

Building the Pool of (Creative) Talent: The Case of Calgary

Cooper H. Langford, Ben Li and Camille D. Ryan

Science, Technology and Society Program

Faculty of Communication and Culture, University of Calgary

2500 University Dr. NW Calgary. CANADA T2N 1N4

Introduction

Attracting and retaining talent is widely regarded to be a key factor in innovation systems from the level of an industrial cluster (Wolfe and Gertler, 2003; Breschi and Malerba, 2001; Malmberg and Maskell, 1999) to the regional system (Florida 2002a, 2002b, 2005; Cooke et al., 1997; Cooke and Leydesdorff, 2004), to national systems (Freeman, 1997; Lundvall, 1992) and to global centres of excellence (Mahroum, 2000a, 2000b and 2005). In innovation studies the presumed role of talent is as the source of creative acts leading to innovation. Various hypotheses have been advanced as to the characteristics of a region that attracts and retains such key players in innovation. Theories range from the idea that a rich and diverse culture plays a central role (Florida, 2000, 2002a, 2002b, 2005; Gertler et al., 2002) to the recognition of simple market factors (Shearmur, 2007). Among Canadian cities, the city of Calgary (the CMA¹) has experienced nearly unique rapid internal migration growth in the 1996-2005 period. This paper reports a qualitative examination of the factors that attract and retain creative talent in Calgary.

This work is a part of an examination of the social factors influencing innovation in a CMA in the context of a national project of the Innovation Systems Research Network (ISRN)². In the present context, the goal of the national project is well summarized by the following quote from the interim report to the funding agency this July (Wolfe and Gertler, 2008).

“If competitive success in many sectors of the economy rests increasingly on intangible assets such as knowledge and creativity, this suggests that the most prized resource is now highly educated and creative workers... recently termed ‘regional talent pools of global significance’—that have the potential to attract and embed globally mobile investment, as well as generating innovative growth in situ. The hypothesis here is that such talent is attracted to and retained by cities, but not just any cities. In particular, those places that offer a richness of employment opportunity, a high quality of place (including the physical infrastructure), a critical mass

¹ CMA = Census Metropolitan Area, defined by Statistics Canada as a central core city of 100,000 or more and surrounding communities where a majority of the labour force is employed in the central city.

² The ISRN project explores how local social characteristics and processes in city-regions determine their economic vitality and dynamism as centres of innovation and creativity. It is supported by a Major Collaborative Research Initiative grant from the Social Sciences and Humanities Research Council

of cultural activity, and social diversity—low barriers to entry for newcomers—are said to exert the strongest pull.”

Macro studies comparing many cities’ performance rely mainly on statistical methods. The special goal of the individual city studies in this project is to move to the level of qualitative examination to identify the attitudes of individual talented workers toward their city environment.

Identifying the creative talent population

The key term ‘creative talent’ has been subject to a variety of definitions and interpretations. We will not attempt to provide a one line specification here, but will develop an *operational definition* that describes the role we seek to identify in the community in this research and the steps involved in development of a selection process for appropriate subjects to interview. Ultimately, it is the operational definition determined by interviewee selection that shapes outcomes and interpretations. Our process begins with statistical definitions that have been used in comparing cities by Florida, (2002a) and Gertler et al., (2002). Seeking to identify key players in innovation, the statistical approach has counted those with post-secondary degrees from bachelor level up and used these as the indicator of ‘talent’. A complementary category used in these sources is ‘creatives’ who are measured by employment in artistic and ‘creative’ (in the artistic sense) occupations. The statistical tool was termed the ‘Bohemian index’ (Florida, 2002c). These are ‘correlate’ indicators in Jaffe’s terminology, not direct measures of a target (Jaffe, 1998). All such correlate indicators are based on a statistical hypothesis. In this case it is the claim that talent relevant to innovation and growth is more concentrated in those with advanced knowledge credentials than in the population in general, and a second claim is that the Bohemian index is correlated to a number of features related to innovation and growth.

The first statistical hypothesis does not imply the conclusion that there are no important individual players in the innovation process who lack such formal credentials, nor does the second mean that contributions arise directly from ‘artistic’ employment. For qualitative investigation, a process both more inclusive and more focused is needed that does not limit subjects strictly by educational credential and seeks to add evidence of creative contribution to all working environments more directly. The assumption made is that creative talent implies substantial control over the direction, management and quality of work and commonly employs abstract concepts as a primary vocational tool. Members of this population have affinities for ‘challenge’, and especially, have the capacity to recognize new connections, even ones that may challenge current thinking and dominant paradigms. This carries implications beyond formal education. The role of the social context (such as the relation to the Bohemian index) will be the matter of empirical investigation. However, the Florida-Gertler et al. statistical definitions of talent set the direction for this inquiry and underline the intent to identify those workers who make contributions that are associated with innovation capacity over a broad range of working contexts. This study targets such a population.

Interviewee subjects are identified by the following process. The overall ISRN project includes interviews with senior executives of firms and community organizations as well as interviews with individuals identified as creative talent. In selecting individual subjects for interviews, the interviews with senior executives help to identify individual representatives of creative talent contributing to innovation. The question posed to senior executives asked for identification of key people in the organization who would be ‘difficult to replace’³ since asking for ‘creative’ staff members tends to direct executives’ thinking towards writers and graphic artists. The basis for the question is the claim that a creative individual plays an occupational role and produces a direct vocational output that is not easily substitutable. However, we must filter suggestions to select those whose work is creative in either an individual sense or in a team, not simply those hard to replace because they act as a node in a communication network such that replacement would imply a long learning curve. To this executive identified pool some individuals whose creative contribution has been identified in public documents are added to complete the creative talent interviewee pool.

Embeddedness

In addressing the attraction and retention of creative talent, we seek to probe ‘embeddedness’ in the Calgary community. The term, embeddedness is intended to be inclusive of factors reported about decisions both to move to, and to remain in, the Calgary community. The term is defined by several characteristics. First, embeddedness applies to individuals. To say that an individual is embedded in a particular city or region means that they prefer to live in that area as a result of desirable professional, physical and social amenities available to them. Embeddedness reflects a person’s tendency and desire to conduct the majority of their normal personal, social and economic activities within the particular geographic locality and the context provided by the defined metropolitan area. The present concept is closely related to firm level ‘job embeddedness’ discussed by Mitchell et al. (2001), but not to the ‘conformist’ embeddedness in ethnic networks of Waldinger (1995). It must be recognized that a person’s embeddedness is determined by a constellation of personal, social and economic forces or amenities that directly affect that individual in a positive manner, and not necessarily from a single overriding factor. To analyze embeddedness, we frame five hypotheses about major driving factors. These can be seen to include the two hypotheses that are implicit in the goals of the overall ISRN project articulated in the quote above (H1 and H3), the economic hypothesis of Shearmur (2007) (H2) and two additional hypotheses related to social networks. These were developed from an initial reading of ten interview transcripts.

H1: A socio-cultural environment rich in diversity attracts and retains creative individuals.

H2: Economic opportunity is a key attractor. Opportunity and growth drive growth.

³ This phrasing was suggested by our colleague in the ISRN study, Richard Hawkins.

H3: Specific environmental factors (natural, e.g. landscape, or social, e.g. safety) are critical to the attraction and retention of creative individuals.

H4: Professional networks (with strong links) are critical.

H5: Personal networks (with strong links, e.g. family) are critical.

A methodology is developed below to test these hypotheses.

The Calgary context

It is important to specify the context of the selected CMA in order to understand the relation of embeddedness of creative talent to the city's innovation, growth and economic and social development. Growth processes are often describable by power law relationships that relate growth (or other variables) to size in exponential relationships called scaling relationships of the form:

$$\text{Log (growth)} = \beta \text{ Log (size)} \quad (1)$$

The existence of a power law implies that the driving mechanisms are scale free. The parameter, β , is constant over all sizes. A wide variety of such relationships for cities (on a global basis) are reviewed by Bettencourt et al. (2007) where the similarities (and dissimilarities) to well know biological growth relationships are noted. For example they find that total employment in US cities (2001) scales against population with a β coefficient of 1.01 whereas new patents, number of inventors, and private sector R&D employment all scale with β coefficients > 1.2 . In contrast, length of road surface (Germany, 2002) scales against population with a β value of 0.83, and gasoline sales (US 2001) scale with a coefficient of 0.79. They note that typical biological scaling relationships exhibit β values < 1 , reflecting 'economies of scale'. For cities, quantities reflecting wealth creation and innovation have $\beta \sim 1.2$ (> 1 , increasing returns to scale as network effects reinforce), whereas those accounting for infrastructure display $\beta \sim 0.8$ (< 1 , economies of scale). Economic geographers (e.g., Krugman, 1996) typically also evoke proportionate growth in order to explain urban hierarchies with growth-size distributions. The growth rate of a city population is commonly assumed, other things being equal, to be higher the larger the city size.

While slopes of power law scaling relations, β , help to characterize mechanisms operating throughout the group, special characteristics can emerge from examination of the properties of outliers that deviate significantly from the overall trend. Indeed trends may sub-divide. Lorenzen and Andersen (2007) report that data for creative class presence in 445 European cities follows power laws, but these divide into three distinct phases of the distribution of the European creative class and city size, each approximating a power law with different exponents.

Considering Canada's larger cities (CMA population $> 200,000$, $n = 17$), the power law relation between overall population growth and size is weak ($\beta \sim 0.2$, $R^2 = 0.15$) while

the power law for employment percentage growth is even weaker ($\beta \sim 0.2$, $R^2 = 0.03$). However, Calgary stands out in employment growth at 17.0% against the national average of 9.0%. The next fastest employment growth is more than four percentage points less than Calgary's. In contrast, Figure 1 shows the relationship for Canadian CMAs between city size, and net migration over the five year period 2001 to 2005. The fit to the power law is good with $\beta = 1.3$ and $R^2 = 0.82$. These results underline that cities over 200,000 are experiencing increasing return to scale in their attractiveness. Some aspects of positive network effects are fundamental to the attraction mechanism shared across Canada. However, it is clear that Calgary is a positive outlier⁴ experiencing a particular form of in-migration. A major factor in the last few years is the 'boom' stimulated by the sharp rise in the price of oil. The oil and gas industry is the most concentrated cluster among Calgary's ten 'clustered' (Spencer and Vinodrai, 2007) employment sectors with an employment location quotient of 4.7 (2006). However, Calgary was similarly an outlier in data for the 1996-2001 period when oil and gas growth was much more measured. Gertler et al. (2002) report that Calgary was ranked fifth amongst the large Canadian cities in both the Bohemian index and the Mosaic (population diversity) index. (Immigration to Calgary has risen since.) The Conference Board of Canada Municipal Outlook (2007) reported an economic structure index of 0.77 for Calgary (0 = not diverse, 1 = highest diversity) in the autumn of 2007, indicating a high level of economic diversity.

The 'oil boom' has, however, added some negative factors. The Calgary Economic Development Authority (2007) conducts periodic polls of attitudes in the Calgary business community. There are some striking differences between the attitudes in 2004 and 2006. Perception of quality of life shifted to lower levels and were being seen as economically important factors, Perception of the labour market shifted substantially downward.

⁴ Others are Edmonton, Kitchener-Waterloo and Oshawa. Edmonton has similarities to Calgary. Kitchener-Waterloo has a vibrant high technology sector, and Oshawa is the closest CMA to Toronto. The three largest CMAs of Toronto, Montreal, and Vancouver are experiencing major growth in suburbs and exurbs and Oshawa may be a beneficiary of this trend.

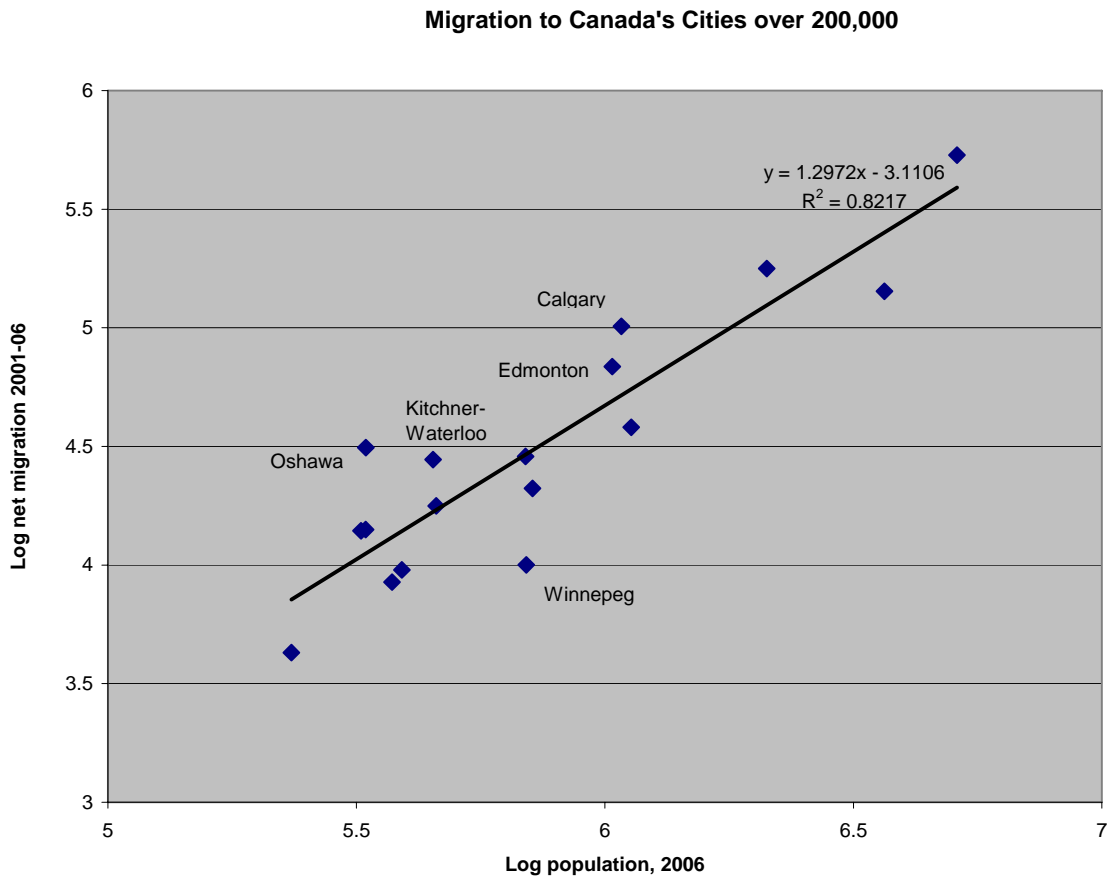


Figure 1. Net migration, 2001-2006, to Canadian CMAAs with population over 200,000 (source Statistics Canada, CANSIM)

Methodology and Results

Methodology

For each of H1 through H5, a set of questions is selected from the ISRN interview instrument that may relate to the hypothesis (see Appendix 1 for list of questions). For each question, a response sheet containing every interviewee's response to the question is automatically compiled from our electronic database of responses. The response sheets employ a consistent order of the interviewees' responses. Some questions provide information on more than one of H1 through H5.

The response sheets are briefly inspected to locate common or otherwise potentially interesting embeddedness factors related to Calgary's innovation system. Responses are coded for mentions of 28 potential embeddedness factors that may be viewed as positive, neutral or negative in the Calgary context (see Appendix 2 for list of embeddedness factors). Each response sheet is then thoroughly reviewed for interviewee responses

specifically targeted to one of H1 through H5, as well as the 23 other embeddedness factors tested. Each embeddedness factor is finally assigned to one of H1 through H5, which in effect provides the operational definition of the hypothesis (*vide infra*).

A grid tabulating embeddedness factors mentioned by interviewees gathers mentions of embeddedness factors and perceptions of their effects on Calgary’s innovation system. At each instance where an interviewee response mentions an embeddedness factor, the question number in which the response occurred was recorded in the grid at the intersection of the interviewee name and the embeddedness factor. Where the interviewee also expresses a positive effect of a mentioned embeddedness factor on Calgary, a ‘+’ is also marked alongside the question number. Where the interviewee expresses a negative effect of the embeddedness factor on Calgary, a ‘-’ is analogously marked. The total number of mentions of each embeddedness factor is tallied, and separately their net perceived positive or negative effect is computed.

We then compute a Positivity Index (-1 to 1) for each embeddedness factor as follows:

$$PI_n = \frac{\text{net sum of positive and negative mentions embeddedness factor } n}{\text{Number of times embeddedness factor } n \text{ occurred}}$$

For each of H1 through H5, we gather the relevant supporting embeddedness factors. We then compute a Weighted Aggregated Positivity Index for each hypothesis as follows:

$$WAPI_{H_x} = \sum (PI_n * \frac{\text{number of mentions for embeddedness factor } n}{\text{number of mentions for all embeddedness factor contributing to } H_x})$$

The summed PIs are reported in Table 1 as the Weighted (Aggregate) Positivity Index.

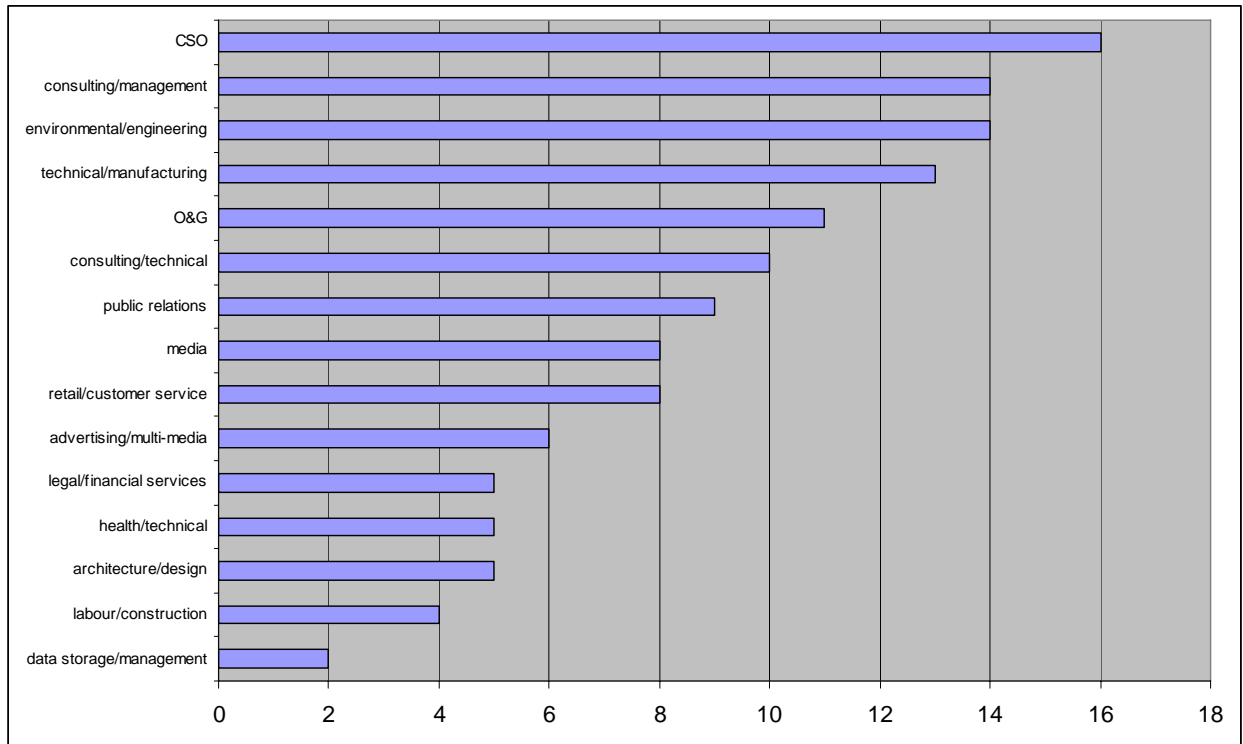
Together, the product of the number of mentions and the Weighted Positivity Index gives the Embeddedness Index, EI, that we use to rank the importance of the hypothesized influences.

Results

The number of creative talented interviewees is 48 at present. We continue to collect data. The present analysis extracted nearly 600 observations from these interviewees that relate to the embeddedness factors. The distribution of interview subjects by employment sectors is shown in Figure 1. Table 1 summarizes the number of relevant mentions for each hypothesis and the resulting positivity and embeddedness indices.

As shown in Table 1, creative talent interviewees indicated that critical environmental factors in Calgary, coupled to Calgary’s economic opportunities, were important to Calgary’s attractiveness, while professional and personal networks are seen as key supporting factors. To clarify the findings, we provide the detailed coding of comments in the responses about factors contributing to each hypothesis.

Figure 1. Sectors Represented by Creative Talent* (individuals) (n=48)



**Some individuals practice in more than one sector.*

***CSO refers to 'civil society organizations' and includes government and not-for-profit organizations.*

Table 1. Embeddedness Indicators for the Calgary CMA

	<u>Hypotheses</u>	<u>Number of supporting mentions</u>	<u>Weighted Positivity Index</u>	<u>Embeddedness Index</u>
<u>H3</u>	critical environmental factors	287	0.46	131
<u>H5</u>	personal networks	136	0.71	96
<u>H4</u>	professional networks	156	0.49	76
<u>H2</u>	economic opportunities	276	0.13	36
<u>H1</u>	socio-cultural diversity	137	0.04	5

(H3) Critical environmental factors included embeddedness factors such as: the presence of entrepreneurial spirit in the city, as well as the ability to be accepted as an entrepreneur; spinoffs from oil and gas industry; 'buzz', a meta-descriptor of positive

social and economic energy; conditions and opportunities afforded by the large size and continuing growth of Calgary, government support for entrepreneurial activities; local political environment in governance and business aspects; commuting and local travel times; and especially the unique environmental characteristics for an outdoor life associated with proximity to the Rocky Mountains. It is noteworthy that the dominance of the oil and gas industry also has a perceived negative effect on entrepreneurship, specifically with respect to establishing and growing new firm.

“I’ve learned over the years never start into a business in Alberta that doesn’t have direct implications and impact on the oil and gas business. This is an oil and gas town, so do we want to do new technology that’s wild, wooly and different? No, not a chance. Certainly not in Calgary because the investors can put their money into an oil and gas buy... Frankly, they make so much money [and] they understand it.”

(H5) Personal networks included embeddedness factors such as: desire and opportunities for personal (non-vocationally-driven) learning; volunteerism, civic activity and other community participation; and the presence of friends and, of course, that primary personal network - family connections.

“My grandfather was an executive with [major energy company] for a number of years as well as President of APEGGA for some time so I had... connections through him in the oil and gas industry.”

Another interviewee reported the number of close relatives living here as a tie to the community.

(H4) Professional networks included embeddedness factors such as: the accessibility of local clients and work; the value of informal relationships linked with professional work and business activities; corporate environment with respect to inter-firm and intra-firm relationships; as well as access to local talent.

“...it’s all about keeping your relationships open in Calgary. If you’re a little bit of an extrovert and you’re smart, you should have no problems in networking yourself into never having to worry about work.”

“The oil and gas industry... we are all linked. There is a network that exists, that is tangible... you experience it when you walk into the Plus 15 [the covered connection of downtown buildings].”

“A couple of years ago... my friends [and I] started meeting at the pub every Monday... It’s basically just an excuse for us to get together and speak French and drink beer... I also consider networking as part of my professional life... and I consider that networking...”

“I used my networks and was able to secure [my job] through a friend of a friend...”

“Rather than organizations or firms being key... it’s the individuals that get things done that are important. It’s less about the firms and more about the people. No matter how large Calgary gets... it’s still a big small town!”

(H2) Economic opportunities included embeddedness factors such as: the positive perception of youth in the professional context, conditions and opportunities afforded by the large size and continuing growth of Calgary, economic diversity; available employment opportunities for creative individuals to practice their preferred vocational skills; as well as the price of goods, services and real estate.

“It’s a young, modern city. There’s tremendous opportunity. It’s a fast city... the financial centre, the oil centre, the business centre... It’s a wonderful place, especially for young professionals. There’s so much opportunity here... It’s a wonderful place for young people to come.”

(H1) Socio-cultural diversity included embeddedness factors such as: openness to new socio-cultural novelty; perceived or manifest social issues such as homelessness and discrimination and responses to them; as well as opportunities for socio-cultural participation.

“Here in Calgary we have the opportunity to make our own history together... its an opportunity to come together and build something that we want, we don’t have to undo a whole bunch of the past. We can create something new.”

“[For artists], we really have that maverick Calgary attitude... there is that maverick culture that exists here of ‘let’s just do it!’ That is unique to Calgary.”

“There’s so many positive things about Calgary, it’s clean, they’ve got a lot of things they need to sort out, the social problems, homelessness, which they clearly haven’t got right.”

“Calgary is a place where there is an opportunity for anyone. That said, I think that the scale of urban growth is causing a divergence... causing a gulf between the rich and the poor. That has a very distinct impact...because when you have a boom economy, homelessness is the paradox of prosperity. The economically and socially disenfranchised can’t keep up with the increasing costs...”

“...there's studies that's telling us it's taking newcomers much longer to catch up than the average Canadian. More and more of them are

homeless, and their form of homelessness is different, it manifests differently than the general population, a higher, vast, growing number of them are living in poverty. So even though people are better educated, we have more of them coming, the percentage of people of colour, minority community, but there are more of them living in poverty than ever before.”

Analysis

The first stage in processing the results was the above definition of factors coded from the interviews and their linkage to the five major hypotheses. These factors determined the ranking of each hypothesis. This process gave each hypothesis its *operational definition*, the significance of each hypothesized major factor to creative talent in Calgary. The analysis that follows is based on these operational definitions.

The tables indicate that critical environmental factors (many with economic overtones thus complemented by economic opportunities) are key factors for embeddedness in the Calgary CMA. Within these, entrepreneurial spirit and available work niches appears to be crucial to respondents. However, social problems, the political environment and (outside that sector) the oil and gas industry are identified as detractors. The latter is viewed as a negative in other sectors particularly in the context of loss of talent to the sector (for higher paying jobs) and suggestions that the dominance of the industry may impact economic diversity within the CMA.

"I think that the present market is tough because, for me, the oil and gas sector has really made it difficult for businesses like myself, because they're paying their assistants a hundred grand."

Environment

Among the environmental factors the proximity of the mountains and an outdoor lifestyle requires further mention. An earlier study underlined the importance of these in a high technology sector (Langford et al., 2003). Current examples are reflected by the following quotes:

"...the mountains, the weather and it is pretty easy to get people from down east to come here, from a lifestyle point of view."

"Calgary... you've got so much available—the mountains, right next door! If you're into that kind of thing... the camping, skiing, climbing, etc."

"Beautiful city, great place to live. And yet we all want to escape to the mountains or the lake on the weekends because you want to go back to nature, and the simple things in life that are maybe the most important."

"...I'm involved in sport I have taken advantage of the mountains..."

“I mean, I moved here to be near the mountains, to ski and to mountain bike and to do all those kinds of things...”

However, government awareness or action in relation to backing existing, new—and in the view of the respondents, necessary—initiatives to enhance some aspects of Calgary’s economic environment was seen in an overall negative light.

“God bless the Alberta government, I think they’re really trying hard, but at some point they’re going to have to give up their cheerleader role and actually step in and participate as partners, I mean, these guys are my friends and they say, ‘[interviewee name], you’re great,’ and so on, but if you could put a little bit of money where your mouth is.”

Networks

Personal networks were ranked second in EI as an embeddedness factor while professional networks factored in third. Both were regularly mentioned. Personal networks were often linked to family and/or grassroots connections to the community, key factors in creative talent either staying or returning to the Calgary CMA.

“It’s more of a family thing. My biological family is here in Calgary, so I came out here to visit them and just fell in love with the city and the area.”

“I am pretty established here... my family is here. No, I don’t think that I would move.”

“My father’s family is from the Calgary area. I chose [to live] here.”

A significant number of respondents indicated that it is expensive to live and operate creative enterprises in Calgary, but the observation that they do so, in spite of this adversity, indicates that other factors in the environment are sufficiently valuable economically or socially attract and retain them (Jacobs, 1970).

“I’m struggling in Calgary right now, I’m really tired, I’m fighting for design here all the time. Calgary is the most challenging place I’ve ever worked. I mean, I moved here to be near the mountains, to ski and to mountain bike and to do all those kinds of things, but I need to earn money and I’m an architect and I love design and I’ll fight for design.”

To the best of our knowledge, personal networks escape statistical tabulations.

Professional networks appear to include a valuable informal element. People who work together value informal ties and connections in order to conduct and succeed in work-related activities.

“What makes Calgary unique is that people are pretty open and honest here. Trust is important. It creates a foundation for ‘deals get done with a handshake’.”

“...we’ve been working in some pretty confidential environments, and I’ve only signed one contract—ever! People just trust each other here and that comes about through the network. So the people that you meet are friends that you know through colleagues...there is sort of this [strong] social fabric.”

Many respondents also did not make an effort to distinguish between professional and personal networks with respect to economic opportunity. This supports the impression that Calgary, as a city, tends to be always ‘at work’, even in the social context.

Professional networks are particularly important in individual sectors. Geophysics is an oil and gas area with a very strong professional network that is fairly formalized with regular meetings.

“Calgary has to be the most close knit geo-scientific group in the world. It’s, I think, because the city is compact...”

The strong informal network in wireless telecommunications was identified by Langford et al. (2003) and a good deal of comment emphasized the importance of informal professional networking.

“...it’s during the three-hour cocktail session that we’re actually going to learn something, exchange an idea, start a conversation that goes somewhere... a lot of cocktail hours, shorter formal sessions, that’s the ticket.”

“Going for coffee at Sunterra’s is where 10 times out of 10, I get most of my information [from vendors or other firms], most of my work done.”

Socio-cultural factors, H1

Finally, socio-cultural diversity (H1) scored poorly in terms of its value to embed creative talent in the Calgary CMA. In many cases, creative talent identifies the community as a youthful one (both civically and demographically). This is one aspect that appeared to be viewed positively by many respondents.

Negative attitudes were reported with respect to government responsibility to address social issues such as poverty, ethno-cultural discrimination and economic disparity.

“So, who’s missing? I think the government is missing. Engaging them has not been easy. And getting minorities into positions of influence that could actually make changes is missing.”

The lack of government intervention in addressing social and economic adversity parallels our findings with respect to the strong presence of entrepreneurial spirit in Calgary:

"I think that this is what makes Alberta unique... in Alberta our political culture is such that we don't expect the government to take care of things for us... we don't want government to take care of things for us."

However, the observation that the government does not allocate sufficient resources toward social and economic development may not be unique to any particular Canadian CMA.

Creative talent and social capital

Examination of the texts of the interviews in their integral form supports an additional hypothesis. The character of creative talent accumulated in a given locale will reflect (or be reflected by) the social capital of that locale. Social capital may be defined as: *'networks together with shared norms, values and understandings that facilitate co-operation within and among groups'* (OECD, 2001). In the next paragraphs, we attempt a sketch of Calgary as a city with social characteristics correlated to the impressions drawn from the interviews of its attractions.

Calgary is a young city situated within an hour's drive of the Rocky Mountains that has grown from under 800,000 to over one million in population in a decade at a rate composed of comparable components of natural increase and migration, with the latter component leading. In a longer perspective the city has doubled in population in less than a generation (average growth rate ~ 2.3% per year), these linked to the positives on H2 and H3). Data cited above suggest Calgary consists of a diverse population in social, cultural, and economic dimensions, and continues to be a major destination for both domestic and international immigration [the abundance of Calgary-based immigrant-serving organizations celebrating 20-30 years of operation would indicate that comparatively high international migration to Calgary is no longer "recent"]. There is evidence in the interviews that the diversification has not fully taken hold, which is reflected in recent Statistics Canada data (2006b), hence negatives with respect to H1. In contrast, since the 1988 Winter Olympics, Calgary has been known for a high level of volunteer participation in civic projects and membership on organizations (Statistics Canada., 2006).

The rapid economic growth has been associated with persistent job opportunity and the recent boom has created labour shortages in almost all sectors (Calgary Economic Development, 2006), hence positives on H2. Public service development is strained by the growth rate and concerns over traffic and health and educational services are rising, negative for H1. A significant feature of Calgary is the degree to which employment is concentrated in Calgary's geographic centre, with 138,500 jobs (City of Calgary, 2008a) out of over 700,000 jobs in the Calgary Economic Region being located in Calgary's

downtown core (City of Calgary, 2008b). Despite being one of the most sprawling cities in North America, Calgarians experience average commuting times.

This centre is linked together by a network of enclosed walkways above street level (the 'Plus 15'), reported in the interviews to contribute significantly to communication among those employed there⁵. Such networking links to positives for H4 in Calgary. Although Calgary has ten 'clustered' industries and the oil and gas industry is the direct employer of fewer workers than several other sectors, the very high concentration of that high revenue generating industry is a dominant factor in the overall economy. As one interviewee put it: "you can't do anything [in Calgary] if there is no connection to oil and gas". This industry structure is quite consistent with positives on H3 and H2 as well as H4.

Overall, the social profile seems to correlate quite well with the high ranking of H3, critical environmental factors, and the significance of H2, economic opportunity. The later emergence of social diversity might well be associated with the low response to H1.

Diversity and specialization

The social elements in factors of attraction and retention can be analyzed from another point of view. Given that local environmental factors and networks figure prominently, do the expressed preferences tend to limit learning pathways within a sector of the economy or do they imply inter-sectoral networking that can support learning pathways that cross sector boundaries? For a city with an employment location quotient (LQ) in one industry greater than four and with nine other clustered industries (LQ>1), none having an LQ greater than or equal to two, the issue of specialization vs. diversity (Fujita et al. 1999) becomes important to the CMA's knowledge spillover capacity. As to the importance of inter-sectoral learning, an elegant study by Feldman and Audretsch (1999), unique in the direct use of innovation as a dependent variable, supports the major role of diversity and inter-sectoral knowledge flows. This suggests that the creative talent interview data might be interrogated for any aspects of attraction and retention that may also promote opportunity for inter-sector knowledge flows (supporting diversity as a driver) vs. those focused on one sector (emphasizing specialization). Here, the character of the networks identified becomes the important issue.

In many cases the professional networks do not seem to promote inter-sector interaction. In quotes above, the strength of the geophysical community network emerged and the remarks about coffee meetings and similar informal networking tended to refer to members of a sector's value chain. However, there was one notable exception in the responses. Interviewees in the multimedia/advertising sector reported that their interactions with the oil and gas industry provided learning opportunities applicable elsewhere. In support of this, studies of the origins in Calgary of wireless telecommunication, global positioning systems, and a number of software activities

⁵ It is interesting to note that Calgary has the third highest downtown job density in Canada at 40,631 jobs per square kilometer (City of Calgary, 2008a), behind Toronto and Montreal, which also feature extensive pedestrian networks below their downtown cores

demonstrate the ‘spin-out’ potential of the oil and gas industry where sector specific knowledge has blended into new sectors as the oil industry reached out for new tools (Langford et al. 1993).

Personal networks offer a very different picture. The common relationship of these networks to the major environmental factors of outdoor recreation, civic engagement (volunteerism) and common interests in entrepreneurship clearly bring together enthusiasts who work in different sectors. It is clear that the associations can create ‘weak links’ (Granovetter, 1983) that can facilitate diffusion of heterodox ideas. There are exceptions. The interest in entrepreneurial activity may lead only to membership in a sector oriented association (e.g. The Petroleum Club, or the WiTec wireless association). However enthusiasm for entrepreneurship may find expression in activities of broader based organizations like Calgary Technologies, Inc. or CATA the Calgary Association for Advanced Technology.

Methodological issues

The qualitative approach—the complexity of individual concerns

Statistical analysis of embeddedness of creative talent in Canadian cities, whether interpretation has emphasized the cultural factors (Gertler et al. 2002) or economic factors (Shearmur, 2007), must by definition deal in aggregates that cannot distinguish mixed motives of an individual from variations between individuals. The first conclusion from the qualitative approach to measuring factors influencing decisions by creative talent that embed an individual in a community is the complexity of individual motivation. It should not be a surprise that we find an average of ~ 12 different embeddedness factors per respondent. Each interviewee seems to achieve a delicate personal balance of embeddedness factors, whether or not those factors correspond with the factors originally attracting the interviewee to Calgary. One respondent, for example, makes several favourable references to economic opportunity and the same number to socio-cultural diversity as positives. Negatives include influence of the oil and gas industry. This respondent also sees the large and growing city as a positive while perceiving social problems as a negative. This respondent is in the media sector where he perceives a positive ‘buzz’. In contrast, a respondent from the oil and gas sector is generally positive emphasizing openness to new ideas, environmental factors (outdoors), and both professional and personal networks as well as short travel times.

The examples could be multiplied for each of the interviewees. The significant point is that decisions taken by individuals reflect balancing the factors of interest to them and making a choice based on a marginal difference. Efforts to extract causal factors from statistics on size of population classes or migration data using regression analysis are made more uncertain by the ‘noise’ added from the common situation of a decision being made on the basis of a small margin in one direction among a balance of factors. Extraction of the ‘causes’ of embeddedness is a difficult task in all cases, but the main

lesson from qualitative research is that motives are complex. What qualitative research reveals is more the individual patterns of thought rather than explanatory propositions.

It is not surprising that individual social considerations play an important role in creative talent embedding in Calgary. Our observations about H4 and H5—that both personal and professional networks are key to embedding creative individuals—are comparable to findings about job embeddedness in which a social network provides professional benefits (Mitchell et al, 2001), and consistent with literature about high switching costs to changing social networks leading to locational attachment (Bolan, 1997).

The position of H3, environmental factors, above economic and social factors, merits some deconstruction because it reflects some complex interdependent aspects. There are three distinct components that are all significant.

One is the natural environment illustrated by the remark:

“I’m here because it’s 2 ½ hours to my cottage in Windermere, and the lake is warm in the summer and the skiing is great in the winter.”

There is little doubt that the close proximity of the Rocky Mountains and the opportunities for an outdoor life figure prominently in attracting and retaining young technical and scientific talent (Langford et al., 2003). This is a motive that animates all sectors.

The second is the civic environment of good schools and safe streets:

“I’m happy in Calgary, it’s vibrant, it’s safe, it’s clean, it’s a pretty good place to do business.”

“It’s a great place to raise kids. It still seems to me to be a friendly place.”

“...beautiful city, great place to live. And yet we all want to escape to the mountains or the lake on the weekends because you want to go back to nature, and the simple things in life that are maybe the most important.”

The third is the business environment reflected in the perception of an entrepreneurial spirit:

“...there’s an entrepreneurial spirit in the city... an open-for-business attitude... you can’t duplicate that, not only within Canada—you can’t duplicate that anywhere in the world...”

The third of these, which is quite prominent, is closely related to issues of economic opportunity and to professional networks. Thus, H2, H3 and H4 should probably not be regarded as orthogonal. A suitable coordinate transform among these three might bring

out a synthesis of common elements of these three as the most significant description of a leading factor. However, it would then give a different description of the secondary factors and the complexity would not be resolved⁶.

Concluding concerns

The civic environment (schools, safe streets) did not figure as prominently in our results as entrepreneurial spirit. As a motivation, entrepreneurial spirit has a close connection to H2, economic opportunity. Can entrepreneurial spirit be maintained in the absence of economic growth? Factors connected to Calgary's economic performance may be more significant than is explicitly revealed in the categories we have constructed, but the perception of Calgary as entrepreneurial has emerged as influential in other interview studies. (Langford, et al., 2003).

The perception of entrepreneurial spirit may draw strength from the fact of economic growth, such that entrepreneurial spirit would seem less compelling if economic success were not an accompaniment. In Calgary's case, it is important to realize that the entrepreneurial spirit does not have a straightforward relation to the actual economic success of activities that operate in an environment of received global prices, as the oil and gas sector must. The next period will show whether this conception of Calgary can withstand major fluctuation in world commodity prices.

Finally, Hypothesis H1 was framed to capture factors associated with Florida's (2002a) influential work. Unfortunately, such factors may be under-reported because it is rather difficult to formulate them in the language of everyday conversation. The interviews produced only weak comment indicating positive importance of these factors either by direct reference or by supporting inference. This result is consistent with Shearmur's (2007) interpretation of migration data to suggest that creative talent is attracted to economic growth rather than the reverse. The interview results could, then, be read as consistent with Shearmur's view, but this is not a clear and compelling reading. The qualitative considerations emphasized in comments on environmental factors and comments on professional networks do not provide clear indication of a simple pull by economic growth.

⁶ In technical terms, there are no eigenvectors.

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Appendix 1—ISRN interview questions informing H1 through H5

Questions 6, 7, 10, 11, 12, 13, and, 14 excerpted from ISRN interview instrument.

6. Please describe your employment history (firm/organization, location, sector, position)
Follow up [probe issues of volition, challenges that workers have faced].

- a. In the case where there was a succession of jobs, why?
- b. Where such changes voluntary or not?
- c. What attributes of the cities help to minimize risk associated with losing one's job (role of social networks, location, policies)?

7. To what extent have you moved between different kinds of sectors or occupations?

- a. To what extent does the [city name] economy enable this kind of mobility and the kinds of opportunities available?
- b. To what extent do you apply knowledge gained from working in other industries or firms in your current work?

10. What characteristics of the [city name] economy and/or labour market make it an attractive place to work in your field? Follow up on the following aspects:

- a. Degree to which [city name] is a city characterized by an 'openness' to experimentation and creativity?
- b. Cutting edge work in field?
- c. Degree to which [city name] is a tolerant/welcoming place (i.e. in terms of race/ethnicity/ sexuality/ gender equality in their field)?

11. What characteristics of the [city name] economy and/or labour market undermine its attractiveness as a place to work in your field?

- a. Have you encountered discrimination in [city name] in your field?
- b. In the city more broadly? (Lack of business/employment opportunities? Lack of 'buzz' in your field? Weakness of creative networks? Lack of cooperation and community in your field? Lack of innovation, experimentation, 'cutting edge' work in your field?)

12. What characteristics of living in [city name] make it an attractive place for you? (Possible issues to follow up on: Natural and/or built environment? Recreational amenities? Cultural amenities? Architecture? Institutions? Social networks? Restaurants? Multicultural diversity? Clean environment? Local politics? Quality of public schools? Safety? How appealing is this city as a place to raise a child? Affordability?)

13. Are there particular aspects of [city name] that enhance creativity in the city?

- b. In what ways does it facilitate creativity (or not)?
- c. To what extent are Calgary's strengths unique to the city or are they related to Canadian institutions and values more generally?
- d. To what extent do your professional creative activities benefit from your professional and personal networks in Calgary or abroad?

14. What characteristics of [city name] reduce its attractiveness as a place in which to live? (Follow up on same issues as in previous question)

Appendix 2—Definitions of embeddedness factors

Embeddedness factors are viewed from the perspective of the interviewee, and may be positive or negative.

H1: Socio-cultural Diversity

Openness to socio-cultural novelty: Organizations and individuals are receptive to innovation in social or cultural matters

Socio-cultural opportunity: The opportunity for individuals or firms to participate in events and movements of specific social or cultural interest.

Social issues: Recognition of social problems such as homelessness, crime, racism, etc., or solutions to such problems.

H2: Economic Opportunity

Youth: Young professionals are welcomed, are provided the opportunity to succeed.

Oil and gas spinoff: Effects due to the presence energy industry based in Alberta.

Available work niche: The opportunity of creative individuals to specialize or find work in their chosen occupation.

Price of goods, services and real estate: Broadly, the monetary resources required for an individual or firm to operate in the CMA.

Large or growing city:* Effects of the large size or growth of Calgary on other aspects of the city.

Economic diversity: Heterogeneity of economic activity in and accessible to the CMA.

H3: Critical Environmental Factors

Buzz: Intangible exciting things that make Calgary great in terms of positive energy.

Entrepreneurial spirit: The practice or presence of entrepreneurship, and the opportunity to start new ventures.

Large or growing city:* Effects of the large size or growth of Calgary on other aspects of the city.

Government support: Government programs to help firms or employees. Government attitude toward new ideas.

Political environment: Systematic attitudes within government or among local business or social community toward innovation or creativity.

Travel time: The amount of time required for individuals to access the location of work or clients within the CMA.

Natural physical amenities: The opportunity to recreationally enjoy the Rocky Mountains, nature, or other natural features within or near the CMA.

H4: Professional Networks

Customers unique to Calgary: Firm or creative is in Calgary because most significant customers are here and nowhere else.

Corporate environment: The attitude with which firms behave toward each other and employees.

Talent pool: Diversity of skills and accessibility of skilled employees in local environment.

Informal relations: The ability to do business over a handshake, to work effectively in the absence of formal organization.

H5: Personal Network

Friends: Individuals known to the interviewee where both their geographic proximity to Calgary and friendship are mentioned as being important.

Family: Individuals considered by the interviewee to be family where that relation and their geographic proximity to Calgary mentioned as being important.

Personal learning: Desire and opportunity to gain new knowledge through formal education or peers, for a primary purpose other than vocation.

Volunteer/civic participation: The desire and opportunity to engage in voluntary or civic activities or organizations for a primary purpose other than vocation.