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**Seeking Sustainable Livelihoods:
Constructing a Role for Community Economic
Development in Technology-Cluster Growth**

by

Edward T. Jackson and Rahil Khan

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Introduction

Can technology clusters deliver sustainable livelihoods?

With the bursting of the ‘tech bubble’ worldwide, and the consequent shedding of hundreds of thousands of jobs in the last two years by major and minor companies in the global ‘new economy,’ this question is top-of-mind for many citizens and at least some institutions. The question also encapsulates the challenge faced daily by both employed and unemployed knowledge workers.

Perhaps community economic development (CED) can help. In the past, this locally-driven strategy has been applied to the economic margins, in underdeveloped and remote regions and in poor urban neighbourhoods. It may, in fact, be that CED offers one of the *only* feasible solutions for reducing the dysfunctional volatility of tech-cluster labour and business markets. Drawing on the experience of Canada’s National Capital Region (Ottawa-Gatineau), this paper examines the limits and possibilities for CED strategies to be employed alongside the efforts of business and government to promote the growth of technology clusters.

Technology Clusters: An Ascending but Limited Paradigm

In Canada today, as in most developed countries, technology-cluster growth has gained a privileged position in economic policy discourse and practice [Industry Canada 2002a]. It is an ascending paradigm with undeniable public policy momentum. It is, above all, a concept underpinned by science and technology, and not by social dimensions. Fundamentally, technology clusters are seen to be driven by the commercialization of science and technology, and little else.

During the 1990s, industry advocates point out, a number of clusters grew in robust fashion across Canada. Nationwide, information and communications technologies (ICTs) generated almost \$60 billion in 1997, representing 6 percent of the total economy. Knowledge workers in this sector earned, on average, 50 percent more than employees in the economy as a whole. Vibrant ICT clusters emerged in Ottawa, Toronto, Waterloo, Calgary and Vancouver, among other centres. Other clusters are focused on biotechnology (Montreal), ocean and marine technologies (St. John’s, Halifax), environmental technologies (Toronto), biopharmaceuticals (Winnipeg), alternative energy (Calgary) and fuel cells (Vancouver) [see ITAC 2002].

Social science research has begun to highlight the pivotal role played by local knowledge and learning in growing clusters [Wolfe 2002a]. A major multidisciplinary study, the Innovation Systems Research Network (ISRN) Project funded by the Social Sciences and Humanities Research Council and government agencies, is under way to “investigate how local networks of firms and supporting infrastructure of institutions, businesses and people in communities across Canada interact to spark economic growth” [Wolfe 2002b : 1]. Key to this interaction are networks of trust among different economic actors that combine to form a community’s social

capital. Studies suggest that regions which continuously engage stakeholders within a learning and action framework tend to succeed in cluster development [Wolfe 2002c].

Such recognition of the importance of community-driven innovation is an important step forward in understanding how clusters can be grown. However, the prevailing framework is a limited one. First, it is primarily corporatist in character. The key economic actors are larger businesses, research institutions and governments. And, unless they are CEOs, successful entrepreneurs, venture capitalists, university presidents, senior government officials or major politicians, there is little opportunity for ordinary citizens to exercise meaningful ‘stakeholder rights’ in this process. Rather, the process of building local innovation networks is led by high-profile civic entrepreneurs from the companies and institutions with the greatest stake in cluster success [Henton et al. 1997].

Second, the role for civil society is thus circumscribed to those non profit institutions with a direct interest in business and research and development – notably chambers of commerce, professional associations, research agencies, think tanks and universities.

Third, from a labour force perspective, there is embedded in this framework a kind of knowledge-worker elitism that sees employee recruitment and retention issues as *only* involving highly educated and well-paid software engineers, scientists, consultants and business managers. Public services – education, health, transport, policing, greenspace – that attract and retain these middle- and upper middle-class professionals are what is important, end of story.

That’s who’s in. Who, then, is *out*? Basically, low-income, less educated citizens and the non profit organizations that serve their interests are invisible in cluster-development discourse. The list of organizations *not* on the radar screen of innovations systems policy and strategy is a very long one, indeed, and includes social service agencies, community development corporations, non profit housing programs, microcredit funds and many others. Because they involve tech-sector donors and volunteers, some social agencies, such as community foundations and United Ways, do remain vaguely on the screen. These latter groups are sometimes able to play a bridging role between tech and non-tech elements in the community, and have done so in several North American cities.

So, What’s the Problem?

The general problem is that technology clusters seem to be capable of delivering sustainable livelihoods only for elite workers and, even then, only for a while, and, ultimately, only for some of them. It is well known that the knowledge economy primarily hires highly educated and specialized professionals. Engineers, scientists, consultants and managers form the core of this elite group. It is true that busy supplier firms and consumer spending multipliers (on houses and cars especially) create important spin-off jobs. However, overall, clusters are powered by a narrow-gauge labour market.

Almost by definition, then, there is no natural place in a cluster for undereducated workers, who often also happen to be poor. In labour market terms, clusters are ‘gated communities’ that keep in the ‘haves’ (in terms of education) and keep out the ‘have-nots.’ Left totally to market forces, there are few opportunities for low-education, low-income households to enter and benefit from clusters.

But even for the ‘haves,’ there is another serious problem undermining sustainable livelihoods. In North America at least, few technology companies have shown they have rational plans for laying off workers when, inevitably, booms turn into busts. Against a backdrop of often excessive executive compensation, and plummeting stock prices (translating into heavy losses for employees with big stock option programs), major technology companies have demonstrated a singularly *irrational* approach to shrinking their labour forces. These factors have combined to cause employee motivation to ‘tank,’ at all levels, even among otherwise loyal senior managers. And, in many firms, employee trust in the corporation’s leadership and strategy has hit bottom.

As a veteran manager in the Ottawa technology sector said recently: “Our senior management has no plan. We don’t know who will be next to go. It is hard to live like this. I wouldn’t have said this a year ago, but, if they tell me I’m gone, I’m going to be relieved. It’s like this for everybody. I don’t trust them anymore. Getting out wouldn’t be so bad.”

Moreover, the tension and dissatisfaction caused by labour-market volatility also finds their way home. Households coping with stress and uncertainty in the workplace also must deal with more interpersonal tensions within the family unit. Marriages are strained or broken altogether. Children act out. Teenagers join gangs. Of course, these things happen in other economic sectors that are restructuring or downsizing. The point is that the new economy is not immune to these ‘old’ social dislocations.

Furthermore, there are community-level economic impacts. Large-scale downsizing triggers personal and business bankruptcies, a lowering of real estate values and a general reduction in consumer spending on big-ticket items. ‘Small ticket’ purchases, like eating out at restaurants, also decline.

The Search for Sustainable Livelihoods: The Case of Ottawa

One community that has seen both meteoric growth and stunning decline in the technology sector is Ottawa. And it is beginning to test CED as a way of addressing some of its challenges.

The National Capital Region (NCR), which includes the municipality of Gatineau in Quebec as well as metropolitan Ottawa, is presently home to more than one million citizens and a labour force of almost 600,000 working age adults. The region’s modern infrastructure, clean air, low crime rate, extensive greenspace and many cultural institutions all contribute to a very good quality of life and a growing population.

In the last half of the 1990s, Ottawa's population, especially in the urban core, grew at a much faster rate (7 percent) than that of the country as a whole (4 percent). The population became more diverse in that period as well. In 1996, 15 percent of Ottawa residents were members of visible minorities [Social Planning Council 2002]. In 2001, one in five residents of Ottawa identified themselves as belonging to a visible minority [Tam 2003]. It is also likely that the incidence of poverty in the National Capital Region, which had risen from almost 15 percent in 1991 to 19 percent in 1996 [Jackson and Graham 1999] continued to grow in the late 1990s (forthcoming analyses of 2001 census data will tell the full story).

Traditionally, government and, to a lesser degree, tourism provided most of the region's employment. By the mid-1990s, however, public sector spending cuts had eliminated 15,000 good government jobs in the NCR. Fortunately, a dynamic technology sector – powered by multiple clusters in telecommunications, software, photonics and life sciences – was able to replace those jobs in the latter half of the decade. By early 2001, the new-economy sector in the region reached a peak of 69,000 knowledge-worker jobs [Goff 2002].

Then the 'tech wreck' hit. The lead players in the region's telecom and photonics clusters – notably Nortel networks and JDS Uniphase – announced a series of major layoffs [Bagnell 2002]. In a dramatic reversal, between March 2001 and October 2002, the NCR's technology sector lost 15,000 jobs [Goff 2002]. Ironically, though, this time the slack was picked up by government, which hired 13,000 new employees in the same period – many of them, in fact, 'refugees' from the new economy [Galt 2002]. Government contracts also kept many tech firms viable, a few even prosperous [Bagnell 2003]. Expanded construction activity produced another 4,000 new jobs, especially those related to federal overnment real estate projects [May 2003]. And an estimated 400 technology start-ups were also initiated, many of them by engineers and entrepreneurs using buyout packages from their former employers [Goff 2002].

For this most recent tech downturn, then, it appears that the region was able to regain its economic equilibrium relatively quickly. But without the federal government's spending spree, the economic and social damage likely would have been considerable. The region dodged a bullet. Moreover, the full impact of the technology meltdown has not really played out yet; more layoffs are pending, the startups have yet to prove themselves and knowledge-worker households will have expended much of their savings and equity over the next few years.

The greater Ottawa region has, in many respects, been a textbook case for how to develop technology clusters. The technology sector's origins really began with government agencies and research institutions collaborating with the private sector on communications and computer systems in the early 1970s. The 1980s saw the growth of a number of successful homegrown firms (Mitel, Corel, Newbridge Networks) and units of US companies (Systemhouse, EDS, Digital). In the 1990s, Nortel and JDS became global leaders in their fields and expanded in explosive fashion. Tech-sector leaders like Denzil Doyle, Rod Bryden, Michael Cowpland, Terry Mathews, John Roth and Josef Straus were lionized, with good reason. Ottawa's new economy became more visible, more confident and more globally oriented.

Underpinning this success was a network of institutions that catalyzed and facilitated the learning and action of the sector [Mallett 2002]. Chief among these was the Ottawa Centre for Research and Innovation (OCRI), which connected business, professional, research, education, training and civic institutions in the region with each other and with external markets and policy agencies. Along with the municipal government of Ottawa and its former Economic Development Corporation (OED), OCRI and Centre members promoted labour force programs to provide the clusters with the employees and training they needed, advocated policy reform and research to advance specific clusters, promoted better civic infrastructure in transport and housing, linked companies in the region with markets and partners in the US, Europe and Asia, encouraged the venture capital community to invest more heavily in Ottawa and helped to steadily build the social networks and capital among these key actors in the sector.

As successful and impressive as the work of OCRI was, and is, its links to and concern for citizens and workers outside the technology sector have remain underdeveloped. In fact, OCRI and its allies did take on useful projects on opening labour force opportunities to immigrant professionals and setting up ‘smart sites’ in community centres to democratize Internet access to citizens. Nevertheless, these initiatives were always positioned as subordinate to business imperatives, and their scale remained modest in any case.

Moreover, the role of social sector leaders and agencies in the *governance* structures of OCRI and OED was negligible. This marginalizing of the social sector in OCRI’s decision-making structures contributed, at worst, to mutual distrust between anti-poverty advocates and tech-sector leaders and, at best, to a sustained disconnect. In particular, there was little interaction between OCRI and the Social Planning Council, an agency that struggled financially through the 1990s but stayed committed to and linked with organizations serving the poor, though the Council was also often perceived as anti-business. In another example, OCRI and OED gave only tepid support to the Ottawa Community Loan Fund, a nonprofit microfinance program for unemployed and low-income microentrepreneurs.

However, one site of convergence, where technology leaders and social advocates could work together more frequently, was the Community Foundation of Ottawa (CFO). During the 1990s, the Foundation brought onto its board a number of tech-sector executives. Sector growth also translated into Foundation growth, as wealthy donors from the new economy made major gifts to the CFO. At the same time, the Foundation began a decade-long process of moving towards a more asset-based community-development approach to grant-making with community groups, along the lines advocated by Kretzmann and McKnight [1993; 1999]. Currently, the Foundation is cooperating with the City government and community groups to develop strategies to promote individual development accounts, affordable homeownership and microenterprise among low-income residents of the region [Brown 2002].

Other key players in the region, such as the United Way and social-science academics, are moving towards an asset-based approach as well. In fact, the City of Ottawa’s (2002) Human Services Plan for the next 20 years is heavily influenced by an asset perspective. The Plan seeks to promote human development across all economic sectors, including the region’s technology clusters. With a consensus building on the merits of the assets-based approach, it will be interesting to see how all this plays out in the NCR.

For the most part, though, the experience of the 1990s in technology cluster growth in the National Capital Region was that it was largely irrelevant to the interests of poor and disadvantaged citizens. *While much social capital was built, little social inclusion was achieved.* What was achieved was a technology sector that created social networks, trust and learning *for itself*. This was necessary for sparking cluster growth and impressive in its own right. However, it did not prove sufficient for generating sustainable livelihoods for the broader citizenry or, for that matter, knowledge workers themselves.

Revisioning Possible Roles for Community Economic Development

Community economic development (CED) is an inclusive approach to creating economic opportunity that engages the broadest range of stakeholders, through nonprofit structures, to generate economic opportunity for unemployed and disadvantaged citizens. Across North America, community development corporations, multistakeholder co-operatives, credit unions, microcredit programs, community foundations, and Aboriginal development corporations have provided technical advice, capital and social support services to enable unemployed and poor citizens to set up community, cooperative and micro enterprises in urban and rural areas alike [Bruce and Lister 2001; Favreau and Lévesque 1999; Galway and Hudson 1994; MacLeod 1997; Perry 1987; Savoie 1999; Shragge 1999]. CED is characterized by some commentators as one of the most promising areas of social and economic policy in Canada [Torjman and Leviten-Reid 2003; Battle and Torjman 2002].

CED is, however, no magic bullet or panacea. Used alone, it is a thoroughly inadequate policy tool. But applied in concert with other policies, from effective fiscal and trade regimes to fair and sustainable social programs, community economic development can make an important contribution to nation-building and to sustainable livelihoods for households.

Notwithstanding its limitations, as recent research by CEDTAP and the Caledon Institute has shown, the CED sector has been characterized by a high degree of organizational innovation. CED organizations (CEDOs) and their enterprises mobilize the resources and knowledge of all elements of the community: business, government and civil society. They often have engaged low-income citizens in designing, governing, managing and evaluating CEDOs and their businesses. Seeking to achieve success in two and sometimes three bottom lines – commercial, social and environmental – community enterprises demand more rather than less organizational learning and innovation than conventional businesses.

However, over the past 30 years, CED enterprises have been remarkably *low* in technology and science intensity. Until the full force of globalization hit local economies, it was often possible to create small, labour-intensive service and (less frequently) manufacturing businesses, employing low-income, low-education workers that could survive through a combination of commercial revenue and government grants. In successful cases, these workers would transit from Unemployment Insurance or social assistance to become productive, tax-paying citizens. Thus, the ‘return on taxpayer investment’ via government grants was reasonably good. Today, however, globalization and technology have combined to create a hyper-

competitive environment for small businesses. Without knowledge intensity, *any* small business – community-owned or otherwise – faces severe and unforgiving challenges in the marketplace.

Perhaps it is time to ‘revision’ what CED could bring to cluster development and what science and technology could bring to CED. Perhaps there can be a win-win ‘social contract’ created for both sides. Perhaps the tech sector and the social sector can forge an alliance through the medium of knowledge-intensive CED.

More specifically, experience has shown that there are at least five roles that CED can play in the context of technology-cluster development:

- 1) bridging the digital divide to ensure greater opportunities for new economy jobs among the unemployed and underemployed
- 2) enabling knowledge workers to cope with technology-sector volatility
- 3) mobilizing the resources of corporations, wealthy individuals and governments to promote asset-based community development among low-income and economically marginalized citizens
- 4) creating multisector leadership structures that encode representation not only from business and the tech sector but also, substantially, from social sector organizations as well
- 5) promoting the growth of community-owned science and technology enterprises that generate benefits for the broadest range of citizens and businesses in the community.

It is worth looking more closely at how each of these roles can be operationalized.

Bridging the Digital Divide

The digital divide is, of course, a global as well as a local challenge, especially in developing countries. “But,” as the United Nations has observed, “the digital divide need not be permanent if technological adaptations and institutional innovations expand access” [UNDP 2001: 35]. In Canada, in the late 1990s, the federal government supported a range of programs to expand Internet access in schools, libraries and non profits, especially in rural regions but also in poor neighbourhoods of urban areas. A new program to install broadband connectivity in rural and poor regions is under way as well. Community development corporations, local associations and municipal governments can play a key role in engaging enterprises, citizens and social services to increase connectivity and Internet access – and then to exploit these new tools.

In Ottawa, OCRI manages Smart Capital, an ambitious demonstration program to build ‘the world’s most connected city.’ With 20 service providers and 50 development partners, Smart Capital enables governments, schools, students, community groups, businesses and citizens at large to create and use efficient, low-cost online services including training courses, counselling, database management, software applications, e-mail, webcasting and many other features. Smart Capital is implemented with federal, provincial and municipal funding [Smart Capital 2002].

Roles for Community Economic Development in Technology-Cluster Growth

<i>Role</i>	<i>Lead Organizations</i>	<i>Program Strategies</i>
1. Bridging the digital divide - for undereducated and poor citizens - for rural communities	- Non-profit organizations - Community centres - Libraries	- Public access sites (eg. Smartsites) - Broadband expansion - Training - Employment counseling - Individual Development Accounts (IDAs)*
2. Enabling knowledge workers to cope with sector volatility	- Sector associations - Major companies - Municipal governments	- Work-life balance programs - Employment counseling/networking - Targeted credit programs for mortgages, business loans (“Super IDAs”) - Social support networks - Youth programs for children of knowledge workers
3. Mobilizing resources for asset-based community development	- Community foundations - United Ways	- Microfinance services - Homeownership/options through non-profit and private projects - Individual development accounts - Volunteer leadership training - Donor-advised funds - Donor education programs
4. Creating multi-sector leadership structures with substantial representation from both the technology and social sector	- Leadership forums and roundtables with multiple sponsoring organizations	- Rotating chairs - Study groups/sub-committees on human resources, infrastructure, environment, etc.
5. Promoting community-owned science and technology enterprises	- Community development corporations - Non-profit organizations - Municipal governments	- Laboratories - Super-computers - Telescopes - Museums - Eco-tourism exhibits - Specialized training institutes

* IDA programs seek to enable low-income individuals to save funds for home ownership, small business and education. Individual savings are matched, often on a 2:1 or 3:1 basis, by program funds to encourage asset building. However, Employment Insurance is taxable, while social assistance (welfare) is not, but provincial regulations limit the savings recipients can accumulate. Both these constraints must be addressed by IDA proponents.

Customized training in technology skills is another important strategy for bridging the digital divide [Torjman 1999]. In Toronto, the nonprofit Learning Enrichment Foundation (LEF), a leading community economic development organization, offers short courses in computer, networking, internet and database skills to enable systemically unemployed workers to find entry-level jobs in technology companies. Through partnerships with companies like Microsoft, Novell and others, LEF continuously assesses market trends and the evolving needs of employers in the sector. The Foundation has experimented with different combinations of learning methods, including classroom instruction, self-study and experiential learning. As firm-level skill requirements become more sophisticated, LEF is moving to more advanced training to prepare their students for such jobs as help-desk and walk-around technicians. Federal and provincial grants as well as private sector sponsorships and partnerships support LEF's work [Khan 2001].

LEF is currently leading a five-city demonstration project to show how targeted, community-based training can help overcome labour-market shortages in the new economy. The project uses extensive database management, flexible funding for trainees, call centres and a collaborative network of trainers, counsellors, 'matchers' and corporate developers – all focused on matching the assistance needs of the unemployed or underemployed with the recruitment needs of technology companies [Valvasori 2002].

Between 1995 and 2000, the National Research Council operated Vitesse, a 16-month training program to move immigrants with traditional engineering skills into the technology sector as software engineers. Sponsored by companies, Vitesse students were trained for specific jobs. Another initiative of the late 1990s, the Compaq-Adeco project, trained single parents and new Canadians with generally low education levels to work in Compaq's call centre. The Partners for Jobs initiative funded 40 to 50 percent of the students on social assistance while Employment Insurance funded 30 to 40 percent of the students. By 2000, more than 300 people had been trained in the Compaq-Adeco project, with a 99 percent placement rate [Khan 2001].

There is also an urban-rural digital divide. One serious barrier experienced by small towns and rural areas on the periphery of urban clusters is frustratingly slow internet access. Installing high-speed, broadband telecommunications infrastructure requires cooperation by all levels of government, the private sector and community organizations. Setting up citizen-oriented public access sites to the internet, in libraries, schools and government offices in rural communities requires a similar type of cooperation. So too does promoting a culture of innovation and learning in rural schools, businesses and civic organizations. CED organizations are well placed to animate these efforts, mobilizing resources and hosting projects, to extend the benefits and capacity of cluster-growth to non-urban areas.

Helping Technology Workers Cope with Volatility

There are many ways to help technology workers cope with the volatility of their sector. One important approach is for firms to provide generous layoff, buyout or retirement packages, all of which enable the exiting employees to leave their former worksites with dignity and go on

to conduct job searches, retrain themselves or invest in other businesses, often start-ups. Major companies, including Nortel and JDS Uniphase, have provided such benefits.

Another approach is active recruitment. When the initial rounds of layoffs were announced at software firm Corel, recruiters from other companies were waiting in the parking lot for the laid-off employees to emerge! Some former Nortel employees set up a website to market their services. In the first year of the tech meltdown, a large number of laid-off knowledge workers in the National Capital Region found jobs with other firms. An equal or even larger number, though, moved over to the public sector. Others started their own small businesses.

One of the interesting, though so far minor, by-products of the technology downturn in Ottawa-Carleton is that some exiting workers have, in fact, made their way to the non-profit sector. In so doing, they have brought with them valuable skills in communications, computers, finance and management. For example, former employees of Nortel are now directing donor services at the Community Foundation, and human resources at the Mission, a nonprofit providing food and shelter for street people. Other former tech workers have retired and work part-time or volunteer with such agencies as the Boys and Girls Club and the Children's Aid Society [Orton 2002]. Following the bankruptcy of his company, one technology entrepreneur went to Nepal as a volunteer to teach computer literacy to kids with the nonprofit agency, Child Haven [Pappone 2002]. A more focused effort by local nonprofits could multiply the number of high-skill technology professionals transiting to the nonprofit sector, and match them with the social organizations that could best make use of their talents.

In the area of training, Ottawa's municipal government has maintained the Partners for Jobs Initiative, launched in the late 1990s to mobilize key stakeholders – 'anchor' companies, universities and colleges, training institutes – to address the skill shortages in tech clusters in the region. The most recent incarnation of this effort is TalentWorks, also run by OCRI, which is overseen by a steering committee of the region's business organizations and which spins off new projects as skill requirements evolve. TalentWorks has become the region's main nonprofit 'skill-filling' tool, engaging in and remaining active even in the tech sector's present diminished state, undertaking workforce analysis, municipal planning, and raising awareness of trades training, employee retention and employment for special needs groups, such as Aboriginals and persons with disabilities. Federal, provincial and municipal funds support TalentWorks [TalentWorks 2002].

In the technology sector, work-time and workload expectations continue to cause work-family conflict, stress and burnout, especially among high performers. As with all sectors, there is a high cost associated with these problems to both households and firms [Duxbury 1999; Carnoy 2000]. With some exceptions, technology companies were among the worst in the 1990s in recognizing and dealing with work-family issues. Even when programs were put in place, the industry's culture often inhibited employees from using such programs. One example, however, of a company that has taken this matter seriously is radiation-technology firm MDS Nordion. Assertively promoted by the company's President, MDS' award winning workplace programs include special parental leaves, flexible start-stop time and work-sharing, supported by a regular

employee wellness survey and an employee ‘climate metre’ to assess program effectiveness [Khan 2001].

Community-based organizations can play an important role in lobbying technology companies to institute measures that support employees in coping with the demands of their current workplaces, or transiting to new ones. At the same time, community organizations can directly deliver training and counselling programs that enable tech workers to navigate amid sector volatility.

Mobilizing Private Philanthropy

Community-based organizations also have a role in mobilizing private philanthropy that can be used to promote asset-based community development among low-income and economically marginalized citizens. This is particularly important in Canada, where reliance on government resources to solve poverty-related problems is the ‘knee-jerk’ traditional response. While government should, indeed, be substantially engaged in poverty reduction, the resources of the business sector and, more specifically, technology companies and their leaders, are required as well.

During the boom decade of the 1990s, tech firms and executives demonstrated an ambivalent attitude toward philanthropy. True, there were spectacular examples of generosity and strategy in giving: Microsoft’s Bill Gates set up the world’s largest private foundation to promote international health and inner city education. In Canada, Red Hat’s founder, Bill Young, used his proceeds from the sale of the company to establish a foundation and a non-profit, Social Capital Partners, to engage in venture philanthropy with urban social enterprises. However, self-interest and self-indulgence prevented many companies and individuals from doing more through philanthropy.

One notable exception, however, was that of community foundations. Offering a more targeted approach to giving and receiving, through donor-advised funds, community foundations grew steadily in the 1990s in Canada and the US. These structures often benefited from those gifts that did originate in the technology sector. ‘Older’ philanthropic mechanisms, like the United Ways, seemed to have less appeal for new economy donors. In the US, the assets of Community Foundation Silicon Valley (1998) expanded in breathtaking fashion, benefiting especially from the generosity of younger managers and employees in the tech sector, prompting the foundation to work even harder at surveying and promoting corporate and individual giving and volunteering in that region.

The Community Foundation of Ottawa (CFO) experienced parallel success during the 1990s. CFO received a number of major gifts from tech-sector leaders, most of them anonymous and most in the form of stock. The Foundation’s policy was, and is, to liquidate such gifts as soon as it receives them, at their present value. At the same time, the Foundation recruited new board members from among the ranks of technology executives, set up a range of donor-advised funds, developed new donor liaison and education initiatives (especially for first-time givers),

and began slowly to reorient its grantmaking to a more asset-based approach. The Foundation also was often a voice for the social sector at gatherings of the technology sector. With the shrinking of Ottawa's telecom, photonics and software clusters, the Foundation has renewed its efforts to connect with the social sector and to prepare for the next phase of tech growth [Khan 2001].

More broadly, the 1990s also saw the rise of venture philanthropy, a high-engagement approach to grantmaking that uses some of the techniques of venture capitalism, particularly business planning, board-level guidance and follow-on investments in successful business models. Technology leaders were prominent among the American and Canadian venture philanthropists who emerged during this period. In recent years, however, there has been a realization among venture philanthropists that promoting social enterprise is not as 'straightforward' as regular venture capitalism – and takes much longer to generate economic and social returns. As they have hit these programmatic 'walls,' many venture capitalists have gained a new appreciation of the skills and dedication of social sector leaders and professionals [Byrne 2002].

Creating Multisector Leadership Structures

One of the most innovative models for creating multisectoral leadership structures in Canada were the Leadership Roundtables set up under the Opportunities 2000 (OP2000) project in Waterloo, Ontario a few years ago. Involving business, all levels of government, foundations, educational institutions and social organizations, these structures enabled technology executives to interact directly with welfare mothers, for example, to try to understand each other better and develop a poverty reduction plan together. This required strong professional facilitation skills, with an appreciation of the knowledge and capacity of all stakeholders – skills impressively possessed by the OP2000 team. Subsequently, the Maytree Foundation set up the Tamarack Institute for Community Engagement, which, with the support of the McConnell Foundation, has embarked on a replication in eight Canadian cities of the OP2000 approach [Tamarack Institute 2002].

In Ottawa, the Partners for Jobs initiative, led by the City and involving other sectors, has probably been the most broad-based structure that involves both the social and technology sectors [Torjman 1999]. There is an important difference between Partners and the OP2000 model, though. Where Partners became primarily a training and labour force initiative, OP2000 was designed as a more comprehensive poverty reduction effort, of which training was one component. And, while they run important and innovative programs, the governance structures of other organizations – OCRI and the Community Foundation, in particular – contain little or no permanent, *direct* representation of organizations serving the poor in the National Capital Region. This is unfinished business in an institutional sense in the region. Community economic development can serve as the framework to address this outstanding issue.

Promoting Community-Owned Science and Technology

There is something else that CED can do. It can promote community ownership of science and technology facilities. In turn, these facilities – including laboratories, telescopes, super-computers and research museums – can generate sustainable local employment and business opportunities for the unemployed, underemployed and general labour force.

In Lethbridge, Alberta, for example, a volunteer association manages astronomy-education and tourism programs associated with a powerful telescope located in the community. Nearby, a nonprofit Aboriginal museum on the buffalo hunt draws tourists and conducts anthropological research on indigenous knowledge and culture, feeding this into the museum's programs.

In Cape Breton, a research chair at the University College of Cape Breton was instrumental in promoting the growth of high-tech start-ups on an island dominated historically by resource extraction employment. There have also been some interesting twinning arrangements involving small technology enterprises and local CED organizations on the Island [Gurstein 2002].

There are other good examples of smaller Canadian cities or regions building dynamic technology clusters: astrophysics and agrifood in the Okanagan Valley; agricultural biotechnology in Saskatoon; applied agriculture and biotechnology in Olds, Alberta; land resource management in Brandon; mining and forestry in Timmins; microelectronics and environmental technologies in Sherbrooke; bioactives for pharma/nutraceuticals in Charlottetown; and ocean engineering and marine communications in St. John's [Industry Canada 2002b]. In each case, networks of public and private institutions, supported by universities, have served as important tools to grow these clusters.

Community organizations also can directly own and operate technology companies. Some 15 years ago, the West Prince Industrial Commission in Prince Edward Island set up Westech Agriculture, a biotechnology firm that used gene-splicing techniques to develop new varieties of crops, including wheat and barley. Westech created seven permanent and 50 seasonal jobs, in the process attracting several research scientists and technicians to permanently relocate to the region [MacKinnon and Peirce 1989]. More recently, in Ottawa, the Social Planning Council used geographic information software to build a poverty mapping capacity that has generated revenue through consulting and research contracts. There have been many other examples in both rural and urban settings where community development corporations, co-operatives and nonprofits have mobilized science and technology to set up new businesses.

To succeed in these ventures, however, community agencies initially must build strong alliances with government laboratories and research programs. The role of the National Research Council's institutes on biotechnology in Saskatchewan and bio-diagnostics in Winnipeg was crucial in fostering technology cultures in those regions [Doern and Lévesque 2002]. Federal science and technology labs are themselves looking to form new alliances with NGOs and communities as they seek to both demonstrate their value to the public and diversify their revenues [Doern and Kinder 2002]. Finding ways to make public laboratories in

government and universities more responsive to changing research needs and opportunities is a challenge common to all developed countries [OECD 2001].

What is needed in Canada, though, is a more comprehensive initiative to promote community-based science and technology. In poor urban neighbourhoods and in towns and villages, public funds should be available for community organizations to test new approaches to generating jobs and businesses in knowledge intensive fields. Linking these efforts to technology clusters in nearby regions would make sense as well. Some communities would establish specialized laboratories and research centres, others would start up technology companies. All would seek strategic alliances with governments and the private sector. Most would target export as well as Canadian markets for their products and services.

Conclusions

It would appear that technology-cluster growth needs CED and vice versa. Technology clusters can only deliver sustainable livelihoods when knowledge workers have the opportunities and tools to cope with inevitable sector volatility, and when economically marginalized citizens are included in the new economy. ‘Smart communities’ and customized training, plus rural broadbanding, to bridge the digital divide; ‘skill-filling’ systems and work-life programs in the tech sector itself; mobilizing private resources; asset-based initiatives with the poor through community and venture philanthropy; multisector leadership structures with an authentic role for the social sector; and new forms of community-owned science and technology – these are all important strategies for optimizing the livelihoods capacity of technology clusters.

In Ottawa, some of these measures are under way. One crucial outstanding issue, though, is to restructure the region’s economic-development governance structure to include an effective voice at the table for the social sector. With such broader representation and its associated stronger links to the non-tech and poorer segments of the economy, regional institutions would be well positioned to undertake a comprehensive study of how the Ottawa cluster is surviving the present extended downturn, and how it could possibly reinvent itself to regain its growth trajectory. How the non-tech economic sectors and civil society are adjusting to these circumstances matters a great deal as well, and should be examined in detail. Community economic development can serve as both a lens for understanding these dimensions of economic and social change, and as an instrument for taking action on what is learned.

A second issue relates to scale. In the National Capital Region today, a large pool of public and private resources and organizations are devoted, and rightly so, to the labour force needs of tens of thousands of knowledge workers. But, to date, inclusive training for those outside the sector has reached only hundreds of citizens. The actual need, in fact, is to reach *thousands* of these citizens. Addressing both key issues – governance and scale – will require substantial political will, through a coalition of nonprofit, public and private leaders.

One of the most important tasks ahead, for Ottawa and for Canada generally, however, is to inject into community economic development activities much greater knowledge intensity than in the past. Community organizations should set up research and development facilities, partner with government labs and private companies, capitalize small technology enterprises and

commercialize scientific innovations. Linking these initiatives to nearby technology clusters, and supplying high-quality products and services to anchor firms in those clusters, will optimize the impacts and sustainability of these efforts.

Sustainable livelihoods is the goal. Knowledge for inclusion is the path forward.

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Advanced Technology Sectors by Province

<i>Province</i>	<i>Sectors</i>
Newfoundland, Nova Scotia, New Brunswick	E-Business, ocean and marine technologies, life sciences
Quebec	Biotechnology, aerospace, alternative energy
Ontario	IT, photonics, telecom, aerospace, alternative energy, life sciences
Manitoba	Biopharmaceuticals, biotechnology, medical devices
Saskatchewan	Biotechnology, computer technology, IT
Alberta	Alternative energy, life sciences, nanotechnology
British Columbia	Biotechnology, alternative energy, wireless, new media, IT/software

Source: ITAC 2002

**Average Unemployment
(persons actively seeking work)**

	1997	2001	2002
National Capital Region	9.0	6.2	7.5
Ontario	8.4	6.3	6.8
Canada	9.1	7.2	8.5

Source: Statistics Canada 2002

**Ottawa-Gatineau Employment by Industry
(thousands)**

	1996	2001	2002
All Industries	373.7	441.9	435.7
of which:			
- Professional Scientific and Technical Services	33.3	50.2	47.5
- Management, Administrative and Other Support	12.4	17.6	16.6
- Public Administration	72.4	75.7	84.9

Source: Statistics Canada 2002

**Population
(thousands)**

	1996	2001	% Change
Canada	28,847	30,007	4.0
Ontario	10,754	11,410	6.1
Ottawa *	721	774	7.3

* Not including Gatineau/Hull

Source: Statistics Canada 2002