

# WORKING PAPER

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## Creativity and Connectivity: Understanding the Positive Effects of Connections\*

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### Abstract:

*The importance of creativity as a driving force in regional economic growth and prosperity has been well documented (Florida, 2002). However, the mechanisms of this relationship are less understood. Knudsen et al (2003) have shown that innovative activity within a region is positively associated with population density and creative class workforce both jointly and separately. The explanation put forth suggests, but does not confirm, that high levels of density and creative class employment create conditions under which positive interactions between individuals are more likely to spontaneously occur. This paper examines the specific interactions among the creative, technical, business and design communities of the Canadian Montréal region. Our findings document both positive and negative effects associated with these connections. This paper does not present an exhaustive analysis of these issues; rather it demonstrates that such connections are possible and can have a positive impact on the innovative and total business activity across the region. With its bilingual and multicultural nature, the Montréal region occupies a unique*

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*position within the North American context. While many of the connections presented may be applicable to any city, some are unique to the Montréal region. These are separately presented and discussed. By providing specific examples, this paper demonstrates a set of mechanisms through which creativity helps to achieve regional growth and prosperity benefits.*

## Introduction

The importance of creativity as a driving force in regional economic growth and prosperity has been well documented (Florida, 2002). However, the mechanisms of this relationship are less understood. Knudsen, et al (2003) have shown that innovative activity within a region is positively associated with population density and creative class workforce both jointly and separately. The explanation put forth suggests, but does not confirm, that high levels of density and creative class employment create conditions under which positive interactions between individuals are more likely to spontaneously occur. This paper presents evidence of those positive interactions.

In "The New Economics of Urban and Regional Growth", Edward Glaeser (2000, p.84) comments:

In dense, urban environments proximity enables workers to acquire human capital by imitating a rich array of role models and learning by seeing. Alternatively, the flow of ideas may increase the rate of technological innovation and may lead dense cities to have a faster rate of new product innovation. If there is a greater variety of new ideas in cities, then these ideas may show up in new firms and better production processes.

In *The Death and Life of Great American Cities*, Jane Jacobs (1961, p. 148) notes:

[W]herever we find a city district with an exuberant variety and plenty in its commerce, we are apt to find that it contains a good many other kinds of diversity also, including variety of cultural opportunities, variety of scenes, and a great variety in its population and other assets. This is more than coincidence. The same physical and economic conditions that generate diverse commerce are intimately related to the production, or the presence, of other kinds of city variety.

Later, in *The Economy of Cities*, Jacobs (1969) contrasts the decline of Manchester, whose "efficient specialization portended the stagnation and a profoundly obsolescent city" (p. 88) with the success of Birmingham whose "fragmented and inefficient little industries kept adding new work, and splitting off new organizations, some of which have become very large but are still outweighed in total employment and production by the many small ones" (p. 89).

While density alone may increase the chance of positive interactions between individuals that result in innovations, the diversity and size of the underlying innovative population, in this case the "creative class," or workers paid to think for a living, magnify these results. As Knudsen, et al (2003) put it, "the 'whole' of this class is greater than the sum of its parts, in large part due to the relationships between its members that are made possible by density." They propose that this effect is the result of interactions between various and differing members of this class. By examining specific interactions among the creative, technical, business and design communities of the Canadian Montréal region, this paper documents some of those interactions and provides a further explanation for Glaeser's and Jacob's suggestions and Knudsen, et al's finding that regional innovation is related to both density and a broadly creative population.

Our findings document both positive and negative effects associated with these connections. This paper does not present an exhaustive analysis of these issues; rather it demonstrates that such connections are possible and can have a positive impact on the innovative and total business activity across the region.

With its bilingual and multicultural nature, the Montréal region occupies a unique position within the North American context. While many of the connections presented may be applicable to any city, some are unique to the Montréal region. These are separately presented and discussed. By providing specific examples, this paper demonstrates a set of mechanisms through which creativity helps to achieve regional growth and prosperity benefits.

This paper will present background on the relationships between regional innovation and growth and both density and diversity of the creative economy. Background and comparative information on the Montréal region is next presented along with motivation for selecting the Montréal region as the study locale. This is followed by an exposition of the hypotheses to be investigated and the methodology used to inform those hypotheses. The study concludes with a discussion of the results found and implications of those results along with future avenues of research.

## Background

Theories of regional economic growth have stressed the importance of the role played by technological spillovers. For examples, see Marshall (1890), Arrow (1962), Jacobs (1969), Romer (1986), Porter (1989), and Glaeser, et al (1992). The interactions created by the combination of density with size and diversity within cities accelerate and magnify this spillover process (Jacobs, 1961; Glaeser, 1992; Knudsen, et al, 2003). Recent research has demonstrated the importance of human capital on regional innovation (Zucker, et al, 1998; Lucas, 1988). Richard Florida's creative capital theory (2002) claims that it is the density of not only human capital but of those whose occupations have a creative component that are primarily responsible for innovation and subsequently growth. While density and diversity are known to have a positive impact on regional innovation, the findings rely on unseen and undocumented interactions to generate the spillovers.

The standard approach to understanding the positive impact from spillovers is to investigate knowledge spillovers between firms in an industry (Arrow, 1962; Romer, 1986). Marshall (1890) applies this thinking to cities and posits that industry and city growth is positively impacted by the knowledge spillovers generated by high concentrations of an industry in a city. Porter (1990) adds that local competition within the concentrated industry cluster drives more rapid generation and adoption of innovations. Unlike the Porter and Marshall approaches, Jacobs (1969) posits that knowledge transfers across industries and even sectors are the most important source of innovation. In this case, diversity and proximity rather than specialization and concentration drive innovation and growth. In a comparison of these three models (Marshall-Arrow-Romer, Porter, and Jacobs), Glaeser, et al (1992) found that "inter-industry knowledge spillovers are less important for growth than spillovers across industries, particularly in the case of fairly mature cities."

Existing literature has demonstrated the links between knowledge producing inputs, outputs, and knowledge spillovers (Jaffe, 1986) noting that a significant fraction of spillovers affecting a firm's innovative activity come from other firms. According to Feldman (2000), demonstrating that knowledge can spill across firms at all, especially across firms in close technological proximity, means that there is a credible possibility that geographic proximity can also mediate these spillovers. Thus, recent literature has added a geographic element in an attempt to measure "the geographic impact of knowledge spillovers on innovation" (Feldman, 2000, p. 374). A study by Audretsch and Feldman (1996, p. 630) presents key findings

in this line of research. They note that an important result of previous research is that the R&D investments of private corporations and universities spill over to third parties. If the ability to receive knowledge spillovers depends on distance from the knowledge source, then clustering of knowledge producing inputs (R&D expenditures, human capital, etc) should ensue. It follows that the innovative activity should also cluster, following the clustering of the inputs. Conversely, if we observed a more evenly spread pattern of innovation, it would imply that knowledge spillovers are not geographically mediated. The authors find that, even after controlling for the concentration of production, innovation is still concentrated close to the source of the new knowledge. This provides evidence that the spillovers have a geographic limitation. Glaeser (2000, p.103) provides intuition for this effect when he notes that "The [externality] kind of [non-market] interaction even more strongly depends on spatial proximity. In many cases, these effortless transmissions of ideas and values depend on sight or hearing... Obviously, the ability to see or hear depreciates sharply with space". The important insight from this strain of research is to show that the geographic proximity of knowledge producing inputs influences the knowledge flows that are responsible for innovation. But, there is little empirical attention given to the mechanisms that produce the spillovers. We next describe literature that looks into these mechanisms promoting spillovers.

Zucker, Darby, and Brewer (1998) demonstrate how intellectual human capital is a means by which geographically mediated spillovers are realized. They empirically demonstrate how the localization of intellectual human capital (embodied in "star" bio-technology scientists) is predictive of the localization of new bio-tech start-up firms. Feldman (2000, p.380-1) claims that "This work demonstrates that localized intellectual capital is key in the development of the bio-tech industry and that knowledge generates externalities that tend to be geographically bounded within the region where the scientists reside". Thus, whereas the first strain of literature demonstrated that geographic proximity is important in that it promotes the spillovers necessary for innovation, this research suggests that the skills and knowledge embodied in individuals are the mechanisms by which these spillovers actually occur.

Lucas (1988, p.38) takes this one step further when he reasons that it is the interactions between individuals with high human capital that facilitates spillovers and the growth of knowledge<sup>1</sup>. He continues by saying that these interactions are so important that people are willing to pay extremely high land rents in order to be

close to other people, and thus to benefit in terms of learned knowledge and increased productivity.

According to Florida (2002, p. 249):

[R]egional economic growth is powered by creative people, who prefer places that are diverse, tolerant and open to new ideas. Diversity increases the odds that a place will attract different types of creative people with different skill sets and ideas. Places with diverse mixes of creative people are more likely to generate new combinations. Furthermore, diversity and concentration work together to speed the flow of knowledge. Greater and more diverse concentrations of creative capital in turn lead to higher rates of innovation, high-technology business formation, job generation and economic growth.

Thus, to summarize, the knowledge transmission and learning preceding innovation is geographically bounded if, given the tacit nature of the knowledge often responsible for innovation, the knowledge producing sources must be proximate to enable the spillovers to occur. The mechanism enabling these spillovers to occur is the intellectual human capital and knowledge embodied in individuals, and specifically, according to Lucas, the interactions amongst these individuals. While earlier work focused on the importance of spillovers between firms as the important driver of regional growth, more recent findings have shown the importance of the connections between individuals and the diversity of those connections as a more important factor. The encounters that create these individual connections are more likely to occur in a region with higher density.

The relationship between population density and innovation reflects, expands upon, but in important ways departs from, the inter-related concepts of proximity, knowledge spillovers, and face-to-face interactions of intellectual human capital often discussed in recent economic geography literature. From a theoretical point of view, density better explains the common mechanisms typically called upon in the literature to relate spillovers and learning to innovation. Density provides a better explanation both for why spillovers promote innovation and why they have a geographic component (Audretsch and Feldman, 1996; Autant-Bernard and Massard, 2001). Ciccone and Hall (1996) find that state level employment density increases average labor productivity, and a working paper by Carlino, et al (2001) demonstrates the positive role of local employment density on innovation. Knudsen, et al (2003) find that population density, specifically density of the "creative class," is more appropriate

than employment density. Creative, educated working people will choose to live and work in those locations that enable them to improve upon and take as great advantage of their skills as possible (Florida, 2002). In essence, they hope to locate in a place that will make them more productive, where an increase in productivity can result in increases in pay, recognition, job satisfaction or other desirable characteristics of work. Thus, we might conclude that they would value dense environments, to the extent that such places promote learning, exchange of knowledge, and gains to their own productivity and skills. Also, to the extent that they are aware of this effect, density can be a factor inducing them to locate.

Glaeser (2000, p.105) describes this broad thrust by saying:

The central question of urban economics - namely, *Why do cities exist?* - can only be answered by understanding the effects of cities on their residents. And to understand what determines the demand for it, we must understand what urban density does.

Learning and returns to one's skills and creativity facilitated by density-induced interactions will lure people to cities. Furthermore, implicit in Florida's creative capital theory is that these interactions do not occur in a vacuum, but that a social structure must be in place enabling their occurrence. This social structure provides a setting and framework for these interactions, while also reinforcing people's creative identities and supporting and fostering norms and attitudes that promote creativity and growth. Thus, a creative person would locate in a dense place to the extent that she could anticipate returns to her skills and creativity, but also to the extent that a creative social structure was in place that provided the necessary setting for these interactions to occur in the first place.

Finally, probing the link between density and innovation is an interesting exercise on its own, due to the value society places on innovation, and to how we often positively associate it with increasing social welfare. The connection between innovation and the promotion of social welfare is well understood and equally well documented. In her seminal book The Economy of Cities, Jane Jacobs (1969, p.49) connects innovation and growth when she claims that "Innovating economies expand and develop. Economies that do not add new kinds of goods and services, but continue only to repeat old work, do not expand much nor do they, by definition develop". Glaeser (2000, p.83) views cities as centers of idea creation and transmission and figures that "cities will grow when they are producing new ideas or when their role as intellectual centers is



increasing". Finally, Paul Romer (1990) and other new growth theorists cite innovation as a key factor in economic development. Thus, given the correspondence between innovation and sought social outcomes, like growth, it remains to identify the mechanism through which connections help to bring about innovation.

A working hypothesis arising from this literature is that the geographic proximity of individuals possessing human capital, skills, expertise, or creative capabilities enables their interactions, and these interactions facilitate the spillovers necessary for innovation. A working paper using French data by Autant-Bernard and Messand (2001) partially tests this theory and finds a positive connection between density of human capital and regional innovation. The recent paper by Knudsen, et al (2003) considered the effect of the density of "creative" capital as opposed to human capital and also found a positive relationship with innovation, measured as regional patents. The creative class consists of workers "whose economic function is to create new ideas, new technology, and/or new creative content", such as scientists and engineers, architects, designers, artists of all sorts, and educators (Florida, 2002). Since innovation is an inherently creative act which is not only traceable to those who meet a certain educational threshold, creative capital offers more precision than the use of education-based human capital measures. Highly creative and innovative people - like Bill Gates - are included in the creative class, whereas they would be excluded from college education-based human capital measures. They additionally make use of population density measures instead of more commonly employed employment density measures. This too derives in part from Florida's characterization of the creative class. Individuals do not leave their creativity, the core element of the economy, behind in the lab, studio, office, or university when they finish their workday. Instead, the creative class is always creatively engaged, and seeks to reinforce their identities as creative people in all aspects of their lives, from consumption, to recreation habits, to interpersonal relationships. Thus, regions that are broadly appealing to the creative class are best situated for growth. Innovation and growth are not singularly institutionally or firm focused. Further by using the more specific, but still broadly defined, creative class, a collection of individuals with diverse skills are taken into consideration.

Until now, we have discussed in detail how geography, human capital and creativity, and interactions relate to spillovers and learning, but we have not described specifically how these various factors (spillovers included) relate to innovation.

In The Economy of Cities, Jacobs (1970, p.57) defines innovation as the process by which new work is added to old divisions of labor, thus creating new products, processes, or ideas, and thus also new divisions of labor. Feldman (2000, p.373) adds that "innovation is the novel application of economically valuable knowledge". In other words, innovation is a process of creating new, profitable products and ideas by combining observations or insights taken from elsewhere to the work one had previously been doing (Desrochers, 2001, p.378).

Building on this definition, innovations occur when individuals with high degrees of existing creativity or knowledge make new and novel combinations of this knowledge with new insights observed or learned through spillovers (Desrochers, 2001). Individuals require a high degree of existing expertise to engage in innovation for a number of reasons. First, an extensive and sophisticated knowledge of the initial work will provide insights into how to create "new combinations" when new observations arise through spillovers. Clearly, if one has a superficial knowledge of the initial work, it will be less obvious how to make interesting departures from that work or important additions to it. Cohen and Levinthal (1994, p.227) note how this phenomenon exists at the firm level, referring to a firm's ability to leverage its installed base of expertise to sift through and take advantage of the signals it receives from the outside as the firm's "absorptive capacity". Additionally, Desrochers (2001, p.37) adds that "...innovation ultimately depends to some degree on one person's knowledge and skills", while Lee (2001) has empirically documented the positive effects of high human capital workers on innovation. Thus, the ideas necessary for innovation are embodied in individuals with the creativity, know-how, and skills to engage in technological advance.

Innovation occurs when a person possessing creativity combines her existing expertise with observations learned through spillovers. Such a spillover occurs when one individual's creativity is transferred to another individual or firm. These creative spillovers are in part believed to arise due to frequent face-to-face interactions and communication between individuals (Feldman 1994, Autant-Berard and Massard 2001). Furthermore, these interactions are made more frequent by population density<sup>2</sup>. Also, the literature explains that geographical proximity (here conceived of as density) makes it more likely that the "tacit" (non-codified) knowledge essential to innovation and embodied in individuals will be shared through face-to-face contact. Finally, learning is facilitated when ideas are closer spatially (Howells, p.58). We extend this reasoning to conclude that it is not just frequent interactions of all people that bring about spillovers and thus

innovation, and also not just high human capital workers as posited earlier. Given the inherently creative nature of innovation, we hypothesize that the density-induced frequent interactions between creatively oriented, high human capital individuals with diverse backgrounds and skills will result in the creative spillovers necessary to facilitate innovation. This reasoning also makes use of Florida's (2002) creative capital theory, where he posits that occupations with a creative component fuel innovation and growth.

In dense cities, scientists and engineers, artists, writers, and people from all walks of life are all forced together and all rub shoulders. For the scientists and engineers, being near people of similar capabilities and expertise increases their own productivity through spillovers. They come up with ideas together that they would not have otherwise generated. Additionally, the general creative milieu of a place with a prominent presence of artists, musicians, and other creative people increases overall creativity and innovation by providing stimulus and inspiration for those who actually produce innovations. The idea is that all creative people, artists, writers, scientists and engineers, etc., work best in an environment that promotes and rewards creativity. Having the creative milieu might also act as a regional attraction for scientists and engineers. The roles of density and diversity in all of this are to compact all of these people into a space where they collide, and where these important interactions and spillovers can occur.

The goal of this paper is to document some specific spillovers and even "spill-acrosses" to show the positive effects of these connections and demonstrate that it is the diverse creative milieu that can give rise to innovation and through that regional growth and prosperity.

## Montréal Background

This study was conducted through a series of focus groups and interviews with individuals from the business, education, arts and government sectors of the Canadian Montréal region. (Further detail on the methodology is presented below.) The Montréal region is defined by Statistics Canada as the Montréal CMA (Census Metropolitan Area) and includes the entire Montréal metropolitan area.

The Montréal region is ideally suited for this study. First, among the 25 most populous metropolitan areas in the U.S. and Canada, the Montréal region ranks third in average population density (behind the Boston CMSA and New York CMSA). Among that same group of regions, the Montréal region has the second greatest percentage of its workforce in the "super creative core" (Florida, 2002, p. 328). These two offer the combination of density and diversity likely to result in significant findings. The authors' relationship with Culture Montréal created an opportunity for unparalleled access across the business, education, arts and government sectors. With its worldwide renown for the arts and international festivals ranging from jazz to fireworks, Montréal exudes the creative milieu in an environment where technology, design, and the arts can all interact. Montréal's location places it equally between Europe and the west coast with easy access to all the major population centers in both the U.S. and Canada. As one interviewee put it, "In the morning I can talk to London and after lunch, L.A. ... In the same six hours, I can fly to either Paris or Los Angeles." Finally, as the only major metropolitan area in the U.S. and Canada that is predominately bilingual but somewhat multilingual, the Montréal region offers a unique opportunity to investigate the innovative impact of both language and cultural connections.

The table below presents comparative information on the Montréal region, the province of Québec, Canada and the United States. (Complete definitions of the measures presented are in the appendix.) While over the 1990 to 2000 period the Montréal region grew faster than the rest of Québec, it saw slower population, job and average per capita income growth than either Canada or the U.S. However, more recent population and job growth is generally in line with both countries. The Montréal region's levels of technology, talent, and tolerance/diversity compare quite favorably to the

province and both countries. The Montréal region has relatively low housing costs while still offering higher levels of amenities.

	Montréal	Québec	Canada	U.S.
<b>Overall</b>				
Population Growth	6.8%	5.0%	9.9%	11.6%
Job Growth	10.8%	10.4%	13.2%	12.1%
Per Capita Income Growth	22.3%	21.1%	24.0%	49.7%
Firm Growth	15.4%	16.7%	23.6%	14.1%
Recent Population Growth	0.99%	0.59%	1.02%	1.11%
Recent Job Growth	2.8%	2.4%	2.6%	2.3%
Creativity Index	0.737	n/a	n/a	n/a
<b>Technology</b>				
Patents per 10,000	2.22	2.81	2.63	2.68
Patent Growth	7.2%	12.4%	16.0%	9.8%
North American Tech-Pole	4.03	1.37	11.75	81.54
North American High Tech LQ	1.196	0.618	0.832	1.009
Recent Patent Growth	15.11%	22.57%	18.21%	12.69%
<b>Talent</b>				
Creative Class	31.6%	27.7%	28.0%	31.0%
Super Creative Core	17.5%	15.4%	15.0%	12.0%
% High School <sup>3</sup>	81.4%	77.1%	79.2%	80.4%
% College	17.5%	16.8%	17.8%	6.3%
% University	21.1%	16.7%	18.5%	24.4%
Overall Talent	38.6%	33.5%	36.3%	30.7%
Brain Drain/Gain Index	0.884	0.808	n/a	n/a
<b>Tolerance/Diversity</b>				
Mosaic Index	18.4%	9.9%	18.4%	11.1%
Gay Index	1.739	1.270	1.000	1.000
Boho Index	1.442	1.036	1.000	1.000
Visible Minorities	13.6%	7.0%	13.4%	33.1%
<b>Territory Assets</b>				
Housing Cost to Income	15.9%	18.7%	19.8%	21.5%
Rent Cost to Income	12.8%	15.7%	16.6%	17.2%
Owner Cost to Income	19.0%	20.9%	21.4%	24.3%
Population Density	846.57	4.34	3.25	30.03
Arts Workers per 100,000	408.95	174.04	385.77	59.42
Arts Establishments per 100,000	69.96	31.32	61.00	8.06
Park Workers per 100,000	11.41	6.11	13.54	10.05
Parks per 100,000	0.64	0.66	1.28	0.35
Homicides per 100,000	1.93	1.63	1.94	5.98

**Table 1 -- Montréal, Québec, Canada, US - Comparison Data**

Table 2 shows the comparison of the workforce among the creative, service, working and farming/agricultural<sup>4</sup> classes as defined by Florida (2002) for the Montréal region, the province of Québec, Canada and the United States. In addition to workforce breakdown, the percentage of total wages earned by each class is also presented. the Montréal region has a larger percentage of creative and service class workers with fewer working class, which includes manufacturing and construction workers, than the province or either

country. In general, the wage differential between the creative and service classes, while still present, is not as pronounced in Canada as it is in the United States.

	<b>Creative</b>	<b>Service</b>	<b>Working</b>	<b>Farming</b>
<b>Montréal</b>	450,200	771,900	377,900	3,300
% of Workforce	28.8%	49.4%	21.6%	0.2%
% of Wages	40.6%	36.9%	22.3%	0.2%
<b>Québec</b>	1,008,198	1,686,223	863,430	86,535
% of Workforce	27.7%	46.3%	23.7%	2.4%
% of Wages	41.2%	35.3%	21.8%	1.7%
<b>Canada</b>	4,361,905	7,161,625	3,518,560	534,480
% of Workforce	28.0%	46.0%	22.6%	3.4%
% of Wages	42.1%	34.1%	21.4%	2.3%
<b>U.S.</b>	32,313,140	47,334,940	24,344,420	235,790
% of Workforce	31.0%	45.4%	23.4%	0.2%
% of Wages	49.6%	30.3%	20.0%	0.1%

**Table 2 -- Montreal, Québec, Canada - Workforce Breakdown**

While the previous two tables have presented comparisons with the Montréal region and provincial and country level information, Figure 1 compares the Montréal region with the 24 other largest metropolitan areas in the U.S. and Canada. (The complete list is in the appendix and the measures are the same as those presented in Table 1 and also documented in the appendix.) When compared against the other major metro areas, while the Montréal region has not been outperforming the other regions in overall growth measures, it does stack up reasonably well in terms of technology, talent, and tolerance/diversity measures and does extremely well for selected territory assets/quality of place/regional amenity measures. The stronger performance for the technology, talent, and tolerance scores suggest that while past growth has not been outstanding, the potential for future growth is much stronger. And, in fact, the more recent population and job growth numbers support this expectation.

The Montréal region presents an outstanding opportunity to look for and examine not only the connections between the creative arts and technology but also those unique bilingual and multicultural connections that can lead to innovation and regional growth and prosperity. The region is also the most diverse in Canada in terms of number of industries which creates greater opportunities for interesting connections to arise (Beckstead and Brown, 2003).

We next turn our attention to specific information on the expected connections that would lead to innovation and these regional benefits. This is followed by a discussion of the methodology used



to identify and understand these connections, the results and discussion.

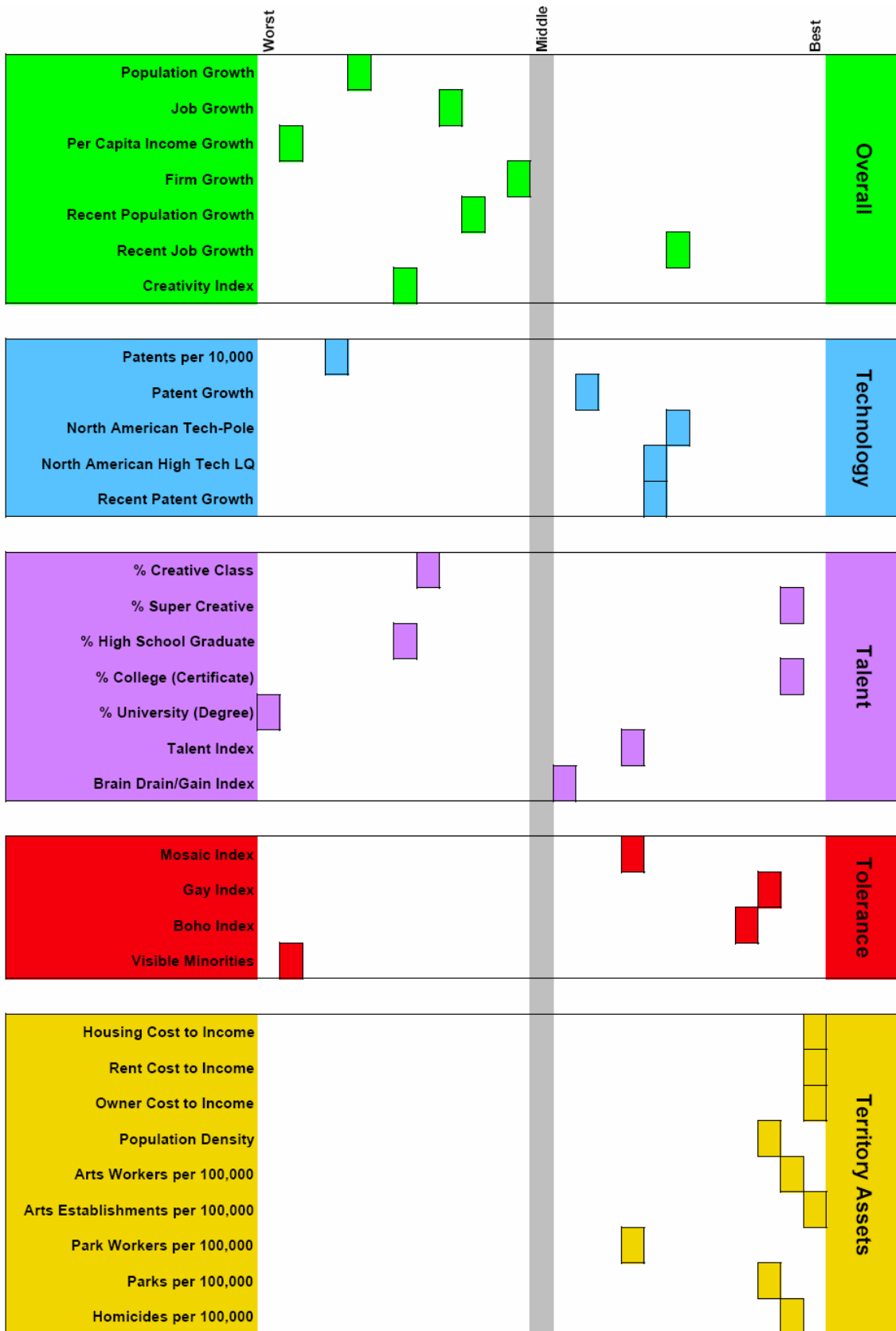


Figure 1 - Montréal Benchmark Comparison

## Theory, Methodology and Hypotheses

As the literature review has shown, density and diversity work together to create spillovers within a city or region. However, while traditional economic thought has centered on the interaction between firms, more recent results point to the role played by individuals, specifically high human capital or creative individuals, interacting with each other in generating innovations and spillovers across a region. Knudsen, et al (2003) found that "density and creativity [specifically the creative class] separately and jointly affect innovation in metropolitan areas" (p. 1). The creative class includes a significant level of diversity on its own, ranging from mathematicians to sculptors to engineers to artists to educators to designers to doctors. Density, on its own, only increases the likelihood of chance encounters among these diverse individuals that lead to connections that create innovations and spillovers. The question is: Do these diverse individual connections exist, and, if they do, do they generate innovations and "new combinations"? More specifically, what kinds of potentially beneficial connections are the ones that are likely to form? And, can we find evidence of these unexpected connections that are only possible with such diversity?

Given that the Montréal region will be the area for this study, the search for previously undocumented connections can be pursued in two ways. The first will be to look for "unexpected" connections that might arise in Montréal but could, just as easily, arise in any other major metropolitan area. The second will be to look for connections that are likely to be unique to the Montréal region. Finding either will provide evidence of the value of such connections. While the former can indicate benefits that can accrue to any region, the latter may only be applicable to Montréal. However, the Montréal region provides an opportunity to look for these additional connections which increases the chances of finding something of interest.

The scope of this study is as follows:

1. The area of interest is specifically limited to the "Creative Class". Although still fairly broad in nature, it is restricted to those individuals who create value through and are compensated for their thinking. The primary area of interest is in the "Super Creative Core" which Florida (2003, p. 328) defines to be those with occupations in the following fields: computers, mathematics, architecture, engineering, life sciences, physical sciences, social sciences, education, training, library, arts, design entertainment, and media.

2. The item of interest is connections that may create innovations and spillovers. These connections would exist among individuals and do not necessarily create equal benefits to those involved but should be, in some way, beneficial to all parties.
3. Most specifically, it is the "unexpected" and previously undocumented connections that are of the most interest, specifically connections that are only possible under conditions of diversity. Firm level, technological spillovers are well understood and documented (see Arrow, 1962; Romer, 1986; or Jacobs, 1969). This study needs to look for previously ignored interactions to more fully develop an understanding of the mechanisms by which innovations can be generated.

As this is a new avenue of research and specific connections that have not been previously identified in earlier research are to be sought out and examined, this study will borrow from grounded theory (Glaser and Strauss, 1967) ideas to develop and refine the specific connections to be investigated which can then be more fully investigated through other means. Ranft and Lord (2002) use the grounded theory approach to more fully develop an understanding of industry knowledge acquisition through mergers and acquisitions with a particular focus on the acquisition of highly skilled human capital. Although not completely parallel with this study, it does demonstrate that the grounded theory approach can be useful in understanding knowledge transfer and human capital.

Strauss and Corbin (1998) define grounded theory as follows: "The grounded theory approach is a qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon". The primary objective of grounded theory is to develop an explanation of the area of interest by categorizing information discovered and finding relationships between categories and properties. Grounded theory is designed to be emergent. It does not test hypotheses; rather it allows the theory to emerge from the data. Fully utilizing grounded theory as the only way to develop the theoretical underpinnings for any situation is not without controversy nor is it easily accomplished correctly. Rather than fully utilizing everything grounded theory has to offer, this study will use the grounded theory idea that much can be learned by asking good questions, listening closely, and taking careful notes before plunging head-first into theory exposition. Grounded theory has not been used as the basis for this entire paper. It was not used to structure, complete, or analyze the data collected during the interviews. Rather, it was used to help build and define the

structure and questions to be included in the interviews. Grounded theory helped to inform and structure the basic hypotheses to be investigated, but the investigation and analysis of those hypotheses was completed using traditional qualitative methods.

The process used to begin the identification of potential connections within the Montréal region started with focus groups. Groups of up to 10 individuals from across the business, education, arts, and government sectors of Montréal were lead through a parallel-thinking technique (DeBono, 1985) that focused on a specific area of the Montréal Creative Economy. The number of participants by sector and topic area is in Table 3. The information from these focus groups was captured, codified, and categorized. This approach allowed the categories to emerge from the data collected without imposing the expectations of the researchers.

	<b>Number of Groups</b>	<b>Business</b>	<b>Educatio n</b>	<b>Art s</b>	<b>Government</b>
<b>Montréal Overview</b>	1	4	1	5	0
<b>Technology</b>	2	6	5	5	4
<b>Talent</b>	2	4	5	5	3
<b>Tolerance &amp; Diversity</b>	2	4	6	4	5
<b>Territory Assets</b>	2	6	4	6	4

Table 3 -- Focus Group Participants by Sector

The results of the focus groups were then synthesized to develop a theoretical perspective which could be used to more fully investigate those connections that created innovation and spillovers within the Montréal region. That perspective was used to develop a survey instrument which was used to complete a series of open-ended interviews. The findings from those interviews will be presented here.

This section will proceed with additional information on the four primary topic areas used for the focus groups ("the 4 T's of Regional Economic Development"), the results from the focus groups, the theoretical framework developed from the focus groups and used to conduct the interviews, and information about the interview survey and protocols.

## **The 4 T's of Regional Economic Development**

Traditional economic development and growth strategies focus on business attraction and new technology advances as the solution - attract the jobs and the people will come. More progressive proposals include elements of talent and workforce development based on the approach that business attraction is made easier if a well-trained workforce is available. Although a good start, these approaches only provide part of the picture. In his book *The Rise of the Creative Class*, Florida (2002) argues:

"Today's economy is fundamentally a Creative Economy... I see creativity - the creation of useful new forms out of that knowledge - as the key driver. 'Knowledge' and 'information' are the tools and materials of creativity. 'Innovation,' whether in the form of a new technological artifact or new business model or method, is its product." (p. 44)

Later in the book, he outlines the drivers of growth in today's Creative Economy:

"[R]egional economic growth is powered by creative people, who prefer places that are diverse, tolerant and open to new ideas. Diversity increases the odds that a place will attract different types of creative people with different skill sets and ideas. Places with diverse mixes of creative people are more likely to generate new combinations. Furthermore, diversity and concentration work together to speed the flow of knowledge. Greater and more diverse concentrations of creative capital in turn lead to higher rates of innovation, high-technology business formation, job generation and economic growth." (p. 249)

To attract creative people, generate innovation and stimulate regional economic growth, a region must maintain substantial but balanced performance across a wide range of factors. Although technology, business attraction and talent are major components of any economic development plan, they are not enough - a plan must also consider the factors that affect talent attraction since an increasing number of well-educated, creative workers make location decisions based on more than just an employment opportunity. Quality of place and regional tolerance/diversity play important roles in attracting and retaining members of the creative class. Each of these four factors (technology [including business attraction and development], talent, tolerance, and quality of place [or territory assets]) must be taken into account along with the interaction among them. While *The Rise of the Creative Class* (Florida, 2002) originally described the "3Ts of Economic Development" and "Quality of Place" separately, it has been helpful to address all four together - by addressing quality of place as

"territory assets" - there are now "4 Ts". A brief explanation of each of the Four T's is provided below.

### **Technology**

The Technology "T" captures most current traditional economic development thinking. "Technology" is not limited to "high-tech." Existing manufacturing and other business sectors are taken into consideration along with business growth and entrepreneurial activity. Regional technology includes not only what is in production but also new innovations and ideas under development - innovations that are coming from colleges and universities in the region, industry R&D departments, government research labs, and garages. In understanding the current state of technology for the region, all need to be evaluated. Increasingly, a high technology base is both a necessary condition for, and a result of, a region having a strong creative economy. Being known as a high-tech region helps to attract more of the creative workforce, who, in turn, generate new technologies that make the region even more high-tech. Additionally, high-tech firms concentrate in places that have a reputation for being high-tech.

### **Talent**

The Talent "T" expands on the more recently identified impact of human capital in economic development. The talent analysis considers the attraction and retention of the Creative Sector, people who are paid to think for a living. With around 40 million people, the Creative workforce is about 30% of the total U.S. employment base, but earns almost 50% of all wages paid. Many regions successfully attract college students but suffer from brain drain after they graduate. While the standard measure of human capital, a college-educated workforce, has been associated with regional growth, we have found that Creative Capital, the concentration of people in the Creative Sector, has a stronger relationship with economic growth. Creative capital is even more important to regional growth than human capital or high-tech industries, since both of these things are shaped by it.

### **Tolerance**

The Tolerance "T" addresses the role of talent and diversity in attracting and retaining Creative talent, which strongly favors organizations and environments in which they feel anyone can fit in and can get ahead. Creative people prefer places that are diverse, tolerant and open to new ideas. Diversity increases the odds that a place will attract different types of creative people with different skill sets and ideas. Places with diverse mixes of creative people are more likely to generate new combinations.

Diversity is favored first of all out of self-interest. Diversity can be a signal of meritocratic norms at work. Diversity of backgrounds and opinions strengthens the creative process. Talented people defy classification based on race, ethnicity, gender, sexual orientation or appearance. Creative Sector people are mobile and tend to move around to different parts of the country; they may not be "natives" of the place in which they live even if they are native-born. When they are sizing up a new company or community, acceptance of diversity and of gays in particular is a sign that reads "nonstandard people welcome here."

### **Territory Assets**

The Territory Assets "T", sometimes called Quality of Place, focuses on the amenities and other assets of a region that can affect the attraction and retention of both individuals and organizations. The emerging geography of the Creative Sector is dramatically affecting the competitive advantage of regions around the world. Regional economic growth is driven by the location choices of creative people -- the holders of creative capital. Prior work with focus groups of creative workers has shown that natural, recreational and lifestyle amenities are essential in attracting creative workers (Florida, 2002). Creative workers want a balance of economic opportunity and lifestyle in selecting a place to live and work. Creative workers prefer places with a diverse range of outdoor recreational activities. Access to water and water-based recreation seems to be of particular importance to these workers and is a particular strength of the region. Regions where amenities and activities are easily accessible and available at whatever time and where they are desired or "just in time" are preferred. A wide range of experiences is preferable to a smaller number of "big ticket" amenities such as "high" arts and culture or professional sports. Members of the Creative Sector are not uniformly drawn only to cities with bike paths and climbing walls and alternate Saturday recycling programs (although those things can help). Members of the Creative Sector come in all shapes, sizes, colors and lifestyles; and to be truly successful, a region must find a way to offer something for every one of them.

### **Focus Group Results**

Nine focus groups with 86 participants from across the Montréal region were held. The first addressed the Montréal region in general while for the other eight, two focus groups were conducted for each of the "4 T's" (technology, talent, tolerance, and territory assets). Each meeting lasted approximately three hours.



Participants were asked to identify positive aspects, problems, and opportunities for their group's focus area. The participants identified 1,547 items: 550 positives, 548 problems, and 449 opportunities. Each participant next voted on the top three items for each category. In total 838 votes were cast among 427 items: 139 positives, 139 problems, and 149 opportunities. One hundred items were judged to be a priority for greater than 25% of each group's participants. Although these 100 items were the primary basis, all 1,547 items were reviewed. The 100 high priority items combined with the earlier research in this area formed the basis for the theoretical framework used to more fully investigate those connections that create innovation and spillovers within the Montréal region.

Among the top positive aspects identified were:

- International links/contacts
- Now 3,700 independent artists, 19 independent artists centers
- Great walking place - human scale - you can see people, meet them, sit around
- 4 universities, specialized schools, low cost of education
- Cultural diversity
- Security
- Low fear, tolerance
- Vehicle to stay free spirit
- Colleges and universities
- Opened society: foreigners, ideas, diversity
- "bilinguisme" multiculturalism
- Diversity / arts / people / food
- 4 major universities increasingly close links between university researchers + community (business, social)
- Multilinguality : French - English - Spanish - Arab - Yiddish - German - Italian - Mandarin, etc.
- Authentic mix of cultures

Among the top problem aspects identified were:

- Lack of self confidence, always think that other people have better ideas
- Academic recognition vs. practical experience need to "DO IT!"
- Lack of recognition of the importance of cities in federal and provincial public policy
- Lack of inter-sector thinking + collaboration "silos"
- Québec isolation in Canadian politics
- Under investment in infrastructure
- Lack of esthetic urban & architectural vision

- Poor funding of universities
- Investment in education

Among the top opportunities identified for the region were:

- Have the will to make Montréal an international arts capital like London, Paris, New York. Momentum
- Better bridging + partnering of 3 levels of government
- Become a "green" city and develop environmental expertise
- Use Montreal's cultural institutions + organizations as a development + unifying tool
- Improve access to river
- Dorval airport
- Better access to St. Lawrence riverside
- Improve public transportation
- Keep Montreal 1 island, 1 city
- Keep the village-size economy
- Have a vision and develop and support (good government policies by all levels)
- Distinguish Montréal by design + culture
- Create multidisciplinary institutes

## **Theoretical Framework**

From the existing research, we draw the following conclusions (or at least stylized facts):

1. The geographic proximity of individuals possessing human capital, skills, expertise, or creative capabilities enables their interactions, and these interactions facilitate the spillovers necessary for innovation.
2. Innovation occurs when a person possessing creativity combines her existing expertise with observations learned through spillovers. These creative spillovers are in part believed to arise due to frequent face-to-face interactions and communication between individuals. These interactions are made more frequent by population density.
3. For scientists and engineers, being near people of similar capabilities and expertise increases their own productivity through spillovers. They come up with ideas together that they would not have otherwise generated. Additionally, the general creative milieu of a place with a prominent presence of artists, musicians, and other creative people increases overall creativity and innovation by providing stimulus and inspiration for those who actually produce innovations.

The goal of this paper is to document some specific spillovers and even "spill-acrosses" to show the positive effects of these connections and demonstrate that it is the diverse creative milieu that can give rise to innovation and through that regional growth and prosperity. Most specifically, it is the "unexpected" and previously undocumented connections that are of the most interest, specifically connections that are only possible under conditions of diversity. Firm level, technological spillovers are well understood and documented (see Arrow, 1962; Romer, 1986; or Jacobs, 1969). This study addresses previously ignored interactions to more fully develop an understanding of the mechanisms by which innovations can be generated.

As the nature of technology-based spillovers among firms and, more accurately the employees of those firms, is well established, this study will address those spillovers, perhaps more appropriately called "spill-acrosses" between different sectors of the regional economy. As diversity of industries has been found to be an important factor in generating innovation, should that finding be expanded to a more broadly diverse mix of firms and organizations? We believe that it should and are most interested in looking at the creative, geographic, linguistic and cultural milieu that Montréal presents in order to find value in previously unexplored connections.

Specifically, earlier research, our own work, and the findings from the focus groups resulted in three new areas where connections that create spillovers leading to innovation could be found. The first is the connection between technology (traditional or high tech business) and the artistic, creative community. Not only technology's impact on the arts but also the potential impact that the arts may have on technology should be investigated. The second area to look for connections is the direct result of the bilingual nature of Montréal. The prevalence of the French and English languages and the ability of a significant portion of the population to speak both create a unique opportunity for linguistically related innovation. The third and final area where connections could be found relates to Montréal's geographic and cultural position. Montréal is among the closest (by air) major North American cities to Europe and affords ready access to the major U.S. population centers in the northeast. This physical proximity should enable multinational connections across which ideas and innovations would flow. Each of these potential connections is more fully explained below.

### **Technology ← → Art-Culture Connections**

For many, the potential impact of technology on the arts is seen every day. One need go no further than the nearest movie theater to see how computer generated imagery (CGI), pioneered by SoftImage and Pixar, has changed movie-making. In pushing and expanding boundaries, artists use new materials and new media in ways unforeseen by their inventors. Some artists use the microchip and the soldering iron in the same way that Van Gogh used paint and brush. Technology changes the arts. However, art also impacts technology and helps to drive innovation. Artists like Christo and Jeanne-Claude work directly with manufacturers to develop new materials and techniques for completing their monumental artworks. Although "the performer is always the primary focus," Cirque du Soleil pushes the technology envelope as much as any traditional "high-tech" company with its own major R&D division. More subtly, art impacts business indirectly through the design community. The juxtaposition of colors seen in at a gallery opening the night before can make its way into a graphics designer's product packaging. A new rhythm or sound from the "Techno" band can become part of a video game. In many instances, the artist having the new opening is the graphic designer of product packaging and the band member is doing sound design for the video game. This is the "creative milieu". These are the kinds of connections that, if found, will create the "spill-acrosses" that generate innovation across a region.

### **Language: French ←→ English Connections**

Over 98% of the population of the Montréal CMA speaks either French or English, and over 53% speaks both (Statistics Canada, 2001). Over 44% of "mother tongue" French speakers used English "most often" or "regularly" at work while over 66% of "mother tongue" English speakers used French "most often" or "regularly" at work (Statistics Canada, 2001). Although the majority of the region is bilingual, there are a significant number of French-only (38.0%) and English-only (7.5%) speakers (Statistics Canada, 2001). Additionally, 18.5% of the population has a "mother tongue" in addition to speaking French and/or English (Statistics Canada, 2001). While some sections of the Montréal region are generally unilingual, most are bi- or even trilingual. This rich mélange of languages creates opportunities for linguistic connections that can generate or translate innovation. This rich language basis creates interesting opportunities to realize innovation simply through translation.

### **Geography: Montréal ←→ Europe Connections**

The Montréal region is served by a major international airport (Trudeau) that puts it within 6½ hours of London, 7 hours of Paris, 9 hours of Berlin, and 10 hours of Rome - just under the flight times from New York City to those same European destinations. Montréal is closer to Europe than any other major North American city. This relative proximity creates opportunities for diverse connections with those in a wide variety of European cities. While the potential connections identified earlier focused *within* the Montréal region, these connections, and the ones that follow, *extend beyond* the region. While the primary focus of this study is the value generated by internal connections, information collected on the potential value of these external connections can be used for comparative purposes.

### **Geography: Montréal ↔ U.S. Connections**

Montréal is within 700 miles (1,200 km) of 112 of the 321 major metropolitan areas in the U.S. and Canada. Although only 35% of the metro areas, they represent almost 45% of the total population in metro areas from both countries. Within that area, almost 100 million people are in 81 U.S. metro areas - over 42% of the total U.S. metro population. Montréal itself is only 70 miles (120 km) from the U.S. border. By road, Montréal is closer to the U.S. than Toronto. As with connections to Europe, Montréal has an opportunity for external connections with the U.S. that could be a source of innovation.

## **Interview Survey and Protocols**

Based on the potential connections identified above, a structured interview instrument was developed. (A copy of the full instrument is in the appendix.) The instrument itself is in five sections:

1. Basic information about the interview and interviewee segment/sector.
  - a. Background of the research study
  - b. Specific information on terms used during interview
2. Demographic information about the interviewee.
3. Specific, sector-based questions (only 1 subsection used)
  - a. For "Creative" companies (arts and design)

- b. For the general business community
- c. For others (nonprofits, government, academic)
- 4. Interviewee perceptions of the Montréal region
- 5. Firm information (collected where appropriate)

The majority of the interview consisted of open-ended questions on the impact and value of various connections, as perceived by the interviewee. In addition, quantitative information was also collected on the value of various types of connections, the interviewee, the interviewee's firm, and their perceptions of the Montréal region. Each interview generally lasted one and a half hours. The interviews were recorded (with the interviewee's permission), but each interviewer still took extensive notes on the interview form itself. Two "visual aids" were shown to each interviewee (copies provided in the appendix). The first was for the seven-point Likert scale that was used for most of the quantitative questions, and the second was a list of ten cities used to rank against the Montréal region for the perceptions section.

Over 85% of the interviews were conducted in person, with the remaining interviews conducted over the telephone. All telephone interviews fell into the "other" category and were only used for quantitative information. Three interviewers, all well versed in both the background and purpose of the study and proper interviewing and data collection techniques, completed all interviews. All interviews were conducted in English. However, a representative from Culture Montréal was present, introduced the research methods and goals (in French), and was available for translation assistance, which was rarely needed. After the introduction, he remained as a silent observer and only spoke when asked for translation assistance by the interviewee.

As the goal of this research project was to find evidence of spillovers and "spill-acrosses" arising from the unexpected and previously undocumented connections among the artistic, design and business communities. Care was taken in selecting potential interviewees from across the creative milieu of Montréal. The goal was to interview at least 15 people from the artistic and design community (15 were interviewed) and 15 people from the business community (24 were interviewed). Other interviews from the government and academic sectors were used primarily for additional perspectives and to provide quantitative information.

All interviews were arranged by a representative of Culture Montréal according to the specifications given above. They were incredibly persistent and were able to successfully arrange interviews with over 90% of the people initially targeted and contacted. All interviews were conducted in June and July of 2004 and were held at the interviewee's location or an alternate location in Montréal.

## Results

Thirty-three interviews were completed. Most were with representatives from the business sector, but the business ranged from purely creative- or arts-based business to design and software development to technology companies. Table 4 shows the breakdown of interviews by economic sector and primary function or segment. On average the interviewees had been living in Montréal for 15½ years with the period of time ranging from 2 to 35 years.

	<b>Creative/ Arts</b>	<b>Business/ Technology</b>	<b>Design</b>	<b>Other</b>	<b>Total</b>
<b>Business</b>	3	11	7	0	21
<b>Academic</b>	0	2	1	2	5
<b>Government/Civic</b>	0	0	0	3	3
<b>Arts/Cultural</b>	2	1	1	0	4
<b>Total</b>	5	14	9	5	33

Table 4 -- Interviews by Sector and Segment

Interviewees were asked to separately rank (1=best; 10=worst) the Montréal region among a list of ten cities (included in appendix) for performance and standing in technology, talent, tolerance and diversity, and territory assets/quality of place. They were also asked to give their overall impression or feeling on the Montréal region in each of those same four areas using a 7-point Likert scale, which ranged from 1=extremely negative to 7=extremely positive (sample of "visual aid" in appendix). This same scale was used consistently to collect information from the interviewees throughout the interview. Table 5 summarizes both the interviewees' rankings and impressions. When compared with the strictly quantitative summary presented earlier in Figure 1, the interviewee's subjective perceptions of the Montréal region are generally in line with objective data. The Montréal region's best performance and highest rankings are in the area of tolerance/diversity and territory assets, followed by talent and then technology performance, which is generally above average, but not outstanding. Overall, the more objective data shows that the

Montréal region performs better on territory assets measures, while the subjective rankings had tolerance/diversity out-ranking territory assets. However, only eight of the interviewees ranked the Montréal region higher on tolerance than territory assets while 24 ranked the region equally on both or higher on territory assets. These results show that, on average, the high-level creative economy perceptions of the interviewees do not vary greatly from more objectively defined and collected measures.

	Ranking (1-10) <sup>†</sup>	Range	Score (1-7) <sup>‡</sup>	Range
Technology	3.5	1 - 8	6.1	4.5 - 7
Talent	2.2	1 - 7	6.1	3 - 7
Tolerance	1.6	1 - 3	6.2	3 - 7
Territory Assets	1.9	1 - 6	6.3	5 - 7

**Table 5 -- Ranking/Feelings of Montreal (N=32)**

Based on the hypotheses presented above, interviewees were asked their opinion of the impact of various connections on their organizations. Some specific connections inquired about varied according to the interviewee's sector and segment, and others we're asked of all interviewees. Specifically, interviewees were asked about the impact of connections between:

1. The arts and technological innovation
2. The arts and the design community
3. The arts and the general business community
4. The design and business communities
5. Montréal and Europe
6. Montréal and the United States
7. The French and English languages

Table 6 presents a summary of these results. Generally, interviewees felt that the impact of these various connections on their organizations was "somewhat positive" to "very positive". The highest average impact was between the arts and technological innovation, and the lowest, while still above "somewhat positive," was between the design and business communities. In general, these results are in line with the hypotheses - in addition to the typical (firm to firm) spillovers, additional value is (perceived to be) generated by boundary crossing "spill-acrosses" that can be facilitated by a more diverse creative milieu. Although the sample

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<sup>†</sup> 1=Best/10=Worst

<sup>‡</sup> 1=Extremely Negative/7=Extremely Positive



is not very large, most interestingly, a greater average impact was perceived from connections between art and technological innovation. This was seen from the perspective of both the high-tech innovator and the independent artist. It was not the case that one set of interviewees (say the artists) thought this connection was valuable while the other (say high-tech companies) did not see any significant impact from this connection. Also worth noting, is that although the geographic and language connections rated, on average, about the same as the other connections, the range was much greater. Some participants rated the impact of these connections as "somewhat" or "very negative."

<b>Bridge</b>	<b>N</b>	<b>Average Score (1-7)<sup>s</sup></b>	<b>Range</b>
<b>Asked by Sector/Segment</b>			
Art - Technology	10	6.1	5.5 - 7
Art - Design	11	5.6	4 - 7
Art - Business	23	5.6	4 - 7
Design - Business	18	5.4	4 - 7
<b>Asked of all Interviewees</b>			
Europe - North America	29	5.6	2 - 7
Montreal - US	29	5.6	3 - 7
Language Connections	29	5.6	2 - 7

**Table 6 -- Impact Ranking of Selected Connections**

In addition to the previously discussed survey-based, semi-quantitative data, a great deal of information on specific connections and both positive and negative examples of organizational impacts were collected via open-ended questions. After all interviews were completed, a review by all three people conducting interviews, including the primary author of this study, was held to discuss the results, refine hypotheses and cull specific positive and negative examples for inclusion in this report. The general expectation of value being generated from nontraditional, unexpected connections, especially among the connections between the arts, design, technology and business communities, was confirmed (and is discussed in more detail below).

<sup>s</sup> 1=Extremely Negative/7=Extremely Positive

However, the results of the interviews also revealed that the geographic and language connections, although generally judged to have positive impacts, were not properly capturing all the nuance of the situation in the Montréal region. In reviewing the comments made about both the geographic and language connections, it became apparent that these more specific connections were, in fact, being understood to represent a much more general set of cultural connections. Numerous interview participants pointed out that while linguistic and geographic connections may play a role, the broader cultural connections with both Europe and the U.S. are more important. As one interviewee put it, "Montréal has a culture that is both European and American. We have the laid-back attitude of the French and the Italians along with the organization of the English and Germans that works so well with the U.S." As a software development executive put it, "We develop products that we can sell in both the U.S. and Europe because we understand them both."

Based on an analysis of the results of the interviews, some revision of the original hypotheses is necessary. While connections between art and technology are generating innovations and value for the region, the more detailed geographic and linguistic connections need to be recast more broadly in terms of cultural connections in order to more fully understand the mechanism through which value is being created for the Montréal region.

In 1982, the UNESCO world conference on cultural policies developed the following definition for culture:

"In its wildest sense culture may now be said to be the whole complex of distinctive spiritual, material, intellectual and emotional features that characterize a society or group. It includes not only the arts and letters, but also modes of life, the fundamental rights of human beings, value systems, traditions and beliefs."

When describing cultural connections between Montréal and Europe and Montréal and the U.S. and the unique position of Montréal, this definition is generally appropriate. While the U.S. and Europe already have much in common culturally, differences do exist. And, while the U.S. and the U.K. may have more in common than the U.S. and much of Montréal, Montréal has the advantage of proximity. Montréal is not simply bilingual - it is bicultural. While the same may be true of the entire province of Québec, Montréal is the only major city within the province. And, while the Montréal region accounts for 47.4% of the total population of Québec, it also contains 73.8% of the province's native English-speaking

population (Statistics Canada, 2001). The Montréal region is uniquely positioned to benefit from these cultural connections.

The discussion of the results will conclude with specific examples, culled from the interviews, that demonstrate the specific ways these previously uninvestigated connections have generated spillovers and "spill-acrosses" for the resident firms and individuals of the Montréal region. These examples will focus on two areas: the value-generating connections between the arts and business/technology, and the value-generating cultural connections and unique cultural position the Montréal region occupies. While the latter is certainly unique to Montréal, the former connections are of the type that could generate value for any region.

The examples selected are only some of the ones identified during interviews. As the goal is to demonstrate that these previously uninvestigated connections are capable of producing value, and therefore worthy of further study, every effort has been made to select a diverse sample from among the connections identified. As the interviews also made apparent, these connections did not necessarily always generate positive outcomes. Negative aspects identified are included at the end of each section.

### **Art-Culture ↔ Technology Connections, Confirming Examples**

Of the 33 interviews completed, 22 were with individuals from firms. The firm size ranged from 3 to over 6,000 with an average of 555 and a median firm size of 83. Among these 22 firms, respondents estimated that a remarkable 49% of their employees had an "[outside] part-time job, hobby or passion related to arts, design, or culture." Although creative and design firms were included in the sample, so were the major aerospace technology manufacturing companies in the Montréal region (Bombardier and Pratt and Whitney), along with consulting, IT development, architecture, design, and other company types.

Many interviewees mentioned how the artistic and cultural environment of the Montréal region helps to attract technical talent. Bombardier has hundred of young, technical employees who live in the city because of the nightlife and affordability, and interviewees from other companies cited the same energetic atmosphere of Montreal. Reaching outside the firm to establish connections is an important option for employees to have. Discreet, an entertainment technology software developer, recognizes that. It cultivates a bottom-up engineering development environment through academic internships and uses the "soft" cultural aspects of the Montréal region's clubs and art scene to

get potential employees "stuck" in the region. In this way, the underground scene helps attract and retain these highly sought after employees. This underground scene was described in interviews as a viral, word-of-mouth, and very low cost communications and distribution channel for emerging artists and designers. Its barriers to entry are low - almost non-existent - which provides the "techie-by-day; artist-by-night" with a channel to perform and exhibit.

Equally important as having a region with the creative milieu to allow employees such pursuits is the ability of a firm to tap into its own employees' creative energies. Occasionally, a firm will lose an employee when her outside job becomes successful enough that the day job is no longer needed. Rather than being perceived as a negative by the firm, several firms mentioned that they use success stories like these as a recruiting tool to help attract new talent to the firm. One local marketing company goes so far as to give its own employees grants of up to \$50,000 to develop and pursue their own creative/artistic opportunities after hours. The company produces the events and items, but the individuals profit from them. The company says that 50% of its staff are artists, and sees this as a way to not only retain its creative staff but also to provide them an opportunity to learn something new which can be applicable to their work.

Such art-technology-business synergy occurs not just within companies but across them, and between companies and outside individuals, too. The interviews produced countless examples of companies (small and large, but many smaller) using outside, independent design firms and independent workers of all types. "Innovation uses a lot of subcontractors," said one interviewee. Game designer A2M, for instance, hires local artists, both visual and musical, to help in developing its software. This adds creative "depth" to a company, in the words of another interviewee. It also creates a market for independent design that allows people to pursue their passions and occasionally get paid for it; in Montreal, "artists work for themselves first, then for a company."

Specific examples of connectivity between the art, technology, and business worlds are too numerous to mention all of them, but a representative sample will help to paint a picture of the Montreal region's inter-disciplinary connections.

Montreal has long excelled in filmmaking-related fields. In the 1980's, the National Film Board (NFB) of Canada provided funding for a short film made completely with CGI (computer generated imagery). Production of "The Hunger" prompted the development of

rudimentary software to create computer-generated "realistic" 3-dimensional characters. This software then became the basis for SoftImage, which took the basic "engineering-based" interface (all numbers) and developed an "artist-based" interface. The SoftImage software's first major commercial use was in *Jurassic Park*. In the meantime, CRIM, a research center for computer technology, partnered with the NFB to develop a search engine for audiovisual materials.

Kino, a loose organization of independent filmmakers who craft and show short films, works with a local provider of digital imagery equipment. The business owner loans equipment to the filmmakers, who then provide feedback on the equipment, its strengths, and its limitations. Kino also provides an opportunity for individuals to learn the skills needed by professional production companies in film and television. Individuals are able to build their portfolio and skills, which positions them to apply those skills for employment. Kino enables and supports the training with new imagery technology and techniques that are later applied for commercial use.

Ex Centris is developing technology for digital film delivery. Their DigiScreen product is designed to provide a high definition, digital movie theater experience at an affordable price. Traditionally, this conversion has been very expensive, and even digital movies need to be distributed via actual film prints. Digital projection supports nearly instantaneous distribution on demand, reduces distribution costs, and dramatically change the access that independent filmmakers have to movie theaters. In a similar vein, D-Box, is now working on a high-speed, robotic chair for a home theaters research project with L.A.-based music composer Gary Mace to advance the concept and richness of the surround sound experience in theaters.

Completing the film production, distribution, and promotion loop is another Montreal mainstay, Pixman (see [www.pixman.com](http://www.pixman.com)), which describes itself as technology for "nomadic advertising." First used to promote the Montréal Independent Film Festival, Pixman has since shown up in cities around the world for uses ranging from fashion shows to promoting Nintendo's latest video games. The Pixman concept started as art - almost performance art - and has since been developed for commercial use.

One of Montreal's most famous exports is Cirque du Soleil. Cirque serves as one of the best examples of the city's technology-art interface, defining itself not as a circus company, but as a creative content provider. In fact, they employ more engineers

than performers in the Montréal region. Cirque has one of the largest R&D operations in the region. A recent *Business 2.0* (Jan/Feb, 2004) article reported that 40% of Cirque's profits are reinvested in its "creative think tank." Consider the millions spent to develop the technology used for "O" at the Bellagio, or the millions being spent for their new show at the MGM Grand in Las Vegas.

Cirque's basic R&D is conducted in three areas: biomechanical, rigging, and general. Ideas can come from anyone, anywhere. All development is done in-house; the only production element that Cirque outsources is set construction. The R&D division within Cirque completes about 35% of the development of any new technology and then makes all possible new ideas available to a new show's Creative Director. When the Creative Director decides he or she wants to use a particular item, setup, or technology in a show, it's developed fully. The technology must serve the artist/performer, who is always foremost in any Cirque show.

Through similarly ambitious cross-fertilization, TOHU - Circus City brings together the greatest numbers of material and human resources in the world to create, form, broadcast, and produce circus arts. It also serves as a model for sustainable development by utilizing green design and re-used materials. Based around the second largest landfill in North America, TOHU - Circus City has been established as a showcase for community development and technology transfer.

High-powered art and entertainment industries naturally create other business opportunities around them. Admission, now part of TicketMaster, was a spin-off of Cirque du Soleil and the first web-based ticket sales site. They invented the e-ticket for show business in 1999 to meet the demand from the success of the regional circus and arts industries. Admission referenced the demand by the arts and cultural community for their services as one of the early drivers of their success (arts and non-profits were their key customer market).

M2C1 is a design firm involved in a wide range of international projects, including many large-scale public and museum exhibits. Their design strategy is quite different from Cirque's in that they function essentially as a general contractor and outsource nearly all of their work. As a result, they interact with a wide cross section of Montreal's design, industrial, and technology communities. For example, they used a Montreal technology company

to assist in designing the ticketing system for a Singapore museum. Tickets were designed as "keys" to access specific portions of the museum, depending on what the customer purchased. Through its outsourcing, M2C1 often functions as a bridge between the design and technology sectors in Montreal and connects these sectors to international contacts.

At a similar juncture of art, commerce, and technology is 4-D Art, an organization crucial to Montreal's reputation as an emerging "MixMedia" (preferred over multimedia) capital. The integration of art and science is a central tenant to this industry. Boundaries between the two disciplines disappear, which has the positive side effect of eroding the boundaries between different individuals, too. Montreal used to be the modern dance center of the world; now it is the center for this innovative "MixMedia."

More traditional creative industries thrive in Montreal, too. Employing over 100 industrial designers, Megabloks has one of the highest concentrations of industrial designers anywhere in the world. It designs and builds toys for Canadian, U.S. and European markets.

Beyond just companies, Montreal is fertile ground for connective organizations and societies. "The Society for Artists and Technology" provides a forum for companies from the two fields to come together. It provides a "play space" for artists from tech companies to try new ideas. This space is also used for a variety of commercial purposes, including the production of fashion and television shows. SAT creates connections among artists and technologists not only from Montréal, but also from around the world. The Daniel Langlois Foundation for Art, Science, and Technology fosters the connection between art and science within the context of technology. In particular, The Centre for Research and Documentation (CR+D) documents history, artworks, and practices associated with electronic and digital media arts, making this information available to researchers in an innovative manner through data communications.

Montréal, often called the *ville de festivals*, provides a tremendous showcase for lots of experimental work for all kinds of artists. These various festivals also create tremendous opportunities of interactions via temporary density and concentrations of people from across all sectors. The artists are not the only ones who win; organizations and the municipality itself benefit from their presence. In developing the recently completed International Quarter in Montréal, much of which was defined by its use of open space and its "urban furniture," one

interviewee noted: "we hired the best talent - designers who are artists."

Clearly, the art-business-technology links in Montreal are strong and vital. One of our subjects summed it up like this: "Innovation is in Montréal. You must work to find it. It can be hidden, so you have to network and be curious and look outside your own industry." A dense, tolerant, vibrant, and interconnected city allows for such a search to take place.

### **Art-Culture ↔ Technology Connections, Moderating Examples**

Despite many companies mentioning the help that arts and culture provide in attracting technical and other creative employees, others commented on the difficulty of attracting or retaining the technical talent generated by the region's four major universities. Part of the problem may lie in the fact that Montreal's high tech industries are described as being "immature," making it difficult to establish a known presence and develop a reputation for those industries. As one economic developer put it "our numbers are too dependent on a few large technology companies like Bombardier."

Business support for the arts has been "typical" at best. Big companies tend to support the SOB (symphony, opera, ballet) amenities, in part because many high-level executives serve on their boards. Of late, though, there has been a greater reliance on government support, which is declining. The emerging, nontraditional arts garner little to no support from the business community. While businesses undoubtedly benefit from the cultural milieu of the Montréal region, they are doing little to directly support or encourage that environment - aside from employing much of the creative talent drawn to Montreal.

As in most underground or independent arts communities, the artists themselves are not always happy with what they find in their fellow practitioners. "Everyone has their own CD, but quality control is an issue," lamented one musician. It is possible, though, that only a high level of output - and the corresponding failures that brings - can produce the one or two great works that put Montreal on the map. Practitioners also seem to bristle at the inherent tension between different disciplines. "[The relationship between art and technology] is a challenge for artists, who don't care about making things marketable, to impact technologists, who want functional purpose." Interconnectivity is not always an easy thing.



## **Cultural Connections - Confirming Examples**

Montreal's most unique cultural attribute - its bilingual and multicultural nature - also serves it well on the economic front. The region is known as an ideal test market for both English and French products, and can in turn create and export products in both languages. One interviewee called it "the perfect market. It is both big enough and small enough. It is big enough that if you are successful, you are likely to be successful in other places. It is small enough, that you have a good chance of being successful." Another echoed this sentiment, also referring to Montreal as the "perfect laboratory" for trying out new ideas; "the many different cultures of Montréal help to improve chances of success in other places."

Within Québec, Montréal works well as an incubator. It's a good place for entrepreneurs of all stripes to get a leg up, because companies can create products and try them out locally. If successful locally - and it helps that the Québécois like to purchase Québec products - a company can expand to (1) the rest of Canada, (2) the United States, (3) Europe, or (4) any combination of the above. Asia was also cited an important geographic region in terms of Montreal's global connectivity. The typical linkage between Montréal and the U.S. is not from Montréal to anywhere the U.S. but specifically from Montréal to New York City, which is seen as having a similar urban, cosmopolitan, and international character to Montréal. After New York, successful ventures can be assured that their ideas and products have a good chance of succeeding in the rest of the U.S.

Having access to multiple languages and cultures also seems to have a positive impact on the region's talent itself. People "think differently," we were often told, as a result of their bi- or multilingualism. A respondent from a consulting firm noted that when he is faced with difficult problems to solve, he intentionally forms strategy groups with multi-lingual staff. He observed that being multi-lingual means you understand the world from different perspectives and are more likely to devise creative and innovative solutions. It's "good for the brain to have to learn how to work and think in [multiple languages]." One problem solves with "more creativity when you have to approach problems from both cultures." And a constructive "synergistic tension" is created by the presence of both English and French. These are all different explanations for what makes Montreal's cultural connectivity tick.

The bilingual nature of Montréal also makes it much easier to attract international students, who aren't as concerned about language issues. Its multiple cultures, diverse resident population, and Canadian location all create a worldwide perception of "neutrality" that can be comforting to foreigners. It also helps that scientists and researchers can directly read research reported in a multiple languages. There is no lag time in the acquisition of new information, and they are able to maintain a more worldly view of their discipline than their counterparts who only speak one language.

Geographically, Montreal's connectivity serves several important functions. From Europe, it is said, Montréal is not perceived to be part of "America" (unlike English-speaking Canada). It is recognized as "North America," of course, but not "America" - a crucial distinction in this day and age. In the U.S., on the other hand, companies like Megabloks are often perceived to be "American" firms. Megabloks, for instance, has enough of an "American" culture (its sales force works almost exclusively in English) that even retail outlets buying their products think of them as American. In this sense, then, Montreal's connectivity allows it the best of both worlds.

Partly because of this global, urban, and cosmopolitan connectivity, Montreal's creative milieu is appealing to immigrants and artists alike. It "provides a lot of reinforcement for the independent artist," said one interviewee. "There are a lot of successful artist models. It is more open and there is a good image of creative people. Regional government provides good funding for the experimental arts. They are the future raw material for film, TV and music. Our creative sector provides the R&D for Society." This generally supportive atmosphere is cited by those who have moved to the city from abroad, too: "Montréal is much more a mosaic or patchwork than a melting pot. Immigrants come to Montréal and are able to retain their language and culture." At the same time, immigrants, entrepreneurs, and artists alike are afforded myriad opportunities to connect with the larger social, artistic, economic, and cultural scenes.

## **Cultural Connections - Moderating Examples**

Multiculturalism and bilingualism are not always unmitigated blessings. One software development company faces both direct and indirect translation costs because its software designers all work in French and its programmers all work in English. They not only have to maintain software requirements documentation in both languages - they also have to translate the original documentation from French to English and any updates that are made. They employ a full-time translator among a staff of fewer than 50 just for this purpose. Another web development company talked about doing design work in both French and English, depending on who the designers were, but then having to translate everything into English for the programming staff, many of whom are non-native English speakers.

Among Montréal's four major universities, two are taught in English and two in French. It can be difficult to hire non-Francophones who attend the English universities, and if students didn't speak French before coming to Montréal, they aren't likely to stay in the Montréal region after graduation. "Bill 101," designed to help preserve the French language, can also make it difficult to attract permanent foreign workers to the Montréal region - especially those with or planning to have children, who must attend private schooling if they wish to take the non-French-only option. It's equally difficult to attract workers from other parts of Canada and the U.S. Bill 101 also requires that anyone in Québec have, for example, a French web site, even if the company does business only in the U.S.

While the geographic connection between Montréal and the U.S. is obvious, the economic connection, especially for independent contractors traveling to the U.S. to work, is much more complicated. Getting into the U.S. for a specific job can be complicated, and generally requires a great deal of documentation and knowledge of process and procedures. Canadian immigration policies can also be problematic, often making it difficult to bring in foreign workers, especially those with trailing spouses. One company mentioned the need to "lie" on immigration forms as the only way to get foreign workers with trailing spouses into Canada.

The Montréal region sometimes suffers from being seen as a "stopping off point" for Europeans. They come to Montréal first, but use it only as a way to transition to the United States. Often, they're not interested in staying in the Montréal region. On the bright side, the multicultural environment of the Montréal region creates a wonderful way to transition from Europe to the U.S. But it can also create a culture of transience that does little to get temporary residents invested in Montreal as a place they care about.

The perception of political instability and the uncertain future of Québec is generally seen as a minor but real concern. The "fusion" and then partial "defusion" of Montréal was mentioned as a source of political instability across the region. This may not be a cultural issue, per se, but it does spring from language and culture issues, and concerns many Montrealers.

According to the University of Montréal (Lisee), entrepreneurship is lower in Montréal than in Canada generally and especially the U.S. It is growing, to be certain, but a lack of seed capital (informal high risk investment money), no highly visible entrepreneurship training programs, and limited encouragement for women-owned business, combined with a more laid-back European culture, have all dampened the entrepreneurial environment somewhat. In addition, "Québec has a confidence and image problem when, in fact, it is as good as the States."

As these examples demonstrate, the creative milieu of the Montréal region has given rise to numerous beneficial connections, as well as some disadvantages. These connections, most in previously uninvestigated areas, generate "spill-acrosses" that arise from the creative diversity, density, and tolerance of the Montréal region. Density helps to propel the formation of these connections by enabling more frequent interactions that occasionally give rise to these innovation-generating connections.

While the value of many of these specific cultural connections applies uniquely to the Montréal region, the more generic art and technology connections help generate innovation in any region. This paper therefore concludes with a discussion of the implications of these results as they apply not only to Montréal metropolitan area but also to any major metropolitan area in today's creative economy. Potential areas of future research resulting from these findings are also outlined.

## **Discussion**

While the value of industrial diversity in generating innovation for a regional economy has been well documented, this paper clearly demonstrates that the result must be extended to include a more broadly defined creative diversity. Connections at all levels in a rich, creativity-based economy can generate innovation and value across a region. These connections among the broadly defined artistic, design, technology, and business sectors generate the anticipated more closely related spillovers as well as the less

expected and more far reaching "spill-acrosses". While the cultural connections presented in this paper most clearly identify with Montréal, making it difficult to extrapolate those findings to other regions, the art and technology connections present an opportunity for other regions to learn from the specific examples uncovered in the Montréal region.

## **Implications for All Regions**

The importance of the arts and cultural events as a regional amenity that can help attract talent to a region and thereby indirectly drive growth, has recently garnered attention (see Florida, 2002; Clark, 2004). However, the findings presented here suggest that the arts can have a more direct impact on a region's ability to generate innovation. However, these connections are not necessarily established along traditional lines of communication and rely more on the density and diversity of the creative milieu than on specific programs or policies designed to facilitate traditional spillovers (industry networks, tech councils or chambers, other industry cluster and technology transfer initiatives). Much of the benefit in the Montréal region is derived not from specific programs and policies, but from a more general support of the arts (in many forms) along with a broad creative environment.

Tremendous innovations in film production and even entire industries have evolved in the Montréal region (although not necessarily directly) from relatively small grants made by the National Film Board of Canada to independent film directors and producers. This is not meant to imply that every region needs its own "film board" - rather it demonstrates the much more complicated nature of innovation being generated through these less "traditional" connections. As one interviewee put it, "It [the relationship between art and technology] is a challenge for artists, who don't care about making things marketable, to impact technologists, who want functional purpose." The primary linkage seems to be via designers and other outside contractors who may be simultaneously pursuing both professional and artistic endeavors. Creating ways for businesses to find and utilize independent designers and for those independent designers to make their services known and available to businesses of all types could help to exploit the diversity and generate new connections.

Further, opportunities for artists and the artistically-minded to find each other can help to build and nurture the creative milieu. the Montréal region, like most major cities, already has an artistic "underground". The underground was described as a viral, word of mouth communications and very low cost distribution channel for emerging artists and designers to spread information about openings, performances, and other events. The barriers to entry are low to non-existent which provides the "techie-by-day; artist-by-night" a channel to perform and exhibit. As with most such "weak tie" artistic (even "counter-cultural") networks, a region can do things to support and encourage it but cannot be seen to be sponsoring or controlling it. A region can enact policies to encourage connections between creative class members, but cannot organize them.

Finally, regions can and should undergo a process similar to the one that was completed for the Montréal region as part of this study. A small investment of time and some carefully selected interviews or even a more global survey could result in a similar catalog or inventory of art and technology connections across the region. By developing an understanding of the kinds of connections that exist within the region, a more full appreciation of them and the value they create can be developed. Much as is the case with traditional *industry clusters* (Porter) or the newer *occupational clusters* (Stolarick and Florida), developing an understanding of a region's unique *creative clusters* (industries, occupations, and individuals) could result in identifying additional opportunities for enhancing regional growth and prosperity.

## **Future Research**

Follow up work could include a more thorough and detailed investigation of the value generated by specific connections and more detailed explanation of how these connections are established and maintained. Such an investigation would focus more on specific examples as case studies and examine each in depth. The current research has investigated the value of these connections with a great deal of breadth but little depth. By looking at a few specific examples, a deeper understanding would be developed for (1) the conditions leading up to the establishment of such a valuable connection, (2) the actual economic value of the connection, and (3) the conditions necessary to maintain the connection.

A specific investigation can be completed into the conditions under which such connections can be initially created and maintained.

Density is one important element because of the potential to create an interaction in the first place. Diversity at some level is also helpful. These connections are only possible with some diversity of economic activity and among individuals. What is the relationship between density levels and the creation of these valuable connections? What about diversity levels? What else is necessary or sufficient to enable these connections?

A more comprehensive survey of the Montréal region and possibly other cities would allow for a more general, quantitative assessment of the type of connections that exist and the value created by each. The survey could be used as an initial data collection instrument that would capture much more information across the region or regions and would also be used to identify specific connections which could be investigated in more detail using either a follow-up survey or interview process similar to the one used here.

Finally, the results in this paper have focused solely on the Montréal region. Although it is clear that such connections exist and generate value within the Montréal region, it is not certain that Montréal is a completely unique case and that similar results would necessarily be found for other cities and regions. This same methodology and analysis could be applied to several cities simultaneously to allow for comparison of results and greater determination of the more generalizable findings.

## **Summary**

The importance of creativity as a driving force in regional economic growth and prosperity has been well documented (Florida, 2002). However, the mechanisms of this relationship are less understood. Knudsen et al (2003) have shown that innovative activity within a region is positively associated with population density and creative class workforce both jointly and separately. The explanation put forth suggests, but does not confirm, that high levels of density and creative class employment create conditions under which positive interactions between individuals are more likely to spontaneously occur. This paper has examined the specific interactions among the creative, technical, business and design communities of the Canadian Montréal region. Our findings document both positive and negative effects associated with these connections. This paper does not present an exhaustive analysis of these issues; rather it demonstrates that such connections are possible and can have a positive impact on the innovative and total business activity across the region. With its bilingual and

multicultural nature, the Montréal region occupies a unique position within the North American context. While many of the connections presented may be applicable to any city, some are unique to the Montréal region. The applicability of the more generic art and technology connections and the implications for other regions was discussed. By providing specific examples, this paper demonstrates a set of mechanisms through which creativity helps to achieve regional growth and prosperity benefits.



## **Acknowledgements**

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Additional thanks will be included in final version.

# Appendices

## A. Additional information on metrics

Overall Economic Measures	
Population Growth	Percentage change in total population for the region between 1991/1990 and 2001/2000
Job Growth	Percentage change in total number of employed population for the region between 1991/1990 and 2001/2000.
Per Capita Income Growth	Percentage change in average per capita income for the region between 1991/1990 and 2001/2000, unadjusted for inflation
Firm Growth	Percentage change in total number of business establishments for the region between 1990 and 2000
Recent Population Growth	Average annual population growth between 2000 and 2003.
Recent Job Growth	Average annual job growth between 1996 (Canada) or 1998 (US) and 2003.
Creativity Index	Combination of the technology, talent and tolerance scores for a region; designed to indicate potential for success in today's <i>creative economy</i>
Technology Measures	
Patents per 10,000	Number of U.S. patents granted in 1999 to the region per 10,000 people
Patent Growth	Average of year-to-year changes in number of patents in a region (1990 to 1999)
North American Tech-Pole	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
High Tech Location Quotient	A location quotient captures the difference between a specific region's concentration of a specific characteristic and the average concentration across the entire country. The high tech LQ measures the concentration of high technology among employment for a region against the concentration of high technology among employment for U.S. and Canada combined.
Recent Patent Growth	Average annual patent growth between 1996 and 1999 (latest years fully available).
Talent Measures	
Creative Class	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	Percentage of the employed population in the region in occupations in the following categories: Computers, Architecture/Engineering, Science, Education, Arts and Design
% High School	Percentage of the population aged 25 and above in the region that has a high school diploma or equivalent
% College	Percentage of the population aged 25 and above in the region that has a college certificate (associate's

	degree for U.S.)
% University	Percentage of the population aged 25 and above in the region that has a university (4 year or graduate) degree.
Overall Talent	Percentage of the population aged 25 and above in the region that has a college certificate (associate's degree) or higher.
Brain Drain/ Gain Index	Percentage of the workforce, age 25 and above, with at least a college certificate divided by the percentage of the population age 20 to 24 currently attending college or university.
<b>Tolerance/Diversity Measures</b>	
Mosaic Index	Percentage of the population that is foreign born.
Gay Index	Location quotient that is the ratio of same sex unmarried partners to total partners in a region over same sex unmarried partners to total partners for all regions in Canada
Boho Index	Bohemian Index; Location quotient that measures whether a region has more or fewer professional artistically creative people than the average metropolitan region
Visible Minorities	Percentage of the population that is a visible minority
<b>Territory Assets Measures</b>	
Housing Cost to Income	Average annual housing cost as percentage of annual household/family median income
Rent Cost to Income	Average annual housing cost (rental only) as percentage of annual household/family median income
Owner Cost to Income	Average annual housing cost (owned only) as percentage of annual household/family median income
Population Density	Total population per square kilometer
Arts Workers	Performing artists and independent artists, writers and performers per 100,000 population
Arts Establishments	Performing arts and independent artists, writers and performer establishments per 100,000 population
Park Workers	Zoological, Botanical, and other Heritage/Parks workers per 100,000 population
Parks	Zoological, Botanical, and other Heritage/Parks establishments per 100,000 population
Homicides	Total homicides per 100,000 population

## B. Benchmark Cities

Montréal QC	Miami FL
Toronto ON	Minneapolis MN-WI
Vancouver BC	New York NY-NJ-CT-PA
Atlanta GA	Philadelphia PA-NJ-DE-MD
Boston MA-NH-ME-CT	Phoenix AZ
Chicago IL-IN-WI	Pittsburgh PA
Cleveland-Akron OH	Portland-Salem OR-WA
Dallas-Fort Worth TX	St. Louis IL-MO
Denver CO	San Diego CA
Detroit MI	San Francisco CA
Houston TX	Seattle WA
Los Angeles CA	Tampa FL

Washington-Baltimore DC

**C. Interview Instrument (starting on next page)**

Montreal as a Bridge  
Case Study Interview Question Guide  
Draft 8.0

Interview Date: \_\_\_\_\_

Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_

INTERVIEW CODING:

Interview Location: \_\_\_\_\_ or  
Telephone \_\_\_\_\_

Interviewee: \_\_\_\_\_

Organizations: \_\_\_\_\_

Interviewer: \_\_\_\_\_

Culture Montreal Representative: \_\_\_\_\_

Other (if needed)

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CASE STUDY SEGMENT:

- Creative/Arts Organization (museum, opera, theatre, ballet, symphony) 1
- Business/Technology Organization ..... 2
- Design Organization (graphic arts, architect, film, animation) 3
- Other Organization ..... 4
- Emerging Leader ..... 5
- Informational Interview / Not Case Study ..... 6

SECTOR:

- Business/Technology ..... 1
- Academic ..... 2
- Government/Civic ..... 3
- Arts/Cultural ..... 4
- Other to be added ..... 5

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Introduction - Thank you for agreeing to participate in this important research project. This interview will take most of the time we requested or about two hours. We think it will be interesting for you and valuable for the Montreal region and organizations like yours.

**Purpose** of this project is to investigate and frame our Hypothesis that considers the role Montreal plays as a **bridge or connector** in the new creative economy. This includes its roles as a geographic bridge (between Canada and the United States), as a cultural bridge (between Europe and North America and between the French and English languages), and as a bridge between traditional cultural endeavors and the multi-faceted role of technology and creativity in today's economy. *See page 3 for more detail on research sample and survey terminology.*

**Disclaimer and Privacy Statement** - The interview is for research purposes only and none of your remarks would be used publicly without your permission. We will respect your privacy rights and hold your individual comments confidential within our research team and sponsoring partner organizations. We are audio taping this interview to be sure we can capture all of your ideas and comments correctly. No part of this audio tape will be distributed for public or commercial uses.

**Psychographic/Demographic Profile of Interviewee:**

1. First, please tell me a little about yourself, such as your title, professional background, and so forth. **(ASK FOR ITEMS NOT VOLUNTEERED)**

Title: \_\_\_\_\_

Role(s) in organization: \_\_\_\_\_

Length of time with organization:

- 1 year or less .....1
- 1 - 3 years .....2
- 3 - 5 years .....3
- 5 - 10 years .....4
- More than 10 years .....5

Professional background: \_\_\_\_\_

Age Range:

- Under 35 .....1
- 35 - 44 .....2
- 45 - 54 .....3
- 55 - 64 .....4
- 65 or older .....5

Education:

- Advanced Degree .....1
- University/College Degree .....2
- High School .....3

Country Born In: \_\_\_\_\_

Cities/Regions Lived In and How Long:

**Area**

**Years**

_____	_____
_____	_____

---

## Montreal's Connections and Bridges

Let me take a moment to outline the purpose of our conversation. Our discussion today is about Montreal's Connections and Bridges; that is, to understand the positive and negative impacts on your organization among the three Montreal communities or sectors we are studying, as well as by some of the geographical connections. The sectors include:

- 1) The Arts and Cultural Community, such as Culture Montreal, Museums, Opera, Ballet, Theatre, etc.
- 2) The Design Community, such as Kino, Blue Sponge, Diesel Marketing, Society Arts and Technology, Ron Rayside Architect, etc.
- 3) The Business Community, such as Alcan, Alcatel, Cirque Du Soleil, Norvartis, middle market companies, Kutoka Interactive, etc.

Some of the key concepts we are dealing with include:

- 4) **Technological Innovation** - to introduce something new (patents, products, services, processes, etc.) using new science or existing technology defined in the broadest
- 5) **"Connections-Interactions-Bridges"** the links or ties that foster communications, relationship building and exchanges of ideas, commerce, people, etc.
- 6) **"Overall Impact" and "Impacted"** the overall combinations of influences or effects on a body or organization. It can be positive, negative or neutral.



**I. Montreal Regional Creative Companies (Arts and Cultural Organizations and the Design Community Samples) Design Community Sample about 15**

**A. Arts and Technology/Innovation**

1. Describe how, if at all, your organization impacts **technological innovation** in the Montreal region.

1a. How have these interactions impacted your organization in a positive manner?

1b. And how have these interactions impacted your organization in negative fashion?

2. Describe how, if at all, this works in reverse; that is, how does **technological innovation** in the Montreal region impact your organization?

2a. How have these interactions impacted your organization in a positive manner?

2b. And how have these interactions impacted your organization in negative fashion?

3. Overall, how would you rate the impact of these interactions and connections with technological innovation? Would you say the impact was . . . **(READ LIST)** Hand Out Scale.

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative     4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

**B. Arts and Design**

4. Describe how your organization impacts the **design community**, including organizations such as architects, graphic arts, industrial design, film, animation, etc.?

4a. How have these interactions impacted your organization in a positive manner?

4b. And how have these interactions impacted your organization in negative fashion?

5. And could you describe the impact that the **design community** has on your arts / cultural organization?

5a. How have these interactions with the design community impacted your organization in a positive manner?

5b. And how have these interactions impacted your organization in negative fashion?

6. Overall, how would you rate the impact of these interactions and connections with the design community? Would you say the impact was . . . (READ LIST)

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

**C. Arts and Business**

7. Describe the impact your arts / cultural organization has on the **business sector**.

7a. What are the positive results that these interactions and connections with the business community have had on your organization?

7b. And how have these connections and interactions with the business community impacted your organization in a negative fashion?



8. Describe the impact the **business community** has on the creative community, specifically on your organization.

8a. How have these connections and interactions with business affected your organization in a positive manner?

8b. How have these connections and interactions with the business community affected your organization in a negative fashion?

9. Overall, how would you rate the impact of these interactions and connections with the business community? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

CHECK TIME - should be about 60 - 65 minutes

**D. Europe - North America Connections**

10a. How, if at all, has the connection between Europe and North America impacted your organization in a positive manner?

10b. How, if at all, has the connection between Europe and North America impacted your organization in a negative fashion?

10c. Overall, how would you rate the impact of these connections between Europe and North America? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative     4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

**E. Montreal - U.S.A. Connections**

11a. How, if at all, has the connection between Montreal and the U.S.A. impacted your organization in a positive manner?

11b. How, if at all, has the connection between Montreal and the U.S.A. impacted your organization in a negative fashion?

11c. Overall, how would you rate the impact of these connections between Montreal and the U.S.A.? Would you say the impact was . . . (**READ LIST**)

Extremely Positive .....7  
Very Positive .....6  
Somewhat Positive .....5  
Neither Positive Nor Negative 4  
Somewhat Negative .....3  
Very Negative, or .....2  
Extremely Negative .....1

**F. French -English Connections**

12a. How, if at all, has the bilingual French-English language connection impacted your organization in a positive manner?

12b. How, if at all, has the bilingual French-English language connection impacted your organization in a negative fashion?

12c. Overall, how would you rate the impact of the bilingual French-English language connection? Would you say it was . . . (**READ LIST**)

Extremely Positive .....7  
Very Positive .....6  
Somewhat Positive .....5  
Neither Positive Nor Negative 4  
Somewhat Negative .....3  
Very Negative, or .....2  
Extremely Negative .....1

**G. Other Significant Connections and Bridges**

13. What other types of connections, interactions and bridges have been most helpful to your organization's development and growth?

(SKIP TO SECTION IV)



II. Montreal Regional Business Community (**Sample about 15 Companies**)

**A. Business and Technology Innovation Processes**

1a. Briefly describe how your company develops new technologies and innovations. If you use any specific processes, such as the stage-gate process for new product development, what are they? Do you use outside companies in the innovation process?

1b. Overall, how would you rate the impact of these technology innovation processes (versus just letting innovation happen) on your company? Would you say the impact was . . . (**READ LIST**) **Hand Out Scale**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative     4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

**B. Business and Design Community**

2a. How would you describe your company interactions and connections with the **design community** in the Montreal region, such as with architects, graphic arts, industrial design, film, animation, etc.? (**PROBE:** usage of designers inside your company or externally via outsourcing and usage of external design supplier.)

2b. Overall, how would you rate the impact of these interactions and connections between the design community and your company? Would you say the impact was . . . (**READ LIST**)

- Extremely Positive .....7

Very Positive .....6  
 Somewhat Positive .....5  
 Neither Positive Nor Negative 4  
 Somewhat Negative .....3  
 Very Negative, or .....2  
 Extremely Negative .....1

**C. Business and Cultural/Arts**

3a. How would you describe your company's connections and interactions with the **cultural and arts community** in the Montreal region?

3b. Overall, how would you rate the impact of these interactions and connections between the cultural and arts community and your company? Would you say the impact was . . . **(READ LIST)**

Extremely Positive .....7  
 Very Positive .....6  
 Somewhat Positive .....5  
 Neither Positive Nor Negative 4  
 Somewhat Negative .....3  
 Very Negative, or .....2  
 Extremely Negative .....1

**D. Europe - North America Connections** (Major Emphasis Question for

Business Sector)

4a. How, if at all, has the connection between Europe and North America impacted your company in a positive manner?

4b. How, if at all, has the connection between Europe and North America impacted your company in a negative fashion?

4c. Overall, how would you rate the impact of these connections between Europe and North America on your company? Would you say the impact was . . . (READ LIST)

Extremely Positive .....7  
Very Positive .....6  
Somewhat Positive .....5  
Neither Positive Nor Negative 4  
Somewhat Negative .....3  
Very Negative, or .....2  
Extremely Negative .....1

**E. Montreal - U.S.A. Connections** (Major Emphasis for Business Sector)

5a. How, if at all, has the geographic connection between Montreal and the U.S.A. impacted your company in a positive manner?

5b. How, if at all, has the geographic connection between Montreal and the U.S.A. impacted your company in a negative manner?

5c. Overall, how would you rate the impact of this geographic connection with the U.S.A. on your company? Would you say the impact was . . . (READ LIST)

Extremely Positive .....7  
Very Positive .....6  
Somewhat Positive .....5  
Neither Positive Nor Negative 4  
Somewhat Negative .....3  
Very Negative, or .....2  
Extremely Negative .....1

**F. French -English Connections**

6a. How, if at all, has the bilingual French-English language connection impacted your company in a positive manner?

6b. How, if at all, has the bilingual French-English connection impacted your company in a negative manner?

6c. Overall, how would you rate the impact of this bilingual French-English connection on your company? Would you say the impact was . . . **(READ LIST)**

Extremely Positive	.....7
Very Positive	.....6
Somewhat Positive	.....5
Neither Positive Nor Negative	4
Somewhat Negative	.....3
Very Negative, or	.....2
Extremely Negative	.....1

**G. Other Significant Connections and Bridges**

7. What other types of connections, interactions and bridges have been most helpful to your company's development and growth?

(SKIP TO SECTION IV)

**III. Other Organizations and Domain Experts** (Sample about 5 - 10) NOTE: Emerging leaders (those under 35 to 40 years old) will add to the other samples. These are primarily informational. (Not every question may be appropriate for each person.)

**A. Business, Technology, Design and Creative Organizations**

1a. Please tell me what you know about any connections between the arts and arts community and technological innovation.

1b. Overall, how would you rate the impact of the arts community on technology innovation in the Montreal region? Would you say the impact was . . . **(READ LIST) Hand Out Scale.**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

1c. Overall, how would you rate the impact of technology innovation on the arts community in the Montreal region? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

2a. Please tell me what you know about any connections between the arts and arts community and the design community.

2b. Overall, how would you rate the impact of the arts community on the design community in the Montreal region? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

2c. Overall, how would you rate the impact of the design community on the arts community in the Montreal region? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

3a. Please tell me what you know about any connections between the design community and the business, especially technology-based businesses, community.

3b. Overall, how would you rate the impact of the design community on the business community in the Montreal region? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1



3c. Overall, how would you rate the impact of the business community on the design community in the Montreal region? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

4a. Please tell me what you know about any connections between the arts and arts community and the design community.

4b. Overall, how would you rate the impact of the arts community on the design community in the Montreal region? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

4c. Overall, how would you rate the impact of the design community on the arts community in the Montreal region? Would you say the impact was . . . **(READ LIST)**

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

5a. Please tell me what you know about any connections between the arts and arts community and the business community.



5b. Overall, how would you rate the impact of the arts community on the business community in the Montreal region? Would you say the impact was . . . (READ LIST)

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

5c. Overall, how would you rate the impact of the business community on the arts community in the Montreal region? Would you say the impact was . . . (READ LIST)

- Extremely Positive .....7
- Very Positive .....6
- Somewhat Positive .....5
- Neither Positive Nor Negative 4
- Somewhat Negative .....3
- Very Negative, or .....2
- Extremely Negative .....1

**B. Europe - North America Connections**

6a. Describe any positive ways the connection between Europe and North America has impacted the arts, design, or business/technology communities of Montreal.

6b. Describe any negative ways the connection between Europe and North America has impacted the arts, design, or business/technology communities of Montreal.



6c. Overall, how would you rate the impact of these connections between Europe and North America? Would you say the impact was . . . **(READ LIST)**

Extremely Positive .....7  
Very Positive .....6  
Somewhat Positive .....5  
Neither Positive Nor Negative 4  
Somewhat Negative .....3  
Very Negative, or .....2  
Extremely Negative .....1

**C. Montreal - U.S.A. Connections**

7a. Describe any positive ways the connection between Montreal and the U.S. has impacted the arts, design, or business/technology communities of Montreal.

7b. Describe any negative ways the connection between Montreal and the U.S. has impacted the arts, design, or business/technology communities of Montreal.

7c. Overall, how would you rate the impact of this geographic connection with the U.S.A.? Would you say the impact was . . . **(READ LIST)**

Extremely Positive .....7  
Very Positive .....6  
Somewhat Positive .....5  
Neither Positive Nor Negative 4  
Somewhat Negative .....3  
Very Negative, or .....2  
Extremely Negative .....1

**F. French -English Connections**

8a. Describe any positive ways the bilingual French-English language connection impacted the Montreal region.

8b. Describe any negative ways the bilingual French-English language connection impacted the Montreal region.

8c. Overall, how would you rate the impact of this bilingual French-English connection? Would you say the impact was . . . **(READ LIST)**

Extremely Positive .....7  
Very Positive .....6  
Somewhat Positive .....5  
Neither Positive Nor Negative 4  
Somewhat Negative .....3  
Very Negative, or .....2  
Extremely Negative .....1

**G. Other Significant Connections and Bridges**

9. What other types of connections, interactions and bridges have you observed that have been most helpful to Montreal's development and growth?

## IV. Perceptions of Montreal

### (HAND LIST OF CITIES TO RESPONDENT)

- A. Compared to these other cities in Canada and the U.S., where do you believe Montreal ranks on Technology? "1" is the top ranking, "10" is the bottom ranking. On Talent? Tolerance/Diversity? Quality of Life? Hand Out List of 10 Regions.

Technology Ranking \_\_\_\_\_

Talent Ranking \_\_\_\_\_

Tolerance Ranking \_\_\_\_\_

Territory Ranking \_\_\_\_\_

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- B. All things considered, what is your feeling about the Montreal Region on these four areas? (Use the 7 point Likert Scale again 7-Extremely positive/1-Extremely negative) **(READ LIST; GET RATING FOR EACH)**

Technology Rating \_\_\_\_\_

Talent Rating \_\_\_\_\_

Tolerance Rating \_\_\_\_\_

Territory Rating \_\_\_\_\_

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## V. Firmographic Profile of Organization

1. Date Founded: \_\_\_\_\_ 2. Private \_\_\_\_\_ Public \_\_\_\_\_
3. Number of Locations: Montreal \_\_\_\_\_ Canada \_\_\_\_\_ U.S.A. \_\_\_\_\_ Global \_\_\_\_\_
4. Number Employees:  
Total: \_\_\_\_\_ Canada: \_\_\_\_\_ Montreal Region: \_\_\_\_\_ This Location? \_\_\_\_\_
5. What percent of your total employees would you estimate have a part-time job, hobby or passion related to arts, design or culture?  
\_\_\_\_\_ %
6. 2003 Revenue \$ \_\_\_\_\_ Canadian (circle appropriate: thousands / millions / billions)
7. Revenue growth last 3 years? Up \_\_\_\_\_ Down \_\_\_\_\_ Flat \_\_\_\_\_
8. % Revenue spent on Research & Development \_\_\_\_\_ %
9. Number of New Products (not just updates) introduced in last 2 years?  
\_\_\_\_\_
10. Number of Patents in past 2 years: \_\_\_\_\_
11. Diversity of Total Workforce for Your Organization in the Montreal Region. (% represented by):
- Women \_\_\_\_\_
- Immigrants \_\_\_\_\_
- Other Minorities \_\_\_\_\_
- 

### Closing and Thank You

Is it OK for follow-up e-mail or call back? Yes \_\_\_\_\_ No \_\_\_\_\_

Is it OK for someone from Catalytix to follow-up with an e-mail or telephone call for clarification on any questions that may arise as we start to analyze this interview?

Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, obtain business card or e-mail and name of their administrative assistant or key contact.

Based on what you have learned about our project from this interview, is there any else you would recommend that we contact about our research? Yes \_\_\_ No \_\_\_ If yes, capture contact name and complete contact information. Obtain permission to use their name as reference.

Referral Information:

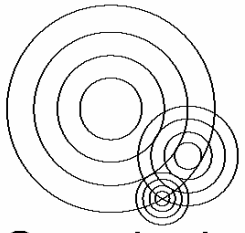
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Catalytix

Culture  
Montréal

CULTURE  
AT THE HEART  
OF MONTREAL'S  
DEVELOPMENT

and Partners

Impact Rating Scale

Extremely Positive.....7

Very Positive.....6

Somewhat Positive.....5

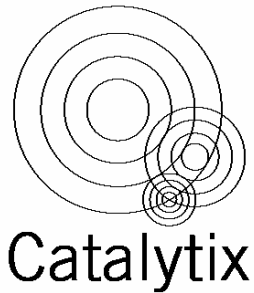
Neither Positive Nor  
Negative...4

Somewhat Negative...3

Very Negative.....2

Extremely Negative...1





Ten (10) Selected Benchmark Regions

Montréal

Seattle, WA

Minneapolis--St. Paul, MN

Houston, TX

St. Louis, MO

Detroit, MI

Toronto, Ont.

Vancouver, B.C.

Ottawa - Hull, Que. / Ont.

Québec, Que.

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<sup>1</sup> Lucas writes "But we know from ordinary experience that there are group interactions that are central to individual productivity that involve groups larger than the immediate family and smaller than the whole human race as a whole. Most of what we know we learn from other people. We pay tuition to a few of these teachers, either directly or indirectly by accepting lower pay so we can hang around them, but most of it we get for free, and often in ways that are mutual - without a distinction between student and teacher. Certainly in our own profession, the benefits of colleagues from whom we hope to learn are tangible enough to lead us to spend a considerable fraction of our time fighting over who they shall be, and another fraction traveling to talk with those we wish we could have as colleagues but cannot".

<sup>3</sup> Reference to Boyle's Gas Laws makes this point more clear. Boyle's Law states that given constant temperature, gas pressure and volume are inversely proportional. In simple terms, if you were to increase the volume of a container holding a gas, the pressure would decrease. This would result because the increased distance between gas particles results in fewer numbers of collisions between them. If we roughly conceive of individuals as "particles", the less densely concentrated people are, the greater the distance between them, and the fewer the collisions or interactions. Of course, Boyle's law also provides interesting intuition into what would happen to a region that "expanded its volume" without increasing its number of "particles". Such an occurrence might result in a place becoming less dense, and, having fewer interactions than it did previously. Refer to [www.chm.Davidson.edu/Chemistry/Applets/GasLaws/BoylesLawCalc.html](http://www.chm.Davidson.edu/Chemistry/Applets/GasLaws/BoylesLawCalc.html) and [dbhs.wvusd.k12.ca.us/GasLaw/Gas-Boyle.html](http://dbhs.wvusd.k12.ca.us/GasLaw/Gas-Boyle.html) for more information.

<sup>3</sup> The level education completed numbers are approximations that are based on different educational systems between the United States and Canada. See the appendix for more information.

<sup>4</sup> The farming/agricultural workers only include those who are working in that sector for a company. The self-employed are not reported in these numbers which includes all four classes.