Warner Robins, GA MSA	281,103	41	59	53	29
Evansville, IN--KY MSA	278,990	50	66	34	46
Windsor, ON CMA	278,685	52	5	49	63
Salem, OR MSA	278,024	26	20	54	37
Sarasota, FL MSA	277,776	12	18	2	36
Erie, PA MSA	275,572	40	52	43	33
Fayetteville, NC MSA	274,566	51	30	62	65
Oshawa, ON CMA	268,773	67	11	36	54

Ranks of Key Variables for Metropolitan Regions with Population between 250,000 and 500,000 (n=68)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic Index	Bohemian Index	Tech Pole Index
New London--Norwich, CT--RI MSA	266,819	17	29	10	12
Binghamton, NY MSA	264,497	20	31	23	3
Provo--Orem, UT MSA	263,590	13	39	14	11
Brownsville--Harlingen, TX MSA	260,120	65	2	65	68
Poughkeepsie, NY MSA	259,462	7	16	8	7
Killeen--Temple, TX MSA	255,301	54	23	66	61
Reno, NV MSA	254,667	22	14	6	45
Fort Pierce, FL MSA	251,071	38	17	57	43
Charleston, WV MSA	250,454	32	64	58	40

Note: In some cases, CMSA and CMA names have been shortened to reflect their core city.

Ranks of Key Variables for Metropolitan Regions with Population less than 250,000 (n=159)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic	Bohemian Index	Tech Pole Index
South Bend--Mishawaka, IN MSA	247,052	50	65	89	28
Columbus, GA--AL MSA	243,072	100	60	109	15
Savannah, GA MSA	242,622	70	90	88	26
Johnstown, PA MSA	241,247	153	142	142	50
Springfield, MO MSA	240,593	58	127	33	33
Duluth, MN--WI MSA	239,971	73	92	91	73
Huntsville, AL MSA	238,912	11	59	32	1
Tallahassee, FL MSA	233,598	10	58	18	24
Anchorage, AK MSA	226,338	20	22	22	31
Roanoke, VA MSA	224,477	59	104	31	44
Portsmouth--Dover--Rochester, NH--ME MSA	223,578	23	66	24	12
Kalamazoo, MI MSA	223,411	22	55	26	14
Lubbock, TX MSA	222,636	32	61	71	70
Hickory--Morganton, NC MSA	221,700	137	134	102	105
Waterbury, CT MSA	221,629	52	13	84	11
Saskatoon, SK CMA	219,056	66	14	21	51
Portland, ME MSA	215,281	15	57	7	21
Lincoln, NE MSA	213,641	18	76	10	6
Bradenton, FL MSA	211,707	86	24	45	71
Lafayette, LA MSA	208,740	60	99	101	48
Boise City, ID MSA	205,775	24	85	16	5
Gainesville, FL MSA	204,111	12	26	27	36
Biloxi--Gulfport, MS MSA	197,125	92	73	95	91
Ocala, FL MSA	194,833	143	49	118	121
Green Bay, WI MSA	194,594	69	107	29	57
Regina, SK CMA	193,652	76	11	17	30
St. Cloud, MN MSA	190,921	85	147	73	75
Bremerton, WA MSA	189,731	54	39	39	68
Springfield, IL MSA	189,550	31	112	64	39

Ranks of Key Variables for Metropolitan Regions with Population less than 250,000 (n=159)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic	Bohemian Index	Tech Pole Index
Waco, TX MSA	189,123	82	51	49	49
Yakima, WA MSA	188,823	124	8	114	140
Amarillo, TX MSA	187,547	62	44	42	103
Fort Collins--Loveland, CO MSA	186,136	8	63	2	8
Houma--Thibodaux, LA MSA	182,842	159	143	159	125
Chico, CA MSA	182,120	57	21	35	58
Merced, CA MSA	178,403	145	2	131	110
Fort Smith, AR--OK MSA	175,911	140	84	133	117
New Bedford, MA MSA	175,641	106	5	56	37
Asheville, NC MSA	174,821	51	109	28	43
St. John's, NF CMA	174,051	79	68	43	40
Champaign--Urbana--Rantoul, IL MSA	173,025	7	20	4	59
Clarksville--Hopkinsville, TN--KY MSA	169,439	130	72	139	144
Cedar Rapids, IA MSA	168,767	37	100	20	2
Lake Charles, LA MSA	168,134	99	152	154	41
Longview--Marshall, TX MSA	162,431	91	94	122	65
Benton Harbor, MI MSA	161,378	74	56	81	88
Olympia, WA MSA	161,238	25	31	41	54
Topeka, KS MSA	160,976	30	118	72	94
Sudbury, ON CMA	160,488	142	16	128	120
Chicoutimi – Jonquière, QU CMA	160,454	149	150	100	85
Wheeling, WV--OH MSA	159,301	134	126	145	129
Muskegon, MI MSA	158,983	148	122	116	83
Athens, GA MSA	156,267	27	71	44	69
Elkhart--Goshen, IN MSA	156,198	107	86	90	63
Lima, OH MSA	154,340	151	148	130	123
Fargo--Moorhead, ND--MN MSA	153,296	28	97	9	47
Naples, FL MSA	152,099	29	9	23	95
Tyler, TX MSA	151,309	53	47	68	89
Tuscaloosa, AL MSA	150,522	56	116	83	106

Ranks of Key Variables for Metropolitan Regions with Population less than 250,000 (n=159)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic	Bohemian Index	Tech Pole Index
Richland--Kennewick--Pasco, WA MSA	150,033	42	10	62	9
Jacksonville, NC MSA	149,838	154	52	153	132
Jackson, MI MSA	149,756	129	119	60	131
Parkersburg--Marietta, WV--OH MSA	149,169	119	149	98	90
Manchester, NH MSA	147,809	36	23	36	7
Sherbrooke, QU CMA	147,384	80	36	54	77
Redding, CA MSA	147,036	118	70	97	99
Waterloo--Cedar Falls, IA MSA	146,611	77	120	59	127
Medford, OR MSA	146,389	68	50	38	86
Anderson, SC MSA	145,196	127	153	119	151
Fort Walton Beach, FL MSA	143,776	45	35	51	19
Steubenville--Weirton, OH--WV MSA	142,523	158	96	151	159
Lynchburg, VA MSA	142,199	75	124	76	27
Monroe, LA MSA	142,191	65	141	99	46
Jamestown--Dunkirk, NY	141,895	104	80	149	108
Trois-Rivières, QU CMA	139,956	126	106	129	111
Janesville--Beloit, WI MSA	139,510	122	102	58	136
Eau Claire, WI MSA	137,543	87	93	75	10
Battle Creek, MI MSA	135,982	115	98	77	155
Las Cruces, NM MSA	135,510	46	4	92	52
Joplin, MO MSA	134,910	128	138	111	134
Laredo, TX MSA	133,239	155	1	148	135
Greeley, CO MSA	131,821	67	32	96	82
Decatur, AL MSA	131,556	103	156	104	116
Alexandria, LA MSA	131,556	123	125	143	130
Burlington, VT MSA	131,439	6	43	5	3
Florence, AL MSA	131,327	102	159	110	150
Charlottesville, VA MSA	131,107	3	53	12	23
Dothan, AL MSA	130,964	101	103	106	93
Terre Haute, IN MSA	130,812	84	91	74	72

Ranks of Key Variables for Metropolitan Regions with Population less than 250,000 (n=159)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic	Bohemian Index	Tech Pole Index
Anderson, IN MSA	130,669	141	151	108	152
Lafayette--West Lafayette, IN MSA	130,598	17	27	79	29
Altoona, PA MSA	130,542	152	136	146	61
Bloomington--Normal, IL MSA	129,180	21	89	19	133
Bellingham, WA MSA	127,780	40	12	47	67
Panama City, FL MSA	126,994	90	54	66	74
Mansfield, OH MSA	126,137	144	88	134	17
Saint John, NB CMA	125,705	132	41	126	60
Thunder Bay, ON CMA	125,562	125	6	103	76
Sioux Falls, SD MSA	123,809	38	113	40	16
State College, PA MSA	123,786	16	33	11	13
Pueblo, CO MSA	123,051	108	83	152	98
Yuba City, CA MSA	122,643	136	7	121	143
Wichita Falls, TX MSA	122,378	88	48	93	139
Bryan--College Station, TX MSA	121,862	14	17	69	34
Hagerstown, MD MSA	121,393	147	123	78	124
Sharon, PA MSA	121,003	120	110	115	119
Wilmington, NC MSA	120,284	41	108	25	22
Texarkana, TX--Texarkana, AR MSA	120,132	131	133	150	141
Muncie, IN MSA	119,659	94	128	37	137
Abilene, TX MSA	119,655	48	46	70	114
Odessa, TX MSA	118,934	150	15	135	146
Williamsport, PA MSA	118,710	133	135	120	56
Glens Falls, NY MSA	118,539	93	77	85	38
Decatur, IL MSA	117,206	96	144	136	118
Santa Fe, NM MSA	117,043	2	37	1	64
Anniston, AL MSA	116,034	113	121	147	112
Wausau, WI MSA	115,400	121	81	107	128
Pascagoula, MS MSA	115,243	105	114	57	104
Sioux City, IA--NE MSA	115,018	83	62	137	78

Ranks of Key Variables for Metropolitan Regions with Population less than 250,000 (n=159)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic	Bohemian Index	Tech Pole Index
Florence, SC MSA	114,344	97	137	124	107
Billings, MT MSA	113,419	39	111	63	81
Fayetteville--Springdale, AR MSA	113,409	55	101	61	87
Albany, GA MSA	112,561	89	139	117	62
Columbia, MO MSA	112,379	4	38	13	42
Lawton, OK MSA	111,486	72	28	127	115
Bloomington, IN MSA	108,978	13	34	3	35
Danville, VA MSA	108,711	157	157	156	156
Burlington, NC MSA	108,213	98	131	94	80
Yuma, AZ MSA	106,895	139	3	158	149
Midland, TX MSA	106,611	19	19	82	96
Rochester, MN MSA	106,470	9	40	52	4
Sheboygan, WI MSA	103,877	114	69	50	92
Fitchburg--Leominster, MA MSA	102,797	64	18	55	32
Cumberland, MD--WV MSA	101,643	146	140	138	79
Gadsden, AL MSA	99,840	156	145	144	153
San Angelo, TX MSA	98,458	81	29	65	18
La Crosse, WI MSA	97,904	49	75	14	101
Kokomo, IN MSA	96,946	116	132	113	100
Kankakee, IL MSA	96,255	138	105	132	122
Iowa City, IA MSA	96,119	1	25	8	55
Elmira, NY MSA	95,195	95	78	86	20
Sherman--Denison, TX MSA	95,021	110	95	123	25
Bangor, ME MSA	88,745	35	64	46	126
Lewiston--Auburn, ME MSA	88,141	135	42	67	138
Owensboro, KY MSA	87,189	112	158	140	109
Dubuque, IA MSA	86,403	71	129	34	97
Pine Bluff, AR MSA	85,487	109	155	157	158
Bismarck, ND MSA	83,831	33	130	87	84
St. Joseph, MO MSA	83,083	117	146	141	113

Ranks of Key Variables for Metropolitan Regions with Population less than 250,000 (n=159)

CMSA / CMA	Population	Talent	Melting Pot / Mosaic	Bohemian Index	Tech Pole Index
Lawrence, KS MSA	81,798	5	30	6	66
Rapid City, SD MSA	81,343	43	87	48	45
Pittsfield, MA MSA	79,250	34	45	15	53
Jackson, TN MSA	77,982	78	154	105	154
Great Falls, MT MSA	77,691	61	74	30	147
Victoria, TX MSA	74,361	111	67	125	145
Cheyenne, WY MSA	73,142	47	79	53	102
Grand Forks, ND MSA	70,683	26	82	80	148
Casper, WY MSA	61,226	44	115	112	142
Enid, OK MSA	56,735	63	117	155	157

Note: In some cases, CMSA and CMA names have been shortened to reflect their core city.