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# **A Series of Unfortunate Events: The Growth, Decline and Rebirth of Ottawa's Entrepreneurial Institutions**

**Running title: Crisis & Entrepreneurial Institutions in Ottawa**

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**Purpose - This chapter examines how informal and formal entrepreneurial institutions are influenced by economic crises. These institutions act as the foundation for many, if not all, entrepreneurial activities, but they are highly vulnerable to change during times of crisis.**

**Design/methodology/approach - This chapter uses a case study of software entrepreneurs in Ottawa, Canada to better understand the influence of the 2001 and 2008 recessions on the social and economic aspects of entrepreneurship. This case is examined through a set of thirty-nine semi-structured interviews with entrepreneurs, investors, and economic development officers.**

**Findings - While informal entrepreneurial institutions have adapted to a changing economic environment, formal institutions and government programs have so far failed to do this. This results in less effective entrepreneurship support programs.**

**Research limitations/implications - As with other qualitative case studies, these findings are not generalizable to other regions. This chapter argues that further research is needed to better understand the social forces behind institutional change.**

**Practical implications - This chapter argues that entrepreneurship support programs must be customized to the informal social institutions that underlie all entrepreneurial behavior and practices. This alignment potentially increases the usefulness of such programs to entrepreneurs.**

**Originality/value - While entrepreneurship in Ottawa has been carefully studied, there has been very little work examining how technology entrepreneurship in Ottawa has fared after the decline of the telecommunications market. This chapter is useful to both entrepreneurship scholars as well as practitioners and policy makers interested in how entrepreneurial institutions react to crises.**

**Keywords: institutions, technology entrepreneurship, economic geography, case studies, qualitative methods**

**Far from being an individual pursuit, entrepreneurship takes place in a complex and overlapping web of economic, legal, and social institutions. Entrepreneurs carry out both their day to day activities as well as their long-term strategies within these institutional assemblages. Some particular institutional arrangements can promote the formation and growth of small firms, while others discourage it. Policy makers and entrepreneurship scholars have shown an intense interest in studying successful institutional mixtures to understand both their origin as well as and how they can be transplanted to other regions (Julien, 2007). The particular institutional mixes that encourage experimentation and knowledge sharing in regions like Silicon Valley are key ingredients in these cities' continued entrepreneurial and economic successes (Baharmi and Evans, 1995; Nelles, Bramwell, and Wolfe 2005; Saxenian, 1994). Others have blamed institutional mixes that discourage risk taking for low regional entrepreneurship rates (Malecki, 2009).**

**However, within the existing literature, institutions are seen as largely static entities that affect economic and social interactions while remaining outside their influence. This cannot be further from the truth. Like all social phenomena, institutions are continuously in a state of flux and change. Institutions are particularly vulnerable to economic shocks and crises, but we have very little understanding of how crises affect entrepreneurial institutions. Economic downturns can suppress inter-firm cooperation or innovation as companies desperately try to stay afloat . But, shocks can also lead to positive outcomes, as actors realize that existing informal and formal institutions are counterproductive and begin to create new ones. A static perception of institutional mixtures makes it harder to understand how economic crises affect regional economies; institutional changes will far**

**outlast temporary economic discontinuities. Policies not attuned to local institutional mixtures will inevitably fail. This is especially true for entrepreneurship policies, which depend on the presence of local informal institutions to help promote risk taking and innovativeness. Policies must build on existing institutions if they are to successfully promote regional entrepreneurship and growth.**

**This chapter examines the influence of economic crises on entrepreneurial institutions through the case of Ottawa, Ontario. This once sleepy government town was transformed in the 1970s and 1980s into a high-tech hub of telecommunications entrepreneurship. However, the crash of the internet bubble in 2001 and the subsequent decline in venture capital (VC) led to a fundamental shift in the region's entrepreneurial institutions. These institutions were further damaged by the 2008 financial crisis, which while less severe than the crisis in the US, still had a profound affect on Ottawa's technology economy. While subsequent generations of entrepreneurs have largely adapted to these changes, government policies and formal institutions have not.**

**In the next section, I discuss the role of institutions and their place in the entrepreneurship process. Following that, I examine Ottawa's history high-tech entrepreneurship, from its origins in government research labs in the 1940s to the rise and fall of its telecommunications industry. Using a dataset consisting of semi-structured interviews with thirty-nine entrepreneurs, investors, and economic development officers, I argue that while many entrepreneurs have adjusted their business strategies to better match the current institutional mixture and economic realities, government policies have largely failed to take into account the significant changes that have occurred.**

**Entrepreneurial Environments and Institutions**

**Institutional assemblages are made up of legal rules, organizational structures, and behavioral norms underlie all social and economic interaction (North, 1990). All economic activities are constituted within and through institutional assemblages. As Martin (2000 p. 79) argues "economic activity is socially and institutionally situated: it...has to be understood as enmeshed in wider structures of social, economic and political rules, procedures and conventions." The economic rationality that is so often considered perfectly natural in the business world is but itself an informal institution. The changing nature of these institutions, between nations, regions, and industries, helps explain the different economic and social practices we observe in the business world. Institutional frameworks shape the nature of labor reproduction and skill development and are an integral part of the long-term development of a nation or society (North, 1990).**

**Formal institutions, like tax regimes, legal frameworks or education systems, as well as organizations like trade groups, unions, and economic development agencies, create the competitive environment in which all businesses and actors operate in. Institutions like property rights and contract enforcement are fundamental to the operation of a free market economic system (Martin, 2000) These formal institutions are enacted by governments and policy makers with the goal of incentivising certain kinds of strategies or behaviors while discouraging others. Some formal institutions, like specialized tax breaks, directly influence firm strategy, while other formal institutions like educational systems, have a subtler affect (see Gertler, 1995). Regions with a dense structure of supportive formal institutions have what Amin and Thrift (1994) term 'institutional thickness.' This thickness is necessary for sustained economic growth and resilience in the face of an increasingly complex and global competitive environment.**

**Informal institutions represent the socially sanctioned norms of behavior and informally enforced standards of conduct that are “often part of the heuristic we call culture” (North, 1990 p. 37). Though these institutions operate at both an industry level and across regions, the most important ones are local. Unlike formal institutions such as business regulations or financial law that enforce certain behaviors through the threat of legal coercion, informal institutions do not punish bad behavior as they create the context in which good or bad behaviors are socially defined. Adhering to the norms of informal institutions allow actors to build up the bonds of trust and reciprocity that underlie everyday economic life.**

**Informal social institutions can be seen in almost every aspect of the entrepreneurship process, from the first thought to start a firm to the final exit decision. These institutions all but forbid particular entrepreneurial actions while promoting others. Informal institutions create norms for risk taking, innovativeness, and tolerance of failure. Some communities without a history of entrepreneurship have social institutions that discourage entrepreneurial risk taking (Feldman, 2001). In these contexts, other actors like family, friends, and banks will be less willing to invest resources in a new firm because entrepreneurship is seen as exceptionally risky. Informal institutions relating to business failure are also clearly important to the entrepreneurship process. The majority of entrepreneurial endeavors end in failure, and the rate is even higher for risky, growth oriented firms (Baldwin, Bian, Dupy, and Gellatly 2000). A tolerance and even celebration of failure is necessary for a vibrant entrepreneurial economy (Shavinina, 2004; Aoyama, 2009).**

**Institutional economics, especially the New Institutional Economic popularized by Williamson (1985) has been criticized for viewing institutions as mere constraints on rational behavior and for seeing all activities through the narrow lens of transaction costs (MacKinnon, Cumbers, Pike, Birch, and McMaster, 2009). The older Veblenian tradition of institutions, along with more recent developments in institutional economic geography offer a richer theoretical understanding of the multifaceted role of institutions in economic and social life (Hodgson, 2004; Martin, 2000). From these perspectives, informal institutions make up the essential 'rules of the game' of social and economic interaction; they enable a multitude of actions, rather than constraining them to a few possibilities.**

### ***Environments for Entrepreneurship***

**The right combination of formal and informal institutions, networks, and economic structures create what Malecki (2009) terms local entrepreneurial environments. Beneficial institutional, economic, and historical forces combine to create a virtuous cycle that supports and strengthens entrepreneurship (Julien, 2007). A critical mass of successful entrepreneurs helps attract entrepreneurial support services, including venture capitalists, accountants, lawyers, and advisers specializing in startup firms (Patton and Kenny, 2005). Entrepreneurial environments do more than just attract resources to a region. Over time, a series of visibly successful entrepreneurs in a region alter the region's social structure and institutions. The successes of prominent local businesses legitimize the risks of entrepreneurship, encouraging both new firms and spinoff formation. Institutional shifts also legitimize risky investments in startups, not only by professional investors and angels but also by informal sources like family and friends. The increased willingness of informal sources to invest in startup firms helps create an ecosystem in which new firms can obtain**

**the capital necessary for protracted research and development. In a similar fashion, a local history of startup success stories helps create a labor pool that is willing to take the risk necessary to work at entrepreneurial firms.**

**The presence of mentors and angel investors are important components in supporting regional entrepreneurial environments. Mentors are current or former entrepreneurs, often in the same industry as their proteges, who provide advice and wisdom to the next generation of entrepreneurs (Lafuente, Vaillant, and Rialp 2007; Vaillant and Lafuente, 2007). They encourage new entrepreneurs to pursue high-growth opportunities instead of choosing slower-growing lifestyle firms. Mentors can also act as angels, non-institutional investors who invest very young firms. More than money, angels provide critical business experience and help guide entrepreneurs through the critical early stages of firm growth.**

### ***Changing Entrepreneurial Institutions and Environments***

**Existing work on entrepreneurial institutions and environments are problematically static. While many studies carefully examine the origin and initial development of the institutional and cultural mixes that make up entrepreneurial environments, they have paid less attention to how these environments change over time in response to both internal and external factors. There is a poverty of dynamic theoretical frameworks on institutional change. While economists have examined the role of exogenous crisis in institutional change (see Setterfield, 1997), less has attention has been paid to the internal sources of institutional change. Without this, it is impossible to explain why some regions, such as Silicon Valley, can maintain their collaborative and resilient entrepreneurial environment**



**in the face of economic downturn, while other regions like Ottawa struggle to overcome similar challenges.**

**We must avoid “the constant temptation to want to ‘read off’ the individual behavior from national (or local) institutional structures” (Gertler, 2010 p. 5). Too often institutions are perceived as monolithic forces that equally influence all actors. While institutions structure the social and economic contexts in which firms and actors make their decisions, they do not force particular choices or behaviors. Actors retain significant freedom to experiment with new practices or strategies within the institutional limits in which they operate. This is especially true of entrepreneurs, who can only succeed by constantly experimenting with new ideas and techniques (de Clercq and Voronov 2009). Institutional frameworks constrain, but do not dictate, individual choice and agency. This freedom leads to a continual churn of new practices and ideas, successful ones are copied and eventually are integrated into local institutions and norms.**

**Feldman’s (2001; Feldman, Francis, and Bercovitz, 2005) study of the emergence of entrepreneurial institutions in Washington D.C remains the best work on the subject. She locates the shift from anti-entrepreneurial to more supportive institutions in the region through the economic shock caused by layoffs of federally-employed scientists during the Reagan administration. Before the layoffs, many of these scientists saw entrepreneurship or commercialization as “betraying scientific integrity” (Feldman, 2001 p. 866). But, because many of them (and their spouses) had deep ties to the community that prevented them from migrating to regions with more jobs, many were forced to start their own companies to sell back their services to the government as consultants. The success of these pioneering scientific entrepreneurs helped create a foundation of beneficial formal and**

**informal regional institutions that helped spur further entrepreneurial development in the region.**

**Entrepreneurial institutions and environments are complex social entities that react differently in the face economic crises. Formal institutions change very slowly due to the political difficulty of altering them. While informal institutions are more malleable, they too have substantial inertia that makes change difficult. But crises, such as the 2008 financial crisis, can quickly disrupt informal institutions and entrepreneurial environments. A series of bankruptcies and the withdrawal of venture capital can devastate a region's pool of entrepreneurial mentors and potential angel investors. This in turn has a profound affect on the region's entrepreneurial institutions going forward.**

#### **The Emergence of Ottawa's Entrepreneurial Institutions**

**Ottawa — a city of 800,000 350 kilometers east of Toronto and 165 west of Montreal — exemplifies both how quickly entrepreneurial institutions can change as well as the challenges that result from mismatched formal and informal institutions. Between 1975 and 2001, the city experienced almost thirty years of near-continuous growth in the telecommunications and IT sectors. This period saw the development of a set of formal and informal institutions that encouraged entrepreneurship and risk taking. As the internet evolved from an academic research project into a global industry, Ottawa's technical expertise in routing and networking helped the city become a hub of high-tech telecommunications development and entrepreneurship, a veritable 'Silicon Valley North' (Shavinina, 2004)**

**However, this technical economy was damaged by the internet bubble's collapse in 2001. Several leading companies either left the region or closed entirely because of the**

**collapse: between March 2001 and August 2003, private-sector technology jobs in the region declined from about 51,000 to 18,000 (Brouard, Chamberlin, Doutriaux, and de la Mothe, 2004). Furthermore, while Ottawa and Canada as a whole were less affected by the 2008 financial crisis than was the United States, the region still suffered both because its telecommunications industry is almost entirely dependent on sales to the US as well as the drying up of venture capital both in the US and Canada (Corona, Doutriaux, and Mian., 2006). These shocks fundamentally altered the entrepreneurial environment and informal institutions.**

**This case study is based on thirty-nine interviews with entrepreneurial actors in Ottawa, carried about between September and December, 2011. As part of a larger project studying the social foundations of Canadian technology entrepreneurship, twenty-nine semi-structured interviews were carried out with entrepreneurs, eight with bankers and institutional investors, and two with local economic development officials.<sup>1</sup> The average age of the interviewed firms is 8.5 years and the entrepreneurs had lived in the region for an average of 22.6 years, so their views can cast considerable light on the region's recent economic and social changes. Interviews were classified and coded using the Dedoose qualitative analysis platform. Interviews were coded using an open method that allows for the development of a thick description of the case study. This coding method helps achieve a 'close dialog' with Ottawa's unique history of entrepreneurial institutions (Clark, 1998).**

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<sup>1</sup> Entrepreneurs were randomly selected from a list of technology firms in the region. After removing non-entrepreneurial firms, 113 firms were contacted for interviews, producing a 24.7% response rate. Because this was a random sampling of entrepreneurs, it is reasonable to consider this dataset as generalizable to other Ottawa technology entrepreneurs

**These interviews are paired with a historical analysis of Ottawa's economy to investigate the evolution of the region's entrepreneurial institutions and environment.**

***Initial development of entrepreneurial institutions***

**While Ottawa has been Canada's capital since 1867, its economy did not diversify beyond the federal civil service and the pulp and paper industries for more than a century (Andrew, Ray, and Chiasson, 2011). However, since the 1920s the National Research Council (NRC), a federally funded industrial research organization, has operated laboratories in the Ottawa region. After the Second World War, these laboratories slowly began to spin-off high-tech companies that would go on to form the core of the local telecommunications industry. Beyond their substantial technical innovations, these labs served to attract a large number of highly trained scientists and technicians to the region, many of whom would go on to either work at or found startups.**

**Ottawa's high tech economy emerged out of NRC research into telecommunication technologies in the 1950s and 1960s. In 1961, AT&T sale of its Canadian assets to Bell Canada lead to the creation of Northern Telecom, which eventually became known as Nortel. After a series of changes and acquisitions, Northern Telecom would become a world leader in advanced telecommunications infrastructure. Bell Northern Research (BNR), a research corporation spun out of a NRC-funded lab and eventually acquired by Nortel, helped create one of the most highly skilled telecommunications labor pools in the world during the 1970s and 1980s (Harrison, Cooper, and Mason, 2004). Nortel became anchor for an entire cluster of high-tech telecommunications R&D firms and government labs (Chamberlin and de la Mothe, 2003).**

**The founding of Mitel by Douglas Copland and Terry Mathews in 1975 was particularly important to the formation of Ottawa's entrepreneurial institutions. An early adopter of microprocessors in phone networks, Mitel grew quickly, going public in 1979 before being bought out by British Telecom in 1986 (Callahan and Charbonneau, 2004). Both founders used their profits from the sale to start new companies: Mathews created Newbridge Networks, a network technology firm and Copland established Corel, a consumer software firm. While the mere presence of such successful companies helped encourage the next generation of entrepreneurs, Mathews in particular helped create an extremely productive entrepreneurial environment in Ottawa. His Newbridge Affiliates program provides young entrepreneurs with mentorship, funding, back-office support to help them pursue market opportunities he has identified as being important, but outside of Newbridge Networks' core strategic interests (Callahan and Charbonneau, 2004). This program has helped start over ninety new firms, helping produce a generation of serial entrepreneurs in the region.**

**Organizations like the Ottawa-Carleton Research Initiative (OCRI) were established during this period to help foster high-tech entrepreneurship and investment. OCRI, first established by the city government and later spun-off into an independent non-profit organization, helped organize the region's telecommunications industry and heavily promoted local technology entrepreneurship. OCRI runs educational programs for entrepreneurs, lobbies for government support, and attracts outside investment to the region. Local universities and colleges not only started specialized technical programs to help fill the need for a skilled labour force, they also began programs to encourage entrepreneurship and spin-off formation among student researchers and faculty.**

**By the hight of the internet bubble, Ottawa's entrepreneurial environment had solidified. Major firms and organizations like Nortel, BNR, Newbridge, and the NRC labs had attracted an educated workforce specialized in telecommunications research and development. While many of these employees stayed at the large firms, others, inspired by local institutions that encouraged entrepreneurial risk taking moved on to smaller startup firms. Mason, Cooper, and Harrison (2002) quote a prominent angel investor who explains that during the late 1990s:**

**“stories [like] a young guy aged 26 who...is now a multi-millionaire and runs in a \$195,000 Porche...have become common place. It turns everyone's head...In the past I couldn't get anyone out of Nortel or Mitel to join my start-ups but now I can because they feel confident of getting \$10 million within six months as we've got the thing started.” (p. 271)**

**These successes were not limited to entrepreneurial firms. Nortel Networks became a leading, if not dominant player, in the telecommunications field during the internet bubble. The company served as a launching platform not only for nascent entrepreneurs who gained technical knowledge and business skills in the company before setting off on their own, it also helped to develop the region's angel investment infrastructure. Several former Nortel and BNR executives and engineers founded the Purple Angels group in 2001, which has funded dozens of local startups. Retired Nortel and BNR engineers or executives commonly act as advisors to startup firms and often work with OCRI or other public entrepreneurial development programs.**

**Even at the hight of the bubble, Ottawa, and Canada more generally, has always had a deficit of local venture capitalists (Riding, 1998). Throughout much of the 1990s, only one or two VC firms were located in Ottawa (Mason et al., 2002). But while Ottawa has always been a peripheral VC market, its proximity to New York City, as well as Toronto**

**and Montreal — two of Canada's VC hotspots — allowed entrepreneurs to tap into significant amounts of venture capital from outside the region. What little local VC did exist served to support early-stage firms while trying to attract outside investors who could provide larger capital injections.**

***Ottawa's Entrepreneurial Institutions at the Hight of the Internet Bubble***

**By the end of the technology boom in 2001, Ottawa had transformed from a government town in to one of North America's primer high-tech regions. An entrepreneurial environment had grown around several core institutions. The first was a transformation of the region's business culture. The success of early pioneers like Terry Mathews along with the more recent successes of entrepreneurs throughout the 1990s proved that the risk of entrepreneurship can indeed pay off. A technology economy that was once completely based upon government consulting, with its attendant risk-adverse culture and informal institutions, had now developed into a risk-tolerant, economy with both formal and informal institutions that firmly supported entrepreneurship.**

**Second, a decade of success, measured both by the growth of entrepreneurial firms along with rising stock prices at larger firms, helped create a substantial population of both formal angel investment groups like the Purple Angels as well as more informal angels that invest in firms introduced to them by their friends and colleagues. Early-stage angel investments prepared technology firms for rapid growth catalyzed by either subsequent venture investments or acquisition by larger firms. These profitable exits were critical for creating new generations of angels, mentors, and serial entrepreneurs.**

**Organizations like OCRI as well as specific university research programs aimed at the telecommunications sector represent the formal institutions that supported this**

**entrepreneurial environment. OCRI acted both to support new entrepreneurs through training and attract outside investment for existing firms. From its beginning, OCRI has been oriented towards supporting the region's telecommunications industry, and only later branched out to other sectors and other forms of entrepreneurship. OCRI was instrumental in helping the two local universities expand their engineering programs to support the a skilled labor force and market-oriented research and spin-off activity. These university programs served to educate a workforce specialized in telecommunications technology and to produce basic and applied research relevant to the R&D needs of local firms.**

#### **Decline and reemergence of Ottawa's technology economy**

**Ottawa's entrepreneurial economy was battered by the collapse of the internet bubble. While the city's economy has largely recovered, its entrepreneurial environment and institutions were fundamentally altered. Because Ottawa's historical specialization in the telecommunications sector, it profited handsomely as global computer networks were built out throughout the 1990s. When the internet bubble collapsed in 2001, the region's firms found themselves overextended and overvalued. Numerous firms failed during this period due to the evaporation of sales and investment opportunities. Nortel, the region's dominant firm, found itself uniquely exposed to the precipitous decline in network equipment purchases. The decline in sales, combined with strategic missteps by the company's leadership, led to a decade of deterioration that eventually resulted in the firm's bankruptcy and liquidation. From 2000 to 2002, global employment at Nortel dropped from a peak of 94,000 to 37,000. 10,000 of these lost jobs were located in Ottawa alone (Nortel, various years; Brouard et al, 2004).**



### ***The changing nature of entrepreneurship***

**The decline of Nortel and other large telecommunications firms did not spell the end of technology entrepreneurship in Ottawa. To the contrary, while Nortel shed 61% of its global labor force between 2000 and 2002, the number of technology firms in Ottawa increased by 25% over the same period (Statistics Canada, various years). While there was a significant drop in technology workers in 2004 and 2005, the population of skilled technical workers soon recovered. Even during the worst of the crash, the number of high-tech firms in Ottawa continued to increase.**

**The continued increase in technology firms despite the ongoing downturn in the technology is not surprising given the socially embedded nature of entrepreneurship. Much of Ottawa's technical labour force was and still is made up of people who moved to the area to take a job at large organizations like Nortel or the federal government. While they may have been drawn to the city for their jobs, many quickly became enamored of the city's high quality of life. When these workers lost their jobs at larger organizations, they faced a choice of either looking for a new job locally, difficult, given the declining economy and bureaucratic nature of government hiring, or leaving the region in search of a new job, which entailed uprooting their family and abandoning their networks of friends and colleagues. Technical workers with high levels of human capital and in-demand skills had a third option: they could choose to start their own firms to support themselves while remaining in the Ottawa. The workers did necessarily not aspire to be entrepreneurs, but were rather forced into it by circumstances beyond their control.**

**A larger problem that significantly changed the nature of Ottawa entrepreneurship after the internet bubble was the almost complete disappearance of VC. The pullout of VC**

from the region hurt the angel community in two ways. First, angels who had invested in companies that subsequently received investments were lost money when venture capitalists engineered quick exits from their investments. Venture capitalists often negotiated senior debt rights that diluted the ownership of both the founders and early angel investors. In many cases, venture capitalists were guaranteed a specific profit from their investment, meaning that in these situations entrepreneurs and angel investors did not profit from a sale or IPO. Calahan and Charbonneau (2004) argue that because of these actions “most [angels] have left the scene permanently and the fragile angel networks that had been built up over the preceding 20 years have been significantly weakened” (p. 194). The pullout of VC from Canada was exacerbated by the 2008 financial crisis, which significantly weakened the US dollar. Because many Canadian VCs act as conduits for American venture investments, this drove up the cost of cross-boarder investing. Currently, there is only one venture capital firm headquartered in Ottawa, and they are no longer actively investing in new firms.

Many angels were damaged by venture capitalists' sudden exit. Any profits the angels would have made through the exits were largely wiped out by the debt structure. Furthermore, few of investments that survived this period have paid off for the angels . Even nine years after the initial crash of the telecommunications market, Ottawa based angels still have less available capital to invest in new firms. In the words of one local angel investor:

The angel community in town, the word I could use to describe it is tired. There's a lot of angels that made lots of investments over the last 10 or 15 years, not a lot of it is paid back yet. A lot of those investments still look really good but they're still investments, not returns. So there's a lot of people waiting on the sidelines now saying 'I've put a lot of money into this and I'm going to wait until I get some return before I jump back into the pool.' (Interview O125)

**Another independent angel investor spoke of a recent investment in a company that went public after receiving venture capital: “I was one of the first 25 investors in that. When it IPO’ed I was underwater as well. I was sitting there going: you’d think that if you were the first angel investor and the first person working there and someone IPO’ed, you should have a success, this is your home run.” (Interview O107) Consequently, the number of active angels in the regional economy has precipitously declined.**

**The second consequence of the pullout of venture capital was to reduce the number of *future* angel investors. The lack of angel investment over the past decade has significantly reduced the overall number fast-growing entrepreneurial firms. Entrepreneurs depend on angel investors and venture capitalists to support their early research and product development as well as the advice angels provide and the legitimacy their investment signals. Without these benefits, it is hard for new firms to grow to a point where the founder earns enough to act as an angel or role model. Thus, the pull out of VC from the region had a double affect on the angel environment: existing angels largely stopped investing in new firms, which in turn reduced the numbers of new angels in the local economy.**

#### ***Adaption to new institutional environments***

**Both major crises of the 21<sup>st</sup> century — the end of the internet bubble in 2001/2002 and the 2008 financial crisis — changed the institutional context of entrepreneurship in Ottawa. All actors in the city’s entrepreneurial environment have had to adapt their strategies and practices in response to these new institutional assemblages. Two institutional changes are especially important: The first change was in the structure**

**and institutions of the local angel investing and venture capital scene. Second was a shift in local, informal institutional norms away from growth-oriented entrepreneurship and towards lifestyle entrepreneurship. While entrepreneurs have adapted to this new environment, local policies and organizations like OCRI have not fully embraced this new business reality, limiting their overall effectiveness.**

**Entrepreneurs have generally adjusted to the new investment landscape. One angel investor noted that “[i]n 2002/2003, people still thought they’d get money to build large systems. Now it’s getting smaller and smaller, people’s expectations are getting smaller and smaller. Now most people are trying to build software companies that they can build on a shoestring.” (Interview O125) Growth-oriented entrepreneurs are now explicitly choosing strategies to compensate for the lack of available angel or venture capital. A popular strategy in Ottawa to manage the lack of available angel or venture investment is a Software as a Service (SaaS) revenue model, where programs are leased or rented to clients. This provides a stable stream of revenues instead of traditional software sales that depend on new versions to generate income. Several entrepreneurs using this strategy cited the lack of angel or venture capital as the primary reason for choosing it over a more traditional product-based strategy. One serial entrepreneur remarked that during the early years of his second firm “We were going through ‘x’ number of years without really making any money. So we kind of bootstrapped...there was no investor at the time...that was willing to back a new software startup company with zero revenues. So in hindsight I actually think that was fantastic because it really focused the company on if we want to survive we’d better as hell get some revenue coming in here.” (Interview O120)**

**The absence of angel or venture capital has caused many growth-oriented entrepreneurs to adjusted their exit strategies. Without outside investment, it is difficult for firms to grow to the size where either acquisitions or IPOs are feasible. These types of exists provide the founder and other early employees and investors the wealth that can support future entrepreneurial endeavors. Without this, many entrepreneurs expressed an interest growing their first company to where it generates sustainable revenues. At this point, they can essentially 'fire' themselves and use a portion of the firm's reoccurring revenues to support another startup or endeavor. For instance, the founder of an education technology firm expressed his desire to "...direct a movie, that would be my ultimate goal. So what I want to do is that in 3 to 5 years not be actively running the company but having somebody else running it and I would be probably owning the majority of it but not actively involved." (Interview O126)**

**However, this shift towards organic growth and SaaS stratagies, as well as a simultaneous shift to software companies that had fewer fixed startup costs, decreased the usefulness of local competencies in telecommunications and networking technologies. The talent attracted to Ottawa by Nortel and the NRC labs specializing in telecommunications technology are not necessarily well matched for this new breed of software firms. Many former Nortel engineers are used to a corporate mode of development and organization that is quite different from that of entrepreneurial startups. One serial entrepreneur argued that:**

**" all those [former Nortel] engineers went out into the engineering pool of the city and they found themselves at lots of startups. But one of the problem is that having already been trained in one methodology of development, it makes it difficult for us to hire them for two reason. One is that they ask for too much money and two because the startup way is a lot more agile when it comes to developing applications. We don't have meetings upon**

**meetings to talk about things. We have meetings to present things that we've developed.” (Interview O119)**

**A similar problem exists for the local angel investment community. Many of the entrepreneurs who are considering approaching angel investors made it clear that besides the capital investment, they wanted an angel who was familiar with their product and industry and could effectively advise them. Many of the local angels are former Nortel or BNR engineers or managers, and have highly specialized knowledge about networking technologies and markets. As the new generation of software entrepreneurs moves beyond the telecommunications sector, existing angel investors are become less and less able to offer effective advising and mentorship.**

### ***The lifestyle turn***

**The most visible change in Ottawa's technology economy over the past decade has been the shift in informal entrepreneurial institutions away from supporting growth-oriented entrepreneurship and towards emphasizing lifestyle entrepreneurship. This reflects a desire among many new entrepreneurs to spend less time growing their firm into an international leader, and instead dedicate more of their energy to outside pursuits. This change is not simply the outcome of a decade of economic crisis and entrepreneurial malaise, but rather reflects broader changes in the social nature of entrepreneurship. Entrepreneurs, investors, and local economic development officials concede that since Nortel's collapse there has been a marked change in the outlook and goals of new small business owners. The leader of a successful entrepreneurship training program observed:**

**[There is a] big difference between 2002 and 2009. In 2002 you had the guys who were going to grow organically and the guys who were going to go VC and so they'll make money through the VC sale... In 2009 I don't see any of those [later] guys. I haven't seen one guy. Most of it is the lifestyle, the realization that for me to make \$150,000 a year the**

**job that I want isn't here in Ottawa anymore, I don't want to leave Ottawa because it's a wonderful place to live in and my wife doesn't want to leave Ottawa and my kids don't want to leave Ottawa and so I've got to create income for myself and I want to do it using my entrepreneurial skills – so it's lifestyle. The people in there – it's all lifestyle. (Interview O135)**

**Ottawa is a particularly good location for skilled workers to start their own lifestyle firms. The federal government is a massive consumer of IT consultants and contract workers. Entrepreneurs can either create their own firm and pursue government contracts or they can become freelance consultants working for the government through a contracting agency. However, the government tendering and procurement process is exceptionally complicated, several interviewees reported that it took them years before they could effectively apply for government contracts. Beyond the federal government, large firms in the area increasingly contracted out as they laid off their technical support staff. One interviewee, a former Nortel employee who left the company to start his own IT consulting firm, used his connections still in the company to get contracts to provide technical services back to the company. While small firms based around government and corporate contract work are sustainable, their growth potential is limited to the hours they can bill.**

**A major question is why the majority of these workers who were forced into entrepreneurship by the end of the internet bubble largely opted to form slow-growing lifestyle firm instead of fast-growing gazelles. There is some evidence that truly growth-oriented entrepreneurs left the city during the early stages of the crash of the technology economy. These entrepreneurs were likely unmarried or childless and had fewer ties to the region, enabling them to move to regions like Toronto or Vancouver that had more entrepreneurial opportunities. Those that stayed behind did so because they had deeper**

**connections to the region, either because their family, spouse, or children prevented moving or their own preference for Ottawa's quality of life. Lacking other job prospects, many turned to entrepreneurship to support their current standard of living.**

**Entrepreneurs who started their own firms at this time entered a market much different from the one that existed during the internet bubble. Demand for new technologies or products dried up, limiting opportunities for product-based companies. Many entrepreneurs found that consulting was the only viable option. Newly laid off technical workers chose to start consulting firms because they have very low capital requirements and barriers to entry, and have the added benefit of generating revenues almost immediately. This is important, since only some of the laid off workers received severance packages. Others relied either on their savings, their partner's wages, or credit card debt to support them during the startup period. However, despite the ease of starting a consulting firm, many of the entrepreneurs interviewed professed that running a business required very different skills than working for a larger company. Several entrepreneurs explained that learning to network with potential clients was particularly challenging, as one laid-off Nortel worker who started his own consulting firm said: "Some people are really gifted at networking and meeting people and chatting, and that's not really been my strength." (Interview O108),**

**The slow growth of many of these firms is not only due to the constraints of consulting, but rather because many of the founders have no desire to be growth-oriented entrepreneurs. Growth-oriented entrepreneurship demands an incredible level of attention and time and distracts the founder from their family and outside interests. Lifestyle entrepreneurs explicitly chose particular strategies that allows them to find a more**



**preferable work/life balance. For instance, an entrepreneurial husband and wife team choose to layoff most of their employees because they found that managing them became frustrating. When asked what the greatest challenge the firm has ever faced, this entrepreneur responded “getting the goddamn programmer to do his job,” adding that having to manage people made him “an employee of my own company.” (Interview O103)**

**Because of both the growth limits of consulting firms along with some entrepreneurs' own decisions to limit firm growth, very few lifestyle entrepreneurs will ever reach a point where they can act as mentors or angel investors to other entrepreneurs. This has profound implications for the future development of Ottawa's informal entrepreneurial institutions. A continuing lack of role models and mentors who exemplify the rewards of growth-oriented entrepreneurship means that fewer new entrepreneurs will see exceptional growth as an achievable goal. Successful entrepreneurship contributes to institutions that not only convinces other potential entrepreneurs that the risk of both their time and money may pay off, it also affects other potential entrepreneurial actors, such as the entrepreneurs' family and other investors, to take on the risk as well. Without these entrepreneurial institutions, it becomes harder for the region to sustain the growth-oriented entrepreneurial community that is so critical to endogenous regional economic growth.**

**This is not to say that Ottawa no longer has growth-oriented high-tech entrepreneurs. The emerging SaaS cluster demonstrates that new entrepreneurs in the city still dream of creating large firms with the possibility of a very profitable exit. The majority of entrepreneurs in any region will invariably be lifestyle entrepreneurs and Ottawa is no exception to this rule. But, without question, the proportion of growth-**

**oriented entrepreneurs has declined in the region since the end of the internet bubble. As argued above, the lack of new, prominent, successful entrepreneurs in Ottawa over the past decade has altered the region's informal institutions. The lack of informal institutions that promote growth-oriented entrepreneurship does not mean that there will be no growth-oriented entrepreneurs, but rather it suggests that fewer will chose such a path when presented with an entrepreneurial opportunity.**

### ***Informal and Formal Institutions***

**Neither OCRI nor research programs at the local universities have successfully adapted their programs to serve Ottawa's new generation of software entrepreneurs, and instead still focus on telecommunications entrepreneurship and research. These formal institutions continue to serve an economy that in many respects no longer exists; while Ottawa still has a telecommunications cluster, it is far smaller than it once was. This means that the local universities are producing fewer trained workers that have the skills the new generations of small software firms need and there is less useful academic knowledge that can spillover into local firms. This is not to say that government organizations are incapable of responding to institutional change, but rather political decisions were made for these programs to continue to focus on the remaining local telecommunications economy, rather than on the new forms of entrepreneurship that have emerged organically. Formal institutions are less adaptable than informal ones because of the need for political consensus and buy-in from multiple stakeholders.**

**Several software entrepreneurs felt that OCRI's programs were not useful for their particular industry, that as one entrepreneur puts it: "they still had this notion...that chips and wires and cables were going to come back. They just didn't see the potential for the**

**kind of businesses that have sprung up where ...3 people can get together with minimal capital and have a startup. They were still thinking in terms of millions of dollars.”**

**(Interview O116) Another software entrepreneur agreed, saying: “the majority of the associations in the city were built around the telecom boom. Which really says very little software startups, especially small ones like us. What we’ve done because of the lack of support in that space is we’ve created our own.” (Interview O119)**

**OCRI did react quickly to the initial downsizing of large firms like Nortel by helping newly laid off workers transition to entrepreneurship. However, their programs and strategies reflected a clear desire to replicate the old growth-oriented entrepreneurship in order to replace the jobs lost to downsizing. Events and classes focused on attracting venture capital and planning for IPOs and acquisition exists. These programs are designed to help growth-oriented entrepreneurs who need help accessing venture investments. But, in the wake of the earlier VC pullout and the 2008 financial crisis, this is essentially no longer an option for many entrepreneurs. While OCRI does operate an entrepreneurship center, it is geared towards very small businesses like restaurants or commercial contractors. Software entrepreneurs of course benefit from some of the services it provides, such as how write a basic business plan or file for a federal tax ID, but it cannot help them with issues that even small software firms will face, like the challenges of working with foreign customers or managing a very unstable cash flow.**

## **Conclusion**

**Ottawa’s entrepreneurial economy experienced a decade of turmoil. Technology entrepreneurship boomed during the internet bubble, with large firms like Nortel attracting skilled workers from across Canada and the world to Ottawa. Around this**

**economic success, a set of supportive formal and informal entrepreneurial institutions emerged, helping to form a highly successful entrepreneurial environment. These institutions helped encourage many to take on the risk of entrepreneurship, by either starting a company themselves, leaving a large firm to work at a startup, or investing in a new firm.**

**The two economic crises of the last decade, the end of the internet bubble and the 2008 financial crisis, fundamentally changed this environment. The first crisis devastated the market for telecommunications technologies, forcing entrepreneurs to find other markets. The sudden pullout of venture capital from the region not only hurt those firms that had taken it, but also damaged an entire local network of angel investors and other informal investors. This crisis also precipitated the downfall of several of the city's largest technological employers. Many laid off workers turned to entrepreneurship as a way to stay in the region. However, many of them turned to a different kind of entrepreneurship, a form of entrepreneurship that allowed them to preserve time for their family and other pursuits at the cost of firm growth and expansion. This choice is related to larger changes in local informal entrepreneurial institutions that now cautioned against risk taking. This crisis contributed to the decrease in the number of new angel investors and entrepreneurial role models in the city, further hurting local entrepreneurial institutions.**

**The 2008 financial crisis had fewer immediately visible consequences for the city's technology economy, but this crisis continued to damage key entrepreneurial institutions. The strengthening Canadian dollar has meant that Ottawa has largely been unable to participate in the revitalized American venture market. This, combined with the lack of active angel investors left after the internet bubble has caused the remaining growth-**

**oriented entrepreneurs in to embrace growth strategies that do not require outside capital. This in turn has contributed to an increasing focus on sustainable organic growth, largely through SaaS strategies, that will allow the entrepreneur to eventually 'fire' themselves from a profitable company to work on another startup. These changes are summarized in Table 1.**

**[table 1 around here]**

**It is important to note that while these institutional changes are path dependent, they are not deterministic. Despite Terry Mathews' continued success as an entrepreneur, investor, and mentor, his presence alone did not prevent an institutional shift towards lifestyle entrepreneurship over the past decade. Therefore, while the sources of institutional change may be external, the institutional change itself occurs through the actions of individual actors and as a result of individual agency. Individual entrepreneurs made particular choices, such as the choice to pursue a growth-oriented firm or a SaaS strategy, based on their own particular circumstances, goals, priorities, and wider views of the economy. These choices are both influenced by the institutional assemblage they exist within as well as ultimately affecting those institutions based on their successes or failures. When considering institutional change, we must look beyond the causes and carefully examine the nature and process of the change.**

**These changes reflect shifts in the social institutions that underlie Ottawa's entrepreneurial environment. The informal institutions changed quickly in response to the shifting economic conditions. Social institutions that once encouraged entrepreneurs to take on the risks needed to quickly grow an entrepreneurial firm now seem to support slower, less risky strategies. The same cannot be said for the city's formal entrepreneurial**

**institutions. These are still firmly directed towards a telecommunications sector that is no longer a regional economic engine. Because these formal institutions are tied to larger political forces in the city and province, they cannot change as quickly as informal ones. In cases like Ottawa, this leads to a mismatch between the formal and informal institutions; the formal institutions are no longer aligned with the underlying informal institutions.**

**Effective government policies must work in tandem with local informal institutions. While some policies, such as a ban on non-compete agreements, favorable tax policies, and educational investments, can contribute to a thriving entrepreneurial environment, these policies only create change on the margins. While they may help some entrepreneurs, they are unlikely to be very beneficial. Instead, policies should seek to identify informal institutions and social elements already present in the community and strive to work in concert with them. Entrepreneurial environments are fundamentally social systems that cannot be wholly created or sustained by government action alone. Rather than trying to create entrepreneurial clusters or new industries from nothing, policy makers must seek to build on existing regional advantages. The social norms, conventions, and rules that make up informal institutions compose a powerful source of regional advantage that policy makers should seek to harness.**

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**Table 1 - Summary of Institutional Changes over time**

	During internet bubble (1990-2001)	Post internet bubble (2001-2008)	Post financial crisis (2008-present)
Role of venture capital	Used to finance quick firm growth, many firms make explicit strategic decisions to bring on VC	Many firms damaged by quick pullout of VC, forced into early sale or IPO. Initially after bust, many firms still pursuing VC, but less willing to change firm strategy to take it on	Most entrepreneurs now believe that it is very difficult and undesirable to take on VC. Many adjust strategies in order to grow without outside capital.

Presence of angel investors	Entrepreneurial and corporate successes create network of formal and informal angels who invest in local firms. Angels are able to use their telecom expertise to advise firm and help prepare them for quick market growth and eventual VC investment.	Existing angels are harmed by sudden VC pullout. Angels either lose their investment, make no profit, or their investment periods are significantly increased. Many choose to stop actively investing or cease being angels entirely. Angels are still able to effectively advise the telecommunications firms they invest in.	The lack of very large and profitable exists over the past decade results in fewer new angels to replace those who have left. Angel's telecommunication experience less relevant. Entrepreneurs increasingly look for strategies that produce organic growth. This increases the downward trend of local angel investing.
Growth-oriented vs lifestyle entrepreneurship	While lifestyle entrepreneurship is always a widespread, the visible success stories at this time convince many that growth-oriented entrepreneurship is feasible and desirable. Many leave stable employment at large firms to start or work at startups.	Many laid off technical employees turn to entrepreneurship as an alternative to migration or reduced income. However, these new entrepreneurs are much more interested in striking a work/life balance than previous generations, and therefore many of them choose to start low-capital, lifestyle firms.	Given the lack of recent success stories or mentors, the trend towards lifestyle entrepreneurship continues. Entrepreneurs who are genuinely interested in starting growth-oriented firms must either leave the region or adapt to the lack of available angel and VC financing.
Preferred exit	Many growth-oriented entrepreneurs are primarily oriented towards large exits through either IPOs or acquisitions. The legacy of success stories like Mitel and Nortel demonstrate that this is very possible.	Initially, despite a shrinking of the telecommunications, many entrepreneurs still seeking large exit via acquisition. As telecommunications bust continues, many begin to readjust their goals.	Entrepreneurs increasingly aware that a large exit is no longer possible. They begin to choose strategies that allow for long-term sustainable revenues. Some express a desire to use these revenues to help form new startups.
Role of OCRI	OCRI serves to lobby for local telecommunications industry. Helps establish targeted research programs at local universities and attracts outside investment and capital.	OCRI organizes entrepreneurship training classes for laid-off telecommunications workers. The primary goal is to continue local growth-oriented entrepreneurship.	OCRI has largely not adapted to the new informal entrepreneurial institutions in the region. Several software entrepreneurs complain about OCRI's continued focus on the telecommunications industry.

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